**DOCTORAL THESIS**

# TOTAL QUALITY MANAGEMENT
# WITHIN THE CONSTRUCTION INDUSTRY OF KUWAIT

*The role of Total Quality Management and its usage*

By

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# ABSTRACT

The aim of this research is to understand employees' contribution to the successful implementation of total quality management (TQM) within construction companies in Kuwait. A research model was developed based on previous studies to guide the research and understand the different factors that contribute to employee contribution and implementation of TQM.

The research begins with reviewing different literatures on employee contribution and TQM. The factors studies the implementation and usage of quality management in the construction companies and factors such as leadership, employee, teamwork, and information technology on TQM. To understand employee contribution, data was collected from employees in the construction companies in Kuwait. The data was collected using quantitative survey and using questionnaires that were distributed by hand to the companies.

The collected data was entered in statistical software to generate different types of analyses. The types of analyses were descriptive, crosstab, correlation, factor, regression, Kruskall Wallis and Mann Whitney. Based on the results leadership, employee, teamwork and information technology were found to be significant to the role of TQM in the construction companies.

The recommendations were towards practicing continuous improvement, strengthening employee training, increasing and enhancing communication between managers and employees. The future research recommendations are towards gathering information from senior managers and CEO. The data needs to be compared with this study to understand the role of senior managers towards success of TQM in construction companies.

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# CHAPTER 1: INTRODUCTION

## 1.1 Introduction

For any country, the key strength to its infrastructure and economy is its construction industry. However, it can encounter problems relating to instability, high fragmentation, low productivity, inferior quality and a lack of standards, and most countries deal with such problems, although there are disparities in their respective economies (Abd. Majid and McCaffer, 1998). One measure of the success of the industry is the satisfaction of its customers. Organizations should also be able to meet the growth of the sector and perform to the latest standards. As stated by Torbica and Stroh (1999), there will be better competition amongst those who handle their resources most effectively and reply with a timely response, as per the demands of the market.

Quality management (QM) is currently a very important issue responsible for organizational growth and the success of a company in national and international markets, which is a similar situation to the role of quality in construction (Belle, 2000; Burati et al., 1992). In order to achieve better results, organizations invest financially rather than look at options such as TQM (total quality management), which in the long term can be more cost-effective and more successful. The application of TQM requires proper foundations and focus from the construction companies (Culp et al., 1993). This suggests that establishing TQM applications for the construction firms, and this research will examine the TQM frameworks developed by scholars and businesses at construction companies in Kuwait.

The Kuwaiti construction sector has been booming, but there is a lack of focus on providing better outcomes in terms of quality and products. A report by Deloitte (2012) on the construction sector shows that poor labour force work ethics, an inadequate supply of infrastructure, a lack of an adequately qualified and experienced workforce, corruption, and limitations of government rules and regulations on labour and the workforce are indicators of some of the hurdles which the construction sector faces.

One of the factors which contribute towards these problems is the huge dependence on oil. However, this makes Kuwait highly vulnerable to exogenous shocks, especially in relation to world oil prices. On the other hand, the government has ample assets in sovereign wealth and

reserve funds to keep the economy afloat, in spite of lower oil prices. The discussion here shows the strong dependence of Kuwait on its oil.

Focusing on the construction sector, as per 2011's results, the construction industry value was US$2.4 billion, and the estimated total project value was expected to be as high as US$168 billion. In the year 2010, a four year US$108bn infrastructure investment package was approved, covering power, water, a metro system, housing, roads and healthcare. The Partnerships Technical Bureau in Kuwait was mandated to promote private sector investment through Public-Private Partnerships (PPP) and Build Own Operate and Transfer (BOOT) schemes, to ensure the efficient implementation of the infrastructure investment plan.

Housing and commercial projects represent 50% of the project market underpinned by strong demand growth. Kuwait plans to construct 80,000 housing units over the next six years. Social housing is also a new priority for the Government, with plans in place to use PPP structures to deliver low-cost housing. Plans to construct eight public hospitals by 2016 are in place to deal with the heavy pressure placed on the healthcare sector.

Based on the discussions, the country is highly dependent on its oil revenues, through which it is able to meet government expenditure and economical growth. The construction sector is expected to grow considerably as well. At the same time, there is a focus from the construction companies with respect to project management and bringing about better results. The recommended solution, therefore, is TQM.

### 1.1.1 Overview of the Kuwaiti Population

The latest available data offered by the Public Authority for Civil Information (PACI) revealed that the total population grew to 3.4 million, up from 3.18 million reported at the end of 2006, as illustrated by figure 1.1. This revealed a 6.8% annual growth, higher than the 6.4% growth reported in 2006. A fact not to be overlooked was that Kuwait had been experiencing one of the highest growth rates in the region, displaying a Compound Annual Growth Rate (CAGR) of 6.7% for the period 2001-07. Looking forward, we expected the same growth pattern to continue in 2008, where the total population had been predicted to reach 3.62 million, or even higher (GIH, 2008).

Based on the March 2009 Global Research report, 2008 was a good economic year for Kuwait, although there were some significant signs of a slowdown in the economy towards the end of the year. The construction sector also faced various challenges. New laws prevented shareholding companies from getting involved with private residences, whether it was to do with the financing, acquiring, selling or mortgaging. This, in turn, negatively affected investors and debtors. Such restrictions brought about drawbacks in the real estate market from 2008 onwards, and brought about a 60% stagnancy in real estate trading in 2008, which is predicted to remain for a few years.

In addition to this, the Central Bank of Kuwait (CBK) brought about a tighter monetary policy and tougher credit regulations within the real estate sector towards the middle of 2008. CBK also added restrictions to consumer loans by applying a cap of 40% of the borrower's salary, thereby impacting purchasing power and home financing, and creating a further downturn within the residential market (GIH, 2009).

On the other hand, within the BOT, the start of 2008 brought about a new law which eased government bodies entering into contracts with private contractors without the need for gaining prior approval from the "supreme committee". Instead, this committee would be responsible for coordinating all technical aspects and reviews of the BOT project. The new law also limited the BOT lifespan to 30 years, and upon completion of this period, the project would be handed back over to the government. Only for certain special projects could the lifespan be extended to a maximum of 40 years.

2008 saw further developments within the construction sector, with the foreign ownership of GCC nationals now being allowed. This announcement from the government permitted citizens of GCC countries to own property and land in Kuwait; the announcement came in October 2008 (GIH, 2009). Such a move from the government promised an increase in market activity via increased GCC national demand. However, government regulations within the residential sector undercut the performance of the residential market, bringing about a significant decline in the 2008 market performance compared with 2007. Figure 1.1 shows the residential complexes sold between 2006 and 2008.
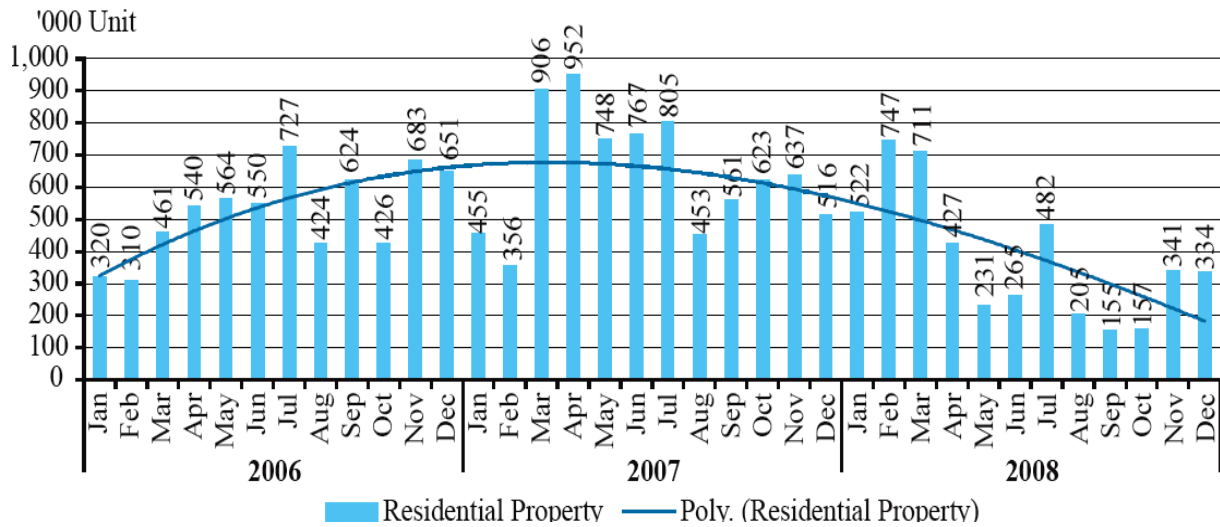
**Figure 1.1: Number of residential real estate units sold, 2006-2008**

*(Source: Ministry of Justice; taken from GIH, 2009)*

According to figure 1.1, a decline in residential properties sold can be seen in 2008. The highest number of residential properties sold was in February (747,000 units), and after the introduction of the rule in March 2008, a continuous decline can be observed.
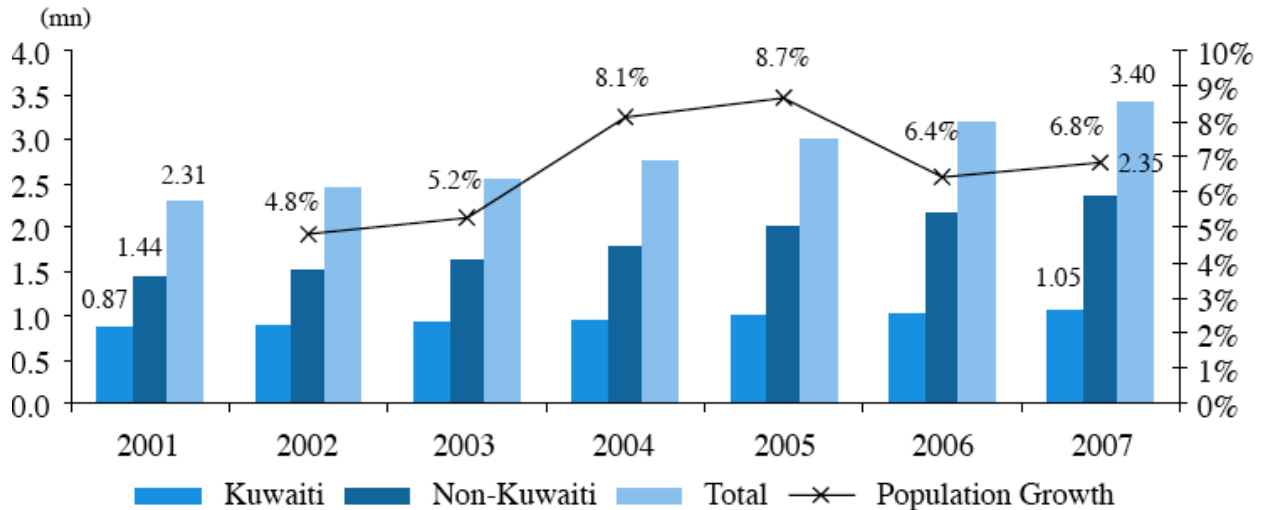


**Figure 1.2: Kuwait's population in millions**

*(Source: GIH, 2008)*

Analysing Kuwait's population growth rates reveals that the expatriate population continued to grow at increasing rates, reaching 8.3% on average for the period 2001-07, while Kuwaiti national growth was stagnant, but still high, at 3.1% on average. The growth in the non-

Kuwaiti population was the result of strong growth in the private sector, where the demand for low-income expatriate labour increased in the construction and retail sectors.

Thus, by the end of 2007, the number of Kuwaiti residents was reported at a new high of 1.06 million, whereas the number of non-Kuwaiti residents bulged to 2.35 million, accounting for 69% of the total population. However, when we consider the composition of the non-Kuwaiti population, it reveals a sharp skew towards the male gender (68.9%), implying a large number of unskilled expatriate workers in construction and other industrial sectors (GIH, 2008).

### 1.1.2 Overview of Kuwait's Construction Sector

Kuwaiti construction started when there was a boom in the oil industry and Kuwait became the first country to sell its oil worldwide (Ministry of Energy, 2006). The construction sector had been going through a boom, and as the economy continued to gain strength, the real estate sector continued to move forward. The strength of the real estate sector was ultimately derived from the intensity of the overall economic scene in Kuwait.

The real estate sector in Kuwait can be broadly divided into three main segments: residential, investment and commercial. The real estate and construction sectors constituted 6% of Kuwait's GDP in 2006 (table 1.1). Following the rebound in real estate sales in 2006, the average monthly sales of units continued the upward trend for 2007 to record 774 units sold, up from 614 units in 2006. This translated into a 26.1% increase, which was mainly attributed to both 'residential' and 'apartments and commercial' sales. By the end of 2007, residential unit sales picked up considerably (by 23.9%), reaching 7,779 units, up from 6,280 units sold in 2006. Similarly, the number of apartments and commercial units sold increased from 1,085 units in 2006 to 1,510 units in 2007, a 39.2% increase (GIH, 2008).

**Table 1.1: GDP composition**

| Construction | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | CAGR 2001 – 2006 |
|---|---|---|---|---|---|---|---|
| | 262.6 | 312.0 | 349.3 | 401.9 | 437.1 | 479.3 | 12.8% |

*(Source: GIH, 2008)*

**Table 1.2: Government finances in construction**

| Construction & Land Acquisition | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|
| | 569.5 | 678.3 | 750.5 | 989.5 |

*(Source: GIH, 2008)*

Preliminary figures point to the fact that the majority of real estate in Kuwait is owned by individuals and not companies (table 1.2). Companies are estimated to own only 2% of total tradable real estate land.

## 1.2 TQM

Total quality management (TQM) is a management philosophy which is gaining a larger and wider acceptance. Through literature and empirical studies, critical factors which contribute to TQM success within the construction sector of Kuwait will be investigated.

Factors which will be discussed and investigated in this research are:

- leadership and related behaviours, such as top management commitment;
- maximising employee commitment;
- involvement and empowerment;
- managing via customer-driven systems and processes; and
- continuous improvement.

The literature review will critically analyse studies which have been conducted in various countries, and the empirical investigation will gather information pertaining to Kuwait. Results from both of these studies will be compared and discussed to form the final stages of this research.

### 1.2.1 TQM in Leadership

Leadership is the ability to inspire confidence and support among those who are needed to achieve organizational goals (DuBrin, 1995). It is the ability of top management to lead the firm in continuously pursuing long-term overall business success. This can be achieved through management participation, encouragement, employee empowerment, learning, employee education and training, product quality, and long-term business success. To be an effective leader in most modern firms, the top manager must continue to develop and learn.

Knowledge of the business and continual learning are essential prerequisites for effective leadership (ibid).

**1.2.2 TQM and the Role of Top Management**

To lead the firm effectively, top management must be committed to providing sufficient resources for employees' education and training, building trustful relationships with employees, and regarding them as valuable resources for the firm. Top management must be committed to allocating sufficient resources to prevent, as well as to repair, quality problems. Top management should discuss quality frequently; for example, by giving speeches on the topic and asking questions about quality at every staff meeting. In fact, people make things happen, so top management must train and coach employees to assess, analyze and improve work processes (Dale and Plunkett, 1990; Deming, 1986).

**1.2.3 TQM in Employee Satisfaction**

An important hypothesis of TQM holds that each employee should treat other members within the organisation with whom he/she interacts as valued customers. Ideally, each internal department operates like a customer-focussed business, much the same way as it would if it was a company in and of itself, and if its customers were free to buy its services from competitors. Everyone in an organisation has customers, and each provider is charged with responding to the needs of those internal customers. When the internal service delivery system is designed to match internal users' needs, the results include more efficient internal exchanges among the various organisational members and departments, lower waste, lower costs, and improved external service quality – all pieces of the TQM mosaic (Berry and Parsuraman, 1991; Ratcliffe, Smith and Brooks, 1993).

A survey conducted in 1992 with more than 1000 *Human Resource Focus* readers showed that 46% rated employee involvement as one of their top three concerns for the future (Evans and Lindsay, 1996). The importance of the employees has been stressed further by the move from TQM to business excellence. The cornerstones of business excellence are the '4 Ps', which a company must focus on in order to achieve excellence: people, partnerships, processes of work and products (Dahlgaard and Dahlgaard, 1999). This means that excellent employees, together with excellent partners and excellent processes, create excellent products. The drivers of excellence are, thus, the employees of the company.

### 1.2.4 TQM, and Education and Training

Firms which implement TQM invest heavily in training for employees at different levels. Deming (1986) spoke often of the importance of properly training workers to perform their work. It is difficult to improve the employee's work without proper training. It is important to provide training to employees just at the time when they need it; that is, to give them just-in-time training.

A good assessment includes an analysis of how well the firm is achieving its goals, the skills needed by the workforce to accomplish these goals, and the strengths and weaknesses of the current workforce. A careful analysis of these areas provides valuable information for designing effective training activities. Investment in education and training is vitally important for ensuring the success of education and training programs.

### 1.3 Problem Definition and the Need for Research

Kuwait is a small country with massive oil reserves, whose economy has been traditionally dominated by the state and its oil industry. During the 1970s, Kuwait benefited from the dramatic rise in oil prices, which it actively promoted through its membership with the Organization of Petroleum Exporting Countries (OPEC). The economy suffered from the triple shock of a 1982 securities market crash, the mid-1980s drop in oil prices, and the 1990 Iraqi invasion and occupation. The Kuwaiti Government-in-exile depended upon its US$100 billion in overseas investments during the Iraqi occupation, in order to help pay for the reconstruction. Thus, by 1993, this balance was cut to less than half of its pre-invasion level. The wealth of Kuwait was based primarily on oil and capital reserves, and the Iraqi occupation severely damaged both.

This simply suggests that the housing needs of Kuwaitis are increasing day by day. The government of Kuwait is also improving businesses in Kuwait. The modernisation of airports and seas ports is another area where the government of Kuwait is spending millions of Kuwaiti Dinars; the government is obliged to create all of the facilities for the citizens and workers in Kuwait. Nearly three decades ago, the government of Kuwait privatised the construction work, and as a result, some of the very large companies were registered, and allowed to construct small and large buildings in Kuwait. These included government offices, universities, colleges, hospitals and residential buildings. It is also indicated that the

government of Kuwait is seeking other sources of income, so that the burden of oil as a resource can be minimised.

The construction industry has lagged behind other industries in implementing reform through total quality management. It has not followed the manufacturing industry in the implementation of TQM. The success of the total quality management philosophy in manufacturing and other industries has forced construction organizations to adopt TQM.

Based on studies by Youssef and Zairi (1995), the results reveal that the management's role, commitment and support are critical factors for the success of TQM. Effective leadership is crucial. Educational qualifications are also considered to be important factors within TQM usage in the Middle East. Education will also create and raise management awareness and appreciation for the importance of TQM, and of achieving their commitment and involvement; the problem definition can be summarized below.

With new rules, regulations and limiting control over BOT projects and residential projects, plus tighter consumer loan regulations from the Central Bank of Kuwait (CBK), the problem statements can be summarized as follows:

- Lack of focus on project management within the construction sector of Kuwait increasing the costs
- Lack of reform/willingness to change through the implementation of TQM
- Lack of providing consumers with the required products and services, by focusing on larger production rather than on quality
- Lack of clear focus from management on managing and improving TQM
- Lack of focus on employee achievement and recognition for bringing in quality products and services
- Lack of effective leadership in working with market changes and demands.

## 1.4 Research Questions

The questions which this research will target and answer, through a combination of literature and empirical findings, are as follows.

- What is the current status of QM and TQM at construction companies in Kuwait?
- What are the benefits which the construction companies in Kuwait have gained from implementing QM and TQM?

- What are the problems/hurdles which the construction companies in Kuwait face due to a lack of TQM?

- What is the role of the top management in TQM success at construction companies in Kuwait?

- What is the importance of employee empowerment for TQM success at construction companies in Kuwait?

- What is the importance of training for TQM success at construction companies in Kuwait?

## 1.5 Research Aim and Objectives

The aim of this research is to understand the potential of TQM within Kuwaiti construction companies and develop recommendations for its application within Kuwait. The have been many developments in the construction sector over the past two decades, where TQM has been used to good effect and improved performance across the sector. In order to achieve this aim the following objectives have been developed.

- To evaluate current construction companies in Kuwait regarding Quality Management (QM) and Total Quality Management (TQM).
- To explore the benefits gained from the implementation of QM and TQM in construction companies in Kuwait.
- To explore the barriers which construction companies in Kuwait face due to the absence of TQM.
- To determine the the extent to which role of top management affects TQM success in construction companies in Kuwait.
- To determine the degree of importance of employee empowerment for TQM success in construction companies in Kuwait
- To establish the level of importance of training for employees and management for TQM success in construction companies in Kuwait

## 1.6 Research Methodology

In order to satisfy the research objectives, research questions and hypotheses, both quantitative and qualitative methods will be utilised. The quantitative method will be used through questionnaire forms targeted at middle management and employees below them within the construction companies. Through personal interviews, information will be gathered from the top management at the construction companies, thereby employing a qualitative method.

With a theory in place, and the formation of research objectives, questions and hypotheses, the research will follow a deductive approach. Quantitative data will be analysed through the use of SPSS (Statistical Package for Social Sciences). This will be discussed along with the qualitative data collected through personal interviews. Outputs such as descriptive frequencies, Cronbach's alpha reliability analysis, chi-square analysis, crosstab analysis, regression analysis, independent sample t-tests and one-way ANOVA will be generated and discussed in the data analysis chapter.

## 1.7: Scope of the Research

The construction sector contributes a lot to the economy and the development of the country. The recent years has seen development in the construction sector. This was especially visible after the recent war with Iraq. The country's infrastructure and buildings has to be improved. Firms are investing into making bigger buildings for both residential and commercial purposes and the government is investing into infrastructure projects. In addition to this the government and the private sector work together on different build-operate-transfer (BOT) and private-public-partnership (PPP) projects. In brief, the construction sector has received much focus and seen big developments. Although the construction firms have grown in demand and business, the internal functioning of these organizations is still same as before.

This research sheds light into the focus of the construction firms in their projects. The need for delivering project based on quality and time is identified in this research. The firms need to focus on the concept of TQM with the aim of improving their projects and deliverables and also the relationship that they have with the customers. Primary the need for increased employee involvement, employee training, top management involvement, importance of quality management practices, and information technology on the role of TQM in the construction firms in Kuwait.

The research provides both literature and empirical data to emphasize the need for TQM in the construction firms in Kuwait. Based on the findings, the conclusion and recommendations are provided.

## 1.8: Key Findings

The research collected empirical data through survey method using questionnaires. The data were collected from project managers and their team. The collected data was entered into

SPSS software to statistically analyze the data. Different types of analyses were used to understand the responses and find the factors that impact the role of TQM in the construction firms in Kuwait.

The initial observations indicated that none of the firms had implemented TQM. The respondents' feedback made it evident that majority of them had only theoretical knowledge of TQM. All the respondents had received training on quality management practices and the importance of quality management in these firms was also evident. These firms had different kinds of quality management practices through which their projects were carried out and most of the firms had implemented ISO standards. The findings showed significance of leadership, employee and teamwork and information technology towards the role of TQM in the construction firms in Kuwait. Training is provided to the employees based on their tasks. Information technology was the most significant of all factors towards the role of TQM.

Organizations need to be prepared to implement the right information technology and provide employees with training and empower them with responsibilities in handling their tasks. This would enhance the current scenario by creating a smoother and transparent communication between the various project parties and the clients. Construction firms can have better project delivery, maintaining higher quality and lowering costs through the use of TQM. TQM therefore is highly recommended to the management of the construction firms with the aim of enhancing their internal processes, better project handling and efficient project delivery.

The finding were able to shed light into the lack of adequate quality management practices and the lack of TQM which is required to bring efficiency into the construction projects and the functioning of the organization as a whole. In addition to this the importance and dependence on technology is also highlighted from the findings.

## 1.9: Limitations

TQM has not been implemented in the construction firms of Kuwait. From the research it was understood that all the firms had quality management practices and most of them had implemented ISO as the quality standards. Therefore, the responses received from the respondents are based on previous knowledge of working with TQM or from knowledge gained from elsewhere. Majority of them lacked practical knowledge on TQM and therefore provided their perception of TQM. Therefore, the feedback is based on the respondent

perception rather from practical knowledge on the use of TQM, which is literally absent in Kuwait.

**1.10 Guide to the Report**

This dissertation is divided into seven chapters. Chapter 1 provides the overview of the research, with the problem definition and need for research, research objectives, and research questions. In addition, a summary of the research methodology used for collecting the data is given. Various methods which will be used to analyse the empirical data collected from the Kuwaiti sample population within the construction sector are also provided here. The main findings section will provide a brief discussion into the findings of the empirical data.

Chapter 2 provides an overview of Kuwait, the area where the research has been conducted. Information such as Kuwait's geography and climate, and communication, transportation and transnational issues are covered within the overview section of this chapter. Further information in this chapter pertains to Kuwait's macro economy and inflation. A detailed discussion of the oil and gas sector is provided, as this is the main revenue generator for Kuwait. A large portion of Kuwait's wealth and government dependence is on its oil production and exports. The chapter also discusses the Kuwait real estate and construction sector, which is the area of this research. Details of some of the major projects, such as City of Silk, Khairan Residential City, Project Kuwait, Bubiyan Island and Failaka Island, are also highlighted in this chapter.

Chapter 3 provides a literature review of the TQM chapter and detailed information on the evolution of TQM, with discussions on the TQM gurus. The role of organizational management, leadership, organizational culture and HR developments form the other parts of this chapter. In addition to TQM, Six Sigma is another model discussed in detail. The values of Six Sigma, improvement methodologies, strategies, principles, tools and techniques form part of the discussion here. The Six Sigma implementation challenges, roles and responsibilities, and DMAIC form further discussions.

Chapter 4 provides information about TQM and employees. Employee participation is highlighted and stressed in this research. The role of employees forms the importance of TQM success, and factors such as employee participation, employee incentives, employee training, employee satisfaction and job satisfaction through hiring the right people,

developing people to deliver service quality, providing employees with the necessary support systems, and retaining the best employees are further discussed in this chapter.

Chapter 5 describes the methods and tools used to collect the data from the Kuwaiti sample population; both quantitative and qualitative methods are used in this study. The data collection comprised two phase. The first phase consisted of the quantitative method, and target the middle and lower level employees within the construction sector. The data collection tool will be pre-designed questionnaire forms with statements designed using a 5-point Likert scale. These will be distributed through emails and personal deliveries. The data collected will be statistically analysed using SPSS software, and the results will form the design of the second phase of data collection.

The second phase will target the senior employees of the constructions sector, such as managers, CEOs and owners of organizations. Employee feedback will help design and focus the questions. Personal interviews will be requested with these managers, and the use of pre-designed questions will guide the interview. The interview session will be semi-structured, as the interviewee will be allowed to speak freely, but within the frame of the questions put forward by the researcher. Data will be collected using voice recorders and jotting down important points during the discussion. A cumulative analysis of the quantitative and qualitative data will provide an in-depth understanding into TQM usage and its benefits to the construction sector in Kuwait.

Chapter 6 is the data analysis chapter. Data collected from Kuwaiti construction sector employees through both quantitative and qualitative methods will be analysed and discussed. Quantitative data will be entered into SPSS software to generate various analyses, such as descriptive frequencies, crosstab analysis, regression analysis, independent sample t-tests and one-way ANOVA. Cronbach's alpha reliability analysis will be used to test the reliability of the quantitative data. Qualitative data collected from senior managers, CEOs and owners will be discussed in parallel to the quantitative data, thereby providing a cumulative response and findings.

Chapter 7 is the final chapter, and provides the conclusions and recommendations based on the empirical findings and discussions. A research model has been adopted from the literature discussions and from what was discussed in the methodology chapter. Based on the

data analysis, the findings and conclusions from the adoption of this model will be tested, and an appropriate model which leads to the effective use of TQM, and success for construction companies, will be designed, discussed and recommended.

In addition to these chapters, the thesis will be supported by the abstract, a table of contents and a list of references. The appendices contain both the quantitative and qualitative questionnaires, and any large reports or secondary data which have been collected during the course of the research.

# CHAPTER 2: AN OVERVIEW OF KUWAIT

## 2.1 Introduction

The following chapter section provides an overview of Kuwait. This research is based in Kuwait, and investigates the construction firms in Kuwait from a TQM implementation perspective. The country of Kuwait is geographically small, yet the construction industry is booming. It is, thus, important to understand the construction market in Kuwait, and to evaluate the feasibility and importance of TQM at the construction companies.

### 2.1.1 Overview of Kuwait

Kuwait is an independent and sovereign Arab state. It is a hereditary Emirate and follows a democratic system of governance. Kuwait, in the cradle of one of the most ancient and most contested corners of the world, is best described as a city state.

With its landmark triple towers looming over a clean and accessible cornice, a first-class aquarium, some excellent museums, stunning pieces of marine and land architecture, malls to please the most discerning or eclectic of shoppers, and a selection of restaurants to stimulate the appetite of the fussiest gourmands, Kuwait City is a sophisticated and interesting destination in its own right. Add to this its sights and attractions of a harrowing layer of modern history, the effects of which rumble invisibly below the surface.

Kuwait constitutes a puzzling but intriguing mix of western liberalism and strict Islam. The capital, Kuwait City, is a bustling metropolis full of high-rise buildings and luxury hotels. Yet the country is also a host to elaborate and opulent mosques, and its religion is an integral part of its affairs. Upon gaining independence from Britain in 1961, Sheikh Abdullah assumed the role of head of state, adopting the title of Emir. Kuwait was the first Arab country in the Gulf to have an elected parliament. Moves to change the male-dominated political structure culminated in the granting of full political rights to women in 2005. The large revenues from oil production allowed an independent Kuwait to build up its economic infrastructure, and to institute educational and social welfare programmes.

Surrounded by three major Middle Eastern powers, the main threat to the country came from the renewal of Iraqi territorial claims over Kuwait (along with the overdue repayment of

some US$40-60 billion on the part of Iraq), which led to the Iraqi invasion of Kuwait in 1990. The Kuwaitis later recovered their country by virtue of a US-led, UN-backed multinational military force.

After a period of euphoria, the Kuwaitis had to address a number of difficult questions; the future security of the country was dealt with by the signing of defence and security pacts with the USA, the UK and Kuwait's Gulf allies. More recently, Kuwait was one of the first countries to join Operation Iraqi Freedom, following the US-led war against Iraq, and provided aid and support during Iraq's (ongoing) process of reconstruction. The official language is Arabic, but English is widely understood, especially in commerce and industry. The religion in Kuwait is 95% Muslim (mostly of the Sunni sect), with Christian and Hindu minorities.

### 2.1.2 Social Conventions

Handshaking is the customary form of greeting. It is quite likely that a visitor will be invited to a Kuwaiti's home, but entertaining is also conducted in hotels and restaurants. A small gift to recognise this company or to represent your own country is always welcome. The visitor will notice that most Kuwaitis wear the national dress of long white dish dashes and white head clothes, and that many women wear yashmaks. It is important for women to dress modestly and according to Islamic law. Men do not usually wear shorts in public and should not go shirtless. Men are expected to wear suits and ties for business and formal social occasions. English is widely spoken in business circles, although a few words or phrases of Arabic are always well received. Business cards are widely used. Some of the bigger hotels have translation and bilingual secretarial services.

All other Islamic rules and customs must be respected. Convicted users of narcotics can expect to receive a sentence of up to five years' imprisonment, plus a heavy fine. 'No Smoking' signs are posted in many shops. It is greatly appreciated if visitors learn at least a few words of Arabic. The import and use of drugs, alcohol, pork products and obscene material are forbidden, and can lead to imprisonment.

### 2.1.3 Geography

Kuwait's geography is dominated by deserts. It is located at the extreme north-western part of the Persian Gulf, with its nearest neighbours being Iraq and Saudi Arabia. It is bordered in the

west and south by Saudi Arabia for about 250 kilometres. The geographic co-ordinates of Kuwait are 29 30 N, 45 45 E. A neutral zone of 5,700 sq km between Saudi Arabia and Kuwait was formed in 1922 by the Treaty of Al Uqayr. Iraq also forms a border with Kuwait in the west, as well as the north, for about 240 kilometres. With a land area of about 17,820 sq km, Kuwait borders the Persian Gulf in the east and has a coastline of 195 kilometres. The Persian Gulf is the lowest point of Kuwait's geography, and the highest point is an unnamed location at a height of about 306 metres.

Most of the land in Kuwait is low-lying, almost flat desert, with the land being sandy. The highest point is in the far west, and rises almost 1,000 feet (300 m) above sea level. There are several oases in the desert, salt marshes along the coast, and islands and reefs offshore. Kuwait is basically a collection of nine islands, amongst which Bubiyan is the largest one. In 1991, this island was transformed into a military base, with a concrete bridge connecting it to the mainland.

The other islands are Auhah Island, Failaka Island, Kubbar Island, Miskan Island, Qaruh Island, Umm a Namil Island and Warbah Island. Failaka Island is highly populated when compared with Bubiyan Island and Warbah Island, which are both uninhabited. Tourist development of the historical island of Failaka is still to come, with the flat desert plains being reformed for oil excavation. There are few distinctive geographical features remaining, with the exception of Mutla Ridge. Kuwait Bay is the notable feature of the geography of Kuwait. This is the bay which provides natural protective armour for Kuwait's port.

Kuwait boasts limestone formations in the south, below which its petroleum resources are stored. There is a shallow valley which forms the western boundary of Kuwait, formed by silt formation on a dry river bed; this is Wadi-al Batin. The freshwater aquifer on the western side of the Rawdatayn is the main supplement of distilled water to quench the thirst of the Kuwaitis. Ash Shuaybah is the other aquifer used for commerce and households. The main natural resources of Kuwait are, of course, its petroleum, natural gas and shrimps; only 0.84% of the land is arable.

The flag of Kuwait has three horizontal stripes, which are green, white and red (top to bottom). On the left of the flag is a black vertical stripe. The basic unit is the Kuwaiti dinar. One thousand fills equal one dinar.

Kuwait is proud to own one of the most comprehensive health and social-welfare systems in the world; all medical facilities are free and there is no income tax. Both business activity and population are the highest in the cities of Salmiya and Hawalli. Kuwait City and Jahrah are the major cities. The summers are quite long and extremely hot, with temperatures often rising above 100°F (38°C); winters are relatively cold. Prevailing natural hazards are sudden cloudbursts, which are common from October to April, bringing heavy rain, and damaging roads and houses. Even sandstorms and dust storms happen throughout the year, though they are seen more between March and August.

As for the environment, international agreements are in place for biodiversity, climate change (the Kyoto Protocol), desertification, endangered species (signed but not ratified) and marine dumping. The population of Kuwait is 2,596,799, comprising of 1,291,354 non-nationals (July 2008 est.). The age structure is: 0-14 years - 26.6% (male 351,057/female 338,634), 15-64 years – 70.5%  (male 1,172,460/female 659,927), and 65 years and over - 2.9% (male 46,770/female 27,951) (2008 est.). The calculated median age total is 26.1 years, with males being 28 years and females 22.6 years (2008 est.)

**2.1.4 Communications**

517,000 landline telephones are in use (2006), with 2.774 million cellular phones (2007). The telephone system quality of service is excellent in general, and the new domestic telephone exchanges provide a large capacity for new subscribers. Trunk traffic is carried by microwave radio relays, coaxial cables, and open-wire and fibre-optic cables. A cellular telephone system operates throughout Kuwait, and the country is well supplied by pay telephones. The international country code is 95, and is linked to the international submarine cable Fibre Optic Link Around the Globe (FLAG), connecting it to Bahrain, Qatar and the UAE via the Fibre-Optic Gulf (FOG) cable, and via coaxial cable and microwave radio relay to Saudi Arabia

**2.1.5 Transportation**

There are four airports with paved runways in total and and three airports. . There are four heliports (2007), 269km of gas pipelines, 540 km of oil pipelines and 57km of refined product pipelines (2007). The roadways total 5,749 km, of which 4,887 km are paved and 862km are unpaved (2004).

The merchant marine totals 40 ships (1000 GRT or over) at 2,460,319 GRT/4,037,282 DWT; by type they are: two bulk carriers, one cargo, three carriers, seven containers, four for liquefied gas, 23 petroleum tankers and 31 registered to other countries (three to Bahrain, one to Comoros, one to Libya, two to Panama, seven to Qatar, six to Saudi Arabia, one to St Kitts and Nevis, and ten to the UAE) (2008). The ports and terminals are Shu'aybah, Shuwaykh, Zawr (Mina' Sa'ud), Mina' Abd Allah and Mina' al Ahmadi.

## 2.1.6 Military

The military branches of the country are Land Forces, Kuwaiti Navy, Kuwaiti Air Force (Al-Quwwat al-Jawwiya al-Kuwaitiya) and National Guard (2007). The military service age is 18 years of age for compulsory and voluntary military service, with reserve obligation up to the age of 40, with one month annual training; women have served in police forces since 1999 (2006). The manpower available for military service for 18-49 year olds is 1,032,408 males and 568,657 females (2008 est.).

## 2.1.7 Transnational Issues

As for international disputes, Kuwait and Saudi Arabia continue negotiating a joint maritime boundary with Iran; no maritime boundary exists with Iraq in the Persian Gulf. Kuwait was controlled by the main regional powers in the Gulf, principally with various dynasties based in Mesopotamia and Persia. The most influential of these were the Safavids, a Persian dynasty which moved into the region around 1500 and established a commercial empire along the eastern seaboard of the Arabian Peninsula.

Later on, in the 16th century, the north-eastern corner of the Arabian Peninsula became part of the Turkish Ottoman Empire. It remained so until the latter part of the 19th century, when the Al-Sabah family, which now rules Kuwait, took control of local administration and steered the country into a semi-autonomous position. However, fearing that the Turks would try to reassert their control, the Kuwaitis made an agreement with the British, allowing for British control of Kuwaiti foreign affairs in exchange for military protection. This danger passed with the collapse of the Ottoman Empire at the end of World War I, although Kuwait remained a British protectorate until 1961, when the country was granted full independence.

Sheikh Abdullah assumed the position of head of state, adopting the title of Emir. The large revenues from oil production allowed an independent Kuwait to build up its economic

infrastructure, and to institute educational and social welfare programmes. Surrounded by three major Middle Eastern powers, the main threat to the country came from the renewal of Iraqi territorial claims over Kuwait which dated back to Kuwaiti independence. Kuwait had been seriously threatened by Iraq in 1961, but Iraq was deterred by British military intervention. In 1990, no such assistance was available. Kuwait had given firm backing to the Iraqis during the Iran-Iraq war, lending some US$40-60 billion to Baghdad. Disputes over repayments and the exploitation of oilfields which straddled the (still disputed) border region between the two countries eventually led to the Iraqi invasion on 1st August, 1990.

The country which Sheikh Jabber and his entourage (who fled into exile in Saudi Arabia) left behind was rapidly incorporated into Iraq as its '19th province', and then systematically looted. Nine months later, the Kuwaitis recovered their country by virtue of a US-led, UN-backed multinational military force which drove the Iraqis out. After a period of euphoria, the Kuwaitis were confronted with the aftermath of the war, and the need to address a number of difficult questions. Adequate funds were available to finance the enormous task of reconstruction.

The future security of the country was dealt with by the signing of defence and security pacts with the USA, the UK and Kuwait's Gulf allies. Since then, Iraq's persistently belligerent attitude towards Kuwait, reflected both diplomatically and through occasional border incursions, had served only to reinforce Kuwaiti caution towards its northern neighbour. However, it was one of the first countries to join Operation Iraqi Freedom following the US-led war against Iraq, and provided aid and support during Iraq's (ongoing) process of reconstruction.

On the domestic front, the Al-Sabah family faced an awkward problem after the 1991 liberation - the future of the government and their role within it. While in exile, the Emir had made a commitment to restore the 1962 constitution, which provided for the elections of a National Assembly (Majlis) and greatly limited the power of the ruling family. The Assembly had been suspended in 1976 by the Emir, on the grounds that it was 'not acting in the best interests of the state'; it was recalled in 1981 and suspended again in 1986. When the Emir returned to Kuwait in March 1991, he immediately declared a three-month period of martial law. However, in the face of concerted domestic and international pressure, he announced that elections to the Assembly would be held in October 1992.

The three elections held since then had majorities secured by opponents of the Emir, then the supporters, and at the most recent poll in July 1999, by the opposition. The outcome had little effect on policy-making, as the Majlis was still confined to a strictly consultative role, but it proved to be a lively forum and a vital channel for popular sentiment. In 1999, it was closed down by the Emir for a third time, but reopened shortly afterwards. Since then, it has clashed several times with the Emir and the Cabinet (which is still dominated by the al-Sabah family) over the misuse of state funds and poor management of the all-important oil industry.

Underlying these disputes has been the growing impression that the ageing and increasingly infirm al-Sabah clan is no longer capable of running the country; however, they continue to dominate Kuwaiti policies. The Emir, who is selected by members of the ruling Al-Sabah family, holds exclusive executive power. The Emir appoints a prime minister and a cabinet of ministers.

## 2.2 Kuwaiti Macroeconomics

Macroeconomics is a study of the economic problems. A country's economy is based on the macroeconomic issues. The main features of macroeconomics are the unemployment rate, the inflation rate, productivity, the interest rate, the government budget deficit and the foreign trade deficit.

Government revenue is the money generated through taxes, foreign exchange through exports and any other profits generated which a government earns through joint ventures. Government spending includes all the investments, ventures and operational costs which it incurs during a country's administration. It precludes all the costs which those activities require. Finally, government expenditure is the subset of government spending; it only includes the costs incurred in running an administration - the difference between spending and revenue generated is either the profit or deficit of a government. A country's oil, gas and mining sectors, also known as the 'extractive industries' (EI), have the potential to produce enormous national wealth. Kuwait's major source of income is from oil. Oil plays an increasingly important role in the Kuwaiti economy, with around 50% of the share of GDP. Kuwait's budget registers surplus through the increased oil revenues, which account for more than 90% of government revenues. On the foreign trade front, oil exports occupy more than

90% of total exports. This reflects the huge dependence on oil and the urgent need for diversification.

Generally, owing to its dependence on oil as the single largest revenue source, the economy of Kuwait can be split into two sectors, the oil sector and the non-oil sector. In the non-oil sector, three important segments by size and business are:

1. Community, Social & Personal Services, comprising of public administration, defence, education, healthcare, and personal and household services
2. Financial institutions
3. Real estate and business services.

The government budget for the fiscal year 2007/08 reported a huge preliminary surplus of KD 9.55bn. As per the state's Financial Administration Accounts report for the month of March 2008, actual revenues for the year stood at a new record of KD 18.9bn, 227.6% above budgeted figures. On the other hand, actual expenditure stood at KD 7.5bn, merely 66.3% of budgeted figures (GIH, 2008)

Oil income makes up more than 90% of public revenue in the Gulf state; out of this, 10% is global crude reserves, pumping out around 2.2 million barrels per day. Kuwait posted revenues of KWD 19.2 billion ($66.2 billion) in the first 10 months of the fiscal year. The revenues were 51.5% higher than the budgeted target, and slightly exceeded projected spending for the whole year. Kuwait has projected spending of at least KWD 18.996 billion ($65.4 billion) and revenues at KWD 12.68 billion ($43.7 billion) for the fiscal year. Oil revenues up to the end of January came in at KWD 18.13 billion ($62.5 billion), up 55.6% on the budget target for the whole year (AFP, 2009).

**2.2.1 Gross Domestic Product (GDP)**

The gross domestic product (GDP) is one of the measures of national income and output for a given country's economy. It is the total dollar value of all final goods and services produced within a country's borders in a given year. GDP can be defined in three ways, all of which are conceptually identical. Firstly, it is equal to the total expenditure for all the final goods and services produced within the country in a stipulated period of time (usually a 365 day year). Secondly, it is equal to the sum of the value added at every stage of production (the intermediate stages) by all the industries within a country, plus taxes but less subsidies on

products in the period. Thirdly, it is equal to the sum of the income generated by production in the country in the period, that is, the compensation of employees, taxes on production and imports less subsidies, and gross operation surplus/profits (Wikipedia, 2009).

Oil and gas is the dominant sector of GDP for all GCC countries. Its share in GDP has risen from 36.6% in 2002 to 52.4% in 2006. High growth rates over the years have contributed significantly to its role in Kuwait's economy. The real GDP was estimated to be around 6.6% of annual growth by the end of 2007, reaching KD 19.58bn.

**Table 2.1: Kuwait's Oil Production**

| (mln b/d) | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| Total Oil Production | 2.03 | 2.27 | 2.52 | 2.67 | 2.68 | 2.61 |
| Crude Oil Production | 1.89 | 2.14 | 2.38 | 2.53 | 2.54 | 2.46 |

*(Source: OPEC, 2006)*

Kuwait's economic development is based on the growth of the oil and gas sector. A strong growth in oil prices was the main reason behind the growth of the sector, which was ahead of most countries in the region. The overall GDP performance used to mirror Kuwait Export Crude (KEC) prices over the years. In the year 2006-07, GDP continued to grow at a slower pace due to the high base of 2005, in addition to the marginal decline in the production of crude oil to 2.46mn b/d during 2007 (table 2.1). At the end of 2006, GDP showed a growth of KD 28.6bn.

**2.2.2 Inflation**

Inflation refers to the debasement of the currency. At the time when gold was used as currency, government collected the gold coins, melted them, mixed them with other metals like silver, copper or lead, and reissued them at the same nominal value. Through this method of diluting the gold with other metals, the government increased the total number of coins issued without having to increase the amount of gold to make them. This way, the cost of each coin was lowered, and the government earned profits from an increased seigniorage. This increased the money supply, simultaneously reducing the relative value of each coin; as this cost decreased, consumers needed more coins to exchange for the same goods and services. These goods and services would experience a price increase, as the value of each coin was reduced.

The term 'inflation' is usually used with reference to a measured rise in a broad price index, which depicts the overall level of prices in goods and services in the economy. Inflation can also mean the increasing level of prices for a narrow set of assets, goods or services within the economy, such as commodities (which include food, fuel and metals), financial assets (such as stocks, bonds and real estate) and services (such as entertainment and healthcare) (Wikipedia, 2009).

As there is a rise in the general price level, each unit of currency will convert to fewer goods and services; consequently, inflation is also a decline in the real value of money - a loss of purchasing power in the medium of exchange, which is also the monetary unit of accounts in the economy. A leading estimate of general price-level inflation is the general inflation rate, which is the percentage change in a general price index (normally the Consumer Price Index) over time.

Inflation can sometimes have adverse effects on an economy. For instance, having uncertainty about future inflation may not enhance investment and saving. Consumers may begin to hoard out of concern that prices may go up in the future, and this may lead to a shortage of goods due to inflation. Economists generally agree that high rates of inflation and hyperinflation are caused by an excessive growth in the money supply.

Inflation, as measured by the consumer price index (CPI), went up to an unprecedented level of 7.1% in the 4Q07, standing at 122.2 points. This inflation level was in addition to the 3.03% reported by the end of 2006. It is important to note that inflation rates had seen a rising trend over the last four quarters, as shown. Even more noteworthy was the higher inflation rates reported during 2007. On an M-o-M basis, inflation picked up even more rapidly, to hit new levels above 7.54% up to the end of December 2007, standing at 124.1 points.

Figures from the Central Statistics office for 2008 revealed that inflation picked up even more, to unprecedented levels of 9.53% by the end of January that year. As per the record, CPI hit 126.4 points by the end of January 2008, as compared to 115.4 points in the previous year. This increase was due to the sharp rise of 16.1% in housing services, and a rise of 15.1% in the prices of beverages and tobacco.

In keeping with the last two years, the rise in inflation during 2007 coincided with excellent economic growth, and was influenced more by demand-pull than by cost-push. Apart from that, external pressures stemming from the increase in the cost of imported non-oil commodities also contributed to the higher inflation. Even though the KD grew stronger than the US$ after adopting the new basket, the previous year saw a decline in the KD against the major non-dollar currencies, which gradually influenced consumer prices as well. There were some other factors behind the rise in inflation in 2007, such as the strong domestic consumer demand associated with credit expansion, rising non-oil activity and the buoyancy of the stock market.

Annual inflation in Kuwait dipped for a fourth time in December to 9.02% as food and housing prices eased, its lowest level of the year (El Gammal, 2005). The consumer price index of Kuwait for all items stood at 135.3 points on December 31st, compared with 124.1 points a year earlier. Food prices rose by 10.96% in December, down from an increase of 12% in November, while housing prices were up 7.48%, compared with 10.21% a month earlier.

Inflation for the world's fourth-largest oil exporter was 10.38% in November, having reached its peak of 11.6% in August. In March, Kuwait's central bank governor declared that inflation would average no more than 7% this year. Kuwait is a country which does not attach itself to the dollar, and now the dip in price pressures has helped it to cut its benchmark discount rate by 225 base points since October, to unlock credit markets and spur bank lending. In February, there was a growth in Kuwaiti money supply to 19.12%.

**2.3 Socio-Economics**

Since oil began to be exported, Kuwait's socio-economic and political developments have been intricately linked to its oil industry. By means of its oil wealth, Kuwait developed from a tribal entity into a state, moving from subsistence to state-sponsored welfare, and from a nation of little importance to one of significant power in regional and international affairs. Oil lifted Kuwaiti society out of its traditional economic environment of hunting, pearl-diving and limited trade. The entire way of life for Kuwaitis changed during a very brief period of time. In 1946, Kuwait's income from oil was under $760,000, but by 1971 it had risen to $963 million, and to $8.9 billion by 1977. It was within this context of rapid economic development that new social forces emerged in Kuwait (Ghabra, 1997).

With the rapid growth of the oil industry, old societal arrangements began to give way to new ones, with the demise of traditional networks and vast improvements in living conditions. Through a large-scale redistribution of its oil revenues, Kuwait sponsored a massive education program, created jobs for all its citizens, and provided free healthcare and modern housing on newly developed plots of desert.

The government offered generous subsidies to replace the old mud brick houses in the neighbourhoods in the centre of Kuwait City with new buildings. Many Kuwaitis moved outside the historical walls surrounding Kuwait City, which had symbolized their isolation and fear of the outside world, leaving their traditional neighbourhoods behind for surrounding desert areas sprouting modern houses and new quarters. By the late 1960s, the city was surrounded by a belt of developed and inhabited areas which extended many miles from the old walled city.

Any discussion of the socio-economic structure of Kuwait cannot ignore the important role of merchants and their families in the state's development. They were the basis of civil society in Kuwait City prior to the discovery of oil. During the 19th century, they travelled to India, Iraq, Persia, Syria and Yemen, and brought a variety of goods back to Kuwait, including wheat, dates, sugar, spices, tea and textiles.  They also opened the first school in 1911 and the second one in 1920, started the first library in 1920, and produced the first magazine in 1928.

The merchants established networks of relations beyond Kuwait and observed other systems of government, which led them to seek changes to their own society. It is they who became the driving force of the reform movement in 1938, which resulted in an elected assembly which sat for six months. In brief, the discovery of oil, its production and its exports changed the socio-economics of Kuwait. The country was able to quickly develop into its current modern state.

**2.4 Kuwait's Oil and Gas Sector**

The economy of Kuwait is comparatively small, being controlled by the oil industry and the government sector. With regards to oil reserves, Kuwait is ranked 4th in the world. It is a fact that about 101.5 billion barrels of crude oil reserves - 8.5% of world reserves - account for nearly half of the GDP, 95% of export revenues and 80% of government income. Kuwait derived benefits from the dramatic rise in oil prices during the 1970s (table 2.2).

**Table 2.2: Kuwait's Oil Reserves**

| (bb) | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|
| Reserves | 96.5 | 99.0 | 101.5 | 101.5 | 101.5 |

*(Source: OPEC, 2006)*

These benefits were greatly enhanced by Kuwait's membership to the Organization of Petroleum Exporting Countries (OPEC). A triple attack shocked the economy in the mid-1980s - the 1982 securities market crash, the mid-1980s drop in oil prices, and the 1990 Iraqi invasion and occupation. During their exile, the Kuwaiti government depended upon its $100 billion in overseas investments during the Iraqi occupation, in order to reconstruct. By 1993, this balance was reduced to less than half its pre-invasion level. Both the oil and the capital reserves, on which the Kuwaiti economy depended, were destroyed by the Iraqis. After Operation Iraqi Freedom, Kuwait experienced a slight economic boom, as many companies working in Iraq established offices in Kuwait and procured goods through Kuwaiti companies.

Towards the end of the Gulf War in February 1991, the Iraqi occupation forces set ablaze and destroyed 749 of Kuwait's oil wells. A lot of money was spent to repair the oil infrastructure damage - over $5 billion. By the end of 1992, oil production was 1.5 million b/d, and pre-war capacity was restored in 1993.

In 1934, the ruler of Kuwait granted an oil concession to the Kuwait Oil Company (KOC), jointly owned by the British Petroleum Company and the Gulf Oil Corporation. The Kuwaiti Government nationalized KOC in 1976. In the next year, Kuwait took over onshore production in the Divided Zone between Kuwait and Saudi Arabia. KOC handled production, along with Texaco, Inc., which, by its 1984 purchase of the Getty Oil Company, acquired the Saudi Arabian onshore concession in the divided zone.

Offshore, in the Divided Zone, the Arabian Oil Company (AOC) - 80% owned by Japanese interests and 10% owned by each of the Kuwaiti and Saudi governments - produced on behalf of both countries from 1961 until 2000, when its concession in the Saudi zone expired. Three years later, the AOC gave up its drilling rights in the Kuwaiti sector. The Kuwait Gulf Oil Company (a wholly-owned subsidiary of the Kuwait Petroleum Company, KPC) has taken over AOC's offshore operations.

The main parent company, KPC, which is an integrated international oil company, takes care of the government's operations in the petroleum sector, and includes the Kuwait Oil Company (which produces oil and gas), the Kuwait National Petroleum Co. (refining and domestic sales), the Petrochemical Industries Co. (producing ammonia and urea), the Kuwait Foreign Petroleum Exploration Co. (with many allowances in developing countries), the Kuwait Oil Tanker Co. and Santa Fe International Corp. The latter, purchased outright in 1982, gives KPC a worldwide presence in the petroleum industry.

Apart from this, KPC has also bought refineries and related service stations in the Benelux nations and in Scandinavia from the Gulf Oil Co., together with some storage facilities and a network of service stations in Italy. In 1987, KPC purchased a 19% share in British Petroleum, which was later cut down to 10%. KPC does the marketing of its products in Europe under the title of Q8, and is interested in the markets of the United States and Japan.

Kuwait owns 96.5 billion barrels of recoverable oil; only Saudi Arabia and Iraq hold larger proven reserves. The estimated capacity before the occupation was about 2.4 million barrels per day (b/d), and during the Iraqi occupation, this oil-producing capacity of Kuwait was reduced to almost nothing. However, it must be pointed out that tremendous recovery and improvements have been made. Oil production was 1.5 million b/d by the end of 1992, and in 1993 the pre-war situation was restored.

Although the Saudi-Kuwaiti Neutral Zone possesses an additional 5bb of reserves, half of it belongs to Kuwait, which puts Kuwait's total oil reserves at 104bb. The area of Burgan holds most of Kuwait's reserves (70bb); this area includes Burgan, Magwa and Ahmadi. OPEC has stated that Kuwait's crude oil production averaged 2.46mn b/d in 2007. Kuwait's total oil production averaged 2.7mn b/d by the end of 2006, while crude oil production averaged 2.54mn b/d for the same year. Kuwait also has some other producing fields - the northern fields of Raudhatain (380,000 b/d of production capacity) and Sabriya (95,000 b/d of production capacity), the south-western fields of Minagish and Umm Qudayr (190,000b/d), Abdali (33,000 b/d) and Ratqa (45,000 b/d) in the north, and Kuwait's share of the Saudi-Kuwaiti Neutral Zone (270,000 b/d). On the whole, around two-thirds of Kuwaiti oil production is from the southeast of the country, with about one-fifth from northern Kuwait and about one-tenth from the west.

Kuwait exports typical medium Mideast crude. Almost 90% of the country's crude oil is sold through term contracts, with prices associated with Saudi Arabian medium crude for the benefit of western buyers, and a monthly average of Dubai and Oman for Asian buyers. Kuwait remains a major exporter to Asia-Pacific countries such as Japan, India, South Korea, Singapore, Taiwan and Thailand. Kuwait's net petroleum exports for 2006 averaged 2.2mn b/d. As stated by OPEC, Kuwait's petroleum exports were valued at US$54.7bn in 2006.

*Oil Refining*

Kuwait currently has three refineries, with a combined capacity of around 0.93mn b/d (table 2.3); the largest of these is Mina al-Ahmadi, with a capacity of 0.46mn b/d. The other refineries are Mina Abdullah, with a capacity of 0.27mn b/d, and al-Shaiba-1, with a capacity of 0.2mn b/d.

**Table 2.3: Kuwait's Refinery Capacity**

| Thousand b/d | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|
| Refinery Capacity | 889.0 | 831.0 | 936.0 | 936.0 | 932.0 |

*(Source: OPEC, 2006)*

The increasing demand for refined products with high profit margins has kept Kuwait's refining sector operating close to its full capacity. 2006 saw Kuwait's output of refined products average 886,700 b/d.

*Oil Expansion Projects*

The Kuwait Oil Company (KOC) had declared its plans to raise the crude oil production capacity to 3.0mn b/d by 2010, 3.5mn b/d by 2015 and 4.0mn b/d by 2020 (table 2.4).

**Table 2.4: Selected Upstream and Downstream Expansion Projects in Kuwait**

| Kuwait Upstream Petroleum Projects | | | |
|---|---|---|---|
| Project | Increase (thousand b/d) | Due Date | Estimated Cost (US$bn) |
| Project Kuwait | 300 | 2012 | 9 |
| Early Production Facilities (EPF - Phase 1) | 50 | 2010 | 0.24 |
| Early Production Facilities (EPF - Phase 2) | 120 | NA | 0.4 |
| Lower Fars Pilot Project (LFPP) | 0.2-0.5 | 2010 | 1 |
| **Kuwait Downstream Expansion Projects** | | | |
| Al-Zour Refinery | 615 | 2012 | 14 |

*(Source: GIH, 2008)*

### *A Shift to Heavy Oil*

Heavy oil is not very desirable, but due to its high viscosity and lower prices, Kuwait is currently concentrating on producing more heavy oil, and has a huge drive towards the targeted 4mn b/d production capacity. It was in June 2007 that KOC launched the Lower Fars Pilot Project (LFPP), to create heavy oil using sands. This project, which intended to evaluate the removal of sand from heavy oil in the northern Ratqa field, will be carried out on a two-year design, installation and operation rental basis. The successful contractor will drill and operate five wells, each with a heavy oil sand production capacity of 200b/d to 500b/d.

KOC signed a preliminary agreement in October 2007, with ExxonMobil helping with the exploration of heavy oil in the Lower Fars at the Ratqa field in northern Kuwait. By doing this, they intend to gain 50,000b/d by 2011, 250,000b/d by 2015 and 900,000b/d by 2020. Negotiations between the two companies will be ongoing, with the final agreement expected to have been signed by July 2008.

### *Project Kuwait is Overdue*

The implementation of Project Kuwait will decide the increase in production, since this project is a vital element in the government's plans to increase oil production capacity to 4mn b/d by 2020. The main aim of the project is to develop the secondary reservoirs in the northern oilfields with the help of international oil companies (IOCs), to enhance production from about 500,000 b/d to 900,000 b/d, at an estimated cost of US$9bn. This project, which has been sitting on the drawing board since 1998, will invest in upstream production in five northern oil fields of Abdali, Bahra, Ratqa, Raudhatain and Sabirya, near the border of Iraq.

A group of MPs in parliament had opposed it, saying it would allow foreign companies to gain control over Kuwait's oil resources in violation of the constitution, and that the involvement of the IOCs was unnecessary. There are others who have insisted that Kuwait is not currently in need of additional capacity, as it has been carrying a surplus capacity for many years.

The three refineries of Kuwait are located at Mina al-Ahmadi, Mina al-Abdullah and Shuaiba. Plans to have a fourth one at Al Zour have come about, making it the biggest in the Middle East, with a planned capacity of 615,000 b/d. The refinery, which would cost about US$14bn, had been due to start production in 2010, and will replace the existing 200,000 b/d refinery at Shuaiba. This would enhance Kuwait's refining capacity from 917,000 b/d in 2005 to more than 1.5 mn b/d by 2010. However, this project may be delayed after Saudi Arabian Texaco objected to the site planned for the new facility, due to this site being in an area of the Neutral Zone which should not be developed, as per the 1954 joint concession agreement between Kuwait and Saudi Arabia.

### Natural Gas Reserves

With regard to its natural gas reserves, Kuwait is ranked twentieth in world, with an estimated reserve of 62.8Tcf, which contributes to 0.9% of the world's total reserves (as of January 2007).

Kuwait made a declaration in March 2006 upon the discovery of commercial quantities of non-associated natural gas, around 35Tcf, in the northern Sabriya and Um Naqqa fields. This was fairly modest but also greatly important to the country, as it could help in meeting the demand. The deposit has not yet been officially classified as 'proved', but if it is then it would increase the country's reserves by 55.7%, ranking Kuwait 11th in terms of gas reserves in the world.

### Natural Gas Production and Consumption

The production of Kuwait's natural gas is quite small - around 1.2Bcf /d in 2006 (table 2.5) - the vast majority of which is 'associated gas' (i.e. found and produced in conjunction with oil). Presently, Kuwait is self sufficient in meeting its own demand for domestic natural gas. However, Kuwait will have to import gas or LNG in order to fulfil its own emerging demands.

### Table 2.5: Kuwait's Natural Gas Production

| (Bcf/d) | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|
| Kuwait | 0.8 | 0.8 | 0.9 | 1.1 | 1.2 | 1.2 |
| Total for Middle East | 21.8 | 23.7 | 25.1 | 28.1 | 30.7 | 32.5 |

*(Source, GIH, 2008)*

### *Natural Gas Expansion Plans*

Another means of increasing its domestic natural gas production is by reducing the flaring of associated gas and through new drilling. Exploratory drilling is presently undertaken at Raudhatain oil field, reaching geological formations rich in natural gas which are much deeper than oil deposits.

### Table 2.6: Kuwait's Upstream Gas Projects

| Project | Increase (Bcf/d) | Due Date | Estimated Cost (US $bn) |
|---|---|---|---|
| **Kuwait's Upstream Gas Projects** | | | |
| Booster Station 160 | 0.3 | 2010 | 0.5 |
| Early Production Facilities (EPF-Phase 1) | 0.4 | 2010 | 0.2 |
| **Kuwait's Downstream Gas Projects** | | | |
| Al-Khafji Field Expansion-Onshore Package | 0.1 | 2009 | 0.5 |

*(Source: Zawya, 2009)*

### *Early Production Facilities (EPF – Phase 1)*

The EPF project is KOC's aim to increase production by processing sour crude, and later blending it with the sweet crude produced from its north, south and southeast oilfields. This project is part of KOC's overall plan to increase oil production to 4mn b/d by 2020.

This primetime commercial heavy sour crude oil production project by KOC aims to process 50,000b/d in the initial stages, from 20 wells in the two northern oil fields of Rawdhatain and Sabriya, and also produce about 35Mcf/d of gas (table 2.6).

### 2.5 Kuwait's Real Estate and Construction Sector

There has been a good rate of construction of private residential projects in Kuwait since the Iraqi invasion of 1990–91. On the one hand, this has been influenced by the invasion-related destruction of infrastructure (including houses), and on the other hand, by the prosperity and availability of attractive government housing subsidies and loan programmes; the amount of

private residential construction projects has surpassed the development of other infrastructural facilities in the state in the last decade.

Before Kuwait was invaded, when it was in a better financial position, every Kuwaiti household head was eligible for a 400sqm plot of land, and long-term cash of KD 70000 ($231,000) for the construction of his/her private residence. In current times though, it would take an approximate waiting period of 12 years to obtain such a housing cash loan.

In the prosperous oil-rich State of Kuwait, the major part of the construction activities is occupied by the residential projects, particularly in the post-invasion period from 1991 to today. Quite naturally, these projects are sometimes delayed and lead to cost increases and owner dissatisfaction (Hafez, 2001). The factors associated with time delays are the selection time-period, the type of construction materials and their availability at the local market. This also affects the cost overruns associated with the delivery of materials to construction sites. Apart from materials-related components, even the hiring of an engineer to independently supervise and control the progress of the construction work is a positive influence for the on-time delivery of materials to construction sites. A factor worth mentioning is the late delivery of construction materials, which delays the larger and costlier projects.

In 2006, 6% of the GDP of Kuwait related to its real estate and construction sector. Broadly divided into three, the real estate sector in Kuwait includes three main segments: residential, investment and commercial. Since the time the Kuwaiti government decided to provide a house to every citizen, with concrete steps for achieving a resolution, the residential segment has been the most important market segment of the real estate sector in Kuwait. The investment segment indicates the investments in land and construction of either villas or buildings for the purpose of rent. The commercial segment represents the construction of commercial complexes, and the sale or rent of spaces in commercial complexes for offices and/or shop establishments.

Most of the real estate sector in Kuwait is owned by individuals rather than companies, because companies can only own 2% of the total tradable real estate land. Kuwait is described as having had a 'hot' real estate market for the last few years. The rise in housing prices has been a great bonus for current owners, who have experienced large returns on their housing investments. With the prevailing economic conditions, the Kuwaiti real estate market

has been able to perform quite well, and with the acceleration of the economy, it is a common prediction among experts that, in the future, the buying boom in the domestic real estate market will continue, albeit at a slower pace.

Corresponding to the growth of the Kuwaiti economy, the real estate sector has also continued to move forward. From this, it is clear that the real estate sector has gained from the intensity of the overall economic changes in Kuwait. Many economic factors, such as high oil prices, moderate inflation rates, abundant liquidity, political stability and the repatriation of funds, have been responsible for bringing about fine changes in the real estate market over the last few years. The sector is actually going through a boom period. There are some other reasons, too, such as the fall of Saddam Hussein bringing a renewed confidence, money previously invested overseas flooding back, and the economy, boosted by high oil prices, surging on a wave of liquidity.

## 2.5.1 Upcoming Projects and the Private Sector Role

The real estate market is the only economic sector which is not organized or controlled by a government authority, but the Kuwaiti government still holds an important position in motivating growth within the market. Often, topics of discussion are dealt with by the related government ministries or authorities, especially municipality, influencing major activity in certain areas or inducing a sell-off in others. These can change to include, among other things, approving building permits and higher buildings, transforming permits from one segment to another, permitting land, or allowing foreign ownership. These influences can either boost or hinder the real estate market.

The growth in demand for housing and strong future demand shows that there needs to be a rapid development of infrastructure in new areas. Good support is given by the government, and so the private sector is given a more dynamic role in relieving the country of its housing shortage.

The government uses the technique of BOT (Build-Operate-Transfer). Using this system, it is possible for private sector companies to create and invest in plots which are owned by the government. The private sector carries out the role of operating and profiting from the investment for a period of 20 years or more, depending on the agreed contract period, after which the project is returned to the government. The government does not hasten, but gives

more importance to BOT projects, and cooperates with the private sector to get optimum benefits for such projects. Privatization is a major step, resulting in the success of infrastructure development. As a part of its efforts in the private sector to develop BOT projects, the government is working on making BOT related regulations more flexible.

BOT regulations are a major concern for private sector participants developing the county's infrastructure. Industry personnel consider these regulations to be a tool which is either supporting or obstructing private sector participation, and gearing construction activity forward. There are many problems which private sector participants encounter in BOT projects. Amongst these is governmental bureaucracy, as well as having no unified procedures to deal with the public authorities. Another drawback is that the investment period is a maximum of 20 years for all projects, which is not suitable as some projects would need only 10 years, whereas others would require longer periods.

The government gives great importance to BOT projects, to link with the private sector in this field. The Ministry of Finance, for instance, gives more support to the use of BOT projects, as they ease the pressure on the state's budget. The government also plans to use the Public Private Partnership principle (PPP) to overcome the main problems associated with BOT projects for public authorities, such as paperwork.

Kuwait's construction industry works in line with the general Gulf trend. The state of Kuwait is going through great changes. With better confidence in the market, local real estate companies have promised many prestigious projects, including the $5,500 million Khabary City project, planned by the Efad Holding subsidiary Al-Dar First Holding, and the highly ambitious Madinat Hareer (City of Silk) in Subiya, expected to cost more than $86,000 million. On completion, this project would boast having the world's tallest tower, along with numerous housing, health, educational, environmental, business and touristic centres. Many smaller projects will also follow suit, including individual tower projects and various housing schemes.

In order to meet the demands of its fast growing population, Kuwait intends to create satellite cities and towns in the outlying regions. Novel developments in the cities of Subiya, Khairan (potentially for 500,000 people), Jaber Al Ahmed City (100,000) and Arifjan (up to 100,000), and other smaller city developments such as Al Mutlaa, Saad Al Abdullah, Sabah Al Ahmad

City are currently experiencing a rise in activity, mostly related to large scale public housing projects.

Some of the other plans and proposals announced include the building of 22 new hospitals (nine of them are government-owned), proposals from the private sector for the construction of a 'Medical City', and the building of a new Kuwait University campus at Shadadiyah, which is estimated to cost around $3.5 billion (source: Arab-German Chamber of Commerce & Industry Quelle, 2008).

Al-Hamra Tower, which is a super tall skyscraper, is presently under construction in Kuwait City, and intends to have 70 floors of office space and a rooftop restaurant including a spa. A 10-screen cinema complex would be a major inclusion in the shopping centre. This is an international project. The tower will be complete by the end of 2010 as planned. This project is being handled by the Al-Hamra Real Estate Company and the Ajial Real Estate Entertainment Company. These companies seek to implement distinguished projects to meet the expectations of His Highness the Emir of Kuwait Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah, with efforts to turn Kuwait into a regional financial centre. The Al-Hamra Company believes it is better to invest inside Kuwait.

Al Khiran Pearl City, located 85km south of Kuwait City, is a waterside development covering an area of 6.4 million square metres. Having two natural tidal creeks at the site, it can house around 1000,000 people. The new city is expected to take up to 25 years to complete. Buro Happold is the master plan consultant. The project client is the La Ala Al-Kuwait Real Estate Company (Middle East Construction News, 2008).

The Failaka Island Development project is for the development of Failaka Island. The development will include the construction of a holiday resort, hotels, shops and restaurants. The total area of the island is 20 kilometres, and it is located 50 kilometres from the Kuwaiti coast. The estimated project duration is from 2010 to 2015. The main consultant is Al Dabbous Engineering (Middle East Construction News, 2008).

The Jabbers Ahmed al-Jaber Al-Sabah Hospital project is to be constructed in Surra, Kuwait. The hospital will have 1,120 beds, with the overall constructed area being 270,000 square metres. The hospital will have a wide range of medical services, including diagnostic and

treatment services, a trauma centre and casualty services, outpatient services, dental services, ob/gyn services, inpatient care services, VIP suites for the visiting heads of states, and a separate wing for VIP suites. The estimated project duration is from 2010 to 2014. The main consultants are Gulf Consults and Langdon Wilson International (Middle East Construction News, 2008).

The Radiant Alhareer, which is also called the City of Silk, is located in Subiya, Kuwait City. The mixed-use development will span an area of 250 square kilometres. The city will be conveniently divided into four main districts: Educational City, Finance City, Leisure City and Ecological City. This development will exhibit an Olympic stadium, residences, hotels and retail facilities (table 2.7).

**Table 2.7: Upcoming Major Projects in Kuwait**

| Project | Type | Expected Delivery Date | Estimated Cost (US$ bn) | Developer |
|---|---|---|---|---|
| City of Silk | Mixed use | | 86.0 | Tamdeen Real Estate Co./Ajial Real Estate Co. |
| Khairan Residential City | Residential | | 27.0 | Public Authority for Housing Welfare |
| Project Kuwait | Industrial | 2010 | 8.5 | Kuwait Petroleum Corporation (KPC) |
| Bubiyan Island | Tourism | 2016 | 6.0 | Mega Projects Agency (MPA) |
| Failaka Island | Tourism | 2014 | 5.0 | Mega Projects Agency (MPA) |

*(Source: Zawya, 2009)*

As a result of these developments, almost 450,000 new jobs will be created, along with almost 700,000 residents in the city. The project under design was approved by the Kuwaiti government in July 2008 (table 2.7). Civic Arts/Eric R. Kuhne and Associates is the urban and landscape designer. More than 10 years would be needed to complete the city. The completion duration of the first phase is 5-7 years. Construction of the first phase is expected to begin in 2012. The client is Al Tamdeen Real Estate Co., K.S.C.C (Middle East Construction News, 2008).

Observing the construction and demolition (C&D) debris, it is understood that a major component of municipal solid waste will account for about 15-30% of all solid waste by weight. More than 90% of this waste is in Kuwait. The amount of C&D waste is impacted by the ever-increasing use of land for new construction, renovation, destruction of old structures, and the reconstruction or expansion of the road transportation network. C&D waste is mostly dumped in landfills. However, in recent times, it has been acknowledged that there has to be

a diversion from the landfills of more and more waste components, which has led to C&D waste becoming a target of interest for recycling (Peng et al., 1997; Trankler et al., 1996).

Since Kuwait is a small country with very scarce land resources, the project of land filling of C&D waste is unsound and impractical, both economically and environmentally. Even if the building and construction waste comes from clearing up after natural disasters (e.g. earthquakes and tornadoes) or from human-controlled activities (e.g. war, demolition, renovation and new construction), the result of recycling will surely provide opportunities for saving land, energy, time, resources and money.

Although both economic and environmental factors makes it possible to reuse and recycle approximately 90% of the waste material, currently only a small part is really being reused in Kuwait. All public and private agencies should take correct measures to encourage (Kartam et al., 2004):

1. Avoidance and reduction of waste production, mainly by the development of cleaner technologies and the reuse of waste
2. Formation of disposal and recycling facilities
3. Management and planning of waste handling.

The innovation in social sciences has generated great awareness of the sanctity of life and the unacceptability of premature death due to accidents. Quite naturally, accidents at construction sites are seen as a major problem throughout the world, and in Kuwait, construction is one of the most hazardous industries, with construction accidents accounting for about 40% of all work-related deaths (compared to 14% in the USA) and 47% of all disabling injuries (compared to 9% in the USA). Safety is a factor which is very important in all industries, as it would be in any civilized country. Therefore, it is necessary to establish a Kuwaiti safety centre specializing in planning and controlling safety performance at the state level.

## 2.6 Summary

This chapter provides an overview of Kuwait and the area where the research is being conducted. Kuwait has a democratic system of governance and is led by a ruling family, the Al-Sabah. The population is a mix of nationals and expatriates. Significant developments to the country, economy and construction have been seen, especially after the Iraq war. Kuwait has one of the strongest currencies in the world, and there are almost no income taxes.

Kuwait is an oil rich country, and its dependence on oil can be witnessed from the discussions above. 95% of exports come from oil, and 80% of the government income comes from its oil production and exports. Kuwait is one of the six GCC countries, and is also a member of OPEC. Kuwait has been enjoying a budget surplus in the last 11 consecutive years. According to Reuters News, as of March 29 2010, the budget of 2010 has increased by US$28.81 billion within the first 11 months of the fiscal year.

Real estate has also seen considerable developments with the growth of the economy, and plays a significant role in business development. The real estate sector can be divided into residential, investment and commercial, and in 2006, 6% of Kuwait's GDP came from the construction sector. The real estate sector is primarily owned by individuals and locally owned family businesses, and there is a limited ownership from large companies or international firms. As discussed earlier, high oil prices, moderate inflation rates, abundant liquidity, political stability and the repatriation of funds have all been economic variables lifting the real estate market to unprecedented levels over the last few years.

With the increase in business, there is demand for an expatriate labour force, and this has also brought about demand for real estate, especially within residential complexes. Within commercial and infrastructure projects, the government has involved the private sector in the construction process, through the Public Private Partnership (PPP) and/or Build-Operate-Transfer (BOT) mechanisms. Some major upcoming projects are the City of Silk, Khairan Residential City, Project Kuwait, and developments on Bubiyan Island and Failaka Island.

# CHAPTER 3: TOTAL QUALITY MANAGEMENT (TQM)

## 3.1 Introduction

Total quality, or continuous improvement, is a consensus-based approach used by many industries for improving product quality and service (Young and Guess, 1994; Young and Winistorfer, 1999). It is a disciplined approach which helps organizations consistently meet customer requirements and drive continuous improvement through process-focused management.

## 3.2 TQM

TQM was developed in USA, but not as many people think in Japan. However, the Japanese effectively used it in the 1980s and the term became associated with them. Management in all organizations should embed the awareness of quality as part of their strategy. Conversely, many organizations preach it but few practice it.

In the eighties, many American companies faced challenges from Japanese products which were lower in price and higher in quality; and the reality is that the Japanese learned about TQM from the American Edward Deming. According to Tim Richardson (1988), 'TQM worked well in a homogenous culture such as Japan, but the challenge to apply TQM in North America is a multi- cultural workforce and high individualism index.'

Total quality management is defined as 'a set of systematic activities carried out by the entire organization to effectively and efficiently achieve organization objectives so as to provide products and services with a level of quality that satisfies customers, at the appropriate time and price' (TQM Committee, 2002). Total quality management is commonly expressed in conjunction with business excellence. It is a scientific management methodology which values the quality of organizations - quality not only in products, but also in their processes and in their organization of quality management.

According to the TQM Committee, in the 21st century, an organization seeks quality by establishing a respectable existence and a co-delighting relationship with the stakeholder. In order to accomplish this, the committee states that 'it is crucial that the organization achieve

competitive and praised ability, technology, speed and flexibility, and vitality' (ibid), and TQM has a significant role to play in meeting those requirements.

TQM is a management approach in which quality is required in all manners, to satisfy both employee and customer requirements. It involves every employee's daily commitment at the office, which differentiates TQM from other management systems. The term 'everybody' implies all levels within the organization, from frontline operators to middle management to executive management. All of the problem-solving processes for all parties contribute to strengthen the organizational capacity and management of the organization.

TQM is not a program, it is 'a strategy, a way of doing businesses, a way of managing, a way of looking at the organization and its activities' (Anschutz, 1995). Therefore, the success of TQM is measured not only by its tangible outcome, but also by both the way in which the organizational structure is established, and the processes by which corporate objectives are achieved.

TQM can be implemented through four fundamental principles (delight the customer, management by fact, leadership and people-based management, and continuous improvement) and eight core concepts (customer satisfaction, internal customers are real, all work is process, measurement, teamwork, people make quality, continuous improvement cycle and prevention). TQM is well used in manufacturing organizations, where TQM generally starts by sampling a random selection on the production line. The samples collected can then be tested for what the end-users consider most, which ensures standards.

TQM is used while implementing quality management systems such as:
- ISO 9000 (International Organization for Standardization)
- Six Sigma
- EFQM (European Foundation for Quality Management).

Before discussing the three certifications (ISO 9000, Six Sigma and EFQM), we need to analyze the evolution of TQM from the perspectives of its gurus.

### 3.3 Quality Management Gurus

### 3.3.1   Edward Deming

Deming emphasized the importance of statistical thinking in the continuous improvement of processes. He felt that Statistical Process Control (SPC) and Shewhart's Plan-Do-Check-Act (PDCA) cycle were important tools for understanding the sources of variability and improving processes. The continuous improvement philosophies of Deming were best communicated in his Fourteen Points for Management, which served as a framework for quality and productivity improvement. Deming's 14 points were as follows.

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.

2. Adopt the new values. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

8. Drive out fear, so that everyone may work effectively for the organization.

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
    - Eliminate work standards (quotas) on the factory floor. Substitute leadership.
    - Eliminate management by objective. Eliminate management by numbers, numerical goals.

11. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

12. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means abolishment of the annual or merit rating and of management by objective.

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the organization to work to accomplish the transformation. The transformation is everybody's job. (Deming, 1986, 1993; Walton, 1986)

Deming believed that one of the 'great evils' of American management was to produce products or services to a 'quality standard' or an 'acceptable-level' of quality (Deming, 1986). He felt that 'quality standards' did not promote continuous improvement. He believed that 'quality standards' produced numerical quotas, which were often met 'on paper' in the quarterly report, but could rarely be verified on the plant floor.

Deming stressed the importance of constantly trying to improve product design and performance through research, development, testing and innovation. He also emphasized that

production and service systems should be continuously improved. He was emphatic about the idea that quality was not some minor function to be handled by inspectors, but an organization's central purpose and a top priority for executive management. Deming felt that employees would not consider quality an important issue if there was no support from or communication with executive management within an organization (Deming, 1986; 1993). There were many other researchers who made significant contributions to the quality movement, namely Joseph M. Juran, Genichi Taguchi, Armand Feigenbaum and Kaoru Ishikawa.

### 3.3.2   Joseph M. Juran

Joseph M. Juran was best recognized for his philosophies of 'Total Quality Management' and 'Cost of Quality'. In the early 1960s, Juran initiated the concept of the cost of quality, which reemphasized management's responsibility for quality. He felt that quality related costs occurred in two categories: 'unavoidable' and 'avoidable.' He felt that design flaws contributed to 'avoidable' costs incurred during manufacturing or from customer complaints. Juran felt that more planning and attention was needed at the design stage of products, to reduce avoidable costs of poor quality (Juran and Gryna, 1951; 1993).

Total Quality Management (TQM) refers to an integrated approach by management to focus all functions and levels of an organization on quality and continuous improvement. TQM emphasizes customer-focused quality, not just for customers of the final product, but also for the organization's internal customers (Kilian, 1992). TQM implementation requires total participation and commitment organization-wide. TQM is not a program for achieving a specific and static goal, but is instead a process committed to continuous quality improvement. The reason why continuous quality improvement is an integral part of TQM is because Juran felt that an organization must continuously improve to survive in a fast-changing and highly competitive business environment (Grant et al., 1994). Juran made significant contributions to the development of TQM.

Juran believed that quality management's specific task was not only to identify and eliminate variation, but also to serve customer expectations. The entire organization must embrace TQM as a customer focused quality improvement initiative (Grant et al., 1994; Juran, 1992). TQM comprises a group of techniques for enhancing competitive performance by improving the quality of products and processes (Grant et al., 1994). To successfully implement TQM,

the systematic changes needed by management include the redesign of work, the redefinition of managerial roles, the redesign of organizational structures, employees at all levels learning new skills, and the reorganization of organizational goals. Proper implementation of TQM has seen numerous financial gains for many organizations (Grant et al., 1994).

### 3.3.3   Armand Feigenbaum

Armand Feigenbaum's major influence on the quality movement was his concept of 'Total Quality Control'. Feigenbaum defined 'Total Quality Control' as 'an effective system for integrating the quality-development, quality-maintenance, and quality-improvement efforts of the various groups in an organization to enable marketing, engineering, production and service at the most economical levels which allows for full customer satisfaction' (Feigenbaum, 1991).

The word 'Total' in 'Total Quality Control' implied that quality control was everyone's job. Feigenbaum's definition of quality was to obtain complete customer satisfaction by providing a product and service which was designed, built, marketed and maintained at the most economical cost. He felt that these values would provide motivation for all of the organization's employees, from top management down to assembly workers, including office personnel, dealers and service people (Feigenbaum, 1991; 1996; 1997).

The scope of 'Total Quality Control' relied on the underlying principles of quality to identify customer requirements. A complete measurement of customer requirements did not end until the product was placed in the hands of the consumer, who continually remained satisfied. 'Total Quality Control' was designed to guide the synchronized actions of people, machines and information, for achieving the goal of customer satisfaction (Feigenbaum, 1991; 1996; 1997).

The key features of Feigenbaum's concept of 'Total Quality Control' were:
- communication of quality in organization-wide and plant-wide activities
- strategic planning for quality
- competitive market leadership through strong customer quality assurance
- measure of profitability improvement and return-on-investment from quality initiatives

- rapid product development and introduction

- maintaining and updating technology

- elimination of work building relationships with vendors and suppliers

- identifying key factors within an organization which led to 'Total Quality Control'.

### 3.3.4 Kaoru Ishikawa

Kaoru Ishikawa is considered by many researchers to be the founder and first promoter of the 'Fishbone' diagram (or Cause-and-Effect Diagram) for root cause analysis (Ishikawa, 1987). He is also recognized for the concept of Quality Control (QC) circles. The value of the 'Fishbone' diagram represented a structured brainstorming approach to problem solving. The basic idea of the 'Fishbone' diagram was to make a listing of all of the possible causes which may have an effect on a known problem. Ishikawa categorized the 'Fishbone' diagram into five main categories (Materials, Methods, People, Machines and Measurement).

Ishikawa felt that the 'Fishbone' diagram was a key tool to be used by workers for problem solving in Quality Control (QC) circles. Ishikawa felt strongly about the proper use of problem solving tools in the improvement of quality. His concept of the Quality Control (QC) circle was to bring production workers, maintenance, design engineers and managers together in organized meetings to solve problems. The quality control circles were critical in the complete root-cause analysis of any problem. The quality control circles were responsible for diagnosing problems and developing permanent solutions for problems (Hermens, 1997; Ishikawa, 1987; Nicholas, 1998).

### 3.4 The Role of Organizational Management in Quality Management

Management commitment is essential in achieving quality management in an organization; such commitment is to be shown to employees, customers and other stakeholders. Total quality concerns are basically announced by the management, who are committed to the organization's policy and established goals. They are then circulated to all levels of departments and sections, with specific and measurable policies and objectives.

A management decision can lead an organization either upwards or downwards. It is not difficult to find examples of established organizations with long-standing success being hit hard by a scandal - seeing their favourable public reputation being lost quickly. Therefore, in

order to achieve sustainable business management, it is necessary for management to implement TQM to convincingly articulate to its subordinates its firm commitment.

Managers are desired to lead in the following areas:

1. performance
2. expertise
3. ownership
4. challenge and visibility
5. mentoring, supporting and role modelling
6. global experience and cultural breadth.

The first stage of development is the preparation stage, in which managers discuss the approach towards TQM. They 'identify and collect information about the organization in the prime areas where improvement will have most impact on performance' (Kanji and Asher 1993; p. 104), while exploring their knowledge on TQM by attending internal and external seminars. As in every study based on quality management, the commitment of management and its strong leadership are two of the most important elements in quality management. Therefore, management needs to be fully familiarized with TQM, and fully understand the objectives, the methodology and its impact on the organization's operations, before disseminating them organization-wide.

As Kume's (1996) study suggests, many organizations do not introduce TQM throughout the organization straightaway. They try it in one part of the organization to see if it can be applied to other departments of responsibility. After TQM effectiveness is assured, the second stage is for management to decide which department will be responsible for its promotion. Many organizations assign this role to their planning office or quality control Circle Office. Then, management formally announces that TQM will be introduced across the organization, and it is implemented in an organization-wide operation.

At the same time, specific training is provided and the activities are disseminated among the different levels of the organization. According to Kume, at this stage, the most important challenge for the organization is how to overcome the negative attitudes of some of the people responsible for the work being improved.

The third stage involves the linkage of the TQM with management policy, and communicating that linkage. As Kume (1996) suggests, it is often the case that policy is only a written exercise of management which is never really implemented. Thus, linking the policy with improvement activity enables the activity to be implemented systematically across the whole organization. Once the activities are seen to be effective, they are standardized and expanded organization-wide. As a cross-functional operation, after activities are well established, the organization often tries to tackle problems which affect the organization as a whole.

Also, a management audit takes place to see whether or not it has happened, and if so, how the policy is implemented in the organization. Management is expected to examine not only the implementation of the activities but the outcome of those activities, and provide appropriate comments and guidance. Application for a quality award such as the Malcolm Baldrige Award or the Deming Prize can be one of the stimuli for the organization.

At the final stage, the main issues will be how to maintain the improved organization-wide quality management. Kume describes how a system will soon deteriorate if not looked after properly. It is important to make sure that the quality level does not deteriorate once it has been improved. This underscores the importance for the organization to improve and enhance its activities in a systematic manner from time to time.

### 3.4.1 TQM and Leadership

Leadership has been defined in a number of ways, such as the ability to guide followers towards shared goals (Bryman, 1992), as a form of influence (Hersey, 1984) and as something a leader simply does (Fleishman, 1973). Pfeffer and Salancik (1975) indicate that leaders exhibit task- and relational-oriented behaviours. Additionally, Castaneda and Nahavandi (1991) indicate that employees are most satisfied when they perceive their supervisors to be exhibiting both relational- and task-oriented behaviours.

Leaders are individuals who generally take control of a particular situation, either by assisting their team to achieve set objectives or by not taking any action at all, as a corrective measure in certain scenarios. Ideal leaders would always seek the necessary measures to deal with a situation in a non-manipulative manner, in order to avoid any resistance in that respect. A leader must possess the ability to influence his team's actions in a positive way through

effective communication. He must reserve his values and practices, in order to lead his team by setting-up a soaring benchmark for his people and make them firmly believe in their set missions.

Leadership is not limited to bestowing commands and instructions, but in demonstrating one's values. According to Zeithaml et al. (2006), 'strong service culture begins with leaders in organizations who demonstrate passion for service excellence'. Employee commitment is enhanced when managers can gain the confidence and respect of employees. They should also develop programs for improving leadership quality, which should form an important part of the organization's strategy. Performance management is one such area which is focused towards increasing manager competency in specific areas (Armstrong, 2006).

Leadership is most effective when the work gets done in a timely, creative, profitable and energetic manner, with a great attitude and a low level of stress. Leadership is most effective when the people who are following are self-motivated. Any leader should have the skills to satisfy the employees, such as compatible culture/values, respecting confidentiality, accepting responsibility, demonstrating positive management skills, making decisions quickly, demonstrating the ability to evolve, behaving professionally, providing an atmosphere of continuous improvement, and regularly reviewing the performances and capabilities of the employees to motivate them. Leadership requires developing the organization's culture and its employees. TQM will be one effective tool for developing the organization's culture and Human Resources, in order to develop the employees.

### 3.4.2 Organization's Culture

Defining culture is very important, and the most comprehensive definition of culture is adapted from Schein (1992), who states that culture should be defined in such a way which stresses how important the perceptions of an individual are, instead of only emphasizing the possible importance of having shared meaning. This definition of culture is:

> *'an individual's basic assumptions invented, discovered, or developed as he or she learns to cope with problems of external adaptation and internal integration – that have worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems.' (Schein, 1992).*

Culture, therefore, refers mostly to latent and underlying assumptions, philosophies and values which work to explain why it is that things happen in the way that they do within organizations (Schneider and Gunnarson, 1991).

It has also been suggested that an organization, as well as the specific units which are contained within that organization, can have various cultures, because the rewards, procedures and practices which those organizations or departments are focused on have objectives and goals which are different.

### 3.4.3 Organizational Effectiveness through HR Development

The organization's workplace affects the way in which employees think, feel and behave, and these in turn affect the organizations they work in. Human Resource Development (HRD) has been a key contributor towards achieving organizational effectiveness and maximizing returns from the most important asset of the organization – its employees (Hyland et al., 2005). HRD strategies need to be developed and aligned alongside organizational needs, to maximize operational effectiveness in an ever-changing environment. This is achieved by providing training and development activities. Kuratko et al. (2001; cited by Hyland et al., 2005) argue that, in a knowledge era, competitive advantage can only be gained through the effective involvement of management and development staff, and the most strategic way to invest in employees is through learning activities.

HRD is vital to an organization, as employees bring forth ideas of innovation, quality, continuous improvement and other critical factors, which make organizations compete and survive. These factors pertain towards the HR development and strategies within an organization (Swart et al., 2005). Therefore, the need for the development of HR is mandatory, and should be an ongoing process. This brings forth the need for the employer and employee to understand the importance of HRD. According to McFarland (2003), 'Survival isn't just a matter of smart machines. Workers have to get smarter as well, and show a willingness to learn new technologies' (BusinessWeek.com, 2003).

### 3.5 Six Sigma

Total quality or continuous improvement is a consensus theme used by many industries for improving product quality and services (Young and Guess, 1994; Young and Winistorfer, 1999). Over the last decade, a newer quality philosophy known as 'Six Sigma' has become

well established in many companies. The 'Six Sigma' quality improvement philosophy is not only impacting the global business sector, but also will re-shape the discipline of statistics (Hahn et al., 1999).

Six Sigma began with Motorola in the 1980s, followed by AlliedSignal in the 1990s, but it was General Electric which made it a popular management philosophy. Motorola started using Six Sigma to systematically improve processes by eliminating defects. Success through Six Sigma can only be achieved if it affects everyone in the organisation. It is a cumulative effort towards achieving quality for the entire organisation. Six Sigma teaches everyone in the organisation to become more effective and efficient. The prime objective is to have satisfied customers and reduce costs by controlling wastage.

The Six Sigma philosophy for improving product and service quality is based upon existing principles established by other well-recognized quality experts, such as Deming, Juran and Ishikawa. The significant difference between the Six Sigma philosophy and existing quality philosophies is that it promotes a stronger emphasis on monitoring production yield and manufacturing costs associated with any quality improvement effort.

It is a disciplined approach which helps organizations consistently meet customer requirements and drive continuous improvement through process focused management. Six Sigma organizations follow a rigorous process improvement methodology - the Define-Measure-Analyze-Improve-Control (DMAIC) method - managing by facts using data and measurement tools, techniques and systems. While this understanding of Six Sigma is correct from a strict quality perspective, the definition is only half right. First and foremost, Six Sigma is about delivering value to the shareholder. It is all about driving results: creating, preserving and realizing value.

The Six Sigma movement stems from the quality journey experienced by Motorola, an American corporation which, in the late 1970s and early 1980s, saw Japanese competition gain a significant market share with superior products. As Motorola executives began looking for ways to cut waste, Bill Smith, a senior engineer and scientist within Motorola's Communications Division, was studying the correlation between a product's field life and how often that product had been repaired during the manufacturing process (Harry and Schroeder, 2000).

Smith found that, if a product was found to be defective and needed corrections during the production process, other defects were bound to be missed and found later by the customer. However, when the product was manufactured error-free, it rarely failed during early use by the consumer. Smith's results were at first greeted with scepticism, but seemed to lead to the start of Motorola's quest to improve quality in a more proactive manner, which simultaneously led to reduced production times and costs. Harry and Schroeder (2000) argue that it was this link between higher quality and lower cost which led to the development of Six Sigma.

### 3.5.1 Six Sigma Case Study

American Express applied Six Sigma principles to improve external vendor processes and eliminate non-received renewal credit cards. GE Capital Corp., JP Morgan Chase and SunTrust Banks use Six Sigma to focus on and improve customer requirements and satisfaction. Therefore, the main objective of Six Sigma is to improve the performance of the process (Park, 2003). Improving the performance of the process will lead to a reduction in cost and increased customer satisfaction resulting in increased revenue, thus producing increased profits.

Park (2003) states the following reasons for the popularity of Six Sigma:
- A quality management strategy which provides a scientific and statistical basis for quality assessment for all processes through the measurement of quality levels, showing a way of achieving process innovation and customer satisfaction
- Six Sigma provides efficient manpower utilization, as the company will provide opportunities and incentives for employees to focus their talents and abilities to satisfy customers.

Six Sigma can be defined as a rigorous and disciplined methodology which uses data and statistical analysis to measure and improve a company's operational performance, by identifying and eliminating 'defects' in manufacturing and service-related processes. Commonly defined as 3.4 defects per million opportunities, Six Sigma can be defined and understood at three distinct levels: **metric, methodology** and **philosophy**

**Metric:** 3.4 defects per million opportunities.
**Methodology:** DMAIC/DFSS structured problem solving roadmap and tools.

**Philosophy:** Focusing on continuous improvement by taking customer-focused and data-driven decisions, and analyzing business processes.

### 3.5.2 Six Sigma Quality Values

The most recent quality value to be adopted by businesses around the world is known as Six Sigma. The founder of the Six Sigma values is Mikel Harry (Harry and Schroeder, 2000). Mikel Harry developed and implemented his Six Sigma values with the Motorola Corporation, and the value has had great success at the GE Corporation (Harry and Schroeder, 2000). Many organizations, such as Ford, Xerox, Intel, Honda, Sony, Hitachi, Texas Instruments and American Express, have adopted the Six Sigma quality values.

Six Sigma derived its name from the Greek letter sigma ($\sigma$). Sigma is used in statistics to define 'the parametric statistic population standard deviation' (Pyzdek, 1999). It is defined in statistics as six population standard deviations, which in a parametric sense would encompass 99.74% of the data population. Six Sigma should not be confused with the statistical definition. Even though it derives its name from a statistic, it is a broad quality value which focuses on using statistical methods to improve quality, decrease costs, reduce waste, and rework and streamline business operations (Breyfogle, 1999).

Six Sigma incorporates many of the traditional quality philosophies established by Shewhart, Deming, Juran, Taguchi and Ishikawa. The Six Sigma values enhance many of the established philosophies by developing an organized framework for continuous improvement (Harry and Schroeder, 2000). Six Sigma values depart from traditional quality philosophies in their detailed focus on financial performance and harsh treatment of employees who do not show a financial return from a Six Sigma quality initiative.

### 3.5.3 The Improvement Methodology of Six Sigma

Six Sigma is an improvement methodology which uses statistical and non-statistical analysis to identify and deal with problems and opportunities. The methodology assists in the minimization of waste and the optimization of resources, while simultaneously aiming for enhanced customer satisfaction.

In statistical terms, Sigma is a measure of variation, called standard deviation. The larger the number of standard deviations which can fit between the process's mean and the nearest

tolerance limit, the fewer defects there are. Most organizations produce results, at best, around four Sigma, or more than 6,000 defects per million (Basu, 2004). By contrast, at the Six Sigma level, the expectation is only 3.4 million defects per opportunity.

A defect is any part of a product or service which:
- Does not meet customer specifications or requirements
- Causes customer dissatisfaction
- Does not fulfil the functional or physical requirements.

Opportunities are units of work which could be a service, a part, a report and so on. Also, the Six Sigma approach recognizes and accounts for the fact that processes vary over time. Inevitably, when data about a process is gathered over a period of time, observers will see that the process does not always perform on target.

The difference between Six Sigma and other improvement methodologies is the focus on reducing variation. Variation results in costs for the organization itself or for its surrounding - the suppliers and customers. The costs of variation can be described by the loss function. The cost increases as the value moves away from the target (Magnusson, Kroslid and Bergman, 2003). Many organizations today are working on improvement projects. Because of its large range of improvement areas, Six Sigma is preferred by the majority of organizations for reducing variation.

Six Sigma can be used in ongoing improvements, but also in breakthrough improvement projects. The focus on variation reduction assumes that the mean has first been improved to a satisfactory level. According to Pyzdek (2001), the main effort in the Six Sigma methodology is to reduce process variation, and consistently meet or exceed customer expectations and requirements. However, to attain breakthrough improvements which are needed for the organization to grow and adapt to a changing environment, some waste and variation has to be allowed for when developing new products. It is important for the managers to understand this contradiction.

Six Sigma highlights:

- The origins of Six Sigma trace back to Card Frederick Gauss (1777-1855) and his study of the 'normal curve'.

- The term Six Sigma was coined by a Motorola engineer in its Communication Sector, named Bill Smith. He was the one who stepped up with the idea that the company could prevent defects and gain a better control over manufacturing, rather than merely make repairs. His plan comprised of exact measurements and analysis to anticipate problems.

- Six Sigma was officially implemented in Motorola in 1987, and won the Malcolm Balridge National Quality Award the following year. The practice and implementation of Six Sigma saved Motorola US$19 billion.

- Maintaining a higher Six Sigma level increases the customer satisfaction; costs and defects drop by an inverted proportion.

- Six Sigma has two approaches:
  1. DMAIC (Define, Measure, Analyze, Improve, Control) – used in pre-existing systems for troubleshooting and fixing problems.
  2. DMADV (Define, Measure, Analyze, Design, Verify) – used for businesses to build from the ground up.

### 3.5.4 Six Sigma Strategies, Principles, Tools and Techniques

The financial benefits are substantial when an operating system performs at 6-sigma quality instead of 3-sigma quality, where control limits equal the specification limits. At the operational level, the goal of implementing Six Sigma is to move the product or service attributes within the zone of customer satisfaction and reduce process variation (Blakeslee, 1999; Hahn et al., 1999; Harry and Schroeder, 2000). Six Sigma closely examines organizations' repetitive processes using statistical methods, and translates customers' needs into separate tasks by defining the optimum specification for each task (Defeo, 1999; Harry, 1999).

The term Six Sigma is defined by Harry as producing products or services in the long-run which are on target and are six sample standard deviations within the specification limits, i.e., only some parts will be outside the specification limits. Each control limit in the short-term in a Six Sigma process which is three standard deviations inside the corresponding specification

limit. The number of defects produced at a short-term Six Sigma quality rate would manufacture one part defective per billion opportunities (figure 3.1). Harry (2000) realises that most manufacturing processes have a changing process average. To account for this, he defines long-term Six Sigma quality as producing products or services which are at sample rate standard deviations within the specification limits, due to a wandering process average around the target (table 3.1).
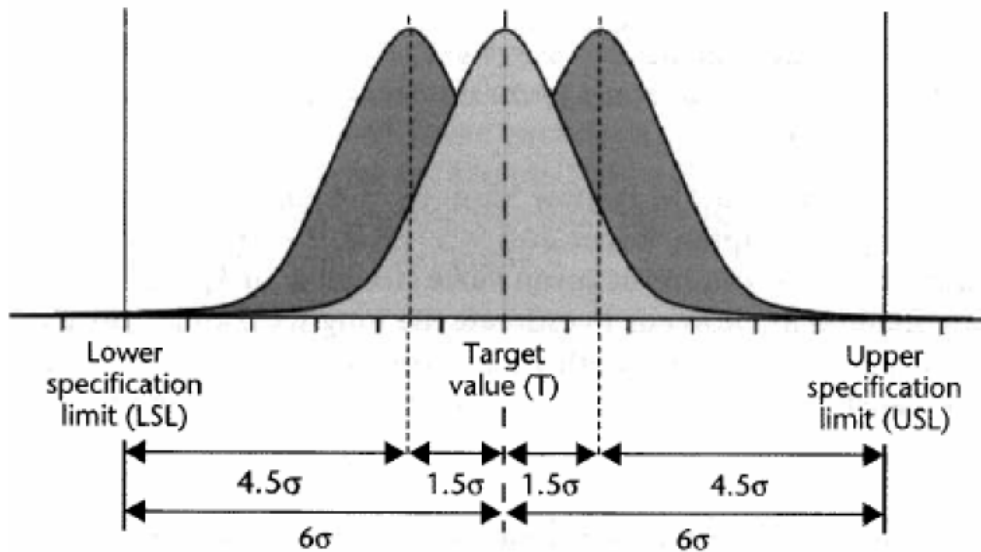


**Figure 3.1: Six Sigma standard deviations**

*(Source: Harry, 2000)*

**Table 3.1: Six Sigma strategies, principles, tools and techniques**

| Six-Sigma business strategies and principles | Six-Sigma tools and techniques |
|---|---|
| • Project management | • Statistical process control |
| • Data based decision making | • Process capability analysis |
| • Knowledge discovery | • Measurement system analysis |
| • Process control planning | • Design of experiments |
| • Data collection tools and techniques | • Robust design |
| • Variability reduction | • Quality function deployment |
| • Belt system | • Failure mode and effect analysis |
| • DMAIC process | • Regression analysis |
| • Change management tools | • Analysis of means and variances |
| | • Hypothesis testing |
| | • Root cause analysis |
| | • Process mapping |

To compete with the rest of technical world, the implementation of quality management in organizations needs to become more effective and efficient. The time for developing new products must be reduced; quality has to be improved with increased production, while costs have to be reduced. To meet those needs, a Six Sigma approach can be effective (Breyfogle, 1999). Six Sigma can be differentiated from other improvement methodologies through its packaging of quality tools and philosophies, and the focus on cost reduction and the organization (Foster, 2004).

Six Sigma was first initiated by Motorola to cut the organization's costs in 1982. This quality management has become more popular and been adopted by many organizations. At Motorola, the CEO at that time wanted to cut annual costs in half. This focus on costs gave a reason for Motorola to improve product design with the help of analytical techniques. This was the start of Motorola's Six Sigma program (Foster, 2004).

### 3.5.5 DMAIC - the Improvement Cycle and Tools Used in Six Sigma

The common tools used in a Six Sigma improvement program are not new, but the way they are packaged and deployed within an organization is. DMAIC stands for Define, Measure, Analyze, Improve and Control (Foster, 2004). The range of improvement areas using the DMAIC-cycle is very widespread. It can be used to improve critical-to-quality characteristics, such as critical to customer, critical to process, and critical to compliance (table 3.2). The improvement-cycle has also been successful with problem-solving and general decision-making; it is a systematic and easy-to-use methodology (Magnusson, Kroslid and Bergman, 2003).

**Table 3.2: DMAIC modelling for improving and maintaining the Six Sigma processes**

| Description of Activity | Improvement of Process | Design / Re-design of process |
|---|---|---|
| Define goal of improving activity | • Determine requirements<br>• Set the planned results | • Identify problems<br>• Define the planned results |
| Measure the existing system by setting reliable metrics for supervision of progress towards goal and use analyse of information | • confirm problem / processes<br>• filter problem/ planned results<br>• measure key steps | • measuring performance according to the requirements<br>• gather information on process efficiency |
| Analyse the system to eliminate gaps between current system or process performances and the desired goal.  Apply statistical tools to perform analysis | • develop hypothesis on causes<br>• identify 'vital minority' of the root of cause<br>• confirm hypothesis | • identify the 'best practices'<br>• assess process design<br>• filter the requirements |
| Improve the system, by using project management and other tools of management and planning, as well as statistical methods, to validate improvements | • develop ideas for removing the root of causes<br>• test solutions<br>• standardise solutions and measure results | • design new process (check assumptions, apply creativity)<br>• Implement new process, structures, systems |
| Control the new system. Institutionalise the improved system by modifying the system of rewards, policies, procedures, budget, etc. | • set standard measurements for maintenance of performance<br>• correct problems as required | • set and re-examine measurements to maintain performance.<br>• Correct problem as required |

*(Source: Milosavljevic and Rall, 2005)*
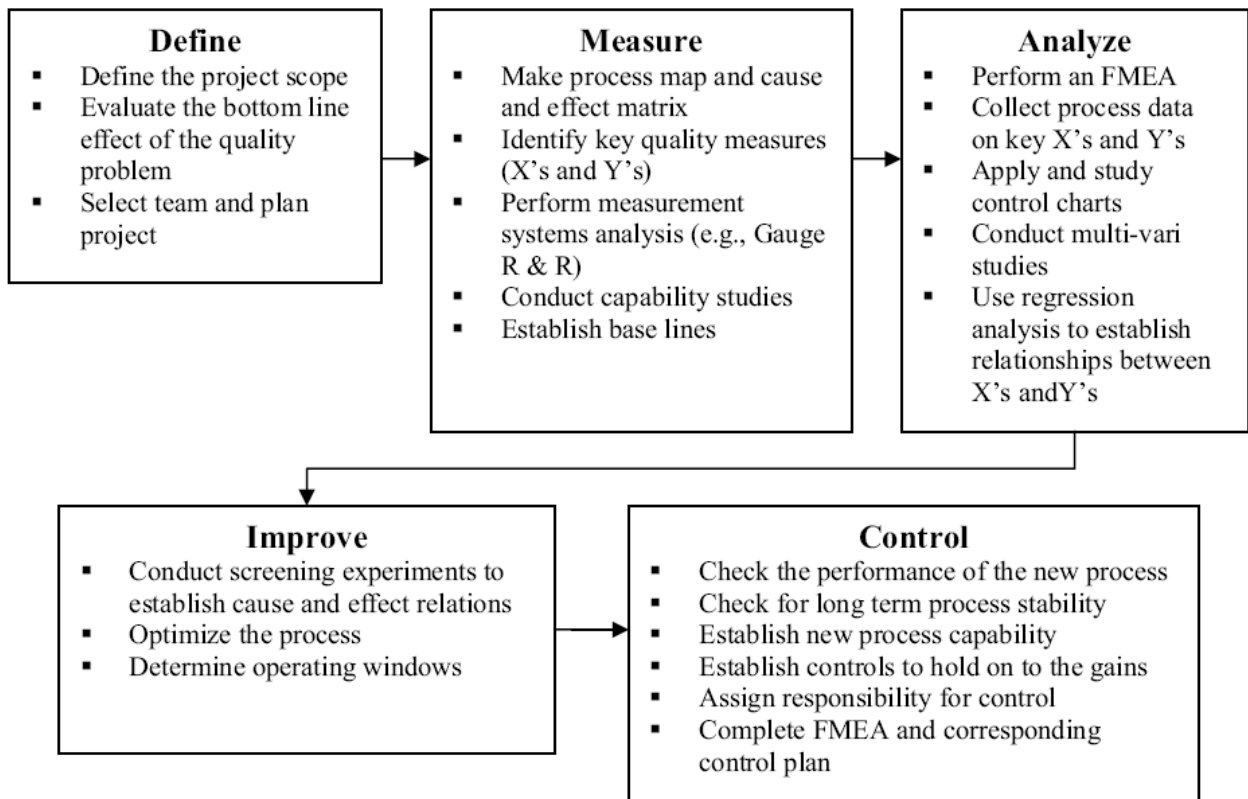
**Figure 3.2: An illustration of the Six Sigma DMAIC process**

*(Source: Does et al., 2002)*

At the **Define** stage, the problem and the goals of the project are defined. A business case is made. The critical characteristics to improve are chosen. The baseline for the process is also determined; commonly used tools are Pareto charts and flowcharts. In other words, Define the customer, their Critical to Quality (CTQ) issues, and the Core Business Process involved (figure 3.2):

- Define who the customers are, what their requirements are from the products and services, and what their expectations are
- Define the project boundaries; the stop and start of the process
- Define the process to be improved by mapping the process flow.

The **Measure** stage is used for identifying possible factors influencing the chosen variables. A measurement plan is made. One common used tool at this stage is cause-and-effect diagrams. Measure the performance of the Core Business Process involved (figure 3.2):

- Develop a data collection plan for the process
- Collect data from many sources to determine the types of defects and metrics

- Compare to customer survey results to determine the shortfall.

The activities at the **Analyse** stage involve learning, to know the chosen y-variable. This is done through normality plots and histograms. Control charts are also common tools. This stage also includes identifying the $x$s influencing the $y$. Useful tools are Pareto charts, correlation analysis, regression analysis and factorial experiments. In short, Analyze the data collected and process map to determine the root causes of defects and opportunities for improvement (figure 3.2):

- Identify gaps between current performance and goal performance
- Prioritize opportunities to improve
- Identify sources of variation.

The fourth stage, **Improve**, concerns improving the process using knowledge from the earlier stages. If this stage is reached, some influencing factors have been found. Every possible solution which is found should undergo a cost/benefit analysis. Improve the target process by designing creative solutions to fix and prevent problems (figure 3.2):

- Create innovate solutions using technology and discipline
- Develop and deploy the implementation plan.

**Control** is the last stage in the DMAIC improvement cycle (figure 3.2). The improvement should now be verified using control charts, where the predictability and the performance of the $y$-variable are confirmed. Often, the process need some time to become stable. The tools recommended to be used in each stage are different from one author to another, and are based on the characteristics of the improvement project. Magnusson, Kroslid and Bergman (2003) collated 49 useful tools in the seven-times-seven toolbox. These are categorized into seven groups, with seven tools in each group. These tools can be viewed in supplement F. Master Black Belts and Black Belts in an organization should be able to master most of these tools. The tools used in this project are mainly based on this approach, and are chosen from the seven-times-seven toolbox.

Six Sigma organizations follow a rigorous process improvement methodology – the define-measure-analyze-improve-control (DMAIC) method – managing through facts, using data and measurement tools, techniques, and systems. While this understanding of Six Sigma is

correct from a strict quality perspective, the definition is only half right. First and foremost, Six Sigma is about delivering value to the shareholder. It is all about driving results: creating, preserving and realizing value.

The most frequently mentioned success factors are senior management commitment, the focus on training, and linking Six Sigma to customers, human resources and suppliers. Six Sigma implementation is usually started as a senior management initiative. Then, a group of people are selected for the various training programs. It is recommended that executives who will be championing Six Sigma projects also receive training, to be able to provide better guidance and become proficient at selecting projects (Breyfogle et al., 2003).

### 3.5.6  Six Sigma Implementation Challenges

Many organizations worldwide have implemented Six Sigma and achieved remarkable improvements in their market share, customer satisfaction, and the reliability and performance of products and services, with impressive financial savings (Harry and Schroeder, 2000). However, there are a number of organizations which were unable to implement the methodology successfully, for cultural or other reasons (Arthur, 2005).

Crom (2000) argues that implementation challenges are strongly related to people, and so it is important to choose the right people and to motivate them for change in the right way. Crom (2000) also advocates soft skills training (for example, facilitating and change management). Gijo and Rao (2005) argue that failures are due to several hurdles before, during and after implementation, and they present a list of possible hurdles.  These are discussed below.

*Lack of constancy of purpose* – If the corporate level and the top management have differing opinions on Six Sigma, the initiative is likely to fail.

*Foot in several boats* – Too many simultaneous initiatives (Kaizen, Quality Circles, TQM, ISO 9000 and Six Sigma) creates confusion and a lack of enthusiasm.

*Old wine in a new bottle* – If consultants do not have the required qualities, people may not find any differences between the earlier methodologies and Six Sigma.

*Improper project selection criteria* – Projects must be selected in line with the organization's goals and objectives, and the project scope should not be too large (Pande et al., 2000; Antony, 2006).

*Lack of resources* – Some organizations are unable to spare their people for the training of Six Sigma or equipment for trials, due to the usual production pressures.

*Lack of coordination between functions* – Six Sigma projects are often cross functional, and a lack of proper coordination may lead to improper selection of their Critical-to-Quality (CTQ) characteristics, such as incorrect data.

*Concentration on the trivial many rather than the vital few* – Sometimes, the Critical To Qualitys are not suitably prioritized, and the ones which are easy to attack but do not give much return on Y are selected instead of those which have the most impact on Y.

*Short closure of projects* – Sometimes the projects may have been discontinued due to organizational restructuring.

*Non-availability of data* – Relevant data might be hard and expensive to collect.

*Impatience to get results* – To observe the effectiveness of any methodology requires time.

*Selection of belts* – The people side of the change is usually given too little attention. Six Sigma belts should have both technical and managerial skills. The selection of these belts plays a vital role in successful Six Sigma implementation.

### 3.5.6.1 Six Sigma Roles and Responsibilities

Six Sigma uses a martial arts ranking terminology to define a hierarchy which cuts across the business functions. Figure 3.3 displays the various belts used by Six Sigma.

**Figure 3.3: Six Sigma implementation roles**

*(Source: Pande et al., 2000)*

**Champions** are responsible for an integrated implementation of Six Sigma across the organisation. They report to the executive leaders of the organisations, and also act as mentors for the master black belts. GE certifies this level as 'Quality Leaders'.

**Master black belt** are the highest level of technical and organizational proficiency. They possess the understanding of mathematical theory on which the statistical methods are based. They undergo extensive training in statistics and problem solving techniques, and dedicate 100% of their time to Six Sigma. They help the black belts in applying these methods correctly. Statistical training should only be provided by the master black belts. It is also their responsibility to provide training to both the black belts and the green belts, in such as way so they can work independently. Black belts report directly to them.

**Black belts** are mainly technical leaders who are actively involved in organizational changes and development processes. They need to possess a background of a certain level of mathematics and tool quality analysis, and may be required to undergo training to become statisticians or engineers. Their training makes them proficient with one or more advanced statistical analysis software packages. They should also have basic computer knowledge to operate one or more operating systems, word processing, spreadsheet and database management software packages.

**Green belts** are trained by black belts and should be highly trained up in using various management, project management and quality management tools. They are also trained up to use problem solving and exploratory data analysis. The green belts who are part of the organizations are not totally dedicated to Six Sigma, but execute it as part of their usual jobs. These people are capable of forming and facilitating Six Sigma teams and managing Six Sigma projects from concept to completion, under proper guidance from the black belts.

**Yellow belts** possess a basic knowledge of Six Sigma, and are usually introduced as a corporate-wide imitative. They are not expected to actively engage in quality improvement activities, as they will not have completed a Six Sigma project as of yet. Yellow belts are also termed as white belts.

To summarise:

- *Champions*: Member of senior management team, reporting to Executive team and responsible for mentoring the master black belts
- *Master Black Belts*: Full time breakthrough experts and responsible for training the black belts and green belts
- *Black Belts*: Full time improvements experts/project manager and specialist
- *Green Belts*: Middle management/supervisors/project manager and team member
- *Yellow/White Belts*: Operators and front-line staff/team member.

When implementing Six Sigma, one should also be aware that Six Sigma only covers part of what a high performing organization needs (McClusky, 2000).

**3.5.6.2 The Development Process of Six Sigma and Quality Management**
Six Sigma and Quality Management considers the matter of quality control, and gives emphasis to the role and support of senior management in their implementation. Neither Six Sigma nor TQM focuses on a separate quality function; rather, both highlight cutting across all functions and perimeters of the organization. Both give significance to the people working within the systems and the change in the organizational culture. Training of people has importance in both of these philosophies, but TQM does not emphasize mass training in statistics and qualities like Six Sigma.

The issue of customer satisfaction is the fundamental consideration in both of these philosophies, as the customers are the ultimate adjudicators of quality. It can be said that Six Sigma focuses highly on business results, whereas the orientation of TQM is highly focussed on quality only (figure 3.4). In this sense, it can be said that Six Sigma is upholding a broader scenario. Another difference is that TQM mainly gives emphasis to self-directed and disciplined work teams, whereas Six Sigma highly emphasizes executive ownership and control over everything.
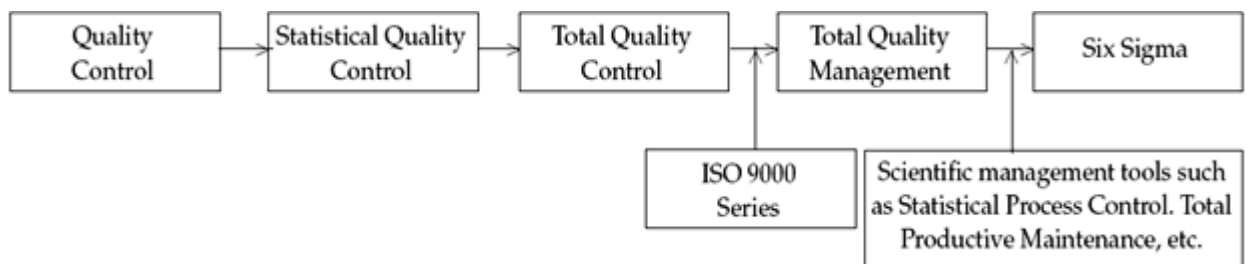


**Figure 3.4: Development process in Six Sigma quality management**

*(Source: Park, 2003)*

The employees working on a Six Sigma project should be more trained in statistics. The most amazing part of Six Sigma is its 'belt system', which is not found in TQM (table 3.3). As discussed earlier, Six Sigma emphasizes the utilization of quality leaders such as master black belts, black belts and green belts. If the functions and training of these leaders of different proficiency levels are analyzed, it will be conspicuous that the overall emphasis is strongly on training related to statistics and data analysis. Thus, it can be said that there is a strong emphasis on training on statistics, mathematics and data analysis in every case. TQM emphasizes training, but not necessarily like these highly rigorous statistical ones.

**Table 3.3: Comparison between TQM and Six Sigma**

| Similarities | Dissimilarities |
|---|---|
| Both focuses on quality control and continuous improvement | Six-sigma is a more mathematical approach in comparison to TQM |
| Both focuses on organizational culture | Six-sigma highlights on business result whereas TQM highlights |
| Both these philosophies do not consider a separate quality control system basically on quality; rather emphasize on injecting the quality concept in all functions of the organization | Six-sigma emphasizes more (than TQM) on employee training in relation to mathematics, statistics and data analysis |
| Employee involvement and training is important in both these philosophies | Six-sigma emphasizes on executive ownership whereas TQM concentrates more on self-directed work teams |
| Both the philosophies give high significance on customer satisfaction | Six-sigma facilitates efficient project management |
| Both these philosophies demand the absolute commitment from the top management | |

*(Source: Arthur, 2005)*

## 3.6 Summary

Organizations worldwide are today working with the TQM concept. Many organizations are successful in their implementation of TQM, but some are not. The failure at organizations which have implemented TQM can be due to leadership foresight. To succeed with TQM implementation, senior management commitment and endurance are important. Many organizations which have failed their TQM initiative do not work with the whole concept. Instead, just a few improvement tools are chosen, with the hope that this will solve all of the problems (Klefsjö et al., 1999). TQM is a continuous process, and the construction companies in Kuwait have to adopt the approach which best suits their requirements.

Through empirical research and data collected from construction companies in Kuwait, information regarding the TQM perspective and its importance will be gathered. Companies which have implemented TQM, those in the process of implementing it and the ones which have not yet, will be identified through the personal knowledge of these organizations. Each of these scenarios will help to identify the successful aspects of TQM, and the hurdles faced during and after implementation of TQM within construction firms of Kuwait. This

information will be useful for making improvements at existing TQM firms, and for those which are planning to implement it. The ones in the process of implementing or have plans to implement it can learn from the failure and success factors which will be identified through empirical research.

# CHAPTER 4: TOTAL QUALITY MANAGEMENT AND EMPLOYEE

## 4.1: TQM AND EMPLOYEE

An important point of belief held by TQM is that every employee should treat their colleagues as valued customers. "Ideally, each internal department operates like a customer-focussed business, much as it would if it were a company in and of itself, and its customers were free to buy its services from competitors" (Albrecht, 1993).There are customers in every organisation, and each provider is responsible for his response to the needs of those internal customers. The results of the internal service delivery system, which is designed to match internal users' needs, will comprise of more efficient internal exchanges among the various organisational members and departments, lower waste, lower costs, and improved external service quality – all pieces of the TQM assortment (Berry and Parasuraman, 1991; Ratcliffe, Smith and Brooks 1993).

### 4.1.1   Employee Participation

Employee participation can naturally be defined as the degree to which employees in an organization can involve in various quality management activities. When employees participate in quality management activities, they will obtain new knowledge, enjoy the benefits of the quality disciplines, and finally, obtain a sense of accomplishment by solving quality problems. Participation is decisive in inspiring action on quality management (Juran and Gryna, 1993). The employees' participation comes in the form of teamwork, employee suggestions, and employee commitment.

Team work is a key feature of employee participation. The objective of any team is to enhance the input and output of any stage. People from different staff areas form a team, and they will contribute ideas, plans, and figures. Teamwork is requisite throughout the organization; it can compensate one's strength for another's weakness (Deming, 1986). Team work and team's decision-making is advantageous than individual effort. With the addition of more knowledgeable people in the decision-making process, it would be possible to view many worthwhile possibilities leading to benefit. In a team, the members grade each others' thinking and views, hence reducing the number of errors committed by the team (DuBrin, 1995). The two most common features of TQM organizations are cross-functional quality

teams and task forces (Hackman and Wageman, 1995). Teamwork is the collaboration between managers and non-managers, between different functions (Dean and Bowen, 1994). In teamwork, the main job is to identify the needs of all and firms involved in decision-making, trying to find suitable solutions benefitting all those who are involved and simultaneously sharing responsibility and credit. Problem-solving teams have a variety of tasks to work on, ranging from cross-functional involvement in tackling quality problems related to many functional departments to solving within-functional quality problems. It was suggested by Anderson et al. (1994a) that it is good to have internal cooperation among employees as this enables higher individual performance by creating mutually beneficial situations among organizational members and between organizational members, and also, the organization as a whole.

### 4.1.2 Employee Incentive

There needs to be a good recognition and reward system for the organization's TQM initiative so as to encourage and motivate employees to obtain the desired performance. Organizations that aim at achieving quality and customer satisfaction need to integrate these aspects into their recognition and reward system. Many organizations use TQM to enhance their performance measurement and reward systems in order to assess and reward achievement of specific quality goals (Hackman and Wageman, 1995). Use of TQM greatly depends on performance measurement and performance-contingent rewards to encourage and control employees. Employees' recognition and rewards should be based on equity, since effective recognition and reward activities can inspire employees' commitment to the organization.

### 4.1.3 Employee Training

An employee needs to have particular skills or knowledge to hold a relevant position, and this can be gained through proper training. Appropriate training programs equip employees with knowledge of how to perform particular activities or a specific job. Simply having the education will only provide employees with general knowledge useful in particular settings. Education and training require a systematic approach, in other words, creating a sound education and training program calls for systematic collection of data about the employees' or the firm's needs. A good assessment comprises an analysis of: How well the firm achieves its goals; the skills required by the workforce to obtain these goals; and both the strengths and weaknesses of the current workforce. A proper study of these items gives valuable

information to create effective training activities. Therefore, it is just wise to invest in education and training to guarantee success of education and training programs.

Firms using TQM invest heavily in training for employees at different levels. Deming (1986) had pointed out the importance of properly training workers perform their work. Employee's work will improve only with proper training, so it is wise to provide training to employees as they require; which means, they need just-in-time training.

### 4.1.4   Employee Satisfaction

Employee involvement and satisfaction are, of course, two of the most important tools of continuous improvement and satisfied customers in most classical total quality management (TQM) literature (Deming, 1986; Ishikawa, 1990; Juran, 1989). It is quite impossible to derive excellent products without satisfied and well-motivated employees, who are actually the internal customers. And when there are no satisfied internal customers, it is impossible to achieve satisfied and loyal external customers, who are the real users of the products and services of a company.

An underlined theory of TQM is that each employee should treat other organisation members with whom he/she interacts as valued customers. "Ideally, each internal department operates like a customer-focussed business, much as it would if it were a company in and of itself, and its customers were free to buy its services from competitors" (Albrecht, 1993). Everyone in an organisation has customers, and each of them is liable corresponding to the needs of those internal customers. When the internal service delivery system suits the needs of internal users, the results will definitely include more efficient internal exchanges among the various organisational members and departments, lower waste, lower costs, and improved external service quality – all of which are components of the TQM framework (Berry and Parsuraman, 1991; Ratcliffe, Smith and Brooks 1993).

Moving from TQM to business excellence, the importance of the employees is stressed further. The basis of business excellence are the '4Ps' that a company must have in order to achieve excellence (Dahlgaard & Dahlgaard, 1999): people, partnerships, processes of work, and products. Now, this simply means that excellent employees combined with excellent partners via excellent processes produce excellent products. Therefore, it should be said that the employees of the company are the key drivers of excellence.

### 4.1.5   Job Satisfaction

An employee will be satisfied in his job when he or she has a positive feeling (approach or avoidance emotion) about different aspects of the work such as payment, promotional chances, supervision, and colleagues. In particular, Locke (1976) explained "job satisfaction" from an employee's point of view as "a pleasurable or positive emotional state from the appraisal of one's job or experiences".   Figure 4.1 illustrates a customer oriented service delivery.
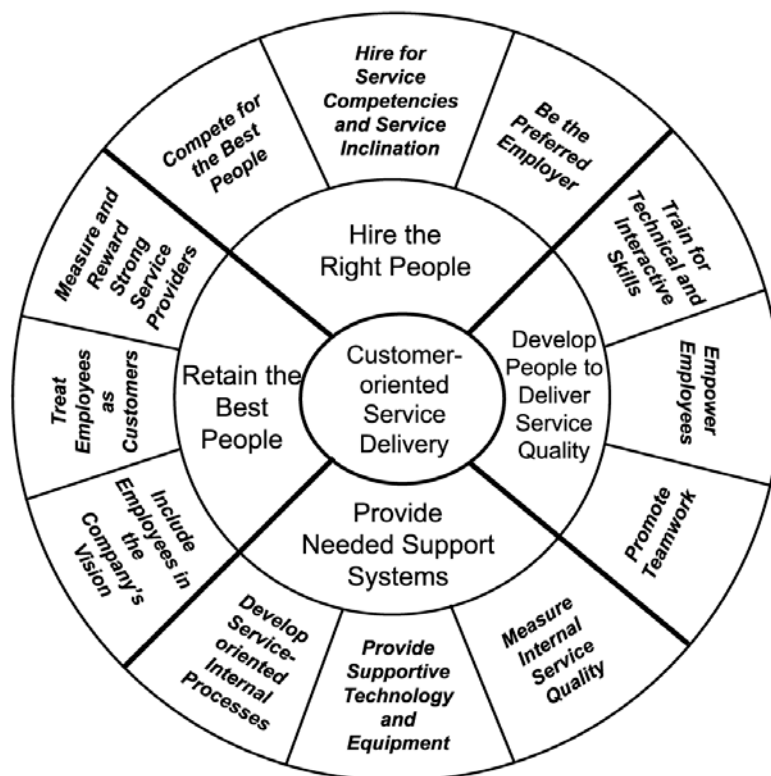


**Figure 4.1: Customer oriented service delivery towards job satisfaction**

*Source: Zeithaml et al, (2006)*

Oriented companies, to attain competition and profitable services, should focus on employment, training, and offering attractive work environment to its employees. That is, there should be investment in the manpower in these companies by taking care of the talents employees and who perform excellent services. A part of this can be done by giving employees ability and required skills to satisfy customers. Hiring right people in right place by an organisation will lead to build a customer-oriented, service-minded workforce. These goals can be reached by using the following strategies:

   a)   Employ the right individuals;

b) Improve employees skills to deliver service quality;

c) Build support systems; and

d) Retain the best employees.

### 4.1.5.1 Hire the right people

An organization should put a lot of effort towards finding and employing the right people to achieve a high quality service. When companies not choosing employees with required skills, they will have to train them and provide orientation to them. This old style hiring have to be changed, therefore, organizations are implementing new methods to select talented staff (Zeithaml et al, 2006).

#### Compete for the best people

There is a strong competition between organizations to employ better people. . Berry and Parasuraman (1991; cited in Zeithaml *et al*, 2006) described this competition as "competing for talent market share". As these organizations are competing using different strategy to increase their customer number and retain them, they are competing to hire better people.

Herman (1999) suggested that attracting and retaining talented employees in a competitive and changing environment are a very important challenge which faces different organizations in different business. People leave their jobs even for small reasons; for example, if they do not find appreciating for what they do. Now, organizations have to work on both sides, improving employees' skill and retaining them by satisfying them.

#### Hire for services competencies and service inclination

"Service competencies" are standing for ability and knowledge that needed to perform a job in best way. While "Service inclination" is the employees awareness to do customer related jobs proficiently. "Service competencies" and "service inclination" should be under concern during job interviews. To achieve this goal both the organization requirements and the organization needs should be under consideration. Both factors are the best way to reach customer satisfaction; as a result, people who own these factors should be chosen and hired.

#### Be the preferred employer

An organization should work hard towards being the preferred employer through which people will be attracted to be employed in this organization (Zeithaml and Bitner, 2000).

That can be reached by offering employee rewards, training programs, career and advancement opportunities, better internal support and through dealing in high quality of products and services that the employees will be proud to be part of it.

### 4.1.5.2 Develop people to deliver service quality

To reach customer satisfaction and providing high quality service, companies should build a strong training and developing programs to their employees. Hence, organizations with very well trained and developed employees will lead to powerful and skilful workforce which will meet with customer expectations.

*Train for technical and interactive skills*

Training and development are important part in any organizations. That is, training programs are critical factors of the organizations that want to develop and retain their employees. Technical skills and interactive ability training will help employees to get enough knowledge about their work which will lead to high performance and increase efficiency.

Technical skills relate to knowledge of how work with equipments and machines necessary to obtain high performance work. While, interactive skills relate to ability to solve problems, communicate with others, and accomplish tasks. Organizations have to provide these skills and training programs for every employee continuously.

Zeithaml *et al* (2006) argue that employees can be prepared to any environmental changes through well training programs. In addition, they believed that training will give employees a clear vision toward the organization goals and growth (Zeithaml *et al*, 2006). Moreover, well-trained people will help the organization to survive and grow in a competitive market.

*Empower employees*

"Empowerment is the process of enabling or authorizing an individual to think, behave, take action, and control work and decision making in autonomous ways. It is the state of feeling self-empowered to take control of one's own destiny" (Susan M. Heathfield, cited in about.com, 2008). Empowerment can be applied by providing staff different skills, tools, and power that they need to delivery high customer service. Empowering employees with good training play a vital role in organization high quality service which will attain customer satisfaction. Also, employees with enough empowering will contribute in customer retention.

Employee empowerment is increasing employees' capacity to resolve customer problems by themselves. Consequently, the customers will be satisfied due to the efficient and effective way to deal with their issues (Zeithaml *et al*, 2006). Empowered employees have to realize the main goals and problems of the organization and how is important their participation to achieve organization goals and resolve its problems.

*Promote teamwork*

Cooperation between employees encourages communication and knowledge sharing, which is a very important factor to achieve a customer satisfaction and expectation. If the organization has a good group of employees and work as teamwork, that will make every person to work at maximum capacity. The cooperation between employees and working as team each one support the other which will build trust which will reflect on the work and they will deliver high quality service. Teamwork can be motivated by rewards and incentives which improve working together to achieve common goals.

### 4.1.5.3 Provided needed support systems

Employees constantly need internal support from top management to achieve efficient and effective work. Examples of providing required support system are the following:

*Measure internal service quality*

Quality of customer service can be the standard of the internal services providing by an organization, the internal services should match with what customer expected (Gilbert, 2000). Kang et al. (2002) suggested that using the SERVQUAL instrument can help in measuring the quality of the internal service. Hallowell et al (1996) defined internal services quality as the measurement of the quality of the services that are offered by the internal service to its internal customers. They declared that there are difference between the internal service quality and internal marketing. The misunderstood comes from the fact that the internal service providers provide similar activities to marketing toward its internal customers. However, internal service quality is concerning the perception of internal customer service offered by the internal customers. Employees' satisfaction comes from providing excellent services. Besides, Employees' satisfaction is a result of their ability to provide results to customers because of the policies that are offered from organization. Hallowell and his colleagues (1996) suggested providing some factors that may help achieving internal service

quality such as: professional work place design, job plans, choosing employees, rewards and incentives, providing tools to serve customer, besides, and providing internal marketing activities.

*Provide supportive technology and equipments*

The importance of information technology has improved significantly in the service industry. That is, the innovative technology and tools facilitate communication and interact with the customers. Furthermore, this new technology will increase the efficiency of an organization (Edvardsson *et al*., 2000).

*Develop service oriented internal processes*

To improve the internal services, employees who involved in this part have to learn how to use service supported system that based on both current customers needs and future customers as well. That is, it is a key to retain existing customers and to grow the debt of the relationship with customers.

Senge (1990) described the five important factors which help in building up the organization internal processes. The five factors are: the systematic thinking of workforce, personal mastery, mental models, building common vision and group work learning. First of all, the systematic thinking contributes in realizing the complicated parts of a company in best way. Secondly, the personal mastery improves the employee motivation to understand their actions. Thirdly, mental models help employee to get better looking to their world. finaly, Building common vision which will help employees to see the organization main goal in clear way by improving group work learning.

### 4.1.5.4 Retain the best people

Organizations must retain their right employees by providing training and development programs. Retaining employees is a very important challenge to organization, employees who working for a long time in the organization will build a strong relation with customers. These employees understand the organization objectives and perspectives and can work more effectively than others. In addition, these employees will gain experience with time in the work that they can transmit to newer employees. Therefore, organizations work hardly to retain these employees (Zeithaml *et al*, 2006).

*Include employees in the company's vision*

Top management should encourage their employees to act on their own and take responsibility of these actions. As a result, employees will be committed to the vision of the organization. Senge (1990) stated that successful organizations are those who develop their employee's skills to learn at all levels in an organization which will increase the productivity of the organization. Get better leadership quality and keep the employees those who have ability to control the customer through a good customer service and approaches parallel to organization's vision. Cooperate between employees will lead to high quality customer service and will build a strong relationship between the employees.

*Treat employees as customers*

If organizations satisfied their employees as their customers, these organizations can retain their employees for a long time. To achieve that, the organization should provide products and services to satisfy their employees such as excellent benefits and high quality work life. Satisfaction its employees is an important part of HR strategies.

*Measure and reward strong service providers*

First step to achieve employees' satisfaction is to provide them with various benefits. After that, the employee performance should be under screen and rewards them. The rewarding system should concern both on individual basis and team basis. As a result, a positive competition between employees will be created which will enhance their performance towards high quality performance and customer satisfaction. Strategic rewarding system is a long term rewards. Long term rewards will support the visions of the organization and encourage employee to achieve these visions.

Strategic rewarding system can be defined as "what the organization wants to do in the longer term to develop and implement rewards policies, practices and processes that will further the achievement of its business goals." Thus, it is a kind of reward where the company aiming to reach long-term business objectives.

It is a rewarding system that based on "Ends" and "Means". "Ends" illustrate a vision of the reward policy regarding to time; while "Means" illustrate the procedure of achieving these visions. Armstrong and his colleagues (2007) described this as a visionary management, that

because, it helps creating organizations vision toward rewarding its employees. The goal of reward strategies is to organize rewarding and supports the business strategies.

**4.1.2: Organization Commitment**

Companies should commit to their strategies, objectives and principles. Example of these key concepts are new ideas, ownership, communication, management development, develop positive feeling to the work, and developing HR strategies (Armstrong, 2006). Some of the important concepts will be discussed further.

*Developing ownership*

That means to be part of the organization. Employees will fell that they are belong to the organization only if there is a good communication between them and the management. Also, this feeling can be enhanced if the employees feel that they are accepted from the management. Employees should feel that their ideas and suggestions are important and they are involved in organization decision; they should feel that they have effective contribution to improve the organization (Armstrong, 2006).

*Organization Culture*

Organizational culture means "the workplace environment formulated from the interaction of the employees in the workplace" (about.com, 2008). Organization culture is a combine of different factors such as life experiences, childhood, strengths, weaknesses, background, education and many other factors. Executives mainly are responsible to build the organization culture shape by their leadership qualities; however, all levels of the organization are involved.

*Communication programs*

Communication happens when the management are ready to listen and accept the employees. In order to do, management expectations should coincide with those of the employees. Complementary channels such as newsletters, briefing groups, videos, notice boards are often neglected for such communications. Communication should be more personalized and in parallel with the employee needs (Armstrong, 2006).

*Leadership development*

Management is just giving orders and instructions; it is also including representing one's principles. Zeithaml *et al* (2006) stated that "strong service culture begins with leaders in organizations who demonstrate passion for service excellence." Employee loyalty is improved when leaders achieve trust and respect of employees. In addition, leaders should build up programs that work to improve leadership quality which should be an important part of the organization policy. Performance leadership is aiming to increase manager ability in some areas (Armstrong, 2006).

### 4.1.3: Employee Loyalty

Employee loyalty is an action-oriented term that because it linked to the behaviour of the people (Duboff and Heaton, 1999; McCusker and Wolfman, 1998). Employee loyalty includes several things such as employees committed, personal responsibility, and employee intention to leave the work.

There are three subsystems inside any organization. These subsystems are: the cultural subsystem, the social subsystem and the technical subsystem. The cultural subsystem represents the characteristics and the general policies of the organization. The cultural subsystem highly affects the employee satisfaction and loyalty. The 'wrong' values may lead to employee dissatisfaction if these 'wrong' values involved in the employee job, still, the employee may quit the job if there is a big conflict between his or her personal values and these wrong values (McCarthy, 1997). The social subsystem includes factors that have effects on the person and directly on the job. The relation between the social subsystem and employee satisfaction and loyalty is likely to be a little different. The social subsystem factors can cause satisfaction which may lead to loyalty (Hellriegel *et al*., 1998), however, there is no direct effect on loyalty. In addition, the technical subsystem, also, has the same linkage to employee satisfaction and loyalty (McCarthy, 1997). Technical subsystem organized the relation between the employer and the employee based on the contractual issues. Hence, the contractual relations between employer and employee can lead to disloyalty without dissatisfaction if, for example, the employee find a better job in another organization.

### 4.1.4: SERVQUAL

Quality improvement plans pay special attention to build a successful internal customer service system, where all organisation members are trained to view colleagues up and down the value-added chain as main customers.

External customers consume products and services, while internal customers consume only services. For example, the purchasing department needs supplies of services for the marketing research department, which in turn designs and evaluates studies for marketing managers, who build up strategies and plans for the sales department. Hence, each output in the chain is nearly a pure service.

In the eighties, Valerie A. Zeithaml, A. Parsuraman, and Leonard L. Berry developed the SERVQUAL technique. The SERVQUAL is a procedure that can be used to execute a gap analysis of an organisation's service quality achievements against customer service quality requirements. SERVQUAL is an empirically-derived method that may be used by a services organisation to enhance service quality. This process involves the improvement of an understanding of the supposed services needs of target customers. These measured perceptions of service quality for the organisation in question, are then compared against an organisation that is "excellent". The resulting gap analysis may then be used as a driver for service quality improvement.

SERVQUAL is usually used within service organizations to find the perceptions of target customers based on the services they need. Moreover, it used to give a measurement of the service quality of the organisation. SERVQUAL, also, can be applied inside the organization to find out employees' perception of service quality, with the intention to reach service improvement. Furthermore, SERVQUAL cares about the perceptions of customers of the service quality. This will help an organization to arrange its priorities. Furthermore, it helps organizations to use their resources to improve the most important service features. SERVQUAL method used to be measured on ten aspects of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding or knowing the customer and tangibles. SERVQUAL used to measure the gap between customer expectations and experience. After few years, the authors had developed the model to the useful acronym RATER (table 4.1):

**Table 4.1: RATER**

| Reliability | Ability to perform the promised service dependably and accurately |
|---|---|
| Assurance | Knowledge and courtesy of employees and their ability to convey trust and confidence |
| Tangibles | Appearance of physical facilities, equipment, personnel, and communication materials |
| Empathy | The firm provides care and individualised attention to its customers |
| Responsiveness | Willingness to help customers and provide prompt service |

*(Source: Zeithaml et al, 1992)*

The method basically works by doing a sample survey of customers so that their perceived service requirements are known. After that, the data are collected using surveys of a sample of customers. In these surveys, sampling customers answer some questions. These questions based around a number of important service types. Customers are asked to give answers to a numerous questions within each dimension that verify:

- The importance of each feature;
- A dimension of performance expectations that may lead to an "excellent" company; and
- A measurement of performance of the company in question.

This gives an estimation of the gap between needed and actual performance, together with a ranking of the importance of service criteria. This helps an organisation to use its resources to enhance service quality while cost is controlled.

## 4.2: EMPLOYEE SATISFACTION MODEL

The purpose of this section is to construct a theoretical frame of reference for employee satisfaction based on criteria from the EFQM Excellence Model and the Work Design Model by Hackman and Oldham.

### 4.2.1: The EFQM Excellence Model

The EFQM Excellence Model consists of nine criteria (EFQM, 1999) as shown in figure 4.2. In this model, 'people results' is included as one of the four results criteria. The assumption behind the model is that "Excellent results with respect to Performance, Customers, People and Society are achieved through Leadership driving Policy and Strategy, People, Partnerships and Resources, and Processes" (EFQM, 1999).

There is, however, one flaw with the EFQM Excellence Model. It says nothing about the possible causal links between the enabler criteria and 'people results'. Without any knowledge about this causality the EFQM Excellence Model would not be very useful as a tool for understanding the dynamics of creating satisfied employees. The focus will therefore be to examine the theory of Hackman and Oldham and argue for possible links between enabler criteria and 'people results' based on this theory and the contents of the EFQM Excellence Model.
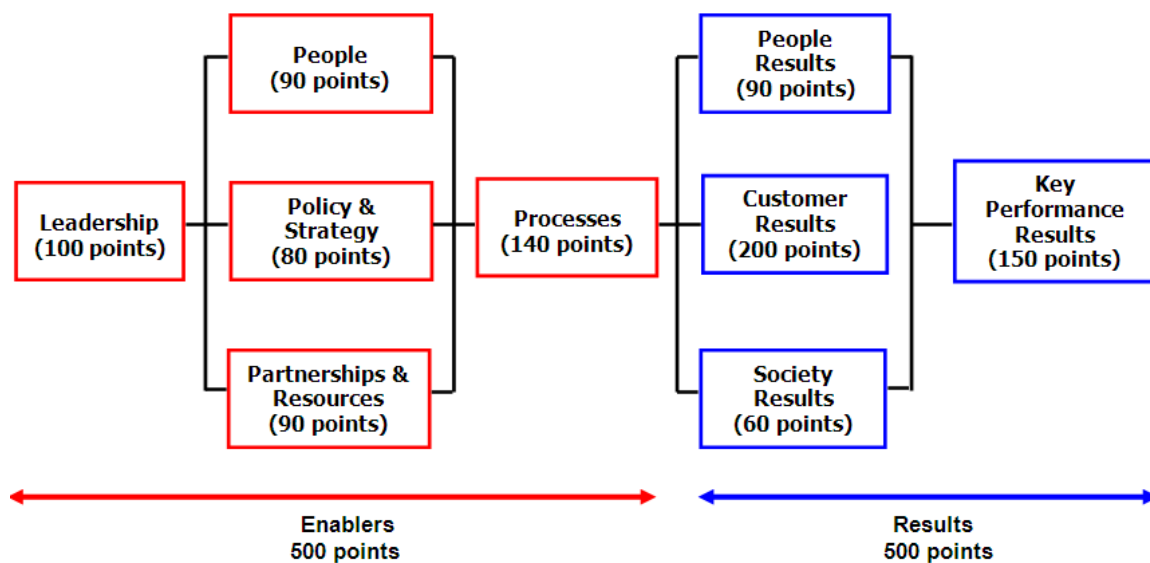


**Figure 4.2: The EFQM Excellence Model**

*Source: Eskildsen & Dahlgaard, 2000*

**4.2.2: Hackman and Oldham's Work Design Model**

In an organization, the processes must be designed to meet not only the technical demands of the organization but also the human/mental needs of the employees who work in it. Continuously improving processes will improve quality and thus productivity (Dahlgaard *et al*., 1998), but if processes are furthermore designed to fulfil the human/mental needs of the employees, morale and motivation will go up, leading to a further improvement of quality and productivity. This is the underlying principle behind Hackman and Oldham's Work Design Model (Evans and Lindsay, 1996) and the model incorporates both the technical and the mental elements of job design.

The Work Design Model, which is shown in Figure 4.3, is a further development and an `operationalization' of Hertzberg's theory, and has been validated in many different organizational settings (Evans and Lindsay, 1996).
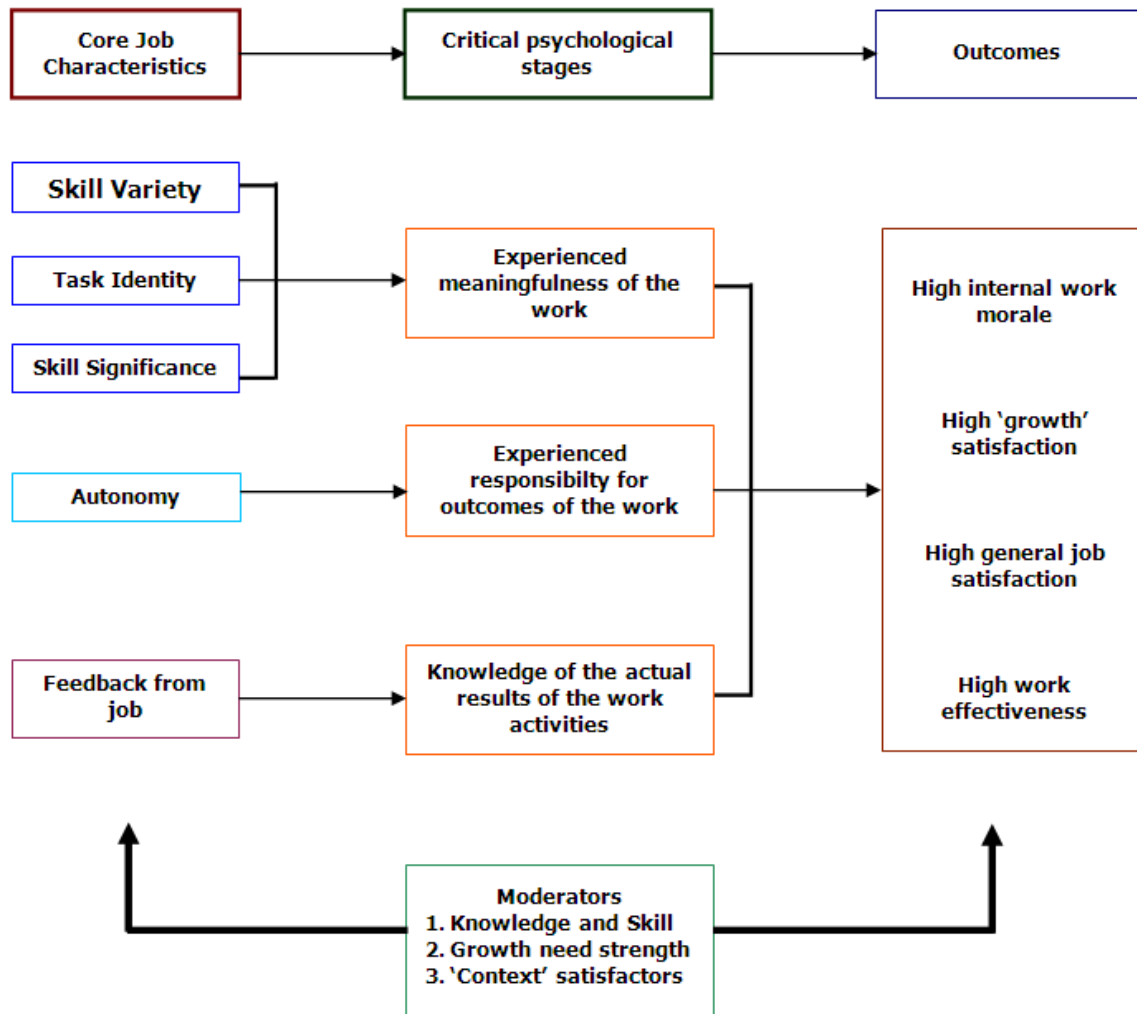


**Figure 4.3: Hackman and Oldham's Work Design Model**

*Source: Eskildsen & Dahlgaard, 2000*

In this model, the outcomes are created by the three critical psychological stages that are influenced by the core job characteristics. Finally, there are some moderating variables that can have both a positive and a negative effect on the influence of the core job characteristics on the psychological stages and, finally, on the outcomes (Evans and Lindsay, 1996).

There are two main differences between the Work Design Model by Hackman and Oldham and the EFQM Excellence Model. The criteria from the enabler part of the EFQM Excellence Model cover far more than the elements included in the Work Design Model. This is

especially true for the enabler criteria. Second, there are no suggested causal relationships in the EFQM Excellence Model such as in the Work Design Model.

With these differences in mind, it does not seem far-fetched to conclude that the psychological stages from the Work Design Model will have an impact on the criterion `people results' from the EFQM Excellence Model.

The first of the psychological stages, `experienced meaningfulness of the work', concerns the employee's need for social acceptance and self-esteem. In order to fulfil these needs the company has to incorporate them into the human resource plans, indicating that there must be a link from the criterion `people' to the criterion `people results'. This link is also suggested in the official description of the EFQM Excellence Model (EFQM, 1999).

`People' includes the areas of empowerment, involvement and recognition that directly cover `task significance', which is one of Hackman and Oldham's five core job characteristics. This criterion also concerns how the organization uses innovative organization methodologies such as job enlargement/rotation (EFQM, 1999), which have an impact on the core job characteristics: task identity and skills variety. Furthermore, this criterion also covers the moderating variables from the Work Design Model. It is through people that the organization can influence `knowledge and skills', 'growth need strength' and the 'context satisfiers'.

There are, however, other criteria influencing the way in which the criterion 'people' addresses the three above-mentioned core job characteristics. Firstly, the criterion includes the alignment of human resource plans with overall quality and operational performance plans, indicating that there must be a link from 'policy and strategy' to 'people'. `Policy and strategy' is the criterion in which management sets the agenda for the future behaviour of the company and of course this must have an impact on people.

The behaviour of management has a large impact on the strategies and plans that the company develops (Whittington, 1993) regarding quality, performance and human resources. Remembering the definition of leadership as a process whereby an individual influences a group of individuals to achieve a common goal (Northhouse, 1997), this suggests that there should be a link from the criterion 'leadership' to both 'policy and strategy' and 'people'.

The second psychological stage, 'experienced responsibility for outcomes of the work', from the Work Design Model is related to the employees' need for creative challenges and independence. This is, largely incorporated in the criterion `processes', suggesting a link to 'people results'. This is again influenced by two of the other enabler criteria. First, 'people' must have and affect 'processes'. The human resource plans of the organization must reflect the desire for employee creativity and innovation as well as support the application of innovative organization methodologies (EFQM, 1999). This strongly supports this linkage. Second, there is a need for resources if the organization is going to explore different organizational structures and encourage creativity and innovation. Included in the criterion 'partnerships and resources' are areas such as how the organization identifies and evaluates alternative and emerging technologies and how the organization harnesses technology in support of improvement and develops and protects intellectual capital (EFQM, 1999). With respect to the core job characteristic `autonomy', it is clear from these areas that the criterion 'partnerships and resources' must have an impact on the criterion 'processes'.

The third and last psychological stage from the Work Design Model by Hackman and Oldham is 'knowledge of the actual results of the work activities'. The core job characteristic associated with 'knowledge of the actual results of the work activities' is `feedback from job'. This is covered in the criterion 'processes' from the EFQM Excellence Model. Here the organization must use performance and perception results to set agreed targets and relate the performance to those targets (EFQM, 1999). This supports the previously suggested link from 'processes' to 'people results'.

As with 'experienced responsibility for outcomes of the work', there are areas from the criteria 'people' and 'partnerships and resources' that have an impact on 'processes' when it comes to 'knowledge of the actual results of the work activities'.

Under the criterion 'people', the organization must deal with issues such as development of employees through work experience and on-the-job training, aligning individual and team objectives with targets, and sharing information as well as having a dialogue with the employees (EFQM, 1999). Clearly, these areas have an impact on the core job characteristic 'feedback from job'. Here it is also important to remember the previously mentioned links from 'policy and strategy' to 'people' and from 'leadership' to both 'policy and strategy' and 'people'. These are also supported by 'knowledge of the actual results of the work activities'.

In relation to this psychological stage, there is also a direct impact of 'policy and strategy' on 'processes'. This criterion concerns, among other things, how policies and strategies are cascaded down the organization, and how policies and strategies are based on information relating to the employees (stakeholders) and internal performance indicators, as well as benchmarks (EFQM, 1999). This information will be used to set objectives and prioritize plans throughout the organization, which means that the employees will be informed about the results of their efforts as well as the progress of improvement initiatives. This justifies the link from 'policy and strategy' to 'processes'.

**4.3: International Organization for Standardization (ISO)**

The International Organization for Standardization (ISO) is an international standard-setting body composed of representatives from national standard bodies and produces world-wide industrial and commercial standards called the ISO standards. The word ISO comes from the Greek word "isos" which means equal. The reasoning is that this reflects the aims of the organization to equalize or standardize across cultures.

International standardization began in the electro technical field: the International Electro technical Commission (IEC) was established in 1906. Pioneering work in other fields was carried out by the International Federation of the National Standardizing Associations (ISA), which was set up in 1926. The emphasis within ISA was laid heavily on mechanical engineering. ISA's activities came to an end in 1942. In 1946, delegates from 25 countries met in London and decided to create a new international organization, of which the object would be "to facilitate the international coordination and unification of industrial standards". The new organization, ISO, officially began operations on 23 February 1947 and comprises of a number of standards that specify the requirements for the documentation, implementation and maintenance of a quality system. ISO is a non-governmental organization (NGO), but often many of its standards have become law, either through treaties or national standards, making it more powerful than NGO's. The major elements and requirements of ISO 9000 are summarized below.

1. Quality management system: General requirements and documentation requirements.
2. Management responsibility: Management commitment, customer focus, quality policy, planning, responsibility, authority and communication, and management review.

3. Resource management: Provision of resources, human resources, infrastructure, and work environment.

4. Product realization: Planning of product realization, customer related processes, design and development, purchasing, production and service provision, control of monitoring and measuring devices.

5. Measurement, analysis and improvement: General, monitoring and measurement, control of nonconforming product, analysis of data and improvement.

ISO 9000 is one of the major and initial steps to be considered to ensure a proper TQM implementation and for continuous monitoring. For better results it is important to confirm ISO requirements to ease TQM implementation. For a better output, case study, quality assurance, quality management is an essential in TQM implementation.

ISO 9000 is a series of international standards for quality management and assurance issued by the International Standards Organisation. The five standards are ISO 9000, ISO 9001, ISO 9002, ISO 9003 and ISO 9004. There are competitive advantages for ISO 9000 certified suppliers. They have recognised quality credentials to show to their customers. An increasing number of customers are asking for proof of ISO 9000 certification to be included in commercial proposals. Others may just be impressed. As ISO is truly international, these quality credentials may save companies in developing countries many hours and much money, providing their capability to overseas clients.

The ISO 9000 programme highlights management and system deficiencies and will, if adhered to, improve the capability to produce a quality service or product. The benefits are fewer errors, less waste, lower unit costs and improved reliability. The result is higher customer satisfaction. Many companies have become more interested in the improvements they start to see in their business than the certification itself. If companies are serious about implementing quality in their organisation, ISO certification will be only one of the actions that they might take. It is essential that continuous improvement is their main focus. Customer expectations will continually rise and competition will respond. Quality improvements should never end. However, companies must remember that the emphasis must be on total quality management, with certification being an important milestone. ISO 9000 is a useful framework for guiding quality improvement, but is an inadequate measure of

the quality level of an organisation. ISO representation and certification have seen an increase in 2007 by 6% compared to 2006. Table 4.2 shows the ISO worldwide representation and table 4.3 shows the ISO representation in Middle East.

**Table 4.2: ISO 9001:2000 (Quality Management Systems) World Results**

|  | Dec. 2003 | Dec. 2004 | Dec. 2005 | Dec. 2006 | Dec. 2007 |
|---|---|---|---|---|---|
| World Total | 497,919 | 660,132 | 773,867 | 896,929 | 951,486 |
| World Growth / Increase | 330,795 | 162,213 | 113,735 | 123,062 | 54,557 |
| Number of countries / economies | 149 | 154 | 161 | 170 | 175 |

**Table 4.3: ISO 9001:2000 (Quality Management Systems) Middle East Results**

|  | Dec. 2003 | Dec. 2004 | Dec. 2005 | Dec. 2006 | Dec. 2007 |
|---|---|---|---|---|---|
| Bahrain | 30 | 99 | 107 | 116 | 126 |
| Egypt | 754 | 810 | 1326 | 1928 | 1535 |
| Iran | 470 | 3,000 | 3,090 | 5,250 | 5,503 |
| Iraq | - | - | - | 3 | 5 |
| Jordan | 112 | 278 | 293 | 248 | 283 |
| Kuwait | 25 | 101 | 111 | 141 | 184 |
| Lebanon | 62 | 154 | 167 | 193 | 296 |
| Morocco | 64 | 296 | 403 | 457 | 504 |
| Oman | 86 | 250 | 267 | 311 | 349 |
| Palestine | 18 | 29 | 27 | 34 | 25 |
| Qatar | 17 | 94 | 97 | 101 | 177 |
| Saudi Arabia | 247 | 394 | 642 | 710 | 645 |
| United Arab Emirates | 892 | 819 | 963 | 1,040 | 2,422 |

*(Source: ISO Survey of Certifications, 2007*

## 4.4: SUMMARY

This chapter discusses the relationship between TQM and employee. For TQM to work effectively, it is important to have the right employees. This begins with the hiring the right people, training them, providing them the right tools for the employees to work efficiently and retaining them. With the quality stream, employee participation is important. For the right participation, employee commitment to the organization is important. Employees have to be satisfied so that they can provide the best. Employee incentive and training are practices through which the organization can enhance satisfaction and commitment.

Employee satisfaction increase job satisfaction and employee retention. SERVQUAL is also discussed in this chapter as an important tool in measuring employee satisfaction. Although this scale is commonly used to measure external customer satisfaction, it can also be adopted to measure the internal customer satisfaction - the employees. In addition to this employee

satisfaction models such as EFQM and ISO are also discussed in this chapter. Organizations should strive to achieve these awards and it makes them to be recognized as professional companies and for this employee participation is highly important.

# CHAPTER 5: METHODOLOGY

## 5.1: INTRODUCTION

This chapter outlines the methodology and methods adopted during this research. It discusses the research problem, research aim and research questions in addition to the research framework with conceptual model, independent variables, dependent variables and hypothesis.

The research adopts a quantitative method. Data were gathered from employees and middle management of construction companies within Kuwait through the use of questionnaire survey forms.

Further to the study follows a deductive approach as it begins with literature on the usage of TQM and focuses on the gathering data from the construction companies in Kuwait. Through the use of SPSS statistical software, the quantitative data will be analyzed along with the interview data. The cumulative finding will provide an insight into the usage and effectiveness of TQM within the construction companies of Kuwait.

### 5.1.1: Research Phases

The research is divided into two phases. Phase one followed a quantitative method through the use of questionnaires, a survey was conducted with the use of pre-designed questionnaires. The data was analyzed using statistical software and the findings are used to design the managerial interview questions. Figure 5.1 outlines the research methodology.
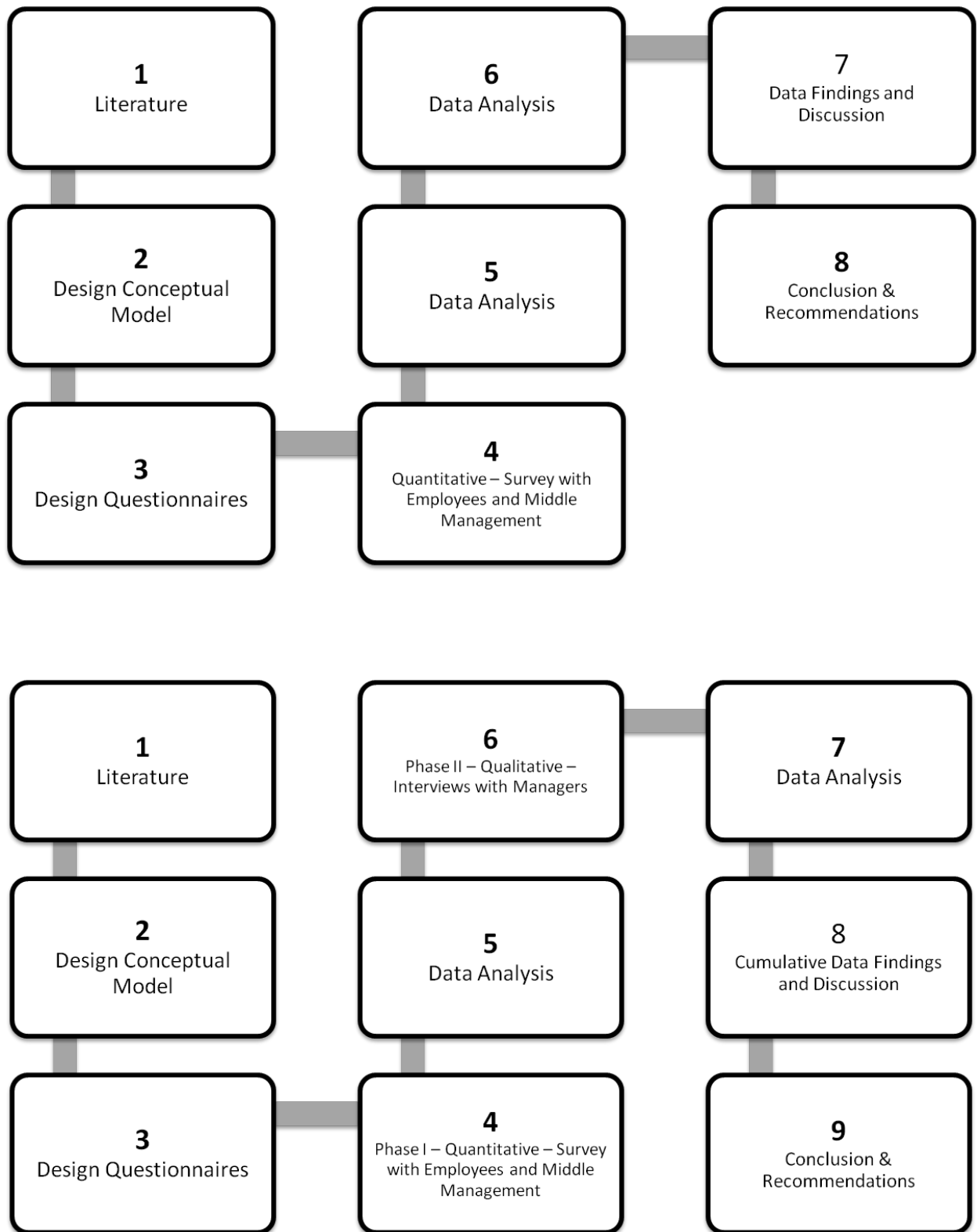
**Figure 5.1: Methodology chart**

Steps taken in Quantitative Survey

The various steps involved in quantitative survey are discussed below and also provided in a flow diagram (Figure 5.2).

1.  Design Questionnaire survey form in Microsoft Word, so that it could be answered easily in electronic and hardcopy format.

2.  Approach Management of construction companies in Kuwait and explain the need for employee participation in the survey and take verbal approval for sending Questionnaires to employees.

3.  Sent and receive Questionnaires via email and personal delivery.

4.  Filter the entire received Questionnaire to ensure that all of them are usable. Discard any incomplete ones.

5.  Enter the usable Questionnaire responses into SPSS software.

6.  Generate Descriptive analysis for all variables and statement to ensure there are no missing or wrong entries. Correct any data entry errors. Once competed with data entry check, move to generating other analyses such as crosstab, regression, t-test and ANOVA.

7.  Discuss the findings in the data analysis chapter
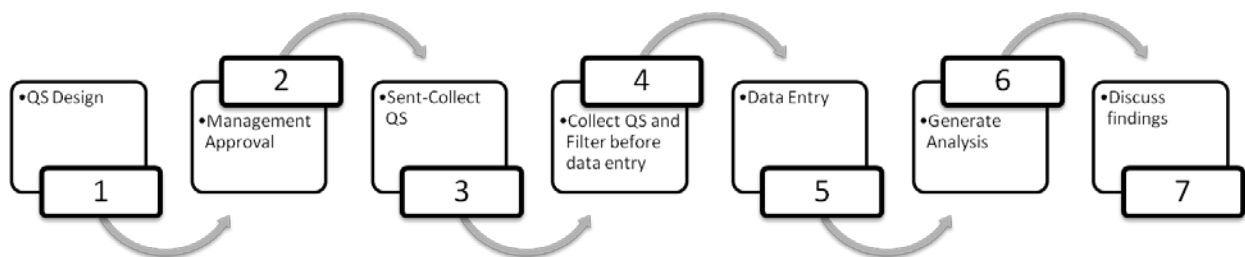


**Figure 5.2: Quantitative Survey flow chart**

## 5.2: PROBLEM DEFINITION

Kuwait is a small country with massive oil reserves, whose economy has been traditionally dominated by the state and its oil industry. During the 1970s, Kuwait benefited from the dramatic rise in oil prices, which Kuwait actively promoted through its membership in the Organization of Petroleum Exporting Countries (OPEC). The economy suffered from the triple shock of: a 1982 securities market crash; the mid-1980s drop in oil prices; and the 1990 Iraqi invasion and occupation. The Kuwaiti Government-in-exile depended upon its US$ 100 billion in overseas investments during the Iraqi occupation in order to help pay for the

reconstruction. Thus, by 1993, this balance was cut to less than half of its pre-invasion level. The wealth of Kuwait is based primarily on oil and capital reserves, and the Iraqi occupation severely damaged both.

The housing needs of Kuwaitis are increasing day by day (PAHW, 2007). The government of Kuwait is also uplifting the businesses in Kuwait through the modernisation airports, seas ports are another area where the government of Kuwait is spending millions of Kuwaiti Dinars. The government of Kuwait privatised the construction work approximately three decades ago, and as result some of the very large companies were registered and allowed to construct the small and large building in Kuwait. These include government offices, universities, colleges, hospitals and residential buildings. It is also indicated that government of Kuwait is seeking other sources of income so that the burden upon oil as resource be minimised.

The construction industry has lagged behind other industries in implementing reform through total quality management, for example, it has not followed the manufacturing industry in the implementation of TQM. However, the success of the total quality management (TQM) philosophy in manufacturing and other industries is encouraging construction organizations to adopt TQM.

Results from studies by Youssef and Zairi (1995) revealed that management role, commitment and support were critical factors towards the success of TQM. Effective leadership is also crucial. Educational qualifications were also considered as important factors within TQM usage in Middle East. Education should also be used to create and raise management awareness and appreciation of the importance of TQM and to achieve their commitment and involvement. With new rules, regulations and limiting control over BOT projects, residential projects and tighter consumer loans regulation from the Central Bank of Kuwait (CBK), the problem thus be summarized as follows.

- Lack of focus into project management within the construction sector of Kuwait, therefore, increases in costs.

- Lack of reform / willingness to change through implementation of TQM.

- Lack of providing consumer required products and services by focusing on larger production rather than quality.

- Lack of clear focus from the management towards managing TQM and improving.

- Lack of focusing on employee achievement and recognition in bring forth quality products and services.

- Lack of effective leadership in working with market changes and demands.

## 5.3: RESEARCH AIM

Recent years have seen developments in the construction sector wherein the use of TQM could contribute to improved competitive advantage in this sector. The aim of this research is thus to **explore employees' contribution to the successful implementation of TQM within construction companies of Kuwait**. In order to achieve this aim, the following research objectives were developed.

- To evaluate current construction companies in Kuwait regarding Quality Management (QM) and Total Quality Management (TQM).
- To explore the benefits gained from the implementation of QM and TQM in construction companies in Kuwait.
- To explore the barriers which construction companies in Kuwait face due to the absence of TQM.
- To determine the the extent to which role of top management affects TQM success in construction companies in Kuwait.
- To determine the degree of importance of employee empowerment for TQM success in construction companies in Kuwait
- To establish the level of importance of training for employees and management for TQM success in construction companies in Kuwait

## 5.4: RESEARCH QUESTIONS

The questions that this research will target and answer through a combination of literature and empirical findings are as follows.

- What is the current status of QM and TQM at construction companies in Kuwait?

- What are the benefits which the construction companies in Kuwait have gained from implementing QM and TQM?

- What are the problems/hurdles which the construction companies in Kuwait face due to a lack of TQM?

- What is the role of the top management in TQM success at construction companies in Kuwait?

- What is the importance of employee empowerment for TQM success at construction companies in Kuwait?

- What is the importance of training for TQM success at construction companies in Kuwait?

## 5.5: CONCEPTUAL FRAMEWORK

The conceptual framework designed for this research has been with the help of various literatures in the field of TQM. Based on the information gathered, the framework is aimed at understanding the effective usage of TQM and the perspective that construction companies in Kuwait have towards TQM and its usages. Figure 5.3 provides the variables that have used to design the conceptual framework for this research.

The conceptual framework in Figure 5.3 discusses various variables considered to be significant to the successful and effective usage of TQM within construction companies in Kuwait. Within demographics variables such as designation, qualification, work experience and number of employees in the organization are focused. These demographic variables are expected to affect the usage and also the respondent feedback to the effective usage of TQM. People with higher designation are expected to know more about the installation and usage of TQM whereas the knowledge of employees should also be strong; else the usage of TQM would be affected. This is because, employees are the ones who would be using TQM on a regular basis compared to the managers. Usage of TQM and its effectiveness can be measured based on the duration that the employees has been with the organization. Further TQM is a management concept that needs to be aligned with the organization structure and functioning. A respondent who has spent more time with the organization will be able to provide better feedback on the use of TQM. In addition to this, it was expected that the number of employees in an organization could affect the way the TQM is being used. A

larger construction company will have more responsibilities of training its employees and communicating on how TQM should be used compared to a construction company with smaller number of employees. Therefore, these demographic variables have been identified to be significant to the answers on the usage of TQM in the construction companies in Kuwait.
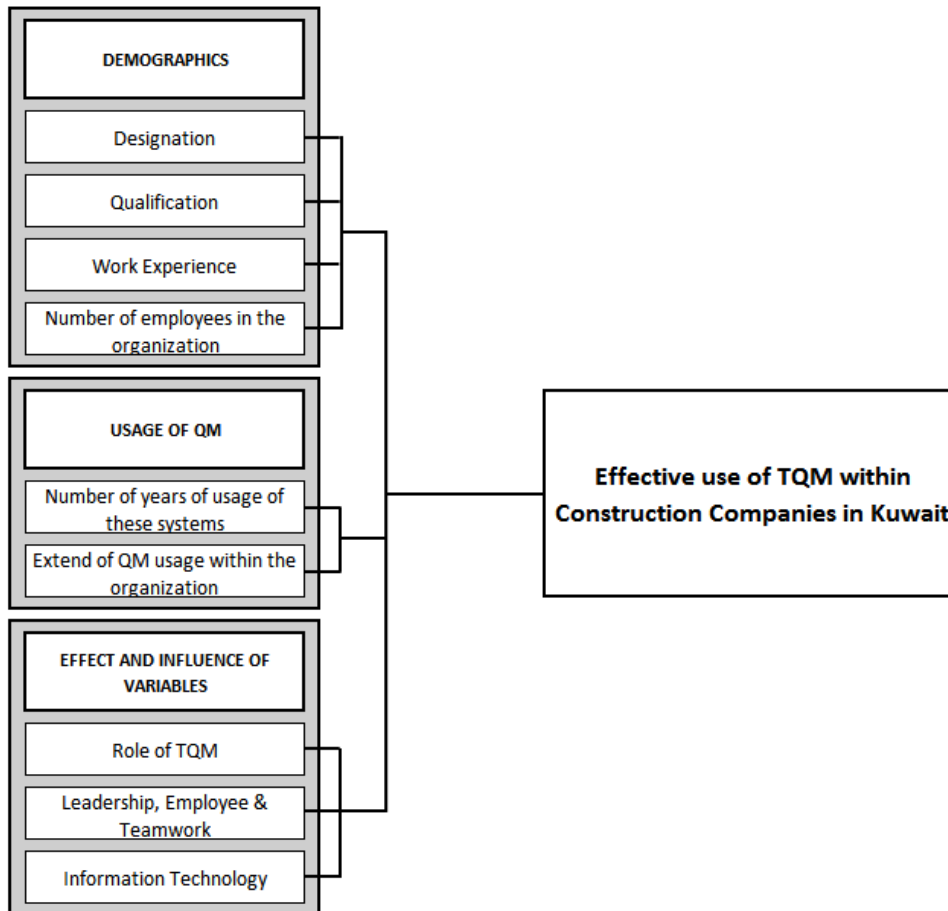


**Figure 5.3: Conceptual Framework**

Specific aspects related to Quality Management (QM) forms the subsequent section. The number of years of using QM and the extent of using QM were to be identified to understand if the construction companies in Kuwait are using QM and also their knowledge on QM and its benefits. The section also focused in finding out the training and knowledge the respondent had on QM. Specifics to the type of system such as TQM, ISO and Six Sigma were also requested. An understanding into the organization structure towards QM could be gathered from this section.

The final section of the questionnaire was designed using a five point scale measuring from 'Strongly Disagree' to 'Strongly Agree' and focused on the studied independent and

dependent variables. The studied variables are Leadership, Information Technology, Employee participation and empowerment, Training, QM and TQM and finally Organization Perspective on TQM. Table 5.1 provides the variables in the study and table 5.2 contains the hypotheses.

**Table 5.1: Variables**

| | |
|---|---|
| Independent Variables | Usage of TQM |
| | Role of TQM |
| | Leadership, Employee & Teamwork |
| | Information Technology |
| Dependent Variable | Effective use of TQM within construction companies in Kuwait (QM and TQM) |

**Table 5.2: Hypotheses**

| | |
|---|---|
| H1 | Effective knowledge and role of TQM will lead to organized use of TQM within construction firms in Kuwait |
| H2 | Leadership, Employee and Teamwork leads of effective uses of TQM within construction firms in Kuwait |
| H3 | Effective use of Information Technology is significant towards effective use of TQM within construction companies in Kuwait |

## 5.6: RESEARCH APPROACH

### 5.6.1: Deductive Approach

This type of approach uses existing theories in the field of research to create a foundation, through which the researcher designs the research aims and objectives, and the tools for collecting empirical data such as questionnaires. Data gathered from this process should then be analysed with the existing literature information to derive conclusions and recommendations (Hyde, 2000). This kind of approach is also called 'top-down' (socialresearchmethods.net, 2008).

According to Saunders et al (2003), deductive approaches follow the following pattern:

- it uses scientific principles;

- it is a process of moving from theory to empirical data;

- it is used to establish casual relationships between variables;

- the collection of data is usually confined to a quantitative method, thereby ensuring large and adequate sample selection within a short span of time;

- the application of controls and concepts ensures validity of data; and

- considered as a highly structured approach.


**5.6.2: Inductive Approach**

The inductive approach can be defined as the opposite of deductive approach and is thus referred to as a 'bottom up' approach (socialresearchmethods.net, 2008). Inductive approaches start off with empirical data collection and work their way towards literature and then defining the theory and the area of research (Hyde, 2000). According to Saunders et al (2003), the characteristics of inductive approach are as follows.

- It aims at gaining an understating and meanings of human emotions.

- It provides a close understanding into the research context.

- The collection of data is primarily qualitative, thereby limiting the sample population size and also taking more time.

- It provides a flexible structure and room for changes as the research progresses.

- It makes the researcher a part of the research.

- It avoids little generalization.


Figure 5.4 shows a diagrammatic layout of inductive and deductive approaches.
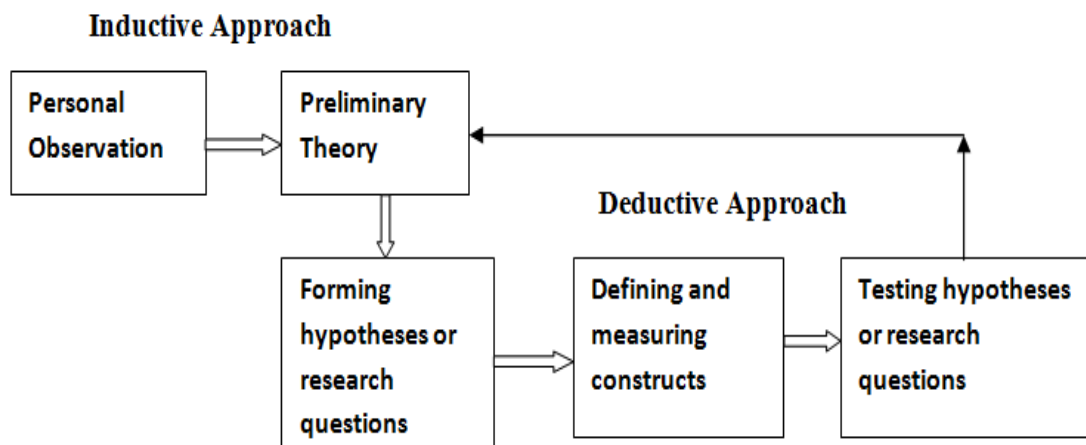


**Figure 5.4: Inductive and Deductive Approaches**

## 5.7: RESEARCH TYPES

A research can be taken up in various ways. Research is mostly defined on the basis of how much the researcher knows about the problem before commencing the investigation. Yin (1994), has made three classifications of research, based on handling a research problem - exploratory, descriptive, or explanatory.

### 5.7.1: Exploratory

The exploratory form of research is mostly used in those situations, where the problem knowledge is either not available or is not aware of. Here, the researcher needs to study his / her environment and find information and also something significant from which further ideas can be developed (Yin, 1994). In case of most studies, this kind of study also starts with a specific purpose but it is also flexible and adaptive in nature and subject to changes in such a way that the research direction may be altered (Saunders et al, 2000). In the situation where the researcher finds it difficult to create a basic statement of the research problem, use of the exploratory research will help develop a better understanding. This kind of research is apt for gathering information (Yin, 1994).

### 5.7.2: Explanatory

Explanatory studies refer to those that establish causal relationships between variables. A problem is studied and the relationships between variables are explained. These relationships can be explained statistically through correlation. The kind of data will be primarily quantitative and alternatively a qualitative study can also be used (Saunders et al, 2007).

To establish a causal relationship, along with posing well-defined research problem, a hypothesis also has to be stated (Jonsson & Sanders, 2000). It was stated by Miles and Huberman (1994) with reference to Bernard (1988) that explanation means "making complicated things understandable by showing how their component parts fit together according to some rules, that is, theory".

### 5.7.3: Descriptive

The term descriptive research intends at portraying 'accurate profile of persons, events or situations' (Robson 2002, cited in Saunders *et al*, 2007). This can come as a follow-up to an

exploratory and explanatory research. Descriptive research could be directly connected to exploratory research; this happens in the case when researchers start by aiming at deriving insights to a problem, after which, their research becomes descriptive (Saunders et al., 2000). This kind of research, primarily, intends to provide a description of different facts linked to individuals, situations, or events that occur, and can also be used when developing empirical generalizations. With these kind of generalizations in hand, they are worth explaining, which leads to theory development. Overviews of the three types of researches discussed above are mentioned in table 5.3.

**Table 5.3: Overview of Exploratory, Explanatory and Descriptive**

| Type of Research | Research Strategy | Evidence collection |
|---|---|---|
| **Exploratory** | Case Study | Observation |
| | Field study | In-depth interview |
| **Explanatory** | Multi-site case study | Observation |
| | Field study | Interviews |
| | Ethnography | Questionnaires |
| | | Document analysis |
| **Descriptive** | Field study | Observation |
| | Case study | Interviews |
| | Ethnography | Questionnaires |
| | | Document analysis |

*(Source: Saunders et al, 2003)*

## 5.8: RESEARCH METHODS

### 5.8.1: Qualitative Method

Qualitative research analysis involves data from interviews and other sources which can be reliable to integrate with the theoretical approach, but the quantitative research mainly focuses on the analysis of numerical data from ample data collection. A qualitative analysis is a detailed description where the researcher knows only a rough knowledge about the subject.

In this analysis the researcher himself / herself is gathering data, which is time consuming. (Saunders et al, 2003).

Qualitative research is used to help explain a phenomenon. It is designed to understand and find to how reasons through explanations (Hancock, 2002). Qualitative data can also help to derive the opinion, experience and feelings of the individual and attempts to describe a social phenomenon as they occur. Qualitative research follows a deductive approach and is aimed towards testing the research theories. Data collection is done through personal interaction with the respondents (Hancock, 2002).

Qualitative data, which comes in the form of words rather than numbers, are always associated with certain social sciences, mainly anthropology, history and political science. There are many ways to derive these words:- observation, interviews and extracts from documents. Although, these words have to be processed before use, they can still remain words, usually arranged into extended text. Qualitative data is rather attractive, and is a source of well-grounded, rich descriptions and explanations of processes in relation to local contexts. It is possible to keep the chronological flow intact, assess local causality, and derive fruitful explanations, with the help of qualitative data. The presence of new theoretical integrations, allow researchers to go beyond initial preconceptions and frameworks.

Furthermore, the findings from qualitative studies are undeniable. Words, especially when they are organized into incidents or stories, have a concrete, vivid and meaningful that often proves far more convincing to a reader than pages of numbers (Miles and Huberman, 1984). This is also one of the reasons as to why more and more researchers are committed to qualitative data collection. The demands of conducting good qualitative research are not small. Collection of data is time consuming and involves lots of work.

## 5.8.2: Quantitative Method

Quantitative research method tackles numeric information, which is usually machine-readable and can be derived from accepted statistical tests and models. In this method, usually, the information is gathered by asking the same set of questions to a specific sample population and recording their answers correspondingly in numeric codes or actual numbers (Saunders et al, 2007). By use of quantitative methods, it is possible to obtain a statistical inference and empirical conclusions about an entire population based on a sample. The most

useful device for a quantitative research methodology is the structure of a questionnaire designed to formulate a specific hypothesis, and for creating an overall context in which quantitative findings could be accurately interpreted. The questionnaire reads a set of structured questions having pre-determined answers involving a large number of respondents.

Skills and knowledge in quantitative methods cannot be learnt without the development of scientific thinking (Saunders et al, 2007). Research based on quantitative method supports that a creative scientific discovery is no different from those found in more commonplace thinking. Quantitative research can help in perceiving the learning theories through psychological, social and cognitive aspects. Many researchers have good experiences of improving courses by using real data or linking the research method courses to other courses based on real life situations (Saunders et al, 2007).

Quantitative technique collects data in numbers and often used when the population is large and / or when generalization is required. The use of variables and testing their relationship and significance through statistical methods are other aspects of quantitative technique. Results are discussed and analysed in mathematical terms using formulas and there by exhibiting numbers and results are arrived in statistical form. This research is on a problem on the basis of theory to be examined detailed in a numerical way and examined applying the method of statistics. The prima facie object of quantitative approach is to arrive whether the predicted results are genuine. This is methodology exhibited applying numerical formulas arrive results in a statistical method to clarify the problem and data receive and generate conclusions. Table 5.4, shows the differences between quantitative and qualitative approaches.

**Table 5.4: Qualitative and Quantitative approaches**

| Point of Comparison | Qualitative Research | Quantitative Research |
|---|---|---|
| *Associated phrases* | Quality (nature, essence) | Quantity (how much, how many) |
| *Objective* | Understanding, description, discovery, hypothesis generating | Prediction, control, description, confirmation, hypothesis testing |
| *Philosophical roots* | Phenomenology, symbolic interaction | Positivism, logical empiricism |
| *Design characteristics* | Flexible, evolving, emergent | Predetermined, structured |
| *Setting* | Natural, familiar | Unfamiliar, artificial |
| *Data collection* | Researcher as primary instrument, | Inanimate instruments (scales, tests, |

| | interviews, observations | surveys, questionnaires, computer programs) |
|---|---|---|
| *Mode of analysis* | Inductive (by researcher) | Deductive (by statistical methods) |
| *Findings* | Comprehensive, holistic, expensive | Precise, narrow, reductionist |
| *Sample* | Small, non-random, theoretical | Large, random, representative |

*(Source: Saunders et al, 2003)*

## 5.9: RESEARCH STRATEGY

According to Yin (1994), the selection of research strategy is based on: the nature of the research questions asked, the degree of control that a researcher has over actual behavioural events, and the extent of focus on contemporary events compared to behavioural events. Depending on these conditions, five research strategies are possible to conduct the following.

1. **Experiment**: The prime research questions of "How many and why", give a start to this strategy. In an experimental research, there should be a control on behavioural events and the research focuses on contemporary events.

2. **Survey**: This strategy comes of use when related questions are selected, like those with phrases such as "who, what, where, how many and how much". Though there is no need for control on behavioural events, but the research will still focus on contemporary events. The survey strategy is most used in business research, associated with the collection of data from a sizeable population in a very economical way. Hardly any importance is given to attitudes, opinions, expectations and intentions except by surveying, because survey techniques help to know about subjects that are solely the rights of the participant. Another point is that, information about past events is often available only through surveying people who remember the events (Cooper and Schindler, 2003). Surveys are used when the researcher has to collect information from a large sample of individuals (Hair *et al*., 2003).

3. **Archival Analysis**: The research question starts with "Who, what, where, how many, how much" and it is not really mandatory to control the behavioural analysis. Archival analysis depends on literature reviews, and as put by Fink (1998), it is a systematic, explicit and reproducible method for identifying, evaluating and interpreting the already existing body of recorded work created by researchers, scholars and practitioners.

4. **Case Study**: Robson (2002) has stated that case study is a strategy for doing research involving empirical investigation of a specific contemporary theory, within its real life context with the help of multiple sources of evidence. Having a rich understanding of the context of the research and the process used is quite important.

5. **Ethnography**: Ethnography approach, originating from anthropology, is wholly based on the inductive approach. This time consuming approach intends to describe and explain the social world the research subjects inhabit in the way in which they would describe and explain.

**5.9.1: Questionnaire Survey**

Questionnaires are very useful in survey data collection. The term 'questionnaires' are used in a general way to include all techniques of data collection in which each person is expected to respond to the same set of questions in a predetermined order (de Vaus, 2002; cited by Saunders et al, 2003). The questionnaire structure affects the response rate and the reliability and validity and its reliability could be maximised by:

- proper design of individual questions;
- clear structure of the questionnaire form;
- logical explanation of the purpose of the questionnaire;
- Pilot testing; and
- Carefully planned and executed administration.

Questionnaires can be used for both descriptive and explanatory research. The descriptive research performed with the aid of attitude and opinion questionnaires and those of organisational practices, will help to recognise and describe the variability in different phenomena. Contradictorily, explanatory or analytical research helps to view and understand relationships between variables in particular cause-and-effect relationships. Two ways in questionnaires are classified are self-administered or interviewer administered; and they can be explained as follows.

- Self-administered are completed handled by the respondents; which means that are delivered and returned electronically using either email or the Internet (On-line questionnaire); Posted to respondents who on completion, return them by post

(Postal or mail questionnaires), or even sometimes, are hand-delivered to each respondent and collected later (Delivery and collection questionnaire).

- Responses to interviewer administered questionnaires are recorded by the interviewer on the basis of the answers given by each respondent. Respondents are contacted via telephone and administer questionnaires (Telephone questionnaire). In some cases, interviewers personally meet respondents and ask questions to face.

According to Foddy (1994), "the question must be understood by the respondent in the way intended by the researcher and the answer given by the respondent in the way intended by the respondent". The validity and reliability of the data collected and the response rate achieved depend, on the design of the questions. While designing questionnaires researchers should follow the following:

- adopt questions used in other questionnaires;
- adapt questions used in other questionnaires; and
- develop own questions.

According to Saunders et al, (2003), layout of a questionnaire is important for both self-administered and interview-administered questionnaires. More emphasis on the layout, design and attractiveness of the questionnaire had to be placed for self-administered so as to capture respondent attention and positive intention to take part in the survey. Questions have to be designed in such as way that they are easy to understand. The length of the questionnaire is another factor that will affect the questionnaire (de Vaus, 2002; cited by Saunders et al, 2003). It is argued that long questionnaire survey forms will negatively affect respondents, therefore, questionnaire survey forms should be precise, concise, and easy to understand and answer.

Most questionnaires are a combination of open and closed questions. Dillman (2000) explained that open-ended questions, permits respondents to give answers in their own way. But, with closed-ended questions or forced-ended questions the respondent has to choose his answer from a number of alternative answers. Since these types of questions require minimal writing, they are usually quicker and easier to answer. List questions provide the respondent with a list of responses, from which he can choose. As opposed to this, category questions are structured in such a way that the respondent's answer fits only one category. Ranking

questions gets the respondent to position things in rank order. Rating or scale questions are often used to collect opinion data. Quantity questions, refers to the responses to a quantity question in number, giving value to the feature of amount. These questions help to derive behaviour or attribute data.

The quantitative questionnaire used in research began with an introduction to the purpose of the survey and acronyms used in the survey. This was followed by collecting demographic information such as designation, department, work experience, education qualification, number of employees in the organization. All of these were provided with multiple choice options and the respondent had to select just one per demographic variable. The following section in the questionnaire after the demographics focused on Quality Management (QM). The section was aimed at gathering the knowledge of the respondents on QM and the usage of QM in their current organization. From this section the quality of answers provided by the respondent based on the knowledge and usage of QM could be understood.

The remaining sections of the questionnaire were split into the studied variables: (1) Leadership; (2) Information Technology; (3) Employee; (4) Training; (5) QM and TQM; and (6) Organization Perspective. Each of the sections had different statements and all were measured using a five-point scale. The scales are numbered as; (1) Strongly Disagree; (2) Disagree; (3) Neither Disagree or Agree; (4) Agree; and (5) Strongly Agree.

### 5.9.2: Validity and Reliability

A high degree of credibility calls for fulfilling requirements regarding validity and reliability. Thuren (1998) had said that reliability and validity have to be kept in mind, especially when conducting quantitative research. If the research has a high degree of reliability, it does not have to be dependent on the performer, and with a high validity, the phenomena would already have been measured and described.

Validity corresponds to the two necessary levels knowledge that research has to work on: the theoretical and the empirical. The researcher structures the questions and the problems on the theoretical level, and considers on the empirical level. Here, there are chances of a problem to arise. The matter in consideration is if the empirical investigation corresponds to what the researcher has said they will investigate. This means that it highlights the level of validity present (Esaiasson et al., 2004).

During the research process, discussions can be carried out regarding the concept validity as soon as the theoretical definitions have been made and the operational measuring instruments have been chosen. The instruments help establish theories. Unless, the investigations on the empirical level are made, it is not possible to calculate result validity. One part of the result validity is the factor of reliability, which will soon be presented (Esaiasson et al., 2004).

Reliability is determined on the basis of how measuring is done, its accuracy, and how the information is arranged. In order to achieve optimum reliability, the measuring instrument, for example a questionnaire, should bring forth the same results. For instance, in interviews, control questions bring about higher reliability. This means that a method must not be dependent on the researched units - depending on the grade of generalisation (Wiedersheim-Paul et al., 1991).

### 5.9.3: Time Horizon

Time horizon refers to planning of the research; Saunders et al (2007) has stated two types of time horizon factors; snapshot, also termed as cross-sectional; and a diary often referred to as longitudinal, as reviewed below.

- Cross-sectional refers to a particular phenomenon or a particular time. Easterby-Smith et al (2002 and Robson (2002; cited in Saunders et al, 2007) points out that cross-sectional studies use survey strategies. Cross-sectional studies use qualitative methods as well as conducting interviews over a short period of time. This research follows a snapshot approach.

- Longitudinal studies tend to change as well as develop. It was pointed out by Adams and Schvaneveldt (1991; cited in Saunders et al, 2007), that observation of people or events over a period of time helps the researcher to control measures over the examined variables, with the fact that it is not affected by the research process itself. It is possible to derive large and valuable amount of published data over a period of time by this research.

## 5.10: DATA COLLECTION METHODS

The theoretical data collection was done via Internet searches, Online Libraries, other libraries and books. The empirical data collection was done via pre-designed questionnaires sent to respondents in different construction firms. The classification of the questionnaire for both survey and interview differentiates between the processes of monitoring and interrogation/communication. The first process consists of studies where the researcher checks the activities of the subject or the nature of the material without attempting to extract any outside response. In the interrogation/communication study, the researcher puts forward questions to the subjects and obtains their responses through personal or impersonal means. The collected data is the result of: face-to-face interviews; telephone interviews; and questionnaires sent via emails.

### 5.10.1: Data Reduction Process

Data reduction process refers to that of selecting, focusing, simplifying, abstracting, and interpreting the data which appear in the form of written-up field notes or transcriptions. Anticipatory data reduction happens even before the data is actually collected, since the researcher decides on which conceptual framework, which cases, which research questions, and also, which data collection approaches he has to choose.

Data reduction is really not separate from analysis, but actually, a part of it. It is a form of analysis that sharpens, sorts, focuses, discards, and organizes data in such a way that 'final' conclusions can be made and also verified (Miles & Huberman, 1984).

### 5.10.2: Data Collection Tool

The data collection will be over several phases. The first phase involves data collection from employees of different construction companies through a questionnaire survey which was divided into the following three sections.

The first section collected information on the demographics. Each of the demographic variables was provided with multiple choice answers and the respondents were asked to select one that describes them. Some of the demographics were related directly to the respondents, whilst others were related to the company. The demographic variables were job designation, department, work experience, education qualification, number of employees in the organization, types of construction projects and project classification.

The second section gathered an overview of quality management. Based on multiple choice responses, the questions in this included 'What is your knowledge level of TQM?'; 'On which of the following have you had formal training on TQM?"; "Do you currently use a QM system for construction projects in your organization?" and "What kind of system are you using?". Based on the response provided in this section, an overall understanding into the quality management of the construction company that is being studied was gathered. Section three focused on the variables that were studied in the research model. These included role of TQM from a general respective; the influence of leadership, employees and teamwork on TQM; the importance of information technology on TQM and finally the impact of QM and TQM on the construction company. These variables were formed using statements designed with a 5-point Likert scale. The scales were (1) strong disagree, (2) disagree, (3) neither disagree or agree, (4) agree and (5) strongly agree.

The questionnaire began with an introductory letter providing the reason for the survey, the structure of the questionnaire and requesting their cooperation and participation. The final part of the questionnaire asked the respondent if they needed a copy of the summary of results and for the email address to which the results can be emailed in case of requirement.

### 5.10.3: Sample Population

The data were collected from the construction companies in Kuwait. The selection of the companies has been based on the construction company grading by the government. The latest records of the company were taken from the government records and companies that were listed as Grade A were selected. A total of eight companies were contacted and five accepted to participate. The construction firms were as follows.

*Kharafi National*

Kharafi National, a general contractor number one in construction in the Middle East and Africa, is involved in various major construction projects throughout the region. From the time it has been established in 1976, Kharafi National has evolved from a local contracting company into a top-class pan-Arabian Infrastructure Project Developer, Contractor and Facilities Management Service Provider with the ability to take up any kind of challenging projects (kharafinational.com, 2011). Kharafi National's multi-faceted organization constitutes all the disciplines – civil, HVAC, mechanical and electrical engineering,

instrumentation systems, telecommunications, quality assurance and control processes, and health, safety and environment procedures – all of which contribute to bring about great amount of development and contracting services to the petroleum, chemical, power, water and commercial industries in the Middle East and Africa.

*First United Construction Company*

First United is a major construction company in Kuwait. The past 16 years have been quite successful for them, having built major landmarks that will stand distinguished in the picture of Kuwait. First United, which came about in 1995, has gained true unprecedented success in the construction industry by means of using a unique approach in the business, based on strong, staunch ethics, fairness to clients and the environment, hard work to obtain the best results and above all, a performance record which mirrors the commitment to the work they have carried out (firstunitedco.com, 2011).

*Al Bahar Construction Company*

Al Bahar Construction, founded in 1983, is an approved contractor with Central Tenders Committee (CTC). This award-winning company successfully undertakes major building contracts for both the Public and Private Sectors. The noteworthy features of quality, honesty and reliability are the key principles behind Al Bahar's goal to achieve quality of workmanship, products and customer service (albaharconstruction.com, 2011). Al-Bahar Construction has always been able to meet the ever increasing demands of the region. Consisting of the highly skilled and highly motivated individuals working in well managed teams, they promise quality, consistency and high productivity at all times. The organization culture of cooperation throughout the company establishes strong and enduring relationships with clients, designers, sub-contractors and suppliers. The approach of Al-Bahar keeps it focused on continuous improvement of the quality, time and cost of services provided to clients. Apart from construction, they offer their services to supply chain management, quality assurance procedures, benchmarking and value engineering.

*United Gulf Construction Company*

Having a fine reputation for the last 35 years, UGCC is a highly-specialized construction company with central competence in building construction, civil infrastructure, roads and landscaping. It remains the most valuable construction company in Kuwait by delivering optimum construction projects of different sizes to every part of Kuwait and Internationally.

The UGCC was able to achieve the ISO 9001:2000 Quality Management Certifications, in 2005, for its entire range of operations; this shows its commitment towards uncompromising quality standards and fine excellence in customer service. UGCC has also gained international recognition for its health and safety programmes by completing OHSAS 18001:2007 certification in Occupational Health & Safety. Its primary safety rule for accidents is governed by: Zero Tolerance. Along with ensuring the safety of work crews, it also minimizes the consequences of reducing injury-related downtime and maintaining reduced rates of materials damage (ugcc.com, 2011).

*Arab Construction Company*

Arabian Construction Company (ACC) follows strong efforts and dedication which brings forth notable achievements and multiple successes. ACC intends to be known as the leader in the local market in the areas of IT, Telecommunications, Electrical, and Fire Fighting and Security services; designing and also working out prime projects delivering to its clients a full range of services beyond their expectations. For ACC, customer satisfaction is of highest importance and so, they strive to provide highest quality services and materials ensuring full satisfaction. Safety is of prime concern, promising complete safety to its employees, clients and the environment during project implementation, using accurate procedures, highly qualified staff, rock solid attitudes; always abiding by the local rules and regulations. Table 5.5 provides the distribution per construction firm.

**Table 5.5: Questionnaire distribution**

| Construction Firms | Questionnaires | | | Percentage | |
|---|---|---|---|---|---|
| | Distributed | Received | Used | Total | Actual (Used) |
| Kharafi National | 450 | 280 | 262 | 62.2% | 58.2% |
| First United | 300 | 97 | 93 | 32.3% | 31.0% |
| Al-Bahar | 350 | 200 | 186 | 57.1% | 53.1% |
| United Gulf | 200 | 86 | 86 | 43.0% | 43.0% |
| Arab Construction | 150 | 83 | 61 | 55.3% | 40.7% |
| **TOTAL** | **1,450** | **746** | **688** | **51.4%** | **47.4%** |

From the 746 questionnaires that were received only 688 were entered into SPSS. This was because 32 of them had sections with many statement unselected. Seventeen were answered with every answer in using single scale, for example if they selected agree for the first statement, all other statements were ticked agree. Similarly some of them had selected disagree or neutral for all statements. This showed that the respondents did not read the statements clearly before answering. Finally 9 of them had only completed the first two sections (demographics and QM) and left all other statements unanswered, therefore, a total of 58 entries were removed and not entered into SPSS.

## 5.11: DATA ANALYSIS

This research study used quantitative methodology.

### 5.11.1: Quantitative Data Analysis

SPSS will help towards generating various statistical techniques. Some of these will be Cronbach's Alpha reliability analysis, Chi-square analysis to test data significance, Crosstab analysis, Correlation, Regression and ANOVA.

*Cronbach's Alpha*: This is a reliability statistics and measures the reliability and consistency of test components (ats.ucla.edu, 2009). Chi-square analysis is measured with quantitative data and is used to determine relationship between two categorical variables (cqpress.com, 2009). Crosstab analysis is used to display the relationship between two or more variables which can be either nominal or ordinal in nature (lib.uoguelph.ca, 2009).

*Descriptive analysis*: This types of analysis provides the output based on feedback received on each variable and statements in the questionnaire. Data that are being gathered through the questionnaire survey form can be understood based on frequencies and percentages. These will be displayed in tables to be discussed individually and cumulatively.

*Crosstab analysis*: This analysis is carried out to understand the results based on two different variables. Through this analysis, the relationship and significance between two variables can be gathered.

*Correlation*: This analysis is used to establish statistical relationship between two or more variables or observed data values.

***Regression Analysis*:** This kind of analysis is useful for modelling and analyzing several variables.  On a more specific note, it helps to indentify the value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed.

***Kruskall Wallis and Mann Whitney*:** This is a statistical analysis that helps to make comparison between two or more variables and will be used to test the significance of demographic variables on TQM.

## 5.12: SUMMARY

From the above discussions, the research approach used for this model is summarized in figure 5.7.  The research begins with literature studies on quality management and total quality management.  Importance of employee participation is also discussed in the literature.  Based on the information that is gathered and the problem identification, research aims and objectives along with research questions are discussed.  Information from literature is used to design the questionnaire survey and interview questions for empirical data collection.  Data collected from quantitative survey were analyzed using SPSS software.  The findings will be discussed in the next chapter.

# CHAPTER 6: DATA ANALYSIS, FINDINGS AND DISCUSSION

## 6.1: INTRODUCTION

In this chapter, data collected from construction companies in Kuwait have been discussed. The first phase of data collection was quantitative, with data collected through a survey method using a questionnaire as the data collection tool. The questionnaires were sent to employees of construction companies via personal delivery and email. The collected data were entered into SPSS software in order to perform various statistical analyses, including descriptive, crosstab, factor, regression, one-way ANOVA and independent sample t-test. Data reliability was calculated using Cronbach's Alpha.

## 6.2: DEMOGRAPHICS

The analysis begins with demographics. The demographics that were captured using the questionnaire included job designation, department, work experience, educational qualification, number of employees in the organization, type of construction projects, and project classification. Company name was identified based on where the response was collected from. The results were grouped according one of the five companies from which responses had been received.

Based on company performance and types of jobs undertaken and completed successfully, the construction companies in Kuwait were ranked and grades were assigned. Attempts were made to contact Grade A companies, which were considered the best construction companies in Kuwait. These companies commonly undertake large construction projects. The projects include public and private projects, and from infrastructure to residential projects. Contact was established with 10 to 12 companies, but five opted to take part in the survey. These were Kharafi National, Al-Bahar Construction Company, Arab Construction, First United and Gulf United.
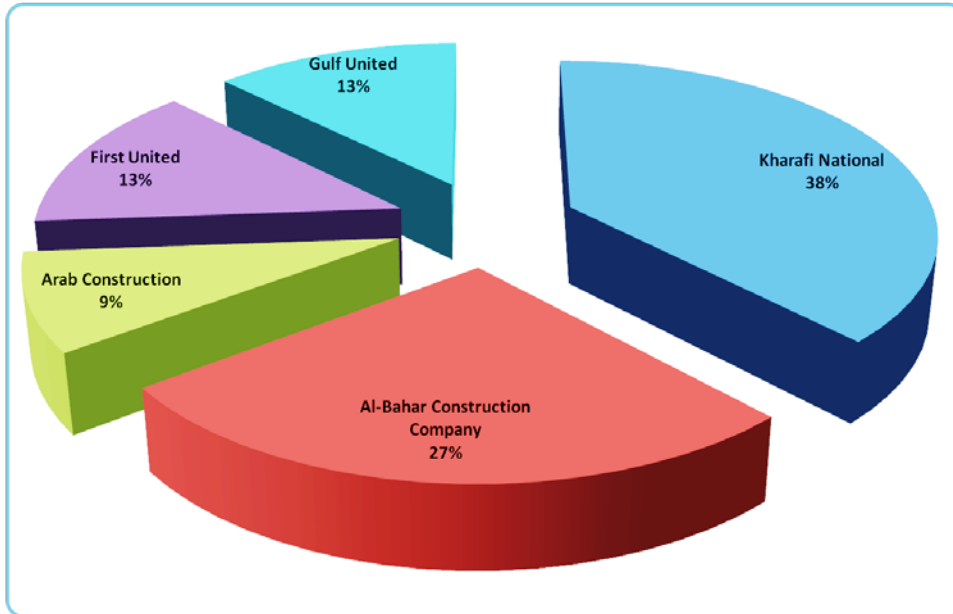
**Figure 6.1: Company**

Figure 6.1 shows that the highest response rate was received from Kharafi National. Kharafi National undertakes nearly all types of projects in Kuwait. With a highly professional company profile, they focus on different types of infrastructure project through Build-Operate-Transfer (BOT), Build-Operate-Own (BOO) and Public-Private-Partnerships (PPP). When it comes to infrastructure projects, in addition to being directly involved in the construction of projects, they also finance, manage, operate and maintain projects based on the project type. They are also involved in construction services related to oil, gas, petrochemical, power, water and related sectors. Facilities management is also a specialty of Kharafi National and they are involved in management, operation and maintenance of commercial complexes, industrial plants and power installations. With a workforce of over 28,000, the company has an annual turnover of US$1 Billion. The other companies from whom responses were received are not as large as Kharafi National, but are still large companies and create competition in the construction market of Kuwait.
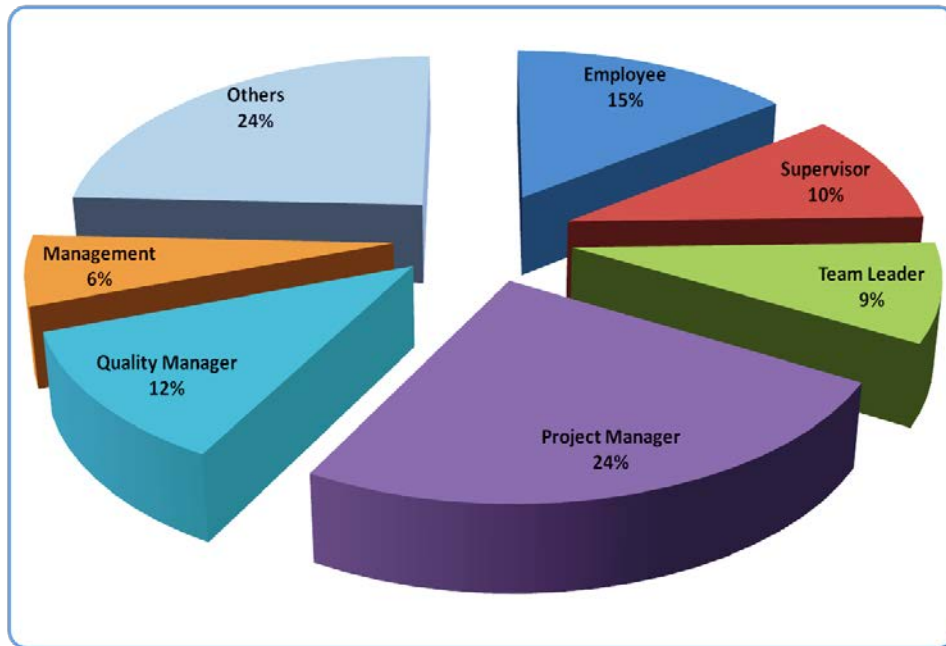
**Figure 6.2: Job Designation**

The questionnaire was distributed to everyone in the organization. It was difficult to contact top management personnel; nevertheless, emphasis was placed on distributing the questionnaires to everyone (figure 6.2). Daily follow-ups with project managers reminded them and they took the responsibility of distributing the questionnaire survey forms to their teams. Due to this, the best responses were received from project managers. Each project that a company undertakes has a project manager assigned to it. The responsibility of the project manager is not limited to the successful completion of projects, but also ensuring clear and timely communication between management, client, employees and suppliers. This aspect was included in the 'Others' category, which included aspects such as the design team, information technology and many others aspects related to construction companies. The table also indicates that responses were received from other job designations as well.
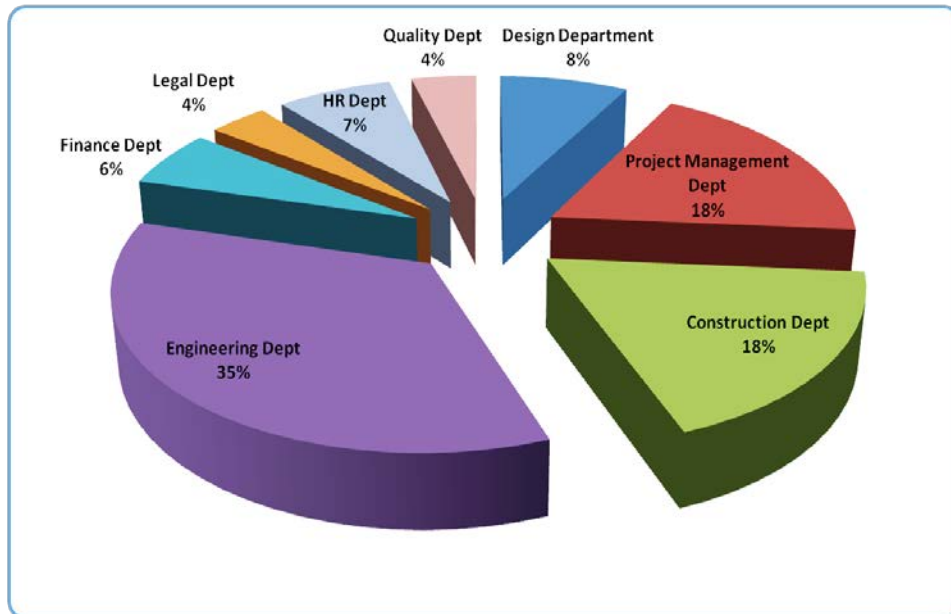
**Figure 6.3: Department**

In the questionnaire, eight departments were provided (figure 6.3). Of the responses that were received from each of these departments, the highest response rate was received from the engineering department. This was followed by the project management department and the construction department. Of the total 692 responses received, 22 of them did not indicate a department. This constitutes 3.2% of the total responses.
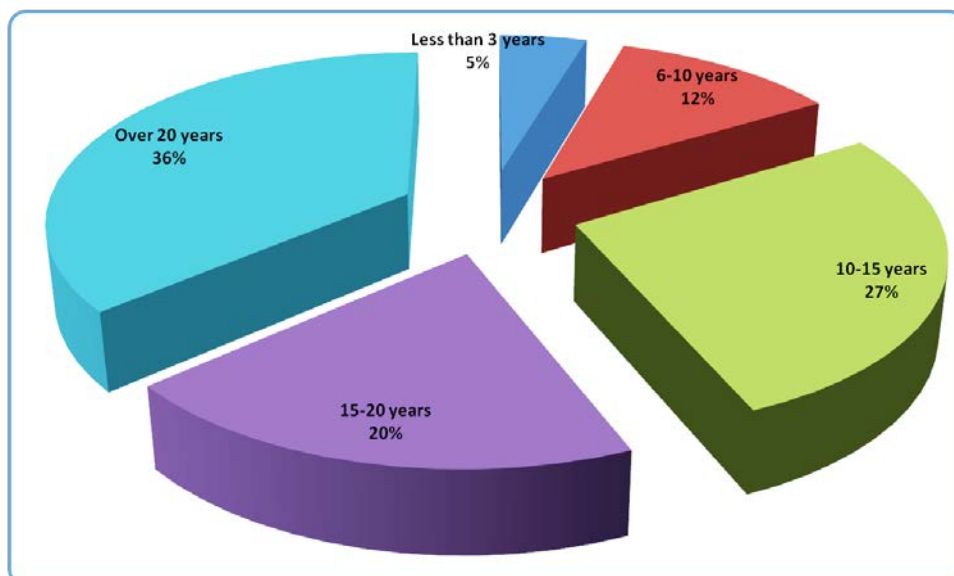


**Figure 6.4: Work Experience**

Work experience indicated in figure 6.4 is an important demographic. People with longer work experience can provide more detailed information regarding the use of TQM and construction projects in Kuwait. New employees may be theoretically knowledgeable but practical experience is considered to be of greater value. Furthermore, experience in the local market is considered to be a big advantage for the success of projects. When it comes to construction projects, good knowledge of the local market structure and government environment is essential for gaining a competitive advantage and the success of projects.
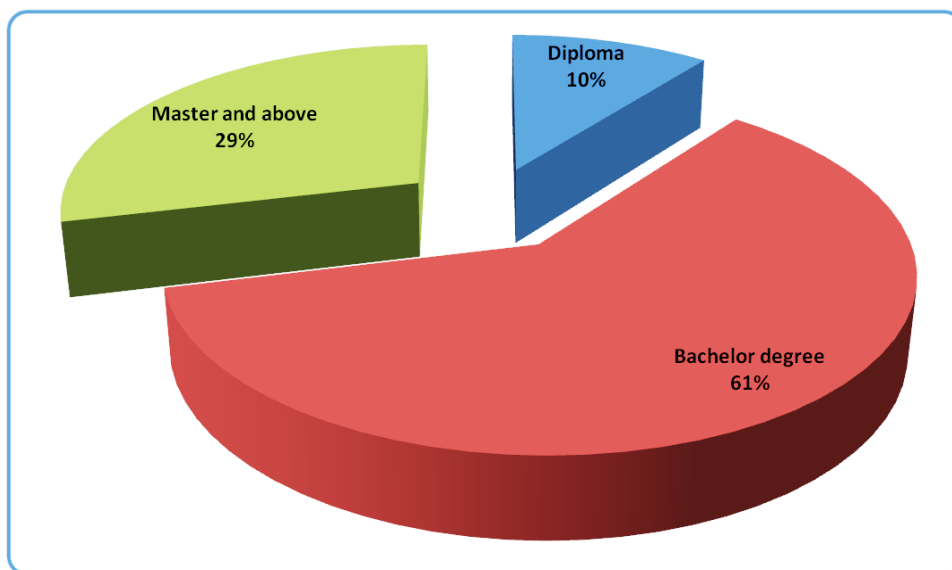


**Figure 6.5: Educational Qualification**

Figure 6.5 provides details of the respondents' educational qualifications. The best response rate came from employees with Bachelor degrees. This was followed by those with a Master degree and above. In addition to academic degrees, these employees also have qualifications related to their jobs. This is because most of the big companies ensure that their employees are well trained and have the right tools to do their jobs efficiently.
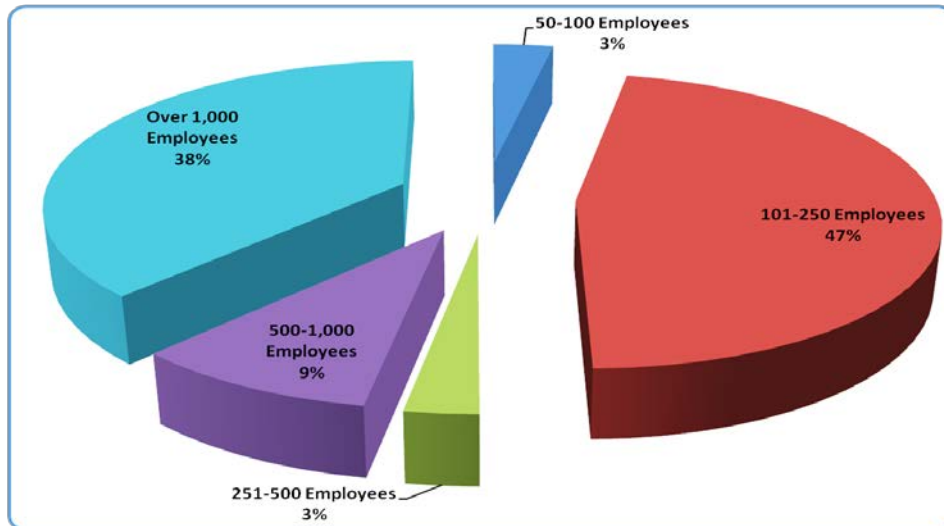
**Figure 6.6: Number of employees in the organization**

Figure 6.6 shows the number of employees in the construction companies that took part in the survey. The best response came from companies that have between 101 and 250 employees. This was followed by companies with over 1000 employees. Construction companies often hire employees based on the project. Permanent / full-time employees may be few, but when working on a large project for which 100s or even 1000s of employees are required, they hire these employees for a limited period of time, which is usually the term of the project. In other words, if the project will last for a period of three to five years, the contracts of the employees will also be for a period of three to five years. After this time the employees will have to return to the country from where they were hired. Therefore, having a low number of employees does not mean that the company is small. Responses were received from companies which have employees within the 100s and also from companies that have over 1,000 employees.

Figure 6.7 show the type of construction projects that are commonly undertaken by the construction companies. It can be observed that infrastructure (39.7%) and building projects (37.4%) are the projects most commonly undertaken by these companies. The others are industrial construction (30.1%), BOT / PPP (23.1%), and other type of projects (3.9%). As these are Grade A companies, the type of projects that they handle are large and prestigious. Kuwait is a developing country currently developing its roads, bridges, and buildings, so these are the projects that the companies compete for in the form of government tenders. BOT and PPP are also common in the country. The types of building projects undertaken

include large shopping malls, high-rise buildings, and state-of-the-art luxury apartments and hotels. These are both government and privately owned.
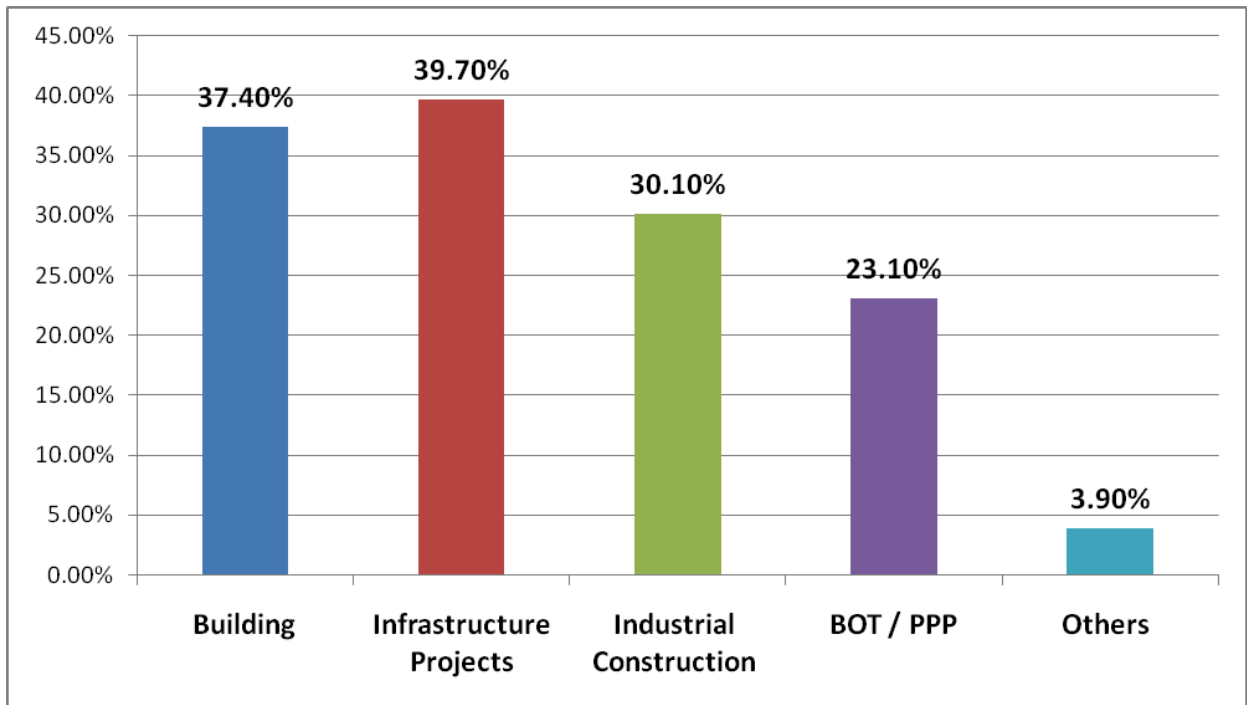


**Figure 6.7: Type of Construction Projects**
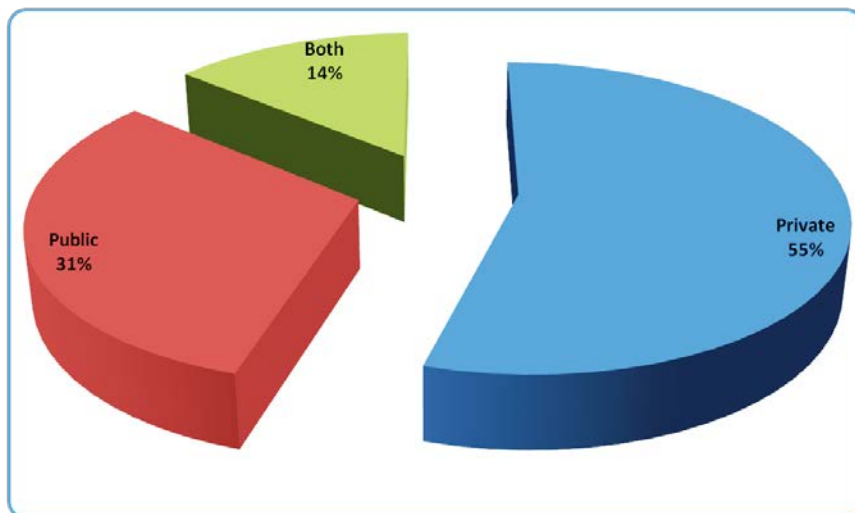


**Figure 6.8: Project Classification**

In the questionnaire, choice of project types was limited to three – private, public and both (figure 6.8). Projects are largely classified into these types. Private projects are more easily handled by the construction companies than public contracts. This is because the

construction companies can sit down with the decision makers and negotiate the demands face-to-face. Communication is limited to the owners and the construction companies, however, when it comes to public projects, negotiations are longer, and even before getting into the project the process is long, beginning with the registration, bidding for the tender and being awarded the project. The timescales for tasks to be carried out are long, as paperwork has to go through many departments before it reaches the final signatory. A small problem can stop the entire process. It can also cause delays in payment and the timeline of the project.

Private projects are limited by the funds of the private owner, whereas government projects are large and can last many years, involving large funds. In addition, with the practice of BOT/PPP, the private contractor makes a profit from the operations completed on the government project before handing it over completely to the government after a stipulated period of time.

Large companies, due to their experience, are able to gain leverage when negotiating with the government and this helps them to win tenders. Due to their financial strength, they are able to handle projects successfully and obtain good profits. Based on the responses obtained, the types of projects undertaken by the five participating construction companies are all within the private sector.

## 6.3: DESCRIPTIVE – QM OVERVIEW

The second section of the questionnaire covered aspects related particularly to Quality Management (QM) and Total Quality Management (TQM). These will be discussed based on the response percentages.
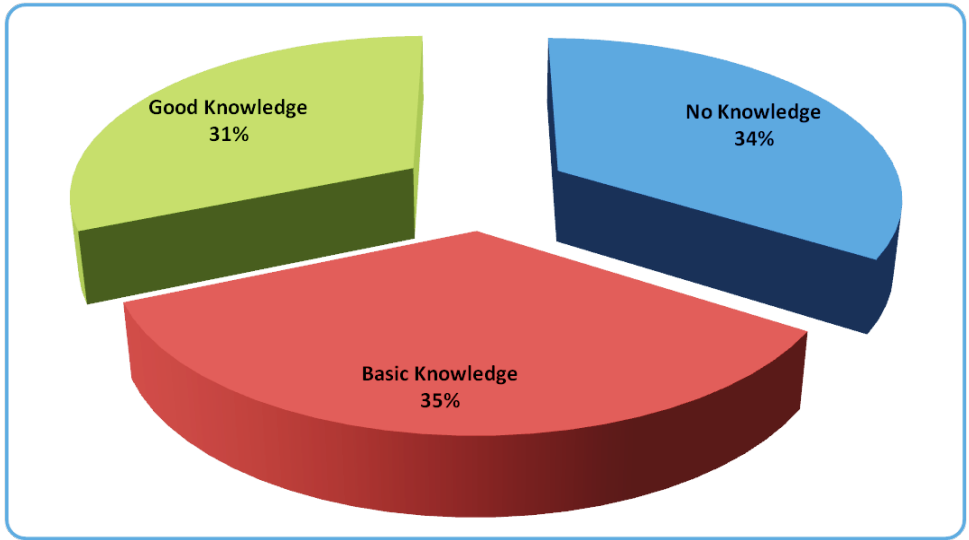
**Figure 6.9: Knowledge of TQM**

Figure 6.9 shows the responses of people regarding their knowledge of TQM. It can be seen that there was a similar percentage for basic knowledge (34.7%) and no knowledge (34.0%). Those who said they had good knowledge amounted to 31.4%, therefore, the knowledge was found to be distributed between the three levels. This may be because there was a high response rate from project managers, quality managers and employees. Further analysis with crosstab of job designation and TQM knowledge level reveals more regarding this, and this will be discussed in subsequent sections.
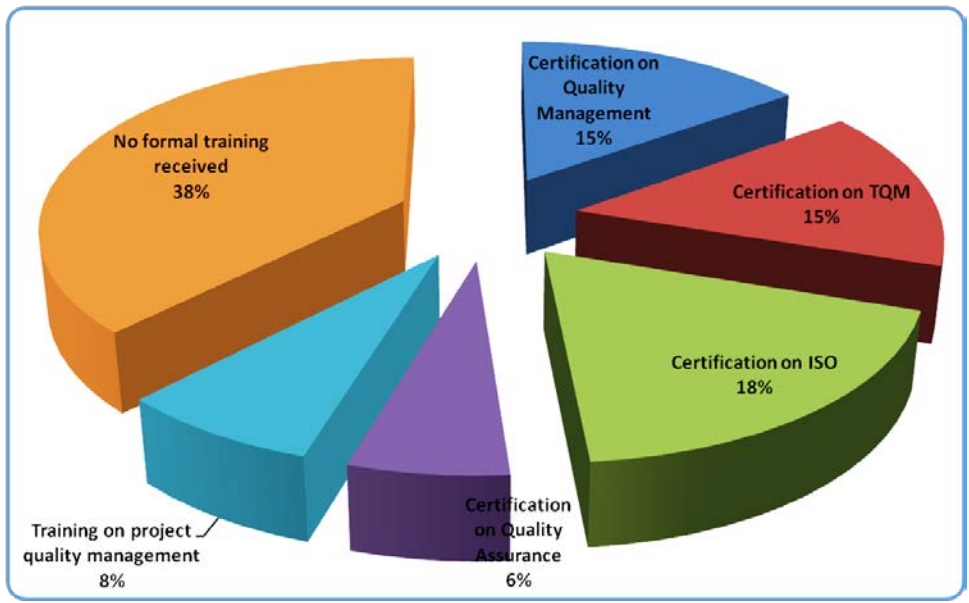


**Figure 6.10: TQM Training**

As the responses in figure 6.10 show, there was a choice of six answers for the type of TQM based training that the respondents had received. The highest response, at 36.7%, was received from respondents who had not received formal training on TQM. This was followed by 18.1% from employees who had received ISO Certification. Most of the companies are ISO certified and as a large number of responses were received from quality managers, the response regarding ISO Certification can be understood. A similar percentage was received from respondents who had received QM Certification (14.7%) and TQM Certification (14.6%).
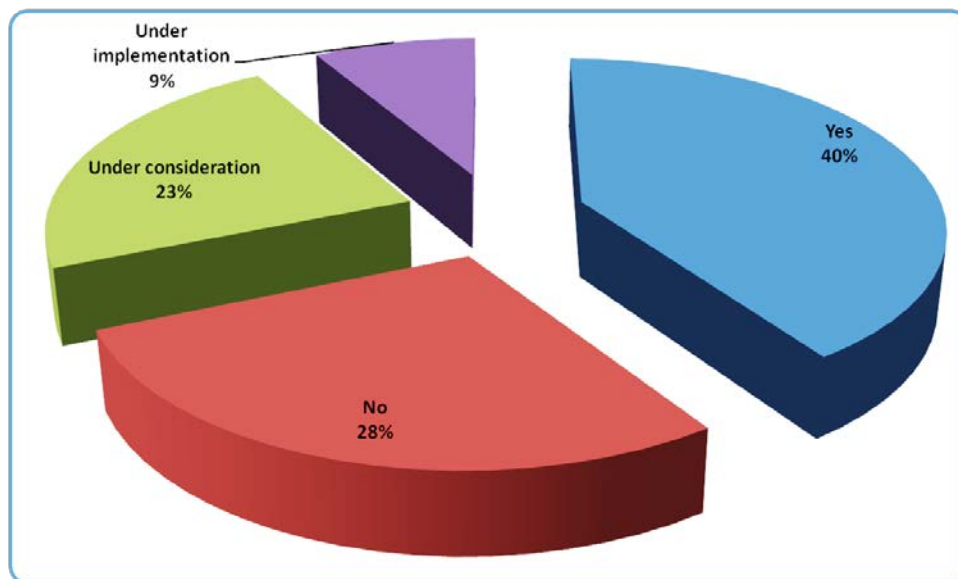


**Figure 6.11: Usage of QM system for Construction Projects**

Figure 6.11 shows the usage of a QM system within construction projects. As can be seen, 40.5% of respondents stated they use a QM system in construction projects. This was followed by 28.2% who indicated that there is a lack of usage of a QM system, and 22.8% who stated they are considering using a QM system. Those who chose 'under implementation' amounted to 8.5%, therefore, a total of 59.5% stated they lacked in use of QM within their construction projects.
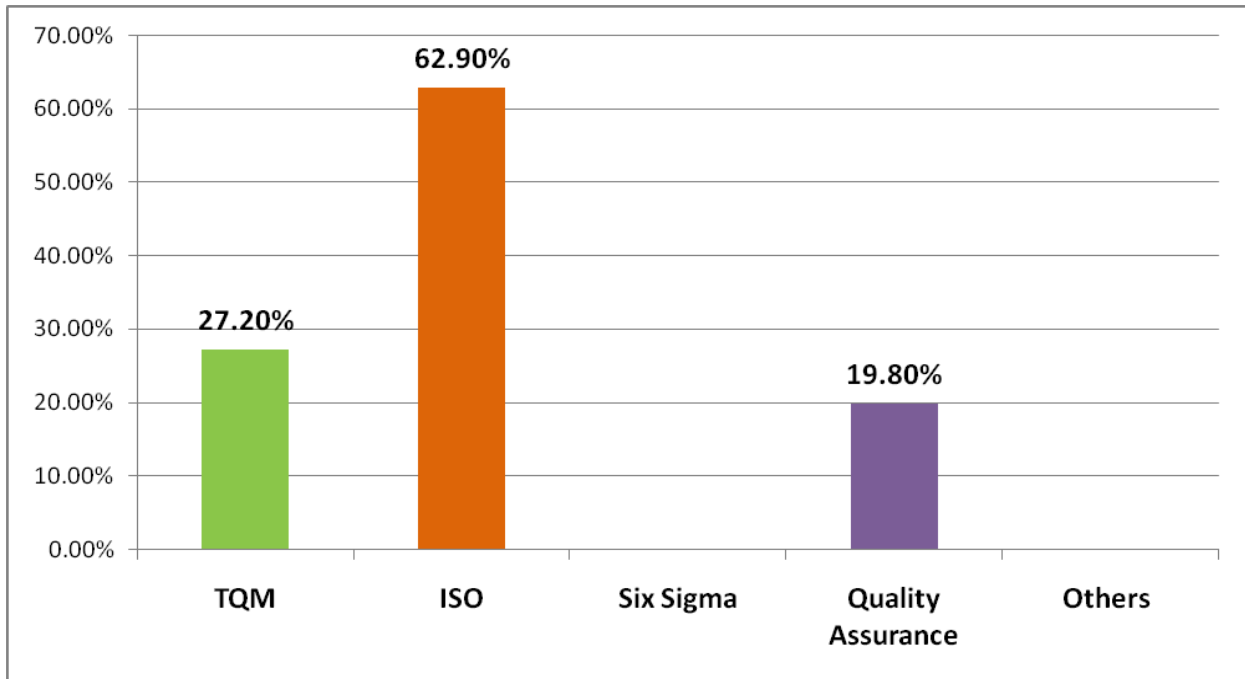
**Figure 6.12: Type of quality system used in the construction companies**

Figure 6.12 shows the type of quality system used in the construction companies in Kuwait. ISO accounted for the highest response, at 62.9%; TQM was 27.2%, and Quality Assurance was 19.8%. None of the companies use Six Sigma. It can also be observed that most of the firms are standardized on ISO. ISO is seen as able to provide a competitive advantage. This is because clients are more interested in doing business with ISO based companies. Although the aim of implementing ISO or TQM may only be to gain an added advantage or competitive edge, in doing so the companies are forced to use these systems throughout their processes. In whichever way it occurs, the companies taking the initiative to use QM based systems take a step towards better performance.

## 6.4: DESCRIPTIVE STATISTICS FOR VARIABLES

The descriptive statistics that are provided here are for the variables that were studied. The variables were role of TQM; QM & TQM; leadership, employees and teamwork and IT. The details are discussed based on the response percentage, as well as the mean value of the response.

The scales used in the variables are five point and the abbreviations used in the tables are: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

**Table 6.1: Role of TQM (cumulative view)**

| ROLE OF TQM | | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|---|
| TQM improves project design | N | 36 | 331 | 183 | 73 | 69 | 2.7225 |
| | % | 5.2 | 47.8 | 26.4 | 10.5 | 10.0 | |
| TQM enhances cost estimations | N | 67 | 207 | 157 | 147 | 64 | 2.8972 |
| | % | 9.7 | 29.9 | 22.7 | 21.2 | 9.2 | |
| TQM provides an enhanced organization image | N | | 191 | 207 | 258 | 14 | 3.1418 |
| | % | | 27.6 | 29.9 | 37.3 | 2.0 | |
| TQM improves changed order tracking | N | | 163 | 283 | 176 | 70 | 3.2211 |
| | % | | 23.6 | 40.9 | 25.4 | 10.1 | |
| TQM reduces claims arising from projects | N | 50 | 103 | 214 | 277 | 48 | 3.2457 |
| | % | 7.2 | 14.9 | 30.9 | 40.0 | 6.9 | |
| TQM enables organizations to capturing a larger market share | N | 22 | 72 | 288 | 302 | 8 | 3.2919 |
| | % | 3.2 | 10.4 | 41.6 | 43.6 | 1.2 | |
| TQM is a tool that helps to increase profits | N | 22 | 125 | 202 | 289 | 54 | 3.3295 |
| | % | 3.2 | 18.1 | 29.2 | 41.8 | 7.8 | |
| TQM is essential to gain a competitive advantage | N | | 94 | 319 | 160 | 78 | 3.3410 |
| | % | | 13.6 | 46.1 | 23.1 | 11.3 | |
| Top management commitment is essential to the success of TQM | N | 33 | 10 | 193 | 267 | 73 | 3.3709 |
| | % | 4.8 | 14.5 | 27.9 | 38.6 | 10.5 | |
| TQM helps to identify and eliminate defects | N | 45 | 79 | 143 | 370 | 55 | 3.4494 |
| | % | 6.5 | 11.4 | 20.7 | 53.5 | 7.9 | |
| Continuous improvement measurements are the key to TQM success | N | 57 | 121 | 81 | 320 | 113 | 3.4494 |
| | % | 8.2 | 17.5 | 11.7 | 46.2 | 16.3 | |
| TQM should be an organization wide concept | N | 22 | 85 | 210 | 307 | 68 | 3.4538 |
| | % | 3.2 | 12.3 | 30.3 | 44.4 | 9.8 | |
| One of main aims of TQM is to satisfy employees | N | 22 | 58 | 250 | 213 | 125 | 3.5404 |
| | % | 3.2 | 8.4 | 36.1 | 30.8 | 18.1 | |
| Top management involvement ensures the success of TQM | N | 26 | 106 | 89 | 378 | 93 | 3.5867 |
| | % | 3.8 | 15.3 | 12.9 | 54.6 | 13.4 | |
| TQM is useful for timely completion of a project | N | 54 | 47 | 146 | 262 | 183 | 3.6835 |
| | % | 7.8 | 6.8 | 21.1 | 37.9 | 26.4 | |
| TQM is used for convincing customers about | N | | 109 | 177 | 185 | 221 | 3.7486 |

| company strength | % | | 15.8 | 25.6 | 26.7 | 31.9 | |
|---|---|---|---|---|---|---|---|
| TQM is a problem solving tool | N | 14 | 19 | 143 | 340 | 176 | 3.9321 |
| | % | 2.0 | 2.7 | 20.7 | 49.1 | 25.4 | |
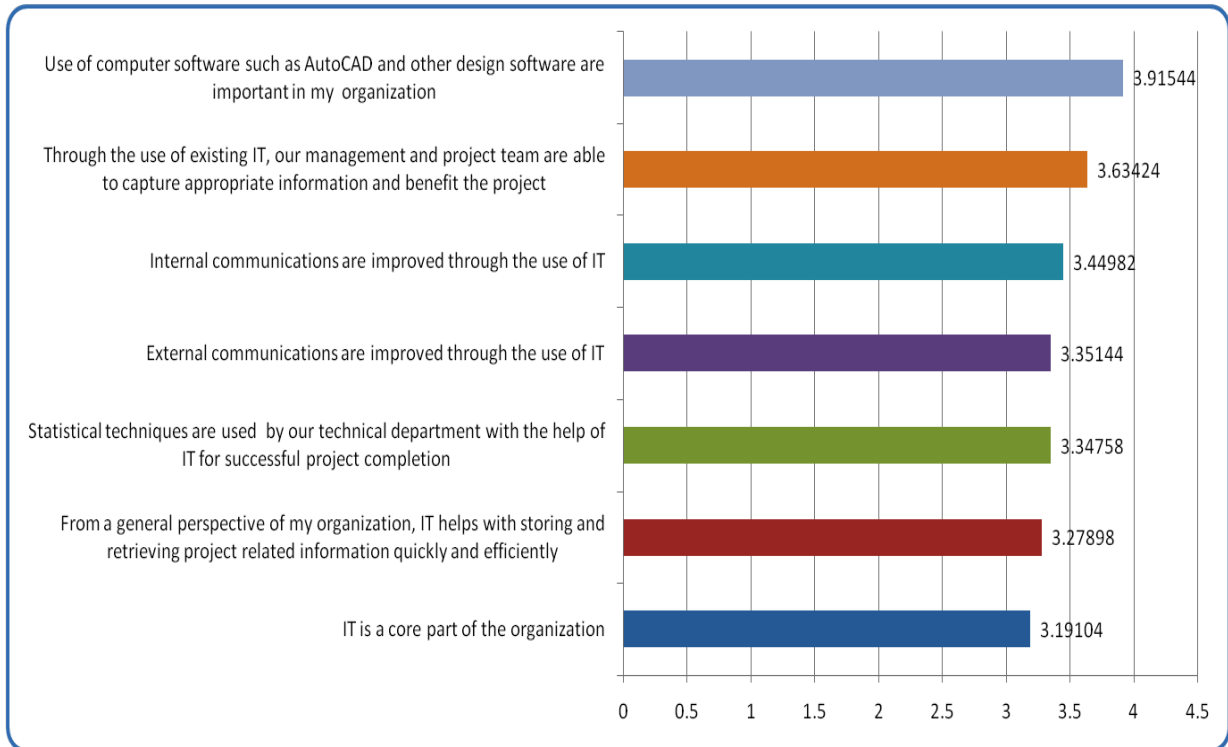


**Figure 6.13: Role of TQM**

The role of TQM had 17 constructs / statements (table 6.1 and figure 6.13). It focused on how TQM was being utilized within the construction companies in Kuwait. According to 37.3%, TQM provides an enhanced organization image. This is in accordance with an earlier discussion about QM systems being adopted by organizations in order to enhance their image. The mean value for this statement is 3.1418 because the next highest response of 29.9% was given in the neutral scale. In addition, 31.9% strongly agreed and 26.7% agreed that TQM is used to convince customers about company strength. There was also 25.6% given in the neutral scale, so the mean value is 3.7486. It was also agreed upon by 43.6% that TQM helps construction firms gain a competitive advantage and a larger market share, however, 41.6% was given in the neutral scale, indicating uncertainty. The mean value here is 3.2919. The mean value has been derived from the descriptive frequency statistical output.

In a similar manner, TQM was indicated to be an aspect that increased competitive advantage. This was because 46.1% was given in the neutral scale with a following 23.1% given in the

agree scale. A mean value of 3.3410 confirms the distribution of responses between the neutral and agree scales. There was also positive support for TQM aimed at employee satisfaction. Although the maximum response was given in the neutral scale, at 36.1%, the following responses were given in the agree scale (30.8%) and the strongly agree scale (18.1%). Thus, there is a mean value of 3.5404.

It is expected by many that TQM will improve many aspects of a company. According to the responses here, TQM is not being used to improve aspects related to project design, cost estimation or order tracking. This is because regarding project design (47.8%) and cost estimations (29.9%), the majority of the responses were given in the disagree scale. The mean values for these are 2.7225 and 2.8972 respectively. With regards to improving change order tracking, 40.9% was given in the neutral scale, indicating that the respondents were unsure. There was a similar response, at 25.4%, given in the agree scale and 23.6% given in the disagree scale, therefore, the mean value for this construct is 3.2211. It was identified by 41.8% of the respondents that TQM is a tool that helps to increase a firm's profits. As 29.2% was given in the neutral scale, the mean value is 3.3295.

In terms of positive responses, it was supported by 37.9% in the agree scale and 26.4% in the strongly agree scale that TQM is useful for completing projects on time, therefore, the statement has a mean value of 3.6835. It was also agreed upon by 49.1% that TQM can be a problem solving tool. The following responses were spread between strongly agree (25.4%) and the neutral scale (20.7%), the mean value is therefore 3.9321, indicating higher responses within the positive scale. Other positive responses regarding TQM were a reduction in claims arising from projects (mean=3.2457) and identifying and eliminating defects (mean=3.4494).

To ensure the success of TQM, it has to be implemented widely as an organizational concept, as indicated by 44.4% in the agree scale. Also, there has to be continuous improvement measurement, as indicated by 46.2% in the agree scale. Both these constructs have subsequent higher values in the neutral scale, thus the mean values are 3.4538 and 3.4494 respectively. In addition, the importance of top management commitment and involvement was indicated by 38.6% and 54.6% respectively.

**Table 6.2: Role of TQM (organization view)**

| TQM Role | Kharafi | Al Bahar | Arab Const. | First United | Gulf United |
|---|---|---|---|---|---|
| TQM improves project design | 2.5916 | 2.4492 | 2.1613 | 3.4043 | 3.3678 |
| TQM enhances cost estimations | 2.9953 | 2.2032 | 2.7419 | 3.266 | 3.8621 |
| TQM provides an enhanced organization image | 2.6756 | 3.6417 | 2.6935 | 3 | 3.908 |
| TQM improves changed order tracking | 3.2748 | 3.0214 | 2.8387 | 3.0638 | 3.931 |
| TQM is essential to gain a competitive advantage | 3.0169 | 3.8235 | 2.9348 | 2.8723 | 3.908 |
| Top management commitment is essential to the success of TQM | 3.4656 | 3.2422 | 2.7903 | 2.9468 | 4.1954 |
| TQM reduces claims arising from projects | 3.0267 | 3.2941 | 3.5806 | 3.3936 | 3.4023 |
| TQM enables organizations to capturing a larger market share | 3.4008 | 2.893 | 3.371 | 3.4894 | 3.5517 |
| TQM should be an organization wide concept | 3.1718 | 4.0428 | 2.9516 | 3.1702 | 3.7011 |
| TQM is a tool that helps to increase profits | 3.0305 | 3.508 | 3.4032 | 3.2447 | 3.8851 |
| Continuous improvement measurements are the key to TQM success | 3.3321 | 3.8021 | 3.3548 | 2.8723 | 3.7356 |
| TQM helps to identify and eliminate defects | 3.4924 | 2.8984 | 3.2581 | 3.9255 | 4.1264 |
| One of main aims of TQM is to satisfy employees | 3.3855 | 3.9509 | 3.5645 | 2.8404 | 3.977 |
| TQM is useful for timely completion of a project | 3.7176 | 3.9893 | 3.2581 | 3.2553 | 3.6897 |
| Top management involvement ensures the success of TQM | 3.355 | 3.9893 | 3.5806 | 3.1489 | 3.8966 |
| TQM is a problem solving tool | 4.3473 | 4.0535 | 2.8548 | 3.8085 | 3.3218 |
| TQM is used for convincing customers about company strength | 3.4275 | 4.4064 | 3.2097 | 4.1064 | 3.2989 |
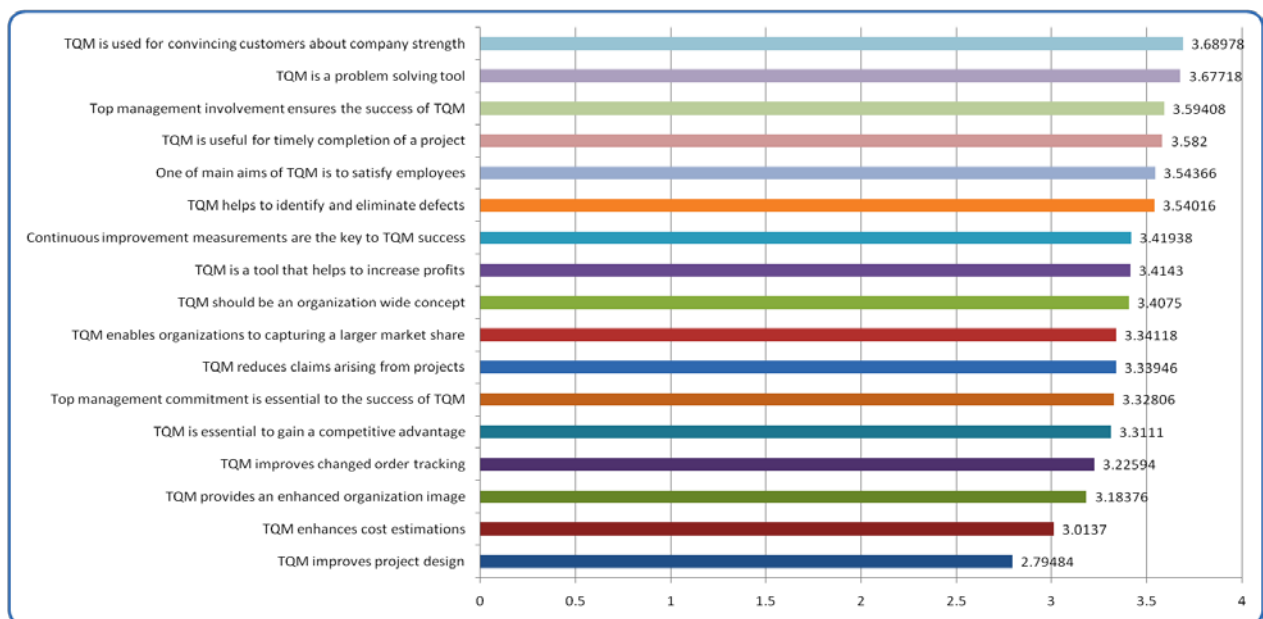


**Figure 6.14: Role of TQM (Organization View)**

The earlier descriptive analysis provided a cumulative understanding into role of TQM within all the organization in study. Table 6.2 and figure 6.14, provides responses based on each of the organizations for each statement. From an overall the higher mean values are from Gulf United construction firm indicating that they are more into the agreement to the statements. This is followed by positive responses from Al Bahar. From a cumulative perspective, Gulf United has a better understanding on the role of TQM compared to other four construction companies.

**Table 6.3: QM and TQM (cumulative view)**

| QM & TQM | | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|---|
| Customer pressure is the reason for us using quality management | N | 93 | 167 | **351** | 81 | | 2.6069 |
| | % | 13.4 | 24.1 | **50.7** | 11.7 | | |
| Competition was the reason for adopting quality management in my organization | N | 67 | 207 | **278** | 139 | | 2.7066 |
| | % | 9.7 | 30.1 | **40.2** | 20.1 | | |
| TQM enhances coordination between members of the project team and other departments in my organization | N | 80 | 192 | **208** | 172 | 40 | 2.8555 |
| | % | 11.6 | 27.7 | **30.1** | 24.9 | 5.8 | |
| From the perspective of my organization, partnering between organization and supplier is key to TQM | N | | **251** | 194 | 215 | 32 | 3.0405 |
| | % | | **36.3** | 28.0 | 31.1 | 4.6 | |
| QM is essential for certification of materials in my organization | N | 68 | 168 | 149 | **246** | 61 | 3.0925 |
| | % | 9.8 | 24.3 | 21.5 | **35.5** | 8.8 | |
| TQM is an effective management tool for employee performance | N | | 203 | 209 | **254** | 26 | 3.1488 |
| | % | | 29.3 | 30.2 | **36.7** | 3.8 | |
| In my organization we practice quality management as an organization-wide concept | N | | 214 | 178 | **253** | 47 | 3.1922 |
| | % | | 30.9 | 25.7 | **36.6** | 6.8 | |
| We benchmarking with other leading companies | N | 113 | 78 | 82 | **359** | 38 | 3.1955 |
| | % | 16.3 | 11.3 | 11.8 | **51.9** | 5.5 | |
| TQM is important in my organization to achieve better project outcomes | N | 20 | 156 | 183 | **291** | 38 | 3.2485 |
| | % | 2.9 | 22.5 | 26.4 | **42.1** | 5.5 | |
| A goal of my organization is to exceed customer expectations | N | 7 | 83 | **367** | 184 | 51 | 3.2731 |
| | % | 1.0 | 12.0 | **53.0** | 26.6 | 7.4 | |
| My company policy requires all projects to go through the quality department | N | 39 | 109 | 221 | **264** | 59 | 3.2818 |
| | % | 5.6 | 15.8 | 31.9 | **38.2** | 8.5 | |
| In my organization, customer satisfaction is the primary focus of being a TQM based organization | N | 6 | 40 | **353** | 220 | 57 | 3.4172 |
| | % | 0.9 | 5.8 | **51.0** | 31.8 | 8.2 | |
| Quality is a principal objective in my organization | N | 17 | 132 | 196 | **226** | 121 | 3.4364 |
| | % | 2.5 | 19.1 | 28.3 | **32.7** | 17.5 | |
| Product and service quality is of high importance in my organization | N | 33 | 76 | 195 | **261** | 127 | 3.5390 |
| | % | 4.8 | 11.0 | 28.2 | **37.7** | 18.4 | |
| Customer satisfaction is very important in my organization | N | | 111 | 143 | **374** | 64 | 3.5650 |
| | % | | 16.0 | 20.7 | **54.0** | 9.2 | |
| Quality is clearly defined in my organization | N | 45 | 48 | 147 | **339** | 113 | 3.6171 |
| | % | 6.5 | 6.9 | 21.2 | **49.0** | 16.3 | |
| IT is essential that TQM is successful in my organization | N | 99 | 58 | 40 | **287** | 208 | 3.6460 |
| | % | 14.3 | 8.4 | 5.8 | **41.5** | 30.1 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| TQM has been the initiative of our top management | N | 58 | 41 | 141 | **297** | 155 | 3.6503 |
| | % | 8.4 | 5.9 | 20.4 | **42.9** | 22.4 | |
| Employee motivation is based on monitory incentives | N | 33 | 107 | 105 | 182 | **265** | 3.7789 |
| | % | 4.8 | 15.5 | 15.2 | 26.3 | **38.3** | |
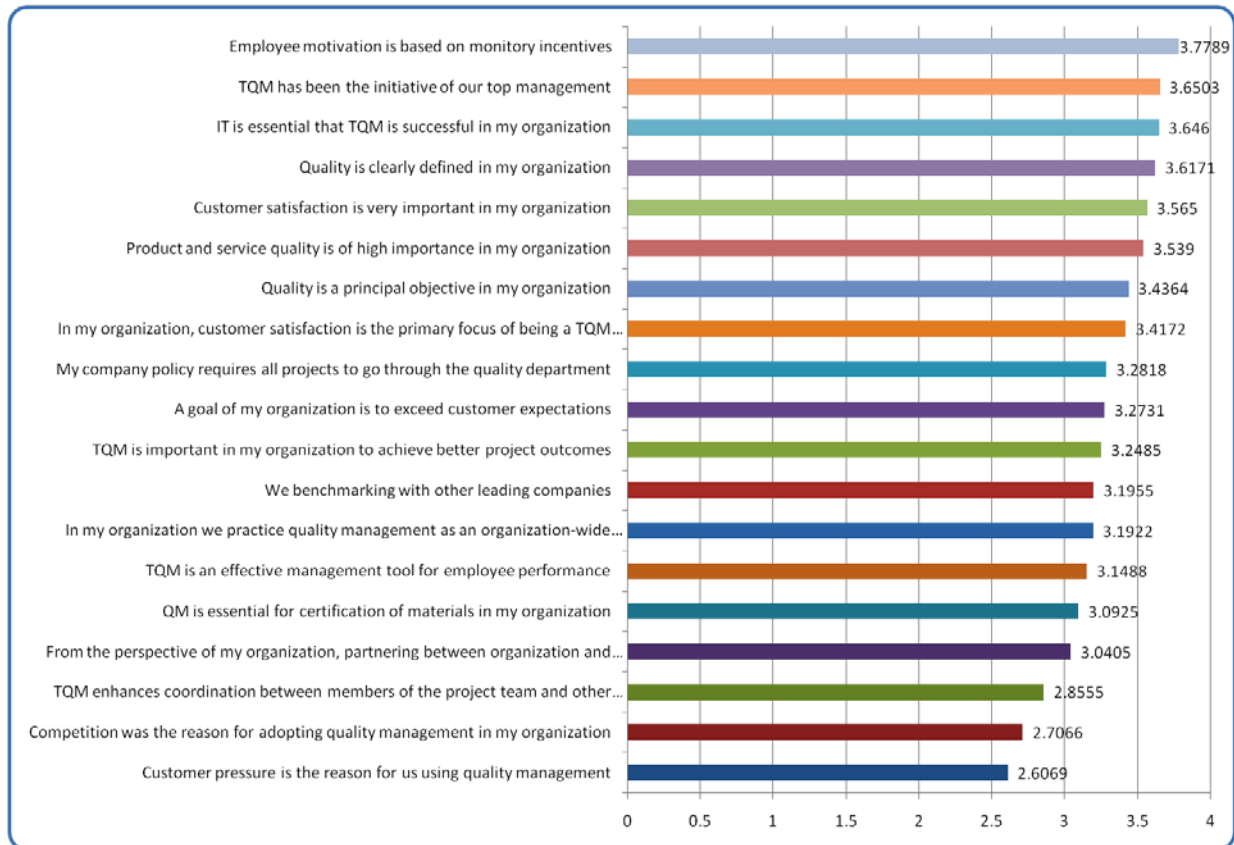


**Figure 6.15: QM and TQM (cumulative view)**

QM and TQM had 19 constructs / statements, looking at the processes observed by the construction firms to ensure quality in their projects (table 6.3 and figure 6.15).

Organizational policy and procedures need to be aligned with quality control to ensure that each project goes through quality control. Based on the 49.0% response rate in the agree scale and the 16.3% rate in the strongly agree scale, and a mean value of 3.6171, it can be understood that quality is an integral part of the construction firms. In addition, 36.6% agreed that quality management was an organization-wide concept. However, 25.7% responded in the neutral scale and 30.9% in the disagree scale, thus the response was mixed and the mean value is 3.1922. It can also be understood from the 32.7% that quality is a principal objective of the companies. This view received strong agreement from 17.5% of the respondents. Nevertheless, there were 28.3% in the neutral scale, which contributed to a slightly lower

mean value of 3.4364. The other responses received showed that 38.2% of respondents agreed and 31.9% responded in the neutral scale. The distribution of the responses can also be understood from the mean value of 3.2818. This indicates that some of the respondents were aware of policies and procedures and how their company follows these, whereas others were not sure. From this we can understand that quality is considered an important factor by the construction firms, but how closely it is related to TQM is not clear.

The importance of TQM has been indicated in many ways. From the response of 42.1% in the agree scale it can be understood that TQM is important for achieving better product outcomes, however, with 26.4% in the neutral scale and 22.5% in the disagree scale, it is clear that there are differences of opinion regarding TQM usages, and therefore the mean value is 3.2485. TQM was considered by 36.7% as an effective tool for employee performance. The mean value is 3.1488 because, 30.2% responded in the neutral scale, and 29.3% responded in the disagree scale. It was asked if partnering between the organization and suppliers was a key aspect of TQM: 36.3% responded in the disagree scale, 31.1% in the agree scale, and 28.0% in the neutral scale, therefore, the mean value is 3.0405.

The importance of customers was indicated by 31.8% in the agree scale, but 51.0% responded in the neutral scale, indicating that they were not able to provide a definitive answer. With a mean value of 3.4172, it can be assumed that people responded in the neutral scale because they were unsure due to the fact that most of them are not employed at a managerial level, or because they interact with customers directly. Looking further into the customer aspects, 53.0% responded in the neutral scale when asked if the goal of the organization was to exceed customer expectations. Only 26.6% responded in the agree scale, and thus the mean value is 3.2731.

From a different angle it was asked if the organization adopted QM and related systems due to customer pressures. Although 50.7% responded in the neutral scale, 24.1% responded in the disagree scale, providing a mean value of 2.6069, therefore, it can be concluded that customer pressures are not the reason for organizations adopting QM processes. It was also identified that competition is not the real reason for organizations adopting QM processes. This is because in addition to 40.2% responding in the neutral scale, 30.1% responded in the disagree scale. The mean value is 2.7066 because 20.1% responded in the agree scale. Here

the responses were distributed, indicating that TQM is adopted to gain a competitive advantage but is not viewed as a particularly important factor.

The employees do their job functions but since they do not interact with customers directly, they are unsure of the objective of the work that is being performed by them. In a TQM environment, employees have to understand the importance of their work and how their actions and outcomes of their jobs impact on customers, therefore, a lack of clear communication of the companies' objectives and the importance of customers can be ascertained from these responses.

With a mean value of 2.8555, it was unclear whether coordination between the project team and other members of the organization was effective. This is an important factor for successful project management. There has to be a strong coordination between the project team and all other departments in the organization to ensure project success and customer satisfaction. According to 54.0% who responded in the agree scale, customer satisfaction is important. There were 20.7% who responded in the neutral scale and 16% who responded in the disagree scale; therefore the mean value is 3.5650. The importance of top management was also indicated by 42.9% of the respondents, who agreed that TQM is a initiative of top management. Similarly, the importance of IT was also indicated, as 41.5% agreed that IT is an integral part of TQM success. The mean score for top management initiative is 3.6503, and the mean score for IT being an integral part is 3.6460.

**Table 6.4: QM and TQM (organization view)**

| QM & TQM | Kharafi | Al Bahar | Arab Const. | First United | Gulf United |
|---|---|---|---|---|---|
| Customer pressure is the reason for us using quality management | 2.8855 | 1.7914 | 3.1452 | 3.0426 | 2.6667 |
| Competition was the reason for adopting quality management in my organization | 2.8588 | 1.9626 | 3.1452 | 2.9255 | 3.2989 |
| TQM enhances coordination between members of the project team and other departments in my organization | 3.1031 | 2.123 | 2.5806 | 2.6915 | 4.0575 |
| From the perspective of my organization, partnering between organization and supplier is key to TQM | 2.7939 | 3.1283 | 3.129 | 3.1702 | 3.3908 |
| TQM is an effective management tool for employee performance | 3.1641 | 3.1765 | 3 | 2.8085 | 3.5172 |

| | | | | | |
|---|---|---|---|---|---|
| In my organization we practice quality management as an organization-wide concept | 3.2137 | 3.2139 | 2.9194 | 2.8404 | 3.6552 |
| QM is essential for certification of materials in my organization | 2.9542 | 2.9733 | 3.1452 | 3.234 | 3.5747 |
| We benchmarking with other leading companies | 3.3511 | 2.6524 | 3.0968 | 3.4306 | 3.7701 |
| My company policy requires all projects to go through the quality department | 3.1374 | 3.3529 | 2.9839 | 3.7021 | 3.3218 |
| A goal of my organization is to exceed customer expectations | 3.3626 | 2.9037 | 3.2581 | 3.3511 | 3.7241 |
| Quality is a principal objective in my organization | 3.5573 | 3.4225 | 2.6613 | 3.5745 | 3.5057 |
| TQM is important in my organization to achieve better project outcomes | 3.3435 | 2.5829 | 3 | 3.8936 | 3.9036 |
| In my organization, customer satisfaction is the primary focus of being a TQM based organization | 3.4885 | 3.385 | 3.1522 | 3.1702 | 3.6782 |
| Quality is clearly defined in my organization | 3.5611 | 3.631 | 2.9355 | 4.1702 | 3.6437 |
| Customer satisfaction is very important in my organization | 3.1718 | 3.8503 | 3.5806 | 3.4468 | 4.2529 |
| Product and service quality is of high importance in my organization | 3.2137 | 3.4171 | 3.4032 | 4.4149 | 3.931 |
| TQM has been the initiative of our top management | 3.4466 | 3.4759 | 3.7419 | 4.2021 | 3.977 |
| IT is essential that TQM is successful in my organization | 3.7252 | 2.9519 | 3.8871 | 4.3617 | 3.954 |
| Employee motivation is based on monitory incentives | 3.3588 | 4.3422 | 3.5645 | 4.2447 | 3.4828 |
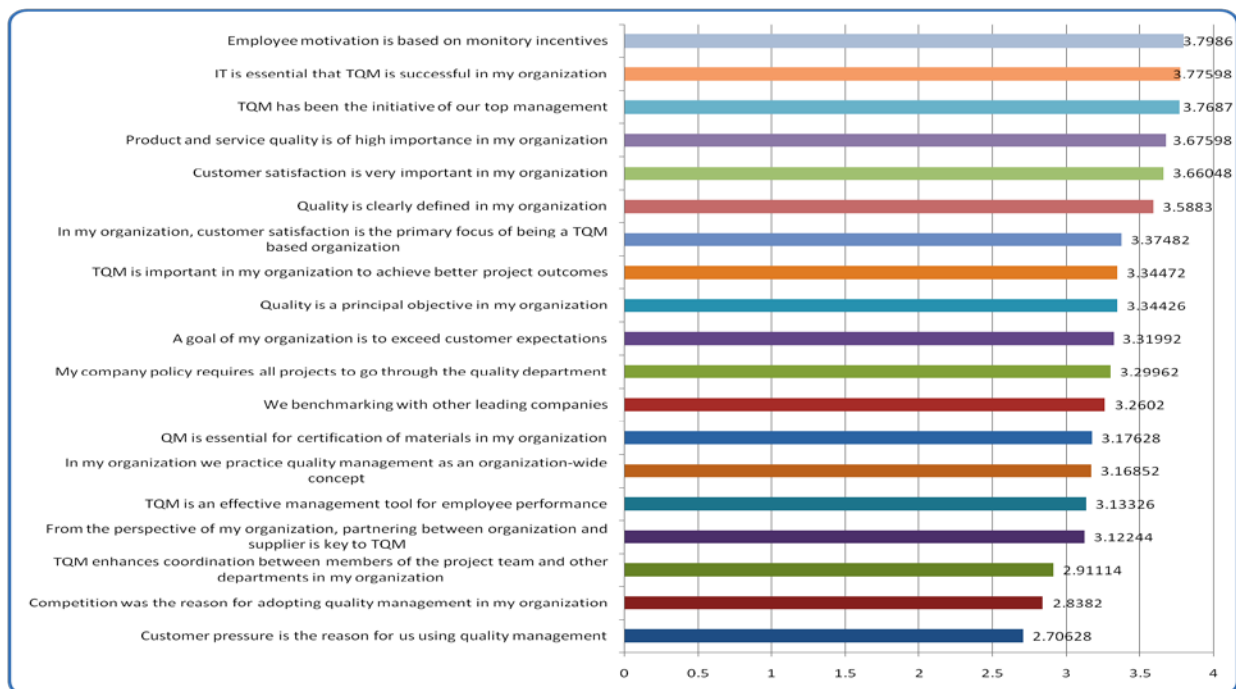


**Figure 6.16: QM and TQM (organization view)**

Table 6.4 and figure 6.16, provides the importance and usage of QM & TQM within the organizations. Based on the overall view, Gulf United Construction Company follows a better QM and TQM focus compared to the other four organizations. This is followed by First United Construction Company where the aspects of quality are emphasized. TQM initiation from top management and the importance of IT towards success of TQM is understood from First United.

**Table 6.5: Leadership, Employees and Teamwork (cumulative view)**

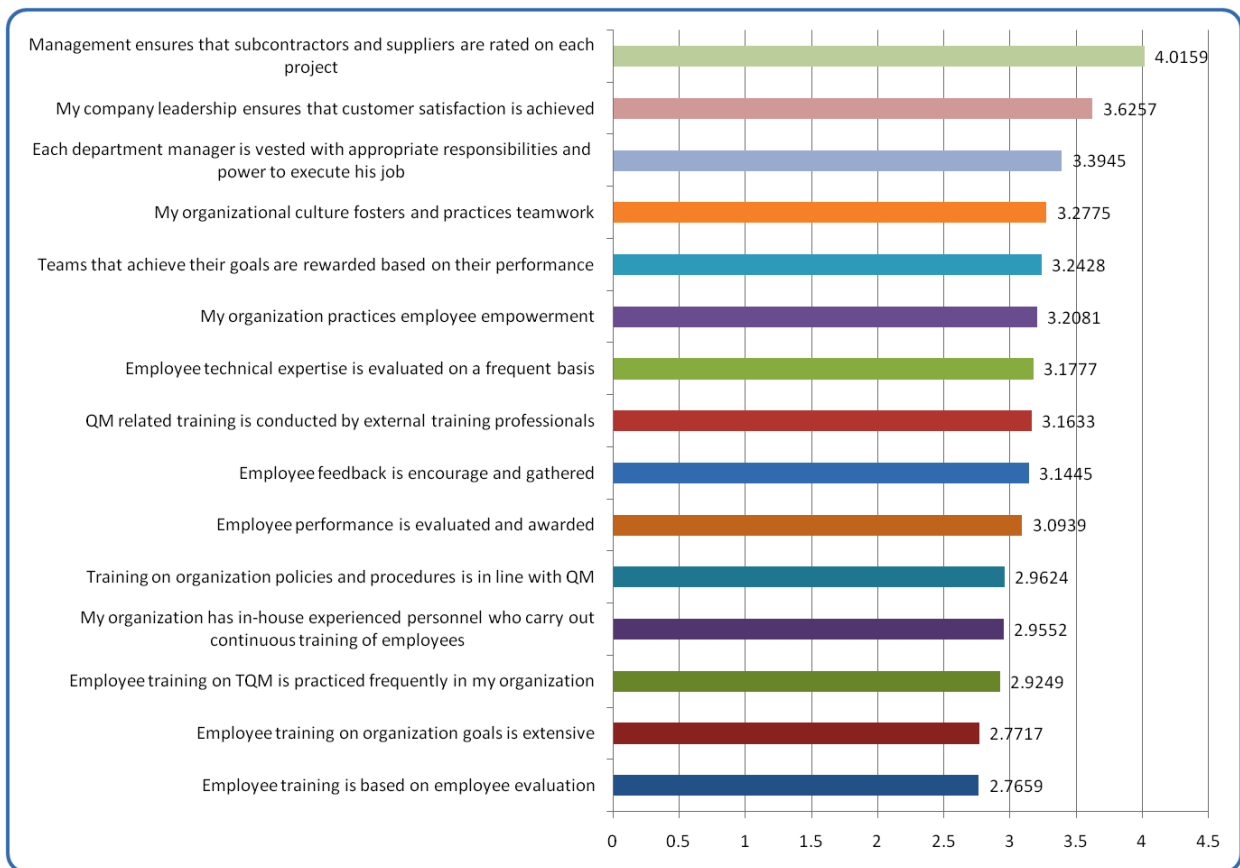| LEADERSHIP, EMPLOYEES & TEAMWORK | | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|---|
| Employee training is based on employee evaluation | N | 89 | 172 | **269** | 136 | 26 | 2.7659 |
| | % | 12.9 | 24.9 | **38.9** | 19.7 | 3.8 | |
| Employee training on organization goals is extensive | N | 101 | 144 | **345** | 106 | 26 | 2.7717 |
| | % | 14.6 | 16.5 | **49.9** | 15.3 | 3.8 | |
| Employee training on TQM is practiced frequently in my organization | N | 19 | 210 | **293** | 144 | 26 | 2.9249 |
| | % | 2.7 | 30.3 | **42.3** | 20.8 | 3.8 | |
| My organization has in-house experienced personnel who carry out continuous training of employees | N | 108 | **204** | 90 | 191 | 99 | 2.9552 |
| | % | 15.6 | **29.5** | 13.0 | 27.6 | 14.3 | |
| Training on organization policies and procedures is in line with QM | N | 85 | 186 | 117 | **278** | 26 | 2.9624 |
| | % | 12.3 | 26.9 | 16.9 | **40.2** | 3.8 | |
| Employee performance is evaluated and awarded | N | 100 | 87 | 211 | **236** | 58 | 3.0939 |
| | % | 14.5 | 12.6 | 30.5 | **34.1** | 8.4 | |
| Employee feedback is encourage and gathered | N | 34 | 192 | 138 | **296** | 32 | 3.1445 |
| | % | 4.9 | 27.7 | 19.9 | **42.8** | 4.6 | |
| QM related training is conducted by external training professionals | N | 122 | 157 | 40 | **232** | 141 | 3.1633 |
| | % | 17.6 | 22.7 | 5.8 | **33.5** | 20.4 | |
| Employee technical expertise is evaluated on a frequent basis | N | 7 | 154 | 253 | **265** | 13 | 3.1777 |
| | % | 1.0 | 22.3 | 36.6 | **38.3** | 1.9 | |
| My organization practices employee empowerment | N | 41 | 124 | **249** | 206 | 72 | 3.2081 |
| | % | 5.9 | 17.9 | **36.0** | 29.8 | 10.4 | |
| Teams that achieve their goals are rewarded based on their performance | N | 7 | 144 | **266** | 224 | 51 | 3.2428 |
| | % | 1.0 | 20.8 | **38.4** | 32.4 | 7.4 | |
| My organizational culture fosters and practices teamwork | N | 43 | 83 | **290** | 191 | 85 | 3.2775 |
| | % | 6.2 | 12.0 | **41.9** | 27.6 | 12.3 | |
| Each department manager is vested with appropriate responsibilities and power to execute his job | N | | 137 | 195 | **310** | 50 | 3.3945 |
| | % | | 19.8 | 28.2 | **44.8** | 7.2 | |
| My company leadership ensures that customer satisfaction is achieved | N | 34 | 76 | 82 | **423** | 77 | 3.6257 |
| | % | 4.9 | 11.0 | 11.8 | **61.1** | 11.1 | |
| Management ensures that subcontractors and suppliers are rated on each project | N | 35 | 33 | 94 | **254** | 276 | 4.0159 |
| | % | 5.1 | 4.8 | 13.6 | **36.7** | 39.9 | |

**Figure 6.17: Leadership, Employees and Teamwork (cumulative view)**

Leadership, employees and teamwork were three separate components, although leadership and employees need to work in a team environment for the success of TQM in an organization (table 6.5 and figure 6.17). Regarding leadership aspects, the discussion has focused on the organizations and their leaders. According to 44.8% of respondents, department managers are vested with appropriate responsibilities and power to execute their jobs efficiently. These department heads are responsible for assigning tasks to their team and individual employees. They also need to take necessary measures to ensure that their employees perform the tasks given to them efficiently, empowering them with responsibilities and decision making roles. Around 28.2% responded in the neutral scale and 19.8% responded in the disagree scale. The mean value is therefore 3.3945.

Ensuring customer satisfaction is a primary aim of the leader. This is especially important in project management, as dealings take place on a one-to-one basis between the construction company and the customers. Unlike other service oriented firms where there are many customers, in this case there is a separate customer for each project. The responses were

135

favourable, as 61.1% responded in the agree scale, along with 11.1% in the strongly agree scale. The mean value is therefore 3.6257.

Construction companies rate suppliers and subcontractors during and after each project. This is a way of creating knowledge, where the construction company gets to know the good and the bad suppliers and subcontractors and is able to make better decisions for future projects. In addition to good and bad, the rating also provides the opportunity to understand their strengths so that the correctly skilled and experienced suppliers and subcontracts can be used for future projects. Of the responses, 76.6% were in the positive scale (agree and strongly agree) indicating that the rating of suppliers and subcontracts is a regular practice by the construction companies, therefore, there is a strong mean value of 4.0159.

One of the first constructs in the questionnaire regarding employees was on employee evaluation and awarding. According to 34.1% of the respondents, their organization evaluates employee performance and awards them accordingly, however, 30.5% responded in the neutral scale as they could not provide a definitive answer. Furthermore, 14.5% responded in the strongly disagree scale and 12.6% responded in the disagree scale. This indicates disagreement and can be further understood by the mean value of 3.0939.

Empowerment is the way in which leaders bestow authority on employees so that they take necessary decisions by themselves when completing their tasks. This is a common practice of transformational leaders, who transform employees into leaders with responsibility and decision making authority; however, this does not mean that the leader does not take part in the work. The leader is the ultimate decision maker, but for tasks that the employee has to complete, he/she can take necessary decisions in order to complete the tasks efficiently. From the responses it can be understood that empowerment is not practiced widely. This is because 36.0% responded in the disagree scale, 40.2% responded in the positive scale (agree and strongly agree), and 23.8% responded in the negative scale (disagree and strongly disagree). The mean value of 3.2081 indicates further the distribution of the responses.

Although there were mixed responses on employee empowerment, when it came to taking employee feedback, 42.8% responded in the agree scale. This considerable majority indicates that the organizations consider employee feedback within a project scenario essential, as each employee has his or her respective tasks which impact on the outcome of

the project, however, the mean value for this construct is only 3.1445. This is because 27.7% responded in the disagree scale and 19.9% responded in the neutral scale.

When discussing employee empowerment and the transferring of responsibilities for decision making, leaders have to understand that employees are qualified and have adequate knowledge to carry out their tasks and jobs efficiently. Although 42.3% responded in the neutral scale, 30.3% responded in the disagree scale. Only 20.8% responded in the agree scale, therefore the mean value is weak at 2.9249.

Aspects related to training were further verified by asking if employee training was an organization goal. The majority responded in the neutral scale, at 49.9%, but a total of 31.1% responded negatively (disagree and strongly disagree) and only 19.1% responded positively (agree and strongly agree). The mean value is also weak at 2.7717. There were more constructs on employee training and this time it was asked if employee training was based on evaluation. Employee evaluation is one of the best ways to identify weak areas and training can be provided for those areas in which the employee is weak. Of the respondents, 38.9% they were unable to provide a definitive answer, however, looking at the subsequent responses of 37.8% in the negative scales and 23.5% in the positive scales, it can be concluded that training was not being provided based on employee evaluation. This can further be verified with the mean value of 2.7659. The next focus was on training that is currently being provided. Based on the responses received, 40.2% agreed, indicating that training that is being provided currently is in line with QM. With a mean value of 2.9624, the subsequent responses were spread across all scales.

Further analysis of how the training was conducted took place. For example, it was asked if QM related training was provided by external training professionals; 33.5% agreed and 20.4% strongly agreed. Similarly, 22.7% disagreed and 17.6% strongly disagree scale, providing a mean value of 3.1633. The final question on training asked whether the construction firms have in-house personnel to carry out continuous training of the employees. The responses were near equal, with 27.6% responding in the agree scales and 29.5% responding in the disagree scales. There were also 13.0% who responded in the neutral scale. With a higher response rate in the disagree scales, the mean value for this construct is only 2.9552.

Teamwork is an essential aspect for the success of projects and the overall working of organizations. With regards to practicing teamwork, the majority of responses were given in the neutral scale; 41.9% of the respondents were not able to provide a clear answer regarding teamwork. On the other hand, 27.6% agreed that there was teamwork, along with 12.3% of respondents who strongly agreed. Rewarding teams when they achieve a goal within a given timeframe is practiced in many large organizations. This provides an incentive to the teams to do better in the future and take greater interest in their jobs. Of the responses, 38.4% were given in the neutral scale as the respondents neither agreed nor disagreed with the statement regarding teams being rewarded. There was also 32.4% of responses given in the agree scale and 20.8% in the disagree scale, thereby providing a mean value of 3.2428.

**Table 6.6: Leadership, Employees and Teamwork (organization view)**

| LEADERSHIP, EMPLOYEES & TEAMWORK | Kharafi | Al Bahar | Arab Const. | First United | Gulf United |
|---|---|---|---|---|---|
| Employee training on organization goals is extensive | 3.1107 | 1.9305 | 2.9032 | 2.9468 | 3.2759 |
| Employee training is based on employee evaluation | 2.9809 | 1.9465 | 3 | 3 | 3.4598 |
| Employee training on TQM is practiced frequently in my organization | 3.3053 | 2.4973 | 3.0645 | 2.7872 | 2.7471 |
| Training on organization policies and procedures is in line with QM | 3.5382 | 2.0535 | 3.5161 | 2.6489 | 3.1264 |
| My organization has in-house experienced personnel who carry out continuous training of employees | 3.1489 | 2.2834 | 3.1452 | 3.2979 | 3.3103 |
| QM related training is conducted by external training professionals | 3.8053 | 2.2086 | 3.3065 | 3.0319 | 3.3218 |
| Employee feedback is encourage and gathered | 2.6908 | 3.5936 | 2.5323 | 3.734 | 3.3448 |
| Employee performance is evaluated and awarded | 3.6756 | 1.6043 | 3.5806 | 3.8085 | 3.4253 |
| Employee technical expertise is evaluated on a frequent basis | 3.3359 | 2.6845 | 3.4839 | 3.4894 | 3.2069 |
| My organization practices employee empowerment | 2.9695 | 3.1123 | 2.8387 | 4.0851 | 3.4483 |
| My organizational culture fosters and practices teamwork | 3.0458 | 3.5348 | 3.0645 | 3.4787 | 3.3563 |
| Teams that achieve their goals are rewarded based on their performance | 3.0458 | 3.3262 | 3.2581 | 3.5213 | 3.3448 |
| Each department manager is vested with appropriate responsibilities and power to execute his job | 3.4084 | 3.0053 | 3.4032 | 4.0745 | 3.34483 |
| My company leadership ensures that customer satisfaction is achieved | 3.4962 | 3.8396 | 3.0806 | 3.9362 | 3.6092 |
| Management ensures that subcontractors and suppliers are rated on each project | 4.2748 | 4.0214 | 3.6129 | 3.9574 | 3.5747 |

**Figure 6.18: Leadership, Employees and Teamwork (organization view)**

Within leadership, employee and teamwork (table 6.6 and figure 6.18) we find higher positive responses from First United Construction Company. The focus on employee productivity and performance of teamwork is higher in First United compared to other four companies. Kharafi and Gulf United also had strong positive responses within leadership and focus organization goals and employee training. These companies ensure that they employees are well trained so that they can produce and deliver the required results.

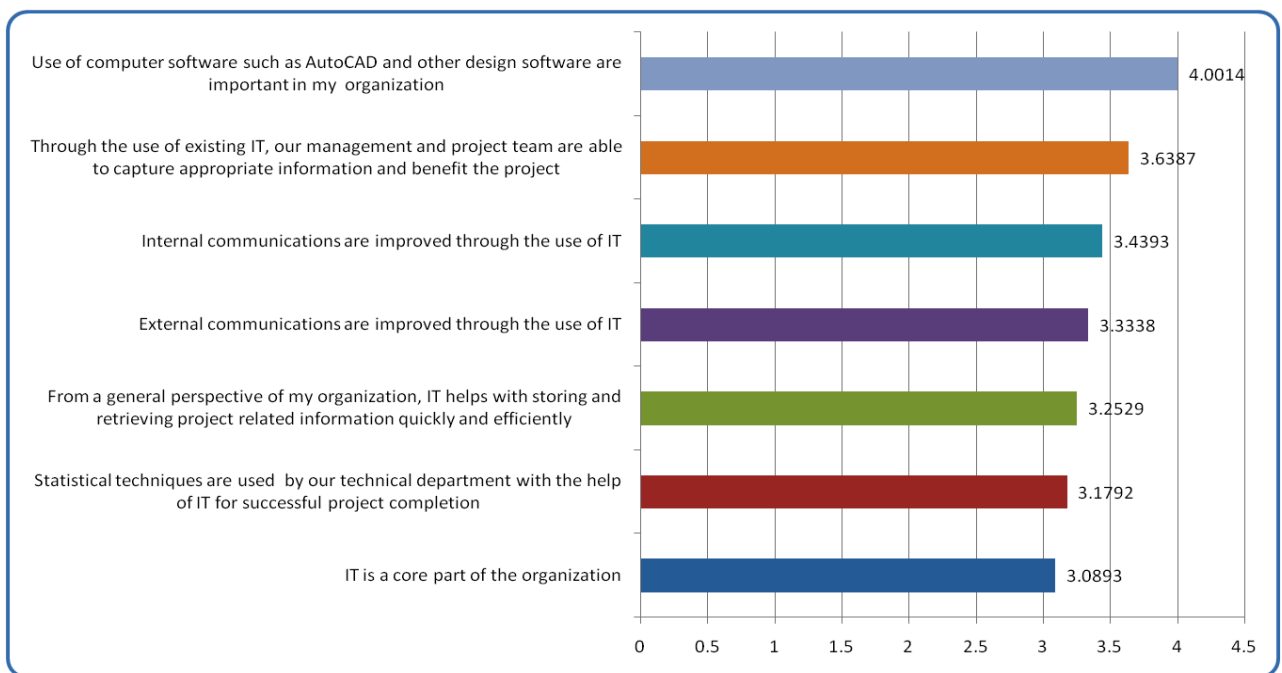| INFORMATION TECHNOLOGY | | SD | D | N | A | SA | Mean |
|---|---|---|---|---|---|---|---|
| IT is a core part of the organization | N | 51 | 173 | 163 | **256** | 40 | 3.0893 |
| | % | 7.4 | 25.0 | 23.6 | **37.0** | 5.8 | |
| Statistical techniques are used by our technical department with the help of IT for successful project completion | N | 20 | 221 | **175** | 167 | 109 | 3.1792 |
| | % | 2.9 | 31.9 | **25.3** | 24.1 | 15.8 | |
| From a general perspective of my organization, IT helps with storing and retrieving project related information quickly and efficiently | N | 94 | 86 | 180 | **215** | 117 | 3.2529 |
| | % | 13.6 | 12.4 | 26.0 | **31.1** | 16.9 | |
| External communications are improved through the use of IT | N | 51 | 80 | 224 | **261** | 76 | 3.3338 |
| | % | 7.4 | 11.6 | 32.4 | **37.7** | 11.0 | |
| Internal communications are improved through the use of IT | N | 11 | 101 | 227 | **279** | 74 | 3.4393 |
| | % | 1.6 | 14.6 | 32.8 | **40.3** | 10.7 | |
| Through the use of existing IT, our management and project team are able to capture appropriate information and benefit the project | N | 11 | 110 | 139 | **290** | 142 | 3.6387 |
| | % | 1.6 | 15.9 | 20.1 | **41.9** | 20.5 | |
| Use of computer software such as AutoCAD and other design software are important in my organization | N | | 13 | 177 | **298** | 204 | 4.0014 |
| | % | | 1.9 | 25.6 | **43.1** | 29.5 | |



**Figure 6.19: Information Technology (cumulative view)**

Information technology plays an integral role in the functioning of organizations and it is also considered to be a factor affecting the success of TQM (table 6.7 and figure 6.19). There were seven constructs in this variable. From an initial overall observation it can be seen that most responses were given in the agree scales.

The importance of IT was established by asking if IT was a core part of the organization. According to 37.0%, who responded in the agree scale, and 5.8% who responded in the strongly agree scale, this was true, however, 23.6% responded in the neutral scale and 32.4% in the negative scale, showing that IT was not a core part of their organization.

It was identified by 31.1% who responded in the agree scale, and 16.9% who responded in the strongly agree scale, that IT is important in their organization, especially for speedy data storage and retrieval. This pertains to information that is crucial to the organization. Information and knowledge that the organization captures and learns throughout its operations is unique to the organization. Such knowledge, if safeguarded, can be used to gain a competitive advantage and produce better project outcomes in the future, however, 26% of respondents lacked understanding of the usage of IT for data storage and retrieval. Although IT is important, it may not be widely used in their organizations. Organizations that do not understand the full usage of IT and its importance do not invest in IT wisely. Their usage may be limited to certain departments such as accounts and finance. Furthermore, if these users are not integrated with each other, data retrieval may not be easy or efficient. This may be one of the reasons why 26.0% responded in the negative scales (disagree and strongly disagree). The mean value for this construct is 3.2529.

It is a common understanding that IT plays an important role in communication. This is not limited to organizations but is also true for individual communications. Today, communication through email, instant messaging, and social networking websites is possible through the internet. Organizations, through both the internet and internal networking such as LAN (Local Area Network), WAN (Wide Area Network), and VPN (Virtual Private Network), use IT for internal communication. Documents are sent between individuals and departments via computer. This helps reduce the wastage of paper and ensures that information reaches the intended recipients quickly and efficiently.

According to 51.0% who responded in the positive scales, IT plays an important role in communication. With 32.8% responding in the neutral scale and 16.2% in the negative scale, the mean value is 3.4393. IT is also used for external communication and 48.7% who responded in the positive scales agreed. Within the construction sector there is much paperwork and although IT has grown to a great extent, the usage of paper still exists.

Communication is still not fully reliant on IT. This was indicated by the 32.4% who responded in the neutral scale and 19.0% who responded in the negative scale, providing a mean value of 3.3338.

The use of IT is not limited to knowledge and communication. Data that is stored in an IT system can only be useful if different statistical analyses are generated. Such analyses can help construction companies determine the exact cost of projects, calculate timelines, and calculate the end result of the project, for example. In order to do this, extensive hardware and software is required. Based on the 39.9% who responded in the positive scales, 25.3% who responded in the neutral scale, and 34.8% who responded in the negative scale, the mean value is 3.1792.

The use of IT by management and the project team for capturing information beneficial to the project was agreed upon by 41.9% and strongly agreed upon by 20.5%. Of the responses, 20.1% were given in the neutral scale and only 17.5% were given in the negative scale. Thus, existing systems are being put to good use for gathering information and making projects successful. Construction companies use AutoCAD and other design software to produce good project designs. This is one of the primary reasons why construction companies use IT. Use of these products helps companies generate designs easily, and if there are changes required then these can easily be incorporated through the use of such software. Of the respondents, 72.6% agreed that such software was used, 25.6% responded in the neutral scale, and only 1.9% responded in the disagree scale. Due to the mean value of 4.0014, we can conclude that AutoCAD and other design software is an integral part of the construction companies.

**Table 6.8: Information Technology (organization view)**

| INFORMATION TECHNOLOGY | Kharafi | Al Bahar | Arab Const. | First United | Gulf United |
|---|---|---|---|---|---|
| IT is a core part of the organization | 3.3664 | 2.1818 | 3.1452 | 3.3882 | 3.8736 |
| From a general perspective of my organization, IT helps with storing and retrieving project related information quickly and efficiently | 3.7672 | 2.3155 | 3.5161 | 3.1064 | 3.6897 |
| Statistical techniques are used by our technical department with the help of IT for successful project completion | 3.2595 | 2.385 | 3.5645 | 3.4255 | 4.1034 |
| External communications are improved through the use of IT | 3.5458 | 2.861 | 3.1452 | 3.0213 | 4.1839 |

| | | | | | |
|---|---|---|---|---|---|
| Internal communications are improved through the use of IT | 3.5458 | 3.2406 | 3.5161 | 3.234 | 3.7126 |
| Through the use of existing IT, our management and project team are able to capture appropriate information and benefit the project | 3.5649 | 3.7433 | 3.3548 | 3.2553 | 4.2529 |
| Use of computer software such as AutoCAD and other design software are important in my organization | 3.8511 | 4.508 | 3.4194 | 3.7872 | 4.0115 |
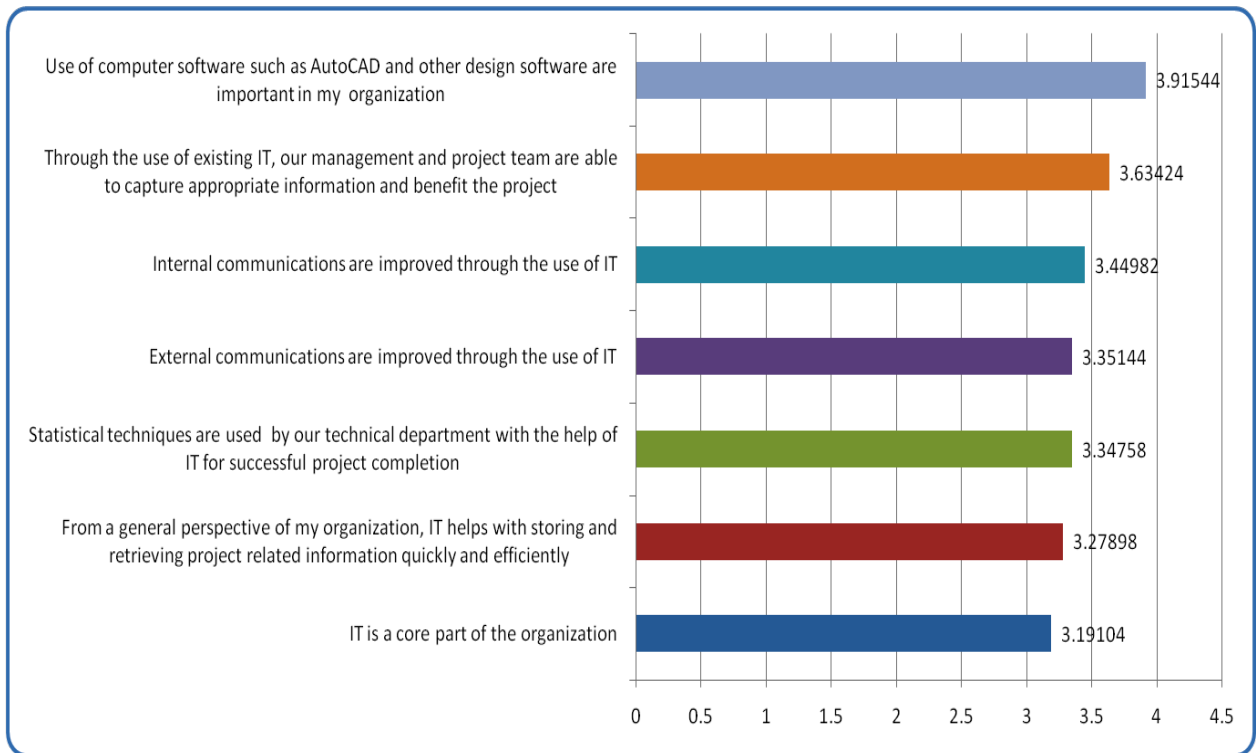


**Figure 6.20: Information Technology (organization view)**

It plays a major role on the use and success of TQM. From table 6.8 and figure 6.20, we understand the focus and usage on IT is higher in Gulf United compared to other four companies. Usage of computers in storage and retrieval of information is emphasized in responses from Gulf United. Data is statistically analyzed by technical department so that critical factors to enhancing projects towards achieving successful completion. Communication is also another factor that is enhanced through the use of IT. Al Bahar indicated the use of professional project software such as AutoCAD for their projects.

## 6.5: RELIABILITY ANALYSIS

This section discusses the reliability of the data, calculated using Cronbach's Alpha reliability statistical analysis. Reliability is proven with anything above 0.700. There is an argument

that it can also begin from 0.600.  The strength of the reliability is increased as the value gets closer to 1.000.

**Table 6.9: Cronbach's Alpha Reliability Analysis**

| Variable | Cronbach's Alpha | Number of Items |
|---|---|---|
| Role of TQM | 0.631 | 17 |
| QM & TQM | 0.800 | 19 |
| Leadership, Employees & Teamwork | 0.731 | 15 |
| Information Technology | 0.784 | 7 |
| **Alpha for Total Constructs** | **0.896** | **58** |

Table 6.9 shows reliability for both total constructs and per variable.  The results show that overall reliability is strong, with an Alpha value of 0.896.  Within the variable, the strongest reliability is for QM & TQM, at 0.800, and the weakest reliability is with role of TQM, with an Alpha value of 0.631.

## 6.6: CROSSTAB ANALYSIS

The analyses were continued with crosstab.  The crosstab was conducted between demographics and variables of QM and TQM.  This analysis provided a further insight into the responses.  Along with the crosstab results, the Chi-square value was generated to understand the significance of the results.  Values that are below 0.05 are considered to be significant and only these are displayed and discussed here.

**Table 6.10: Crosstab between 'Company' and 'Number of Employees'**

| Company | Number of Employees | | | | | Chi-square Sig. |
|---|---|---|---|---|---|---|
| | 5-100 | 101-250 | 251-500 | 500-1000 | > 1,000 | |
| Kharafi National | 0.0% | 0.0% | 0.0% | 0.0% | **35.7%** | |
| Al-Bahar Construction | 3.2% | 22.2% | 2.9% | 0.0% | 0.0% | |
| Arab Construction | 0.0% | 0.0% | 0.0% | 9.4% | 0.0% | 0.000 |
| First United | 0.0% | 14.2% | 0.0% | 0.0% | 0.0% | |
| Gulf United | 0.0% | 10.4% | 0.0% | 0.0% | 2.1% | |
| **Total** | **3.2%** | **46.8%** | **2.9%** | **9.4%** | **37.9%** | |

The results displayed in Table 6.10 (crosstab between company and number of employees, the show that the highest response was received from Kharafi National.  As discussed earlier, Kharafi is one of the largest construction companies in Kuwait.  The results verify that

Kharafi has the largest number of employees from the five companies that took part in the survey.

**Table 6.11: Crosstab between 'Department' and 'QM system currently used in construction projects'**

| Department | Yes | No | Under Construction | Under Implementation | Chi-Square Sig. |
|---|---|---|---|---|---|
| Design Dept | 1.5% | 0.6% | 3.7% | 2.1% | |
| Project Management Dept | 16.4% | 0.0% | 1.9% | 0.0% | |
| Construction Dept | 5.1% | 6.9% | 6.1% | 0.0% | |
| Engineering Dept | **16.9%** | 13.1% | 3.4% | 1.5% | 0.000 |
| Finance Dept | 1.9% | 0.0% | 2.4% | 1.6% | |
| Legal Dept | 0.0% | 0.0% | 0.0% | 3.6% | |
| HR Dept | 0.0% | 6.1% | 1.0% | 0.0% | |
| Quality Dept | 0.0% | 0.0% | 4.0% | 0.0% | |
| **Total** | **41.8%** | **26.7%** | **22.7%** | **8.8%** | |

Table 6.11 shows the crosstab between department and QM system currently used in construction projects. The results show that the highest usage of QM in construction projects takes place in the engineering department. This is followed closely by the project department. The responses were 16.9% for the engineering department and 16.4% for the project management department. These are two very important departments that have a direct impact on a project throughout the various stages.

**Table 6.12: Crosstab between 'Designation' and 'Knowledge level of TQM'**

| Designation | No Knowledge | Basic Knowledge | Good Knowledge | Chi-square Sig. |
|---|---|---|---|---|
| Employee | 3.3% | **11.3%** | 0.0% | |
| Supervisor | 0.0% | 1.9% | 8.1% | |
| Team Leader | 2.0% | 5.6% | 1.0% | |
| Project Manager | 4.9% | 9.7% | **10.0%** | 0.000 |
| Quality Manager | 9.4% | 2.3% | 0.0% | |
| Management | 1.0% | 1.9% | 3.3% | |
| Others | **13.3%** | 2.0% | 9.0% | |
| **Total** | **34.0%** | **34.7%** | **31.4%** | |

Table 6.12 provides the crosstab between designation and knowledge level of TQM. There are three columns that are highlighted in the table. Each of the highest responses within 'no

knowledge', 'basic knowledge' and 'good knowledge' are highlighted.  The highest response for good knowledge of TQM was received from project managers, and for basic knowledge of TQM was received from employees.  This is crucial to the working of an organization, in particular TQM.  Project managers who are directly responsible and answerable for the development of a project need to have good knowledge of TQM, and this has been verified by the majority of the responses being 'good knowledge'.

**Table 6.13: Crosstab between 'Designation' and 'TQM training received'**

| Designation | Certificatio n on QM | Certificatio n on TQM | Certificatio n on ISO | Certificatio n on Quality Assurance | Trainin g on project QM | No formal training receive d | Chi- squar e Sig. |
|---|---|---|---|---|---|---|---|
| Employee | 0.0% | 4.0% | 0.0% | 0.0% | 7.6% | 3.4% | |
| Supervisor | 10.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| Team Leader | 0.0% | 4.2% | 2.1% | 2.1% | 0.0% | 0.6% | |
| Project Manager | 0.0% | 4.2% | 8.5% | 3.9% | 0.0% | 7.6% | 0.000 |
| Quality Manager | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | **12.0%** | |
| Managemen t | 3.4% | 0.0% | 1.9% | 0.0% | 0.0% | 1.0% | |
| Others | 1.5% | 2.7% | 6.1% | 0.0% | 0.0% | **13.1%** | |
| **Total** | **15.2%** | **15.0%** | **18.6%** | **5.9%** | **7.6%** | **37.7%** | |

Table 6.13 provides the crosstab between designation and TQM training received by the respondents.  Training is important. The construction industry is constantly changing due to changes such as the market, regulations, technology, and machinery.  Training keeps employees up-to-date with the latest developments.  TQM and related certifications such as ISO, QA (quality assurance), and project specific training, are discussed in table 6.9.  The results show that the highest responses were received for the 'no formal training received' category.  This is within 'others' at 13.1%, and 'quality managers' at 12.0%.  This indicates that training needs to be focused on within the construction industry.

**Table 6.14: Crosstab between 'Project Classification' and 'Current use of QM system in construction projects'**

| Project Classification | Yes | No | Under Consideration | Under Implementation | Chi-square Sig. |
|---|---|---|---|---|---|
| Private | 14.2% | **23.3%** | 13.7% | 3.5% | |
| Public | **15.3%** | 1.9% | 9.1% | 5.1% | 0.000 |
| Both | 11.0% | 3.0% | 0.0% | 0.0% | |
| **Total** | **40.5%** | **28.2%** | **22.8%** | **8.5%** | |

The crosstab between project classification and current usage of QM in construction projects in table 6.14 indicates that QM is not being currently used in private sector projects, as shown by the highest responses. However, 15.3% of respondents stated that QM is used for public sector projects. This indicates that the usage of QM is currently limited to public projects. This could be due to the nature and size of such projects, as public projects are usually much larger than private projects.

**Table 6.15: Crosstab between 'Work Experience and 'Knowledge level of TQM'**

| Work Experience | No Knowledge | Basic Knowledge | Good Knowledge | Chi-square Sig. |
|---|---|---|---|---|
| Less than 3 years | 4.6% | 0.0% | 0.0% | |
| Between 6-10 years | 2.3% | 3.6% | 5.9% | |
| Between 10-15 years | 12.4% | 10.0% | 4.9% | 0.000 |
| Between 15-20 years | 6.6% | 6.1% | 7.2% | |
| Over 20 years | 7.9% | **15.0%** | 13.3% | |
| **Total** | **34.0%** | **34.7%** | **31.4%** | |

Further crosstabs were carried out with designation and knowledge level of TQM. The results make it clear from whom the responses were received. According to the results shown in table 6.15, people with over 20 years work experience have basic knowledge of TQM. This is followed by 13.3% of respondents with over 20 years of experience who stated that they had good knowledge of TQM. It was shown earlier that most of the people who had basic knowledge were employees, followed by project managers. Therefore, it can be said that most of the respondents had good working experience of the construction industry and sufficient knowledge of TQM.

**Table 6.16: Crosstab between 'Work Experience' and 'TQM training received'**

| Work Exp. | Certification on QM | Certification on TQM | Certification on ISO | Certification on Quality Assurance | Training on project QM | No formal training received | Chi-square Sig. |
|---|---|---|---|---|---|---|---|
| > 3 years | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 4.8% | |
| 6-10 years | 3.3% | 0.0% | 2.8% | 0.0% | 3.7% | 2.4% | |
| 10-15 years | 5.1% | 6.2% | 4.0% | 2.1% | 0.0% | 9.1% | 0.000 |
| 15-20 years | 0.0% | 2.7% | 0.0% | 0.0% | 3.9% | **14.0%** | |
| < 20 years | 6.8% | 6.1% | 11.7% | 3.9% | 0.0% | 7.6% | |
| **Total** | **15.2%** | **15.0%** | **18.6%** | **5.9%** | **7.6%** | **37.7%** | |

The earlier crosstab indicated that most of the respondents had not received formal training in TQM.  For work experience and TQM training shown in table 6.16, respondents with 15-20 years were the largest number to state that they had not received formal training in TQM. The knowledge that they have gained may be from other sources and also from practical usage of TQM in their construction companies.

**Table 6.17: Crosstab between 'Work Experience' and 'Current use of QM system in construction projects'**

| Work Experience | Yes | No | Under Consideration | Under Implementation | Chi-square Sig. |
|---|---|---|---|---|---|
| Less than 3 years | 0.0% | 4.6% | 0.0% | 0.0% | |
| Between 6-10 years | 6.8% | 0.0% | 5.1% | 0.0% | |
| Between 10-15 years | 6.8% | 4.9% | 10.1% | 5.5% | 0.000 |
| Between 15-20 years | 7.4% | 10.0% | 2.6% | 0.0% | |
| Over 20 years | **19.5%** | 8.7% | 5.1% | 3.0% | |
| **Total** | **40.5%** | **28.2%** | **22.8%** | **8.5%** | |

The final crosstab covers work experience and current usage of TQM in construction projects (table 6.17).  Earlier responses indicated that TQM is used more in public projects than private projects.  Here respondents with over 20 years work experience agreed that TQM is used in their companies for construction projects.

## 6.7: FACTOR ANALYSIS

Factor analysis is also known as data reduction by indicating what variables group or go together. This is because it helps to identify the constructs that can be used, as well as the variables that can be used for further analyses. The 'extraction' provides the value of each construct and values that are above 0.300 are accepted. The Eigenvalues Cumulative % or explained variance has to have a value above 60.0%. For a given factor, the sum of these squared factor loadings is the eigenvalue or latent root associated with that factor.

Factor analysis has been displayed here separately for each variable. The values displayed in table 6.18 show that all variables and their constructs are qualified and therefore they will all be used for the subsequent analyses, such as regression, one-way ANOVA and Independent sample T-Test.

**Table 6.18: Factor Analysis**

| Role of TQM | Extraction | Eigenvalues Cumulative % |
|---|---|---|
| TQM provides an enhanced organization image | 0.630 | |
| TQM improves project design | 0.794 | |
| TQM enhances cost estimations | 0.859 | |
| TQM improves change orders tracking | 0.804 | |
| TQM reduces claims arising from projects | 0.551 | |
| TQM enables organizations to capture a larger market share | 0.672 | |
| TQM helps to identify and eliminate defects | 0.644 | |
| TQM is a tool that helps to increase profits | 0.766 | |
| TQM is essential to gain a competitive advantage | 0.777 | 74.928 |
| TQM should be an organization wide concept | 0.734 | |
| TQM is useful for timely completion of projects | 0.758 | |
| Continuous improvement measurements are the key to TQM success | 0.795 | |
| One of main aims of TQM is to satisfy employees | 0.772 | |
| Top management commitment is essential for the success of TQM | 0.759 | |
| Top management involvement ensures the success of TQM | 0.763 | |
| TQM is a problem solving tool | 0.834 | |
| TQM is used for convincing customers of company strength | 0.827 | |
| **QM & TQM** | **Extraction** | **Eigenvalues Cumulative %** |
| My company policy requires all projects to go through the quality department | 0.713 | 78.621 |

| | Extraction | |
|---|---|---|
| TQM is important in my organization to achieve better project outcomes | 0.774 | |
| Quality is a principal objective in my organization | 0.766 | |
| Quality is clearly defined in my organization | 0.805 | |
| In my organization, customer satisfaction is the primary focus of being a TQM based organization | 0.626 | |
| A goal of my organization is to exceed customer expectations | 0.783 | |
| Customer pressure is the reason for us using quality management | 0.770 | |
| Competition was the reason for adopting quality management in my organization | 0.791 | |
| TQM is an effective management tool for employee performance | 0.617 | |
| TQM enhances coordination between members of the project team and other departments in my organization | 0.870 | |
| In my organization we practice quality management as an organization-wide concept | 0.844 | |
| From the perspective of my organization, partnering between organization and supplier is key to TQM | 0.863 | |
| QM is essential for certification of materials in my organization | 0.880 | |
| We benchmark with other leading companies | 0.827 | |
| Customer satisfaction is very important in my organization | 0.794 | |
| Product and service quality is of high importance in my organization | 0.872 | |
| Employee motivation is based on monitory incentives | 0.734 | |
| TQM has been the initiative of our top management | .795 | |
| IT is essential for the success of TQM in my organization | .815 | |
| **Leadership, Employees & Teamwork** | **Extraction** | **Eigenvalues Cumulative %** |
| Employee performance is evaluated and awarded | 0.678 | |
| Employee technical expertise is evaluated on a frequent basis | 0.860 | |
| My organizational culture fosters and practices teamwork | 0.856 | |
| Teams that achieve their goals are rewarded based on their performance | 0.868 | |
| My organization practices employee empowerment | 0.693 | |
| Employee feedback is encouraged and gathered | 0.765 | |
| Each department manager is vested with appropriate responsibilities and power to execute these | 0.798 | |
| My company leadership ensures that customer satisfaction is achieved | 0.884 | 77.585 |
| Management ensures that subcontractors and suppliers are rated on each project | 0.705 | |
| Employee training on TQM is practiced frequently in my organization | 0.579 | |
| Employee training on organizational goals is extensive | 0.751 | |
| Employee training is based on employee evaluation | 0.819 | |
| Training on organizational policies and procedures are in line with QM | 0.801 | |
| QM related training is conducted by external training professionals | 0.838 | |
| My organization has in-house experienced personnel who carry out continuous training of the employees | 0.743 | |
| **Information Technology** | **Extraction** | **Eigenvalues Cumulative %** |

| | | |
|---|---|---|
| From a general perspective of my organization, IT helps with the storing and retrieving of project related information quickly and efficiently | 0.612 | |
| Internal communications are improved through the use of IT | 0.762 | |
| External communications are improved through the use of IT | 0.837 | |
| IT is a core part of our organization | 0.855 | |
| Statistical techniques are used  by our technical department with the help of IT for successful project completion | 0.660 | |
| Through the use of existing IT, our management and project team are able to capture appropriate information and benefit the project | 0.504 | |
| Use of computer software such as AutoCAD and other design software is important in my organization | 0.672 | |

The factor analysis helps to understand the reliability of each construct and the variables. The extraction values provides the results for the constructs and based on this none of the construct need to be discarded.  The Eigenvalues provides the validity of variables.  All of the variables have strong values and hence these will be used for further analysis and discussion.

## 6.8: REGRESSION ANALYSIS

Regression analysis is used to understand the significance of independent variables for the dependent variable.

### Table 6.19: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .266(a) | **0.071** | 0.065 | 0.94633602 |

a. Predictors: (Constant), Information Technology, QM & TQM, Leadership, Employees & Teamwork

R-square (in table 6.19) indicates the percentage of the variance of the original variable is explained by the factor.  When R-square equals 1, the linear regression model fits the data perfectly.  While R-square is computed from the sample data, the 'adjusted R-square' gives an estimate of R-square in the population from which the sample was drawn.

### Table 6.20: ANOVA

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 34.816 | 3 | 11.605 | 12.959 | **.000(a)** |
| | Residual | 458.523 | 512 | 0.896 | | |
| | Total | 493.338 | 515 | | | |

a. Predictors: (Constant), Information Technology, QM & TQM, Leadership, Employees & Teamwork
b. Dependent Variable: Role of TQM

ANOVA associated with the linear regression analysis. The Sig. values shows the level of significance and the expected value is p<0.05.

**Table 6.21: Coefficients**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -0.034 | 0.043 | | -0.793 | 0.428 |
| | QM & TQM | -0.052 | 0.041 | -0.056 | -1.261 | 0.208 |
| | Leadership, Employee. & Teamwork | -0.156 | 0.042 | **-0.164** | -3.700 | **0.000** |
| | Information Technology | 0.254 | 0.044 | **0.258** | 5.718 | **0.000** |

a. Dependent Variable: Role of TQM

Tables 6.19, 6.20 and 6.21 show the results of the regression analysis. The model summary in table 6.19 provides an R-square of 0.071%, which is slightly lower than expected, however, the ANOVA significance in table 6.20 is strong at 0.000. To understand the variables that are significant to the role of TQM in construction companies in Kuwait, one needs to look at the coefficient results in table 6.21. In this table, the Sig. (significance) value and beta value are studied. The beta value is a measure of how strongly each predictor variable influences the criterion variable. The beta is measured in units of standard deviation.

From the independent variables QM & TQM, leadership, employees and teamwork, and IT, the significance of the dependent variable 'role of TQM' has been observed with leadership, employees and teamwork, and IT, therefore, based on the empirical results collected from the 5 major construction companies in Kuwait, it can be said that the role of TQM is influenced by leadership, employees, and teamwork and IT.

## 6.9: DEMOGRAPHICS TO VARIABLES

This section looks at the significance of demographic variables for the independent and dependent variables through two types of analyses – one-way ANOVA and Independent T-Test.

## 6.9.1: One-way ANOVA

The one-way ANOVA provides the significance of demographic variables for independent variables (QM & TQM, leadership, employees and teamwork, and IT) and the dependent variable (role of TQM).

**Table 6.22: One-way ANOVA for Designation**

| Designation | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Role of TQM | Between Groups | 131.105 | 6 | 21.851 | 28.739 | **0.000** |
| | Within Groups | 396.895 | 522 | 0.760 | | |
| | Total | 528.000 | 528 | | | |
| QM & TQM | Between Groups | 130.118 | 6 | 21.686 | 26.874 | **0.000** |
| | Within Groups | 518.882 | 643 | 0.807 | | |
| | Total | 649.000 | 649 | | | |
| Leadership, Employees & Teamwork | Between Groups | 93.941 | 6 | 15.657 | 17.963 | **0.000** |
| | Within Groups | 597.059 | 685 | 0.872 | | |
| | Total | 691.000 | 691 | | | |
| Information Technology | Between Groups | 190.544 | 6 | 31.757 | 43.682 | **0.000** |
| | Within Groups | 491.456 | 676 | 0.727 | | |
| | Total | 682.000 | 682 | | | |

Looking at the one-way ANOVA results shown in table 6.22, significance can be observed with job designation for all independent and dependent variables. Therefore, job designation plays an important role in the role of TQM, QM & TQM, leadership, employees and teamwork and IT.

**Table 6.23: One-way ANOVA for Department**

| Department | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Role of TQM | Between Groups | 102.996 | 6 | 17.166 | 22.712 | **0.000** |
| | Within Groups | 377.903 | 500 | 0.756 | | |
| | Total | 480.899 | 506 | | | |
| QM & TQM | Between Groups | 146.346 | 7 | 20.907 | 28.371 | **0.000** |
| | Within Groups | 456.884 | 620 | 0.737 | | |
| | Total | 603.230 | 627 | | | |
| Leadership, Employees & Teamwork | Between Groups | 127.886 | 7 | 18.269 | 27.397 | **0.000** |
| | Within Groups | 441.452 | 662 | 0.667 | | |
| | Total | 569.337 | 669 | | | |
| Information Technology | Between Groups | 128.285 | 7 | 18.326 | 21.961 | **0.000** |
| | Within Groups | 544.929 | 653 | 0.835 | | |
| | Total | 673.213 | 660 | | | |

The results displayed in table 6.23 show the one-way ANOVA for department and the independent and dependent variables; significance can be observed with all independent and dependent variables, thus indicating the importance of department function for all these variables.

**Table 6.24: One-way ANOVA for Work Experience**

| Work Experience | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Role of TQM | Between Groups | 22.413 | 4 | 5.603 | 5.807 | **0.000** |
| | Within Groups | 505.587 | 524 | 0.965 | | |
| | Total | 528.000 | 528 | | | |
| QM & TQM | Between Groups | 93.510 | 4 | 23.378 | 27.145 | **0.000** |
| | Within Groups | 555.490 | 645 | 0.861 | | |
| | Total | 649.000 | 649 | | | |
| Leadership, Employees & Teamwork | Between Groups | 120.029 | 4 | 30.007 | 36.105 | **0.000** |
| | Within Groups | 570.971 | 687 | 0.831 | | |
| | Total | 691.000 | 691 | | | |
| Information Technology | Between Groups | 113.895 | 4 | 28.474 | 33.982 | **0.000** |
| | Within Groups | 568.105 | 678 | 0.838 | | |
| | Total | 682.000 | 682 | | | |

Table 6.24 shows the significance of work experience for the independent and dependent variables. All variables are significant for work experience, which indicates the importance of work experience.

**Table 6.25: One-way ANOVA for Education Qualification**

| Education Qualification | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Role of TQM | Between Groups | 0.511 | 2 | 0.256 | 0.257 | 0.773 |
| | Within Groups | 516.020 | 519 | 0.994 | | |
| | Total | 516.531 | 521 | | | |
| QM & TQM | Between Groups | 50.026 | 2 | 25.013 | 28.940 | **0.000** |
| | Within Groups | 553.147 | 640 | 0.864 | | |
| | Total | 603.172 | 642 | | | |
| Leadership, Employees & Teamwork | Between Groups | 115.793 | 2 | 57.897 | 68.747 | **0.000** |
| | Within Groups | 574.359 | 682 | 0.842 | | |
| | Total | 690.152 | 684 | | | |
| Information Technology | Between Groups | 117.388 | 2 | 58.694 | 70.518 | **0.000** |
| | Within Groups | 560.161 | 673 | 0.832 | | |
| | Total | 677.549 | 675 | | | |

Table 6.25 shows the significance of education qualification, obtained through the one-way ANOVA, for the independent and dependent variables. The results show that significance is only in the case of QM & TQM, leadership, employees and teamwork, and IT. As the significance value for the role of TQM is above the expected value of 0.050, there is no significance for the dependent variable.

**Table 6.26: One-way ANOVA for Number of employees in the Organization**

| Number of Employees in the Organization | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Role of TQM | Between Groups | 72.438 | 4 | 18.109 | 21.469 | **0.000** |
| | Within Groups | 438.637 | 520 | 0.844 | | |
| | Total | 511.075 | 524 | | | |
| QM & TQM | Between Groups | 76.752 | 4 | 19.188 | 20.792 | **0.000** |
| | Within Groups | 572.165 | 620 | 0.923 | | |
| | Total | 648.917 | 624 | | | |
| Leadership, Employees & Teamwork | Between Groups | 32.873 | 4 | 8.218 | 8.337 | **0.000** |
| | Within Groups | 648.616 | 658 | 0.986 | | |
| | Total | 681.489 | 662 | | | |
| Information Technology | Between Groups | 180.546 | 4 | 45.137 | 59.554 | **0.000** |
| | Within Groups | 491.883 | 649 | 0.758 | | |
| | Total | 672.429 | 653 | | | |

Table 6.26 shows the final one-way ANOVA generated, looking at number of employees in the organization and the independent and dependent variables. The results shows that there is significance for all the variables.

## 6.9.2: Independent Sample T-Test

An independent sample t-test provides the significance of project type (private and public) with the independent variables (QM & TQM, leadership, employee and teamwork, and IT) and the dependent variable (role of TQM).

**Table 6.27: Independent sample T-Test**

| | | Levene's Test for Equality | | t-test for Equality of Means | | | | | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Upper | Lower |
| Role of TQM | Equal variances assumed | 0.000 | 0.994 | 11.729 | 455 | 0.000 | 0.99653741 | 0.08496393 | 0.82956703 | 1.16350779 |
| | Equal variances not assumed | | | 11.815 | 286.011 | 0.000 | 0.99653741 | 0.08434444 | 0.83052285 | 1.16255196 |
| QM & TQM | Equal variances assumed | 4.554 | **0.033** | -7.660 | 551 | 0.000 | -0.70163863 | 0.09159772 | -0.88156207 | -0.52171519 |
| | Equal variances not assumed | | | -7.911 | 423.165 | 0.000 | -0.70163863 | 0.08869583 | -0.87597790 | -0.52729936 |
| Leadership, Employees & Teamwork | Equal variances assumed | 63.356 | **0.000** | -5.370 | 593 | 0.000 | -0.45273764 | 0.08431073 | -0.61832160 | -0.28715369 |
| | Equal variances not assumed | | | -6.134 | 592.727 | 0.000 | -0.45273764 | 0.07380400 | -0.59768681 | -0.30778848 |
| Information Technology | Equal variances assumed | 197.919 | **0.000** | 0.332 | 584 | 0.740 | 0.02723634 | 0.08205253 | -0.13391764 | 0.18839033 |
| | Equal variances not assumed | | | 0.406 | 507.983 | 0.685 | 0.02723634 | 0.06704876 | -0.10449066 | 0.15896334 |

Table 6.27 shows the independent sample t-test for project type and the independent and dependent variables. The results show significance only for the independent variables (QM and TQM, leadership, employees and teamwork and IT). There is no significance for the role of TQM.

## 6.10: SUMMARY

This chapter has discussed the statistical analyses using SPSS of the data collected from five major construction companies in Kuwait. The analyses began by examining demographics, moving onto detailed analyses of the variables. Data reliability was considered to be good for all variables. Further data reduction tests were performed using factor analysis. Regression analysis was carried out to understand the significance of independent variables for dependent variable. Finally, one-way ANOVA and independent sample T-Test methods were carried out to understand the significance of the demographic variable for the independent and dependent variables.

From the overall results, it can be understood that TQM is being used by the construction companies, although it is not being used as an organization wide concept or within all projects. A lack of training was found to exist through the analysis. Employees knew about TQM and its usages, and some of them had good knowledge of TQM, but formal training was not being provided to them. The use of IT was also limited, and adequate usage was not being practiced. Management initiative to improve these aspects is required.

The initial descriptive statistics provided a cumulative view of the role of TQM, usage of quality management and total quality management, leadership, employee and teamwork and information technology. To understand the responses based on each company a separate descriptive analysis was carried out for each of the five construction companies. From these it was understood that Gulf United had better understanding into the importance of TQM and focus on quality practices. Their focus and usage on information technology was also found to be better compared to other companies. The possibility of effective implementation and usage of TQM is therefore higher in Gulf United compared to the Kharafi, Al Bahar, Arab Construction and First United.

The next chapter will discuss the findings in detail, answering the research questions and providing conclusions. Appropriate recommendations will be made for the construction companies regarding the use of TQM.

# CHAPTER 7: DISCUSSION

## 7.1    INTRODUCTION

This chapter provides the discussion of the empirical findings and literature review.  The research began with by investigating and studying different literatures on total quality management (TQM).  TQM enhances the functionality and efficiency of a firm and within construction firms, TQM efficiency can be seen in better project management.  The research adopted various factors to study the impact of TQM in some of the biggest construction firms in Kuwait.

A feature distinguishing of the construction industry is its non-standardization. There are some sort of differences in each of the production processes. Due to this reason, no universal standard or specification can be attached to the product, which means there will be difficulties in quality assurance. Yet again, there are many changes in the details of the design of a project which are typical throughout the construction process. This could be due to the lack of creation of a suitable design produced or differences by the contractors for the sake of speed and cost of production. Making excessive changes often puts quality at risk.

Due to the complicated nature of the construction industry, it is not easy for it to achieve quality performance. TQM, now, helps the construction company to resolve quality problem. The use of TQM calls for a culture change and also changes in management behaviour. The organization has to progress from their current culture to a TQM culture that sees quality as a chief strategy.  The dimensions of quality culture have to be adopted by the construction organization when using TQM for continuous improvement.

The factors that were studies were on the quality management usage in the construction firms, role of TQM, leadership, employee and teamwork, and the impact of information technology on TQM.  Within this chapter the discussion will be based on the empirical data findings and literature review.

## 7.2    QUALITY MANAGEMENT AND TQM

QM and TQM are one of the variables that are discussed in this research.    The implementation of QM and the use of TQM is studied on the role of TQM in the construction firms in Kuwait.    The initial findings showed that most of the large construction firms in Kuwait have not implemented TQM.    Each of the firms practices quality management and they have implemented ISO standards as part of the quality management.    But none of the firms have implemented TQM.

The construction firms from where the data was collected were Grade 'A' firms or rather each of these firms were of considerable size and the type of projects that they handled were infrastructure projects, buildings and industrial construction.    Some of these projects were in partnership with the government and based on BOT (build-operate-transfer) or PPP (private-public-partnership).

This research provides an detailed review of TQM literature from quality gurus including Deming, Juran, Crosby and Feigenbaum combined with quality award models such as the Deming Prize, the European Quality Award, the American Malcolm Baldrige National Quality Award, Six-Sigma and ISO.    The concept of TQM adopted in this study was thus defined as a     management philosophy for continuously improving overall business performance based on leadership, supplier quality management, vision and plan statement, evaluation, process control and improvement, product design, quality system improvement, employee participation, recognition and reward, education and training, and customer focus.

Quality usually, has a three-fold aspect in construction (Hart, 1994): it intends getting the job done on time; ensuring that the basic characteristics of the final project adhere to the required specifications; it means getting the job done within the given budget. A quality construction project should include all these dimensions. Quality in construction is, actually, directly linked with conformance to specifications and fitness for use.

## 7.3    TQM ROLE

TQM role was understood based on the benefits that the construction firms perceived from TQM.  The respondents stated that TQM is a problem solving tool.  It was also perceived that

firms that use TQM would benefit from higher customer confidence in projects. TQM enhances the overall efficiency of projects and this helps the construction firms to deliver the projects on a timely basis. Construction project have many parties involved which makes it difficult for the project management teams to coordinate and communicate with the each parties. But implementing TQM is the first step and to handle the TQM operations effectively. TQM is an organization wide concept and it most cases the current working scenario of the organization has to be changed. Employees need to be trained to deal with the change and the new working environment of the firm.

With increase in competition, quality levels have become higher in almost all business activities and sectors. It has become a challenge to secure the position in the emerging international market; and so, construction firms in many countries are greatly involved in trying to achieve internationally accepted quality levels, which are based on two major outline of TQM – the ISO 9001 family of quality standard, and quality award criteria. The degree of adoption of TQM varies from country to country. Studies showed that TQM became an integrated set of commonly accepted practices as a result of the wide acceptance of these two frameworks (Wiele, 1998 in Kujala, 2002).

## 7.4    TRAINING

Training has been an identified as an important part of the TQM success. Training is imperative and needs to be focused on a frequent basis. Based on the effectiveness of the training, employees can be empowered to carry out various tasks. When the employees are sufficiently empowered through training it will definitely motivate them and will eventually lead to job satisfaction. In TQM programs the top management should be committed to empower the employees to resolve customer's complaint quickly and effectively after receiving proper training on teamwork and problem solving techniques.

In support Rao et al. (1996), TQM training should be present at every level of the organization. This is because senior managers who understand the TQM process will be able to break down barriers within their own organizations, as they will also be able to serve as role models for others who may hesitate to change. Even Zhang et al., (2000) supported the fact that organizations have recognized education and training as a vital part of the TQM initiative.

Based on the empirical findings, training is practiced in the construction firms. With regards to the TQM based training, majority of them did not have such training, mainly because TQM was not implemented or practiced in the firms. But with respect to quality management and other related quality management aspects, especially ISO, most of them had received such trainings. From the training feedback that was received, the importance and focus on training within construction firms in Kuwait was understood. Most of them also received training related to project management and quality assurance programs.

Gufreda and Maynard (1992) saw employee involvement as the process of moulding an organisation's culture to suit to the creative energies of all employees for solving problems and making improvements. The critical ideas in Japanese management were viewed by Mak (2000) and derived several principles linked to people management. He pointed out that management should follow the Tao "road" of people-based management to that recognizes the importance of daily interaction with all employees and a shared identity with them in solving work problems. Zhang et al., (2000) had found in another study that employee participation is a critical need for successful implementation of TQM.

With regard to job related training, the findings showed that most of the trainings carried out by the construction firms were based on employee evaluation. This indicated that the organizations understood employee weaknesses and needs and provided training focused on the employee knowledge and skill gaps. Most of the organizations had in-house training personnel indicating the focus on training.

## 7.5    EMPLOYEE EMPOWERMENT

Another factor that has been identified to be lacking was employee empowerment. Employees need to be vested with responsibilities and authority in carrying out their tasks. It was pointed out by Ahire et al. (1996) that employee empowerment and involvement framework is of no use unless employees have achieved a formal, systematic training in quality management. As put by Ishikawa (1985), quality begins and ends with training. The key components of all TQM initiatives, as believed by McAdam and Kelly (2002), are that of training and development. Firms having education programmes at the workplace report noticeable improvements in their workers' abilities and the quality of their products (Cebeci and Beskese, 2002). Feigenbaum (1961) had said that the importance of training is to make

sure that the skills of the workforce do not become obsolete in the changing environment and an understanding and attitude of quality is developed and maintained.

Although the management is responsible for achieving total quality, it is often the most overlooked part of the process. Employee involvement rose out of business's need to improve performance. The responses of human resources in the organization, naturally, depend on the kind of empowerment given to them. As Kanji (1990) has defined TQM as "to obtain total quality by involving everyone's daily commitment". Lawler et al., (1992) had pointed out that employee involvement programmes have a positive effect on company performance and internal business conditions. Hence, employee involvement programmes are actually, opportunities for organizations in today's competitive environment. According to some authors, employee involvement and commitment seem to be the goals of the TQM process leading condition to its successful implementation (McAdam and Kelly, 2002).

Based on the empirical findings, employees carried out their daily tasks and were not given any responsibilities or opportunities to solve problems. But in some cases, leaders encouraged team participation in gathering feedback. This indicates that there was certain level of employee participation which needs to be developed.

## 7.6    EMPLOYEE INCENTIVES

Based on the empirical findings, it was affirmed that the employee focus is limited with respect to training and development. Employee performance is measured but is not related to employee performance as rewarding of employees based on their performance and it was not of high focus. The aspect of employee involvement with respect to their feedback and employee empowerment was also not practiced widely.

The main important aspect of any quality improvement programme is attributing due recognition for improved performance by any individual, section, and department or division within the company. According to Crosby (1989) recognition is one of the most important steps of the quality improvement process. Kemp et al., (1997) also said that the recognition process is vital to increasing the involvement of all employees in the operation of the business. As put by Zhang et al., (2000), recognition and reward activities should motivate employee commitment to quality improvement.

In order to support organization's quality efforts strongly, top management has to use an employee compensation system that strongly connects quality and customer satisfaction with pay. Knouse (1995) saw the importance of reward and recognition systems in TQM processes and hence, links the failure of the system to its methods of implementation. Even other authors have underlined the importance of rewards and recognition in the TQM process. Rewards do not necessarily have to be in monetary terms. Instead, recognition for outstanding customer service and support, for being part of a team that delivers continual process improvement, and for invoking new activities within organizations are all essential rewards in any organization.

Somehow, the construction sector in Kuwait did not really practice the system of rewarding and recognizing employees.

## 7.7    TOP MANAGEMENT

It is an accepted fact that the top management commitment is one of the major determinants of successful TQM implementation. Juran (1974) has stated that most of the problems linked to quality are connected to management. This means that success of quality management is greatly dependent on the degree of commitment from top management. This commitment has to convey the idea that quality will receive a greater priority over cost or schedule, and that on the long run, consistent and superior quality will lead to development in cost and delivery performance. Deming had considered top management responsible for quality. According to Atkinson (1990), 80 percent of TQM failures occur mainly due to inadequate commitment of top management.

# CHAPTER 8: CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

## 8.1 INTRODUCTION

This chapter presents the research conclusions obtained from conducting this study and provides a brief research evaluation. This chapter is divided into three sections: Section 8.1 presents a brief summary of this study; Section 8.2 provides conclusions obtained from conducting this research; and Section 8.3 provides the recommendations for this study. The data collection was done using questionnaires and began with respondent demographics. The data were collected from five grade "A" construction companies. These companies are certified by the government based on their size, performance and quality of job that they have done. Quality management is part of every aspect of the organization. Most of these companies had over 250 permanent employees and large companies had over 1,000 employees in their payroll. The type of projects that these companies undertook were infrastructure projects, buildings (commercial and residential) and industrial projects. Some of them were active with the government through BOT / PPP projects. Therefore, there were more private projects compared to public projects.

Responses were received from people holding senior positions and with knowledge of quality management and Total Quality Management (TQM). Most of them were directly involved with projects and quality aspects. The knowledge and experience in project management and quality factors were understood initially from three aspects such as job designation, department they were working in and work experience. Most of the respondents had bachelors and masters degree.

The next section was the quality section and focused on both quality management and total quality management. Most of the respondents had basic knowledge and some had good knowledge. But there were many who did not know about TQM. Therefore, with regards to training majority of them indicated that they received no formal training on TQM. The focus seemed to be more on quality management and ISO as that are the areas that most of the training and certification took place. ISO is widely observed to be used by these companies as most of these companies were ISO certified. Quality management played a significant role in project management.

These were the information's identified prior to finding out the responses regarding variables in this study – role of TQM; QM & TQM; leadership, employees and teamwork; and information technology. The following section will provide the conclusion for these variables based on the findings.

## 8.2    CONCLUSION

The research begins with literature review on TQM and other quality models. Discussion is also on quality management gurus. TQM is an organization wide concept and in addition to meeting project timeline and delivering high end quality projects, the focus is also on employees. Employees need to be trained and developed to perform well. In addition to that they need to be rewarded and recognized through incentives for excellent work. These would be an example to others and a motivation for them to perform better. The final achievement is towards employee satisfaction as employees who are satisfied will perform better. Therefore, hiring the right employees that can be trained and developed to organization culture and tasks is the first process which moves to providing the right system and finally ensuring employee retention. In doing so, the organization shows commitment to its employees and this creating a better work environment with satisfied employees. Organization can then retain these employees over a long period of time contributing to overall employee and organizational performance.

TQM is increasingly being adopted by construction companies as an initiative to solve quality problems in the construction industry and to meet the needs of the customer continuously. TQM has the potential to improve business results, greater customer orientation and satisfaction, worker involvement and fulfilment, team work and better management of workers within companies. The implementation of a TQM philosophy within the organization requires a cultural change and as an important aspect of total quality development. In other words it has to be an organization wide concept and not limited to a few departments or even branches. This calls for great changes, and everyone in the organization should be prepared to accept this change. Extensive training and top management support and involvement are required. The objective is to improve performance and provide the best results to the clients and at the same time improve employee productivity. Teams are a major part of any Total Quality Management effort because teamwork enables various parts of the organization to work together to meet customer needs

in ways that cannot be done through individual job performance. The development of teams provides a much richer mix of skills in the thinking and processes amongst many of the company management and those holding supervisory roles of employees. The conclusion will be discussed further by answering the research questions.

The construction industry has numerous problems because of its complicated nature of operation. This industry comprises multitude occupations, professions and organizations. They are involved in the different phases of a construction project, which, include: feasibility; development; finance; concept development; review; estimate; detailed engineering; procurement; construction; and start-up. The client, consultants, contractor and sub-contractors of a construction project all have a role to play in delivering a quality project. Failure of any of the parties will seriously affect the quality of the final project.

The following section of the conclusion will proceed by answering the research questions.

### 8.2.1   Research Questions

The following section will answer the research question based on the findings.

***What is the current status of QM and TQM within construction companies in Kuwait?***

The knowledge of QM in construction projects was understood from QM overview section.

From the knowledge of QM and TQM, it was understood that most of the respondents had good knowledge and basic knowledge of quality management systems. In addition to this, the focus on quality management systems was understood based on the training that was provided. The construction sector is frequently developing and customers are constantly looking at end results with the highest quality, therefore, quality has become a major aspect of construction sector. From the empirical findings the importance of training was on ISO certification, QM certification and TQM certification. This provided understanding that the construction firms emphasized on training in quality management systems.

In addition, most of the construction firms indicated that usage of quality management systems in their construction projects. Some of the companies indicated that they were considering the usage of QM in construction or they were in the process of implementing quality in their construction projects. From an overall perspective the use of QM and TQM

was understood. The type of quality system that were being used were used mainly were ISO. The usage of TQM was limited among these companies although QM was of great importance.

*What are the benefits that the construction companies in Kuwait have gained from implementing QM and TQM?*

The benefits of implementing and using QM and TQM within construction companies could be understood from the role of TQM. Based on the findings, there were various benefits arising from the use of TQM. TQM was identified as a problem solving tool and also identified as a leverage tool to convince customers about the company and projects. TQM also helped in timely delivery of the project and therefore towards success of the project. TQM was an organization wide concept and identified as a tool for employee satisfaction. Top management commitment towards continuous development and improvement of TQM was also understood as TQM was considered to provide competitive advantage. There were many other advantages of TQM such as overall project improvement, efficient project handling, enhance organization image and contributing to overall organization profits. Therefore, TQM was understood to be an advantage to both internal and external customer satisfaction and overall organization performance.

*What are the problems / hurdles that the construction companies in Kuwait faces due to lack of TQM?*

Between the various types of quality tools, ISO was preferred. Some of the reasons were due to the knowledge and acceptance of ISO in the local market. It was also understood from the feedback that the knowledge of TQM was less. Prior to answering the problems or hurdles that organizations face due to lack of TQM a brief look at the reasons for implementing TQM. From the findings it was understood that customer pressures or competition were not the primary reasons for implementing TQM. The organizations looked at enhancing customer satisfaction and perception of the organizations through QM tools such as TQM in addition to various other benefits such as enhancing overall performance and increasing organizational profits.

It was identified that QM is essential for certification of materials and therefore without QM the organizations would face difficulties in certifications. In the similar manner the lack of TQM and the problems that organizations face will be answered based on the advantages that

organizations have indicated. Accurate cost estimations, enhanced project performance by eliminating defects, and providing projects are factors that contributed to success through TQM, therefore, lack of TQM would mean delays or longer project timeline, lower customer satisfaction and lower profits.

*What is the role of the top management towards TQM success within construction companies in Kuwait?*

Top management are committed to empower employees' involvement in decision making process in terms of leadership role and resource allocation. Top management stands as the front runner of any institution, organization, company, in which the outcome is a reflection of their capability and commitment. TQM cannot be fully implemented with total commitment from top managers. Minjoon et al. (2006), points out that some TQM programs have failed in the implementation due to negligence and reluctance of top management to delegate power and responsibility to subordinates. Some managers are afraid due to insecurity because they believe they are accountable for their subordinates. Some do believe that the subordinate do lack the managerial ability and appropriate skills and as a result of this there is that lack of confidence to delegate task. That is the more reason why in TQM implementation training is a very important imperative. Top management should be responsible for training the employees to gain the skills and ability required to perform their task effectively. Top managers need to realize that empowering employees through self-manage teams; quality improvement teams and management team will bring much benefit to the organization, through individual knowledge and skills. Thus, top management commitment requires that management at all levels should reassign the role from authoritarian to coaching facilitator because top management commitment does not mean dictatorship but rather their ability to monitor and control their empowered employees and giving room for their middle and line managers to take responsibility in decision making.

TQM is significantly about collective use of ideas that are well structured in reaching the same goal of customer satisfaction or exceeding customers' expectations. Before the top management can be committed to empower employees they must have a full understanding and concept of TQM and how to use the tool to achieve its aim. In a traditional base management the top managers simply give orders and the employees just merely obey them. TQM based management is largely based on team work and the customer is the top priority.

The initiative of quality management systems and especially TQM has been indicated to be from top management and therefore it was indicated that top management plays significant role in the implementation and success of TQM. TQM is a management concept and the findings indicate the importance of top management commitment. Findings also indicated that for TQM to be successful, top management involvement is important.

*What is the importance of employee empowerment towards TQM success within construction companies in Kuwait?*

Teams are a major part of any Total Quality Management effort because teamwork enables various parts of the organization to work together to meet customer needs in ways that cannot be achieved through individual job performance (Rao et al., 1996). The ongoing development of teams provides a much richer mix of skills in the thinking and processes amongst many of the company management and those holding supervisory roles of employees. Methods such as cross-functional teams, within functional teams, quality control circles, voluntary teams, and suggestion activities can be used for encouraging employee participation.

Employee empowerment is important towards employee participation and efficient working of the organization. But employee empowerment in the construction companies that were studied here were not adequately significant. Only a few of them practiced employee empowerment. The companies ensured team work and practices, but employee empowerment was low. Even with teamwork, instructions came from department manager as responsibilities were vested with these department managers. Employees had to take instructions from the department managers, due to which there was little or no employee empowerment.

*What is the importance of training towards success of TQM within construction companies in Kuwait?*

Employee training was provided and it was understood from the QM initiatives that training was provided on various training and certifications such as ISO, TQM, QM, and Quality Assurance. But these training were not extended to the employees as many of them stated that they did not receive formal training.

In addition to this the focus on employee training was not particularly emphasised in the organizations. With regards to organizations stressing on employee training in par with organization goals, the emphasis was less and it was also understood that training in base to employee evaluation was less. With this respect the TQM training for employees was less. This has to do with the focus of training in general and also because TQM is not being widely used in the construction companies.

There is a lack of adequate focus on training was also understood through the lack of in-house training personnel. This was the reason why respondents indicated that training was carried out by external professionals. In brief, there was lack of adequate training and especially with the focus of developing quality aspects in employees.

The research study reveals that the TQM implementation analysis developed in this research is applicable in practice. This research analysis can be used by construction companies to improve their company's overall performance efforts. The analysis further showed that the use of TQM implementation results in improvement of both product and service that the construction industries provide. Through the use of TQM firms can quickly identify which areas urgently need improvement. Thus, the resources can be allocated more wisely and more effective improvement plans can be formulated.

## 8.3    RECOMMENDATIONS

In a research such as this, recommendations for future research would address the issues generated from this study. Based on this study and data analysis, future research may start from a relatively higher level of knowledge. A replication of this research analysis would be helpful in re-examining the validity of its findings.

The empirical findings indicated that employees had very little knowledge and awareness of TQM and its benefits. One of the top priorities of the management should be in creating awareness and importance of TQM by highlighting its usage and benefits.

TQM is an organization wide concept but the use of TQM was limited. With regards to improving project designs the use of TQM was limited. Lack of TQM usage on estimations was also identified from the empirical findings. Project design is crucial to the success of the project and through TQM, the construction companies can focus on each quality component

and also find way of providing quality outcomes by reducing costs. All of the construction firms that were selected for data collection were grade A companies and therefore large in employee size and operation. Top management of these companies need to focus into how TQM can improve project design and estimation through the use of TQM.

To understand the benefits of TQM, there has to be evaluation on continuous basis on projects and their performance. These can be compared to projects that were handled earlier without TQM and it would give the management a clear picture on the benefit of TQM. But management has to ensure that TQM is an organization wide concept. This calls for major changes in the working of the organization for which employees have to be trained. Each stage of the change towards implementing TQM has to be documented and required training has to be provided to the employees. In doing so, employees will be involved in the implementation process and employees will be positively oriented in using TQM in all projects. Employees should also be provided opportunity to voice out their opinion and feedback on the TQM implementation process and usage. TQM has to be customized to the working of the organization and at the same time, the organization has to adapt to TQM standards.

From the findings it was also understood that ISO was a widely used concept. But some of the aspects related to quality were found to be lacking. For example, the construction firms did not partner with any of their prime suppliers to get the best outcome. Another aspect that was lacking was the integration and coordination between departments; especially the project department. Each department has their own functions, but the end results of achieving organizational goals and outcomes will be possible only if each department work seamlessly. Management has to ensure that department coordination is always there.

Another factor that the management needs to ensure is meeting and exceeding customer satisfaction. Each project will have deliverables with specific time frame and budget. The objective is not limited to meeting with this time frame and budget towards providing the deliverables, but through TQM, construction firms can look at possibilities of exceeding customer expectations. TQM can identify aspects that take long time or costs, and management can look at alternatives through which better quality at lower price can be provided to the customers.

### 8.3.1 Continuous Improvement

The construction companies are either product or service based and need to establish a feedback mechanism to help their internal as well as the external customers. The quality of service and product will certainly increase if the continuous improvement cycle is well embedded in TQM framework. The concept of continuous improvement basically distinguishes "TQM" philosophy from other quality philosophies, therefore, by adopting the continuous improvement concept, the new initiative starting with new targets and taking the complete improvement process to everybody is indicating supplier and customer links in the quality chain. Obtaining information about progress and enhancing success.

As part of continuous improvement, there should be supplier surveys. The quality department should make sure that the quality raw material is delivered by the supplier on demand in a timely manner. Quality department should conduct audits during the construction and development process, and also after the product/service has been provided and implemented. A log of these surveys should be maintained which will help in grading the suppliers.

An effective control mechanism should be designed for monitoring the TQM process. A team must be formulated to champion the TQM framework and produce a process that is addressing the continuous improvement cycle. Focus should be specifically on problems that are faced during construction projects. These issues should be discussed and action plans should be devised to ensure that such problems should not happen again. The aim should be to work on preventive action mode rather than needing to initiate a corrective action plan. A knowledge base should also be maintained for future references.

In closing, the dedication of the senior management results in the success of TQM implementation during the processes. The lessons learnt during the implementation of TQM framework need to be fully documented and evaluated systematically. The service level agreements should be met at all levels, which will result in higher customer satisfaction and increased employee morale. The entire team will work dedicatedly to raise the quality level hence the profitability.

### 8.3.2 Training

Training is an important factor to the success of TQM. Construction companies should create teams who can take care of the in-house training. The selected team should be put through a rigorous training program at different levels. Renowned consultants / experts from academia should be hired to train the team on the concepts of operations of TQM. The consultants/experts will help in drafting the critical parameters to quality features that are specific to the need of company. Hence, defining a system that is fit for purpose and addressing the quality at all levels is required. It is extremely important that manager training should be based on the competencies required for success of the processes that are defined to fulfil the quality functions. In addition to this, the team members should also be trained on different areas of soft skills including communication, time management, conflict management and stress management etc.

It is strongly envisaged that the training of a new employee is of utmost importance to the success of the company. Therefore, it is recommended that the recruitment process be streamlined and a standard operating procedure espousing different ways of recruitment should be put in place. It may well be that different types of recruitment methods are required for different departments of the company. It is believed that this process will help in improving the quality of people who are recruited to specific jobs in the company.

### 8.3.3 Communication

The organization has a mix of nationality as employees. The shared culture between management and employees avoids misunderstanding when it comes to instructions while facilitating a two–way dialogue between management and employees. Therefore, it is recommended that a common language such as English be used in communication among employees. Although, it is difficult to communicate in English especially at the labourer level, it is recommended to choose a labourer who can speak English in addition to his/her mother tongue as leader of a group of labourers and his responsibility will be to transfer the managers" instructions to the labourers. Furthermore, communication skills of the group leader should be enhanced by recommending him/her to communication skill courses.

Effective communication is a vital part to conjoin the framework of the total quality process. Crosby (1979) had pointed out that in each department there should be a quality council, comprising of a quality professional who would be the regular centre for communication

relating to the programme. Effective communication is responsible for keeping momentum and morale for quality improvement process. It is essential for directing employees towards the corporate expectations (Thiagarajan et al., 2001). Many organizations make use of various communication techniques.

Effective communication is a must in the employee empowerment process. Teams play a good role as successful means for cross-functional communication in organizations. Multi-tiered management structure restrained communication. It is essential to have effective communication for the success of any quality initiative. A wide range of activities are included in the communication of TQM, like face-to face conversation, group or site visits, videotapes, brochures, booklets, company newsletter, advertising campaign-anything that clearly states the ongoing quality initiative. From the empirical findings it was derived that employee empowerment had did not have much focus, and their involvement on employee feedback or communication with higher management was also restricted.

## 8.4    KNOWLEDGE CONTRIBUTION

TQM is not a widely used concept within the construction sector in Kuwait. All the construction companies focused heavily into quality management and ISO standards were implemented and followed. There were positive top management initiatives into implementing quality in every aspect of the organization. This was specially the case for project management.

Quality is part of construction companies but this was largely practiced in project management but should be a responsibility of everyone in the organization. Suppliers and customers should be part of the quality program. Defects that are identified in projects should be highlighted and shared with suppliers and customers, so that organizations can learn from their mistakes. The mistakes should be used to point fingers, but as lessons for improvement. These drawbacks should be part of training and development.

Most of the organizations had adopted ISO as their quality standard and since ISO primary focus is into documentation, the process would be documented. But it is not necessary that mistakes or problems that are identified are recorded. Companies should document each and every aspect related to their tasks and these can be used as future knowledge. Adding TQM to these processes will provide organizations with higher level of quality standards and

achieving better results. Supervision and continuous evaluation are also important part of successful quality management. Organization did not practice evaluations of quality aspects. To understand performances, evaluation is crucial component.

There was lack of adequate TQM knowledge and its benefits. Hence the construction companies did not focus into implementing TQM. In Kuwait most of the companies in addition to construction companies, implemented ISO as quality standards. For TQM implementation the environment is positive but first awareness of TQM and its benefits had to be created.

Training is an important aspect through which TQM awareness can be created. To make sure that employees understood the benefits of TQM, the HR and training department should be provided with instructions on including TQM concepts as part of training. Project management and design department should be primary focus. Top management initiative and participation into TQM implementation and practices need to be included as part of quality initiative and this should be an organization wide concept.

This study provided understanding into the factors that contribute to the role of TQM in the construction companies of Kuwait. The role of leadership, employee and teamwork were understood to be particularly important. In addition to this the importance of information technology was also understood to be important in the role of TQM. TQM is an organization wide concept and management participation and direction at every stage is important to the success of the TQM. Although primary focus is applied to construction projects, every other department and organization function should be part of the TQM. In other words, TQM should be built into the business process.

## 8.5 FUTURE RESEARCH

Future research should focus on understand the initiative of top management in implementing TQM and on the process from the idea phase to completion phase. Projects that are carried out using TQM and prior project without TQM, should be compared. The performance of the project, employees and top management should be evaluated before and after implementing TQM.

Through this research the importance of TQM and factors that contribute to TQM success in construction companies were understood.  The research collected data from project managers and supervisors and employees in other departments.

A replication of this study can be done but with data collection from top managers, CEO and stakeholders of the company.  Data collected from the top managers should be based on personal interviews and compared to the quantitative data results in this research.  This would provide an understanding on the importance of TQM from perspective of decision makers and users of TQM.

This study focused on Grade A companies that are involved in large projects.  To understand the overall importance of TQM, data should be collected from other companies as well. Since there are many construction companies in Kuwait classified under Grade B and Grade C, the data collection should be quantitative, thus enabling to collect data from large number of population.  The data collected from Grade B and Grade C construction companies need to be compared with the findings in this research to understand the factors that are considered to be important towards the success of TQM.  To ensure that a proper comparison is done, the research model that is tested in this research should be used in the future research.

This research focused on factors such as leadership, employee, teamwork and information technology as the success factors of TQM.  Future research should focus on other factors such as level of customer satisfaction achieved through the usage of TQM; the quality culture in the construction companies; partnership relationship with suppliers and their involvement in the construction projects; employee empowerment; level of employee training; processes for continuous improvement and procedures in place for measuring quality standards and feedback.

TQM can significantly change the way construction companies do business.  This change requires direct and clear communication from the top management to all staff and employees, to explain the need to focus on processes.  Everyone will need to know roles in understanding processes and improving their performance. The key medium for motivating the employees and gaining their commitment to TQM is face-to-face communication and visible management commitment.  The construction industry has numerous problems in getting quality performance as a result of the complicated nature of the industry. TQM is being

increasingly applied to the construction company to solve quality problem. The implementation of a TQM required a culture change and change in management behaviour. The organization need to shift from their current culture to a TQM culture that focuses on quality as a key strategy.

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**APPENDIX I: QUESTIONNAIRE USED FOR DATA COLLECTION**

**QUESTIONNAIRE ON TOTAL QUALITY MANAGEMENT AND ITS USE BY CONSTRUCTION COMPANIES IN KUWAIT**

**Dear Participant,**

I am conducting a survey as part of my PhD program to explore perceptions about and use of Total Quality Management (TQM) by construction companies in Kuwait. "*TQM is a set of management practices throughout the organization, geared to ensure the organization consistently meets or exceeds customer requirements. TQM places strong focus on process measurement and controls as means of continuous improvement*"[1].

This questionnaire is divided into three sections, which are described below. I have used a few acronyms in the questionnaire which are explained in the beginning.

The *first section* of the questionnaire covers demographics: (1) designation; (2) department; (3) work experience; (4) education qualification, and (5) number of employees in the organizations. These have multiple choices and you are requested to select only one option for each demographic variable.

The *second section* captures your general knowledge with regards to Quality Management (QM). "*Quality management can be considered to have four main components: quality planning, quality control, quality assurance and quality improvement*"[2]. These are again provided with multiple choices and you are requested to select only one for each of the question.

The *third section* contains the six main variables of my study: (1) leadership; (2) information technology; (3) employee; (4) training; (5) Quality Management (QM) and Total Quality Management (TQM); and (6) Organization Perspective of TQM. All of these are designed using a five point scale and the labels for these are mentioned in the beginning of this section.

A few minutes of your valuable time will help me understand your views on TQM and its relevance to the Kuwaiti construction sector. If you have any doubts or queries, please get in touch with me. **Return completed questionnaires to waleed-81@hotmail.com**

Thanking you in advance for your participation and valuable time.

Best Regards

**Waleed Alazemi**
Mobile: 60082552

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[1] Definition of TQM as provided in http://managementhelp.org/quality/tqm/tqm.htm
[2] Definition of QM as provided in http://en.wikipedia.org/wiki/Quality_management

## ACRONYMS USED IN THIS SURVEY

| QM | Quality Management |
|---|---|
| TQM | Total Quality Management |
| IT | Information Technology |
| BOT | Build-Operate-Transfer |
| PPP | Public-Private-Partnership |

## SECTION I: DEMOGRAPHICS

| **Designation** | ☐ Employee | ☐ Supervisor |
|---|---|---|
| | ☐ Team Leader | ☐ Project Manager |
| | ☐ Quality Manager | ☐ Management |
| | ☐ Other (please specify) | |

| **Department** | ☐ Design Department | ☐ Project Management Dept. |
|---|---|---|
| | ☐ Construction Department | ☐ Engineering Department |
| | ☐ Finance Department | ☐ Legal Department |
| | ☐ Human Resource Dept. | ☐ Quality Department |
| | ☐ Other (please specify) | |

| **Work Experience** | ☐ Less than 3 years | ☐ 1 – 5 years |
|---|---|---|
| | ☐ 6 – 10 years | ☐ 10 – 15 years |
| | ☐ 15 – 20 years | ☐ Over 20 years |

| **Education Qualification** | ☐ Diploma | ☐ Bachelor Degree |
|---|---|---|
| | ☐ Masters and above | ☐ Other Degree |
| | ☐ Other | |

| **Number of Employees in the organization** | ☐ Less than 50 employees | ☐ 50 – 100 employees |
|---|---|---|
| | ☐ 101 – 250 employees | ☐ 251 – 500 employees |
| | ☐ 500 – 1,000 employees | ☐ Over 1,000 employees |

| **Type of Construction Projects** | ☐ Building | ☐ Infrastructure Projects |
|---|---|---|
| | ☐ Industrial constriction | ☐ BOT / PPP |
| | ☐ Other (please specify) | |

| **Project Classification** | ☐ Private | ☐ Public |
|---|---|---|

| What is your knowledge level of TQM? | ☐ No knowledge | ☐ Basic knowledge |
|---|---|---|
| | ☐ Good knowledge | ☐ Excellent knowledge |

| On which of the following have you had formal training on TQM? | ☐ Certification on Quality Management | ☐ Certification on TQM |
|---|---|---|
| | ☐ Certification on ISO | ☐ Certification on Six Sigma |
| | ☐ Certification on Quality Assurance | ☐ Training on project quality management |
| | ☐ Others (please specify) | ☐ No formal training received |

| Do you currently use a QM system for construction projects in your organization? | ☐ Yes | ☐ No |
|---|---|---|
| | ☐ Under consideration | ☐ Under implementation |
| **If Yes, please describe** | | |

| What kind of system are you using? | ☐ TQM | ☐ ISO |
|---|---|---|
| | ☐ Six Sigma | ☐ Quality Assurance |
| | ☐ Others (please specify) | |

| 1 =<br>Strongly Disagree | 2 =<br>Disagree | 3 =<br>Neither Disagree or Agree | 4 =<br>Agree | 5 =<br>Strongly Agree |
|---|---|---|---|---|

## SECTION III: RESEARCH MODEL VARIABLES

| Role of TQM (from a general perspective) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

**In this section the role of TQM is discussed from a general perspective.**

*TQM (Total Quality Management) is a set of systematic activities carried out by the entire organization to effectively and efficiently achieve organization objectives so as to provide products and services with a level of quality that satisfies customers, at the appropriate time and price.*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| TQM provides an enhanced organization image | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM improves project design | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM enhances cost estimations | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM improves change orders tracking | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM reduces claims arising from projects | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM enables organizations to capturing a larger market share | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM helps to identify and eliminate defects | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is a tool that helps to increase profits | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is essential to overcoming competitive advantage | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM should be an organization wide concept | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is useful for timely completion of project | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM should be an organization wide concept | ☐ | ☐ | ☐ | ☐ | ☐ |
| Continuous improvement measurements is the key to TQM success | ☐ | ☐ | ☐ | ☐ | ☐ |
| One of main aims of TQM is to satisfy employees | ☐ | ☐ | ☐ | ☐ | ☐ |
| Top management commitment is essential to the success of TQM | ☐ | ☐ | ☐ | ☐ | ☐ |
| Top management involvement ensures the success of TQM | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is a problem solving tool | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is used for convincing customers about company strength | ☐ | ☐ | ☐ | ☐ | ☐ |

| QM & TQM  (from the perspective of your organisation) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

**In this section aspects related to Quality Management (QM) and Total Quality Management (TQM) are specifically <u>related to the organization</u> that you are currently employed.**

*Quality management can be considered to have four main components: quality planning, quality control, quality assurance and quality improvement. Quality management is focused not only on product/service quality, but also the means to achieve it. Quality management therefore uses quality assurance and control of processes as well as products to achieve more consistent quality.*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| My company policy requires all projects to go through quality department | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is important in my organization to achieve better project outcomes | ☐ | ☐ | ☐ | ☐ | ☐ |
| Quality a principal objective in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| Quality is clearly defined in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| In my organisation, customer satisfaction is the primary focus of being a TQM based organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| A goal of my organization is to exceed customer expectations | ☐ | ☐ | ☐ | ☐ | ☐ |
| Customer pressure is the reason for us using quality management | ☐ | ☐ | ☐ | ☐ | ☐ |
| Competition was the reason to adopt quality management in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM is an effective management tool for employee performance | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM enhances coordination between members of project team and other departments in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| In my organization we practice quality management as an organization-wide concept | ☐ | ☐ | ☐ | ☐ | ☐ |
| From the perspective of your organization, partnering between organization and supplier is key of TQM | ☐ | ☐ | ☐ | ☐ | ☐ |
| QM is essential for certification of materials in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| We benchmarking with other leading companies | ☐ | ☐ | ☐ | ☐ | ☐ |
| Customer satisfaction is very important in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| Product and service quality is of high importance in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| Employee motivation is based on monitory incentives | ☐ | ☐ | ☐ | ☐ | ☐ |
| TQM has been the initiative of our top management | ☐ | ☐ | ☐ | ☐ | ☐ |
| IT is essential for the success of TQM in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |

| **LEADERSHIP, EMPLOYEES AND TEAMWORK** (from the perspective of your organisation) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|

**The questions here related to the <u>organization that you are currently employed.</u>**

*Leaders are individuals who generally take control of a particular situation either by assisting their team to achieve set objectives and with the capability of taking timely and effective decisions.*

*Employees here refer to the employees in the organization that you are currently working.*

*Teamwork is sorely needed throughout the organization; it can compensate one's strength for another's weakness. The main aim of a team is to improve the input and output of any stage. A team may well be composed of people from different staff areas, everyone having a chance to contribute ideas, plans, and figures.*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Employees performance is evaluated and awarded | ☐ | ☐ | ☐ | ☐ | ☐ |
| Employee technical expertise are evaluated on frequent basis | ☐ | ☐ | ☐ | ☐ | ☐ |
| My organizational culture fosters and practices teamwork | ☐ | ☐ | ☐ | ☐ | ☐ |
| Teams that achieve their goals are rewarded based on their performance | ☐ | ☐ | ☐ | ☐ | ☐ |
| My organizations practices employee empowerment | ☐ | ☐ | ☐ | ☐ | ☐ |
| Employee feedback is encourage and gathered | ☐ | ☐ | ☐ | ☐ | ☐ |
| Each department manager is vested with appropriate responsibilities and power to execute these | ☐ | ☐ | ☐ | ☐ | ☐ |
| My company leadership ensures that customer satisfaction is achieved | ☐ | ☐ | ☐ | ☐ | ☐ |
| Management ensures that subcontractors and supplier are rated on each project | ☐ | ☐ | ☐ | ☐ | ☐ |

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Employee training on TQM is practiced frequently in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| Employee training on organization goals is extensive | ☐ | ☐ | ☐ | ☐ | ☐ |
| Employee training is based on employee evaluation | ☐ | ☐ | ☐ | ☐ | ☐ |
| Training on organization policies and procedures are in line with QM | ☐ | ☐ | ☐ | ☐ | ☐ |
| QM related training are conducted by external training professionals | ☐ | ☐ | ☐ | ☐ | ☐ |
| My organization has in-house experienced personnel who carry out continuous training to the employees | ☐ | ☐ | ☐ | ☐ | ☐ |

| **INFORMATION TECHNOLOGY**<br>**(from the perspective of your organisation)** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **The questions here relate to the organization that you are currently employed.** | | | | | |

*Information Technology is defined as computer technology (either hardware or software) for processing and storing information, as well as communications technology for transmitting information. The role of information technology has increased substantially in the recent years. New technologies and equipments enable to communicate and interact internally between employees and management and with the customers. Computers play an essential role in quality function. They perform very simple operations at fast speeds with an exceptionally high degree of accuracy.*

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| From a general perspective of your organization, IT helps in storing and retrieving project related information quickly and efficiently | ☐ | ☐ | ☐ | ☐ | ☐ |
| Internal communications are improved through the use of IT | ☐ | ☐ | ☐ | ☐ | ☐ |
| External communications are improved through the use of IT | ☐ | ☐ | ☐ | ☐ | ☐ |
| IT is a core part of the our organization | ☐ | ☐ | ☐ | ☐ | ☐ |
| Statistical techniques are used by our technical department with the help of IT for successful projects completion | ☐ | ☐ | ☐ | ☐ | ☐ |
| Through the use of existing IT, our management and project team is able to capture appropriate information and beneficial of the project | ☐ | ☐ | ☐ | ☐ | ☐ |
| Use of computer software's such as AutoCAD and other design software are important in my organization | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | |
|---|---|---|
| Would you require a summary of the data findings / results? | ☐ Yes | ☐ No |
| If Yes, please provide me with your email address | | |

Please send this completed questionnaire to **waleed-81@hotmail.com**

## THANK YOU