Key issues of Total Quality Management (TQM) implementation in construction: Case Study

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ABSTRACT

This research explores and investigates the intra-organisational issues of Total Quality Management (TQM) implementation within an international construction company. The research explores the Critical Success Factors (CSFs), concerns and benefits of implementing TQM in the company, and subsequently, suggests recommendations to assist the adoption of TQM in the company considered for this research and similar companies in the construction industry.

A case study of the company was employed in this research. The case study was carried out through: (1) conducting semi-structured interviews with management and staff to explore and investigate key issues of TQM implementation within the company; (2) conducting a survey by a questionnaire to ascertain the employees' awareness and perceptions of quality, teamwork and job satisfaction as part of TQM implementation in the company; (3) accessing the company's data and documents.

After analysing the results of the research, the most recognised CSFs for implementing TQM, to be incorporated in the company are: (1) process approach; (2) employees' involvement and training; (3) employees' satisfaction in career, salary and professional development; (4) leadership skills; (5) organisational learning and knowledge management; (6) organisation culture.

The most recognised obstacles to implementing TQM in the company are: (1) insufficient training and professional development for employees, especially for lower bands; (2) lack of satisfaction in career, salary, professional development and work setting; (3) conflict between employees and management, and internal cultural issues of the company; (4) lack of managerial skills of motivation, delegation of decision making, teamwork, communication and coordination; (5) the nature of construction projects; transient, variable and fast track.

Identified benefits of implementing TQM in the company are: (1) reduced rework and cost saving; (2) improved job and staff quality, improved safety and productivity; (3) winning new tenders and projects. Based on these findings, recommendations to assist the adoption of TQM in the company and similar companies in the construction industry have been suggested.

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Chapter One

Introduction

- **1.1 Background, Need for the Study and Value of the Research**
- **1.2 Aims and Objectives of the Research**
- **1.3 Applied Research Methodology**
- **1.4 Structure of the Dissertation**

Chapter 1 – Introduction

The aim of this chapter is to give the reader a general idea about the study presented throughout this dissertation. This chapter is divided into four sections as follows: (1) the first section provides the reader with the background, the need for the study and the value of the research; (2) the second section addresses the aims and objectives of the study; (3) the third section presents the research methodology and research methods used to carry out the research; (4) the fourth section presents the structure of the dissertation.

1.1 Background, Need for the Study and Value of the Research

Today's companies often struggle to secure a competitive edge in the market, due to the conflict between corporate objectives and the instability of economies and markets. Customers these days demand more than just product and service quality, but increasingly seek to influence the management system adopted also, in order to ensure quality. Customers stand to incur substantial financial loss if performance requirements are not met when equipment is in place or if service performance is disturbed. Such concerns give rise to an interest in developing quality management systems and calling for evidence of implementation.

The construction industry has lagged behind other industries in terms of performance and productivity measures during the last century. The ongoing technological and social changes following the start of the new century have altered the pace of the environment within which construction operates and pushed the construction

industry to the forefront with other industries. All construction companies of different sizes have to develop the way they conduct business, in order to survive and to cope with the changes imposed by their changing environments (Nesan & Holt, 1999).

Managing in construction organisations will have to deal with the new challenges of conducting businesses. It will have to satisfy the increasing demands of clients. Such demands entail improved service quality, faster building and innovations in technology. Some innovative business models implemented and used in manufacturing industry are being incorporated into the construction industry. Such models include business process reengineering, lean or Just-in-Time (JIT) production systems and Total Quality Management (TQM). In order for such models to succeed in construction, a culture of teamwork and collaboration inside and between the different sections and departments of the organisation should support these models. As a solution to satisfy the increasing demands by clients in the complex environment of construction, various quality management systems have been adopted by construction companies (Kanji & Wong, 1998). Due to the large size of the construction industry, there are many stakeholders involved. This makes the implementation of TQM more difficult in construction. However, a larger payoff for quality improvement in construction is expected than in any other service industry (Alfeld, 1988).

Due to the lack of literature and research conducted about TQM implementation in the construction industry compared to the manufacturing industry, this research is conducted to explore and investigate the intra-organisational issues of TQM

implementation within an international company specialized in the construction industry. Although such a specific research does not constitute evidence of the validity of TQM theory for the entire construction sector, principles of general applicability can still be concluded from the study.

The construction company, which is considered for this study, has grown to become a major participant in the international construction field, with over 140,000 employees drawn from more than 60 nationalities. The company's activities are mainly in the Middle East, the Gulf region, Africa, Europe, the Caribbean, Central America, United States of America (USA), the Commonwealth of Independent States (CIS) and South East Asia (company source).

The company is engaged in engineering, project management, procurement and construction for oil, gas, petrochemical and industrial plants, and for civil, municipal works, housing and high quality buildings (company source). Its scope of services includes: (1) industrial plant construction including all mechanical, civil, electrical and instrumentation works; (2) heavy civil construction for power and desalination plants, water and sewage treatment plants, airports, bridges and highway interchanges, harbours and docks; (3) Engineering, Procurement and Construction (EPC) for oil, gas and water pipelines; (4) EPC for high quality buildings, industrial buildings, and infrastructure works and networks; (5) construction of highways and roads (company source). The company was awarded Quality Certification by Bureau VERITAS Quality International (BVQI) to ISO 9001, ISO 14001 & OHSAS 18001 (company source). The company has signed up to the United Nations "Global Compact Initiative", which brings together companies, UN agencies, labour and civil

groups to promote Corporate Social Responsibility with regard to human rights, labour and the environment (company source).

The research took place in one of the construction projects currently run by the company. This project is for building the infrastructure package of a university and involves civil, mechanical and electrical departments. The company's scope in this project includes engineering, procurement and construction of infrastructure. The researcher worked in this project for one year which was the last year, and he knows most of the management, staff and employees working in the project. Most of the management, staff and employees working in this project including the researcher, had previously worked in many projects for the same company; however, some of them were new to the company and had been recently employed in this project where the research took place.

This study would advantage the company and the researcher as a manager by implementing TQM. Having worked for the construction company as an engineer, the researcher has experienced the problems of quality issues experienced in the construction field. The researcher believes that implementing TQM in this field would assist in solving the various problems of quality issues, through the entire organisation's involvement, commitment and participation in quality enhancement and continuous improvement. He also believes that TQM would improve the organisation's competitiveness through profitability, service quality, effectiveness and market share. Moreover, the successful implementation of TQM is expected to support collaboration between members of the organisation, and to contribute to employees' job satisfaction, as they would be less exposed to complaints about

quality from clients. In this way, TQM would contribute to maintain the loyalty of the organisation's members.

1.2 Aims and Objectives of the Research

The overall aim of this study is to explore and investigate the intra-organisational issues of TQM implementation within a construction company and subsequently, to propose recommendations to assist the adoption of TQM in the company. In the light of this aim, the following objectives were identified: (1) to explore the internal Critical Success Factors (CSFs) for implementing TQM in the company; (2) to examine the internal concerns serving as obstacles to implementing TQM in the company; (3) to identify the benefits of implementing TQM in the company; (4) to propose recommendations to assist the implementation of TQM in the company. Since TQM is a broad topic, it includes several stakeholders and related issues inside and outside the company but, due to the lack of time and resources to include all the stakeholders and explore all the related issues, the researcher, in this study, focuses on and explores only the intra-organisational issues of TQM, which are inside the company, and excludes the issues which are outside the company.

1.2.1 Focus Questions

The focus questions of the research are: (1) what are the internal critical success factors for implementing TQM in the company? (2) What are the internal concerns about implementing TQM in the company? (3) What are the anticipated benefits of implementing TQM in the company?

1.3 Applied Research Methodology

A case study is utilised in this research to explore and investigate the intra-organisational critical success factors, concerns and benefits of TQM implementation embraced in a construction company. The case study was carried out through: (1) conducting semi-structured interviews with management and staff to explore and investigate key issues of TQM implementation which are inside the company; (2) conducting a survey to ascertain the employees' awareness and perceptions of quality, teamwork and job satisfaction as part of TQM implementation in the company; (3) accessing the company's website and documents.

1.4 Structure of the Dissertation

The dissertation consists of four further chapters and is structured as follows: (1) chapter 2 contains the literature relevant to TQM implementation in the construction industry; (2) chapter 3 outlines and justifies the approach and methodology utilised to conduct this research, and explains the methods of data collection; (3) the author analyses and discusses the results and findings of the research and their implications in chapter 4; (4) finally, the author draws a conclusion about the research; suggests recommendations to assist the adoption of TQM in the company considered for this study and similar companies in the construction industry; discusses the research limitations and boundaries; and gives directions for future research in chapter 5.

Chapter Two

Literature about TQM in Construction

Chapter 2 – Literature about TQM in Construction

This chapter represents the literature relevant to TQM in the construction industry. The literature is organised as follows: (1) TQM preface: definition, objectives, development, its Key Success Factors (KSFs) and framework; (2) TQM in construction: reasons, constructs, methods and framework, concerns and benefits.

2.1 TQM Preface

P.B. Crosby, W. Edwards Deming, Joseph Juran and Kaoru Ishikawa introduced the concept of Total Quality Management (TQM) in the period of 1970 to 1980. Stages for quality improvement were identified by Crosby (1979) such as the zero-defect philosophy. Deming (1982) suggested 14 principles to improve quality in organisations. Ishikawa (1985) highlighted the important role of quality circles in achieving continuous improvement. Juran (1986) pointed out the importance of both technical and managerial facets of TQM. TQM is broadly considered one of the important tools to increase the effectiveness and competitiveness of any organisation. Implementing TQM would increase an organisation's commitment to quality and lead the company to the forefront among its competitors.

2.1.1 TQM Definition

Before discussing the concept of TQM, it is useful to look at the definition of quality. Oakland states: "quality is often used to signify 'excellence' of a product or service" (2003, p.4). Quality is defined as: "meeting the customer requirements" (Oakland, 2003, p. 4).

As previously argued, the concept of TQM has emerged from the works of Crosby, Deming, Juran and other researchers in quality. TQM has a variety of definitions developed by many authors. Feigenbaum defines TQM as: "an effective system for integrating the quality development, quality maintenance and quality improvement efforts of the various groups in an organisation so as to enable marketing, engineering, production, and service at the most economical levels which allow for full customer satisfaction" (1991, p. 6). Besterfield defines TQM as "both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organisation. It is the application of quantitative methods and human resources to improve all the processes within an organisation and exceed customer needs now and in the future" (2004, p. 24). Goetsch and Davis state that "TQM indicates a concern for quality in the broadest senses that refers to quality of products, services, people, processes, and environments" (2010, p. 7). TQM's basic concept is totality (Slack, *et al*., 2010). According to Slack *et al*. (2010), this entails: (1) contribution of all staff to maintaining quality; (2) involvement of the entire company; (3) consideration of all the costs of quality; (4) using every opportunity to do things right from the start and once; (5) incorporating all the systems related to quality. These definitions of TQM are similar in their view of TQM as an

achievement of customer satisfaction with minimum cost through the involvement of the entire organisation. However, the definition by Besterfield is preferable for the purpose of this study since it emphasises the role of the intra-organisational factors in implementing TQM. Such factors include employee mangement and human resources, for example.

2.1.2 TQM Objectives

The main goal of TQM is to meet the clients' requirements and attain their satisfaction (Grol, *et al*, 2007). Antony *et al*. (2002) address some of the objectives of TQM: (1) to improve employee involvement, (2) to improve communication, (3) to increase productivity, (4) to provide high quality standards and reduce reworks by doing things right from the start, (5) to improve customer satisfaction, (6) to reduce costs of poor quality, and (7) to improve competitive advantage. Spencer (1994) identified quality improvement and orgnisational effectiveness as objectives of TQM and as leading necessities for organisations.

2.1.3 TQM Development

TQM has evolved from the established concept of quality. It can be achieved through the following steps of quality development (Slack, *et al*., 2010): (1) inspection by error detection and rectification; (2) quality control which includes statistical methods, process performance and quality standards; (3) quality assurance which contains quality systems, quality costing, problem solving and quality planning; (4) Total Quality Management where the entire operation is involved.

TQM necessitates a quality policy, teamwork, training and development for employees and the involvement of customers and suppliers (Slack, *et al*, 2010).

2.1.4 TQM KSFs

There are many factors that facilitate the implementation of TQM, better known as the key success factors of TQM. As Salaheldin (2009) notes, the critical success factors are those things that must be assured if TQM is to be implemented successfully. Saraph *et al*. (1989) identified eight critical factors: top management leadership, role of quality department, training, product design, supplier quality management, process management, quality data reporting, and employee relations. Ciampa (1992) recognised seven factors essential to quality process: influence, responsibility/authority, innovativeness, desire to change, satisfaction, teamwork, and common vision/benchmarking.

2.1.5 TQM Framework

Oakland (2003) draws a new framework for TQM consisting of process, planning, people and performance (the four Ps) and within which the three Cs-culture, communication and commitment are integrated. Oakland states: "processes are the key to delivering quality of products and services to customes…they are the key linkage between the enablers of planning…through people into the performance…" (2003, p. 26). He adds that the new TQM framework is complete when the 3 Cs or 'soft-outcomes' are integrated into the four P's to move organiations successfully forward. "This new TQM model…provides a simple framework for excellent performance, covering all angles and aspects of an organisation and its operation"

(Oakland, 2003, p. 27). Figure 2.1 illustrates the new framework for TQM developd by Oakland.

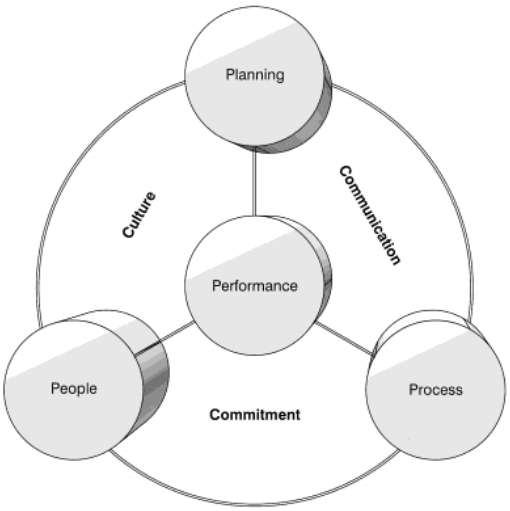

Figure 2.1: The new framework for TQM

Source: Oakland (2003, p. 27)

2.2 TQM in Construction

2.2.1 Reasons for Implementing TQM in Construction

TQM has been adopted in the construction industry as well as other industries. However, the integration and incorporation of TQM into the construction industry is less than other industries (‘‘Star’’ 1999). Huge and complex construction projects entail higher customer involvement and more rigorous requirements and specifications set by the clients for the contractors to meet. For this reason, TQM has been embraced in the construction industry as a way to improve quality, increase productivity, and meet clients’ requirements and specifications in order to gain their satisfaction as a main goal of TQM (Pheng & Teo, 2004). McKim *et al*. (1995) claim that applying TQM will lead to achieve better construction. Kuprenas & Kenney (1998) argue that implementing TQM helps to solve many problems of costs, productivity, occupational safety and health encountered in the construction industry.

2.2.2 Constructs of TQM in Construction

Koh & Low (2010) have identified several constructs, principles and elements of TQM in construction. The following constructs are investigated in this chapter: (1) top management leadership, commitment and involvement; (2) customer focus; (3) employee management; (4) supplier relationship management; (5) quality information management; (6) process management; (7) organisational learning; and (8) continuous improvement. Furthermore, organisational culture is also highlighted within these constructs, due to its importance for the accomplishment of TQM.

2.2.2.1 Top Management Leadership and Commitment

Management establishes the model and guidelines of production and construction processes; hence, their commitment is a key prerequisite for TQM to achieve continuous process improvement and quality enhancement. TQM implementation should entail top management leadership, commitment and involvement. Ahire *et al*. (1996) state: quality values and goals are created by top management. Scarnati and Scarnati assert that quality "must be nurtured from the top down. It is a synergetic teamwork philosophy, a group empowerment process, and a 'can-do' attitude that must be embraced by the entire organisation. Leadership's responsibility is to ensure the philosophy is firmly embedded in the organisational culture. Commitment from the top is an essential ingredient for success. So important is commitment that Dr W. Edwards Deming would not talk about quality concepts with a company unless he first had firm assurance from the highest person in the organisation." (2002, pp.113, 114). From an operational perspective, top management commitment and leadership is reflected in the acceptance of quality evaluation and responsibility by the project manager and heads of department, the introduction of comprehensive quality planning, and a focus on the importance of quality balanced with cost and the construction schedule (Saraph *et al*. 1989). It also entails the assurance of sufficient resources for quality management, and articulation of the organisation's quality focus (Delgado-Hernandez and Aspinwall, 2005). Nwabueze (2001), however, warns against the misinterpretation of top management support by those who think mere talk and executive posturing will suffice; it is meaningless without a focus on what customers actually need and require.

2.2.2.2 Customer Focus

Customer focus is achieved by delivering the products and services that meet customers' requirements. In construction, it is the achievement of the client's satisfaction by complying with the project specification and timely delivery of the project by the contractor. Customer focus also entails building strong relationships with the client, and getting the client involved in the activities of quality management (Ahire *et al*, 1996). Black and Porter (1996) point out that in order for an organisation to be customer-oriented; it must pay attention to communication and feedback about the client's worries and satisfaction, which can provide a basis for both internal and external benchmarking. Encouraging customers to voice any dissatisfaction and prompt, effective action to address concerns are essential to retain customer loyalty (Bryn, 1995). Another key initiative embraced in the customer focus element of TQM is building strong relationship with the end customer in the post-construction stage by providing the end customer with distinctive services and features in their projects (Koh & Low, 2010). Karapetrovic (2003), however, points out that the customer is not the only party whose satisfaction must be secured, as most companies have many other stakeholders such as the surrounding community, employees, investors and society whose needs must be considered. Employees' satisfaction is a critical factor for a customer-oriented organisation. Vora (2004) argues that if employees are not sufficiently looked after through trust and care, they cannot be expected to demonstrate the same towards customers. Customer focus must be enshrined in organisational culture. Bansal *et al*. (2001) argue that attracting and retaining customers to ensure a sustainable competitive advantage necessitates

organisational emphasis on creating and sustaining an organisational culture that pays attention to the welfare of internal customers as a means to attract and retain external customers. However, Kordupleski *et al*. (1993) criticized TQM for focusing mainly on internal issues, which include performance measure, training, employee participation and leadership, arguing that what most affect the growth of an organisation are the external factors such as marketing (Kordupleski *et al*, 1993). Therefore, in his view, TQM should embrace the marketing aspect of quality by linking the external measures of customers' requirements, fulfilment and purchase behaviour to internal quality measures. Bryn (1995) asserted that market research should be part of the quality system. He realised that customer expectations are evolving, and what is considered satisfactory initially will eventually come to be seen as inadequate, so achieving quality necessitates ongoing research and anticipation of customer needs (Bryn, 1995).

2.2.2.3 Employee Management

Employee management necessitates the centrality of employees in management practices as a way for an organisation to be more successful (Rogovsky and Sims, 2003). Employee management includes employees' involvement, commitment and participation in quality decision making through a bottom-up organisational structure. This initiates the use of cross-functional quality structure consisting of quality improvement teams (Ahire *et al*, 1996), and performance measurement tools. The TQM concept from an operations perspective calls for the participation of the entire staff in quality enhancement (Burati *et al*, 1992). Employees are also required to embrace quality standards in their work with support of a formal quality procedure

and necessary resources. Employee management also entails training and education for employees. In the view of Goetsch and Davis (2003), these are essential to enable the organisation's rapid and continual change. They note that current knowledge and skills, however advanced, may soon become outmoded, so regular updating is vital. Jaafari (2000) views training and education as the key to success in any development where human beings are involved. This should be a systematic process beginning with needs assessment. Goetsch and Davis (2003) suggest two ways in which this can be done: by the observation of managers who work closely enough with their team to identify where training may be required, or by asking employees to state their needs. As TQM grows in a teamwork environment, the selection and recruitment of employees should be based on their teamwork potential (Flynn *et al*, 1994). TQM also requires effective communication between employees. According to Henderson and McAdam (2003), effective employee management requires communication and the quality of communication between people within an organisation is a critical factor in organisational success. Employees' satisfaction has also been identified as facilitating their involvement in continuous improvement. Bou and Beltran (2005) emphasise that employees' involvement in the attainment of continuous improvement is related to their job satisfaction level. They also argue the need for an organisational culture that fosters employees' trust, commitment and participation, and they note the connection between Human Resources practices and TQM performance. Here emerges the role of human resources to work in line with TQM and measure the employees' performance of quality practices (Black and Porter, 1996). This can be done by using Key Performance Indicators (KPIs) to measure the degree of employees' participation, involvement, empowerment and

satisfaction. Although, after addressed separately, TQM is closely related to HRM. Giles and Williams (1991) point out the high personnel element within TQM, which emphasises the strategic importance of policies and processes traditionally associated with personnel. For this reason, HRM plays a key role in the TQM success, for example by participating in designing, conducting and evaluating the philosophy behind total quality, while maintaining its professional integrity, expertise and legitimacy. Herbig *et al*. (1994) draw attention to certain goals that TQM and HRM share, such as productivity, profitability, customer-orientation and high employee motivation. However, Guest (1999) noted the existence of some controversy over the extent to which TQM should be linked with high performance and high commitment HRM, and he suggested that this may depend on industry context. Oakland (2003) describes three ways in which organisations can promote the empowerment and involvement of their employees: (1) corporate employee suggestion schemes, which offer a formal mechanism for encouraging employee participation; (2) company-wide culture change programmes, for example by making use of workshops, ceremonies and events to enhance awareness of and commitment to continuous improvement; (3) measurement of Key Performance Indicators (KPIs) such as labour turnover, accident rate, absenteeism and time lost through accidents, in order used to identify where improvement may be necessary.

2.2.2.4 Supplier Relationship Management

Since companies are interdependent in terms of resources provision, establishing a long term relationship with suppliers is important for an organisation (Anderson *et al*, 1994). Sadler (1995) argues that one of the major changes entailed in a TQM approach is a move towards a sustained collaborative relationship with suppliers. Such a relationship in construction is represented by subcontracting and many other supply arrangements by the contractor, which also include designers and suppliers (Koh & Low, 2010). The quality of the work provided by the main contractor depends to a large extent on the quality of resources and work provided by other parties: designers, suppliers and subcontractors (Koh & Low, 2010). Managing the supplier relationship entails the selection of suppliers based on quality rather than just price (Saraph *et al*, 1989). It also entails dealing with a few suppliers/subcontractors, including the supplier/subcontractor in the construction process, and building a long-term and strategic alliance to enhance collaboration and role integration in the supplier-customer relationship (Koh & Low, 2010). Beckford (2002) however, notes that such an approach is not without drawbacks. There is a risk that the contractor may restrict its options and weaken its bargaining powers, especially when supplier power is high. It may be adversely affected by changes in strategy, tactics or performance by its supplier. From the supplier perspective, such a sustained and intensive relationship may require it to commit a significant proportion of its production to a single client, making it vulnerable if the client changes its product or strategy.

2.2.2.5 Quality Information Management

The principle of quality information management entails the systematic collection of data at every point of the construction process, improvement and problem solving activities (Koh & Low, 2010). The data collected are used to facilitate continuous learning, and assist control processes (Flynn *et al*, 1994). Employees use this quality information as an indicator of their performance, thereby, enhancing learning and maintaining employees' focus on quality (Ashford and Cummings, 1983). The construction operation can be envisaged as consisting of horizontal and interdependent processes. Hence, the quality of the final-built facility relies on the quality of the processes by which this facility is built (Koh & Low, 2010). There is always variance in processes, which often causes quality problems and it is essential to analyse and control this variance (Hackman and Wageman, 1995).

2.2.2.6 Process Management

Process management is another construct of TQM which involves the incorporation of quality measures in the construction processes, which must be continuously monitored and controlled (Claver *et al*, 2002). In order to ensure quality in the process outcome, it is essential to implement in-process and final inspection and review, and to design the construction process in a way that minimizes workers' errors (Koh & Low, 2010). Process management entails such techniques as quality engineering, six sigma, process mapping and business process reengineering.

2.2.2.7 Organisational Learning

Organisational learning is an important element and tool to practise TQM in construction. Lessons learnt from a project are used to prevent mistakes from occurring in future projects. Learning that is implemented in orgnisational systems through knowledge management motivates staff for continuous improvement (Anderson *et al*, 1994). Knowledge management, which focuses on the sharing of knowledge through the use of Information Technology, has come to be seen as having significant implications for organisational innovation and competitiveness (Chourides *et al*., 2003). This focus is rooted in several related areas, including Human Resources Management, Total Quality Management and Information systems (Moffett *et al*., 2003). According to Voelpel *et al*. (2005) however, many knowledge management initiatives fail to deliver the expected benefits, and they suggest that this is due to an over-concentration on technical solutions at the expense of organisational cross-cultural factors. Writers in organisational learning have highlighted two fields perceived as necessary to stimulate such learning which entail the factors for double-loop learning and learning dimensions (Kululanga *et al*, 2002). Double-loop learning concerns error detection and correction in order to adjust the organisation's norms and objectives (Love *et al*, 2000). Learning dimensions are policies that an organistion applies to gain knowledge from its internal and external environments (Kululanga *et al*, 2002).

2.2.2.8 Continuous Improvement

The construct of continuous improvement entails a commitment to measure technical and administrative processes for better performance. Boer *et al*. (2000) defined continuous improvement as "the planned, organised and systematic process of ongoing, incremental and company-wide change of existing practices aimed at improving company performance". Organisations can always meet their customers' requirements and achieve their satisfaction by the continuous improvement of their processes (Dean and Bowen, 1994). Continuous improvement objectives are to enhance and control the performance objectives of the construction system. It involves investment in learning so that the organisation can still develop new potential and skills (Sitkim *et al*, 1994). An organisation structure is required to assist continuous improvement. The structure involves a technical system that helps to identify and study key processes for improvement, process control mechanism, the assessment for improvement, a mechanism for analysing cost data to gauge performance, and benchmarking activities (Black and Porter, 1996).

Collard (1989) suggested regular assessment of TQM projects to maintain continuous improvement, and proposed that such evaluation can be linked with awards for success. This would also create an environment of continuous improvement and promote an organisation culture that supports quality. Quality programmes are composed of five elements acknowledged by IDS (1990): (1) knowing your customer. It is essential for all employees to be customer-focused and to recognise their customers' needs; (2) TQM is an organisation-wide programme, monitored and maintained by a formed quality structure. This requires top

management dedication to the programme, as well as, participation of the entire staff in the quality decision making; (3) continual problem solving is an essential component of TQM; (4) development of Key Performance Indicators (KPIs) and measures for TQM monitoring. Benchmarking is one of the measurement techniques to identify and follow the best practice in the industry and to set practical performance objectives and measures; (5) Training and education should be applied as an essential component of quality development programmes.

2.2.3 TQM Methods and Framework in Construction

Formoso & Revelo (1999) called for incorporating TQM elements and methodologies which are used in the manufacturing industry into the construction industry. Similarly, Lahndt (1999) argued that construction industry needs to use the same types of tools and techniques of TQM used extensively and beneficially in manufacturing industry. This is to control processes and prevent defects before they happen, as a result, saving millions of dollars. However, it might be necessary to modify such tools and techniques before being incorporated into construction, due to the different nature of this industry. A case study which included three small-sized building firms from the Brazilian building industry was conducted by Formoso & Revelo (1999). The study aimed at using TQM principles as a tool to improve the material supply system in those firms, and focused on quality techniques for problem identification, analysis and solving, such as flowchart, brainstorming, checklist and Pareto diagram. The findings of the case study revealed that it is not easy to apply such tools in small-sized building firms. Others have attempted to link the TQM approach with other management systems, such as project-management, partnership,

Quality-Assurance Plan (QAP), Quality Function Deployment (QFD), Jobsite Quality Planning (JQP) and/or to the ISO 9000 and 14000 standards (Bubshait & Al-Atiq, 1999).

Authors have recommended various frameworks for implementing TQM in construction. Burati and Oswald (1993) argued that TQM achievement in an organisation constitutes three phases: (1) the exploration and commitment phase; (2) the planning and preparation phase; (3) the implementation phase. Low and Peh (1996) identified the following actions to construct a model for TQM implementation in an organisation: (1) Obtain the commitment of the client to quality; (2) generate awareness, educate, and change the attitudes of staff; (3) develop a process approach toward TQM; (4) prepare project quality plans for all levels of work; (5) institute continuous improvement; (6) promote staff participation and contribution using quality control circles and motivation programmes; and (7) review quality plans and measure performance. Measuring quality performance can be done through clients' complaints, cost of quality, quality meetings, customer feedback and customer satisfaction. Developing a measurement system for the cost of quality; a system to measure the cost of defects by means of an index to prevent from occurring in the future, is part of TQM implementation. Leonard and McAdam (2003) state that a key issue with TQM implementation was that most firms initially applied TQM at an operational level. Those firms which began at this level found it difficult to switch the application of TQM to the strategic level. Of those firms which initially applied TQM at the strategic level, some used the model to implement their strategy. Very few firms started TQM at the strategic level. Figure 2.2 represents a

framework recommended by Pheng & Teo (2004) for TQM implementation in the construction industry. The framework was developed by Pheng & Teo (2004) as a result of two case studies conducted by the authors. The framework in Figure 2.2 highlights the following factors as important considerations for TQM implementation: (1) an understanding of TQM requirements (including customer/supplier involvement, continuous improvement, top management commitment, etc.); (2) strategic review of education and implementation plans; (3) provision of ample budgets and resources; (4) teamwork, training, and timely feedback (Pheng & Teo, 2004).

Authors have also criticized the methods, approaches, frameworks and models of TQM. Nwabueze (2001) cited the criticism by Deming and Juran of the philosophical limitations of Crosby's 'zero-defect' concept of TQM. Deming and Juran described the 'zero-defect' philosophy as useless and hypocritical. It is illogical to urge a line worker to produce perfection, since the majority of defects are due to poor design, which is out of the worker's control. Nwabueze (2001) also cited some limitations of Deming's approaches. These limitations include: "the action plan and methodological principles are too vague, implying that there is no clear Deming method. Deming failed to actually contextualize in an explicit holistic framework the implementation process of TQM. Hence, practising managers are faced with the difficulty of not knowing the "how, when and where" to start implementation of his 14 points" (Nwabueze, 2001, p.505). Leonard and McAdam state: "the Business Excellence Model (BEM) and other similar quality models have beneficial applications in organisations. However, they do not adequately address the dynamic issues present within TQM applications in organisations" (2003, p.655).

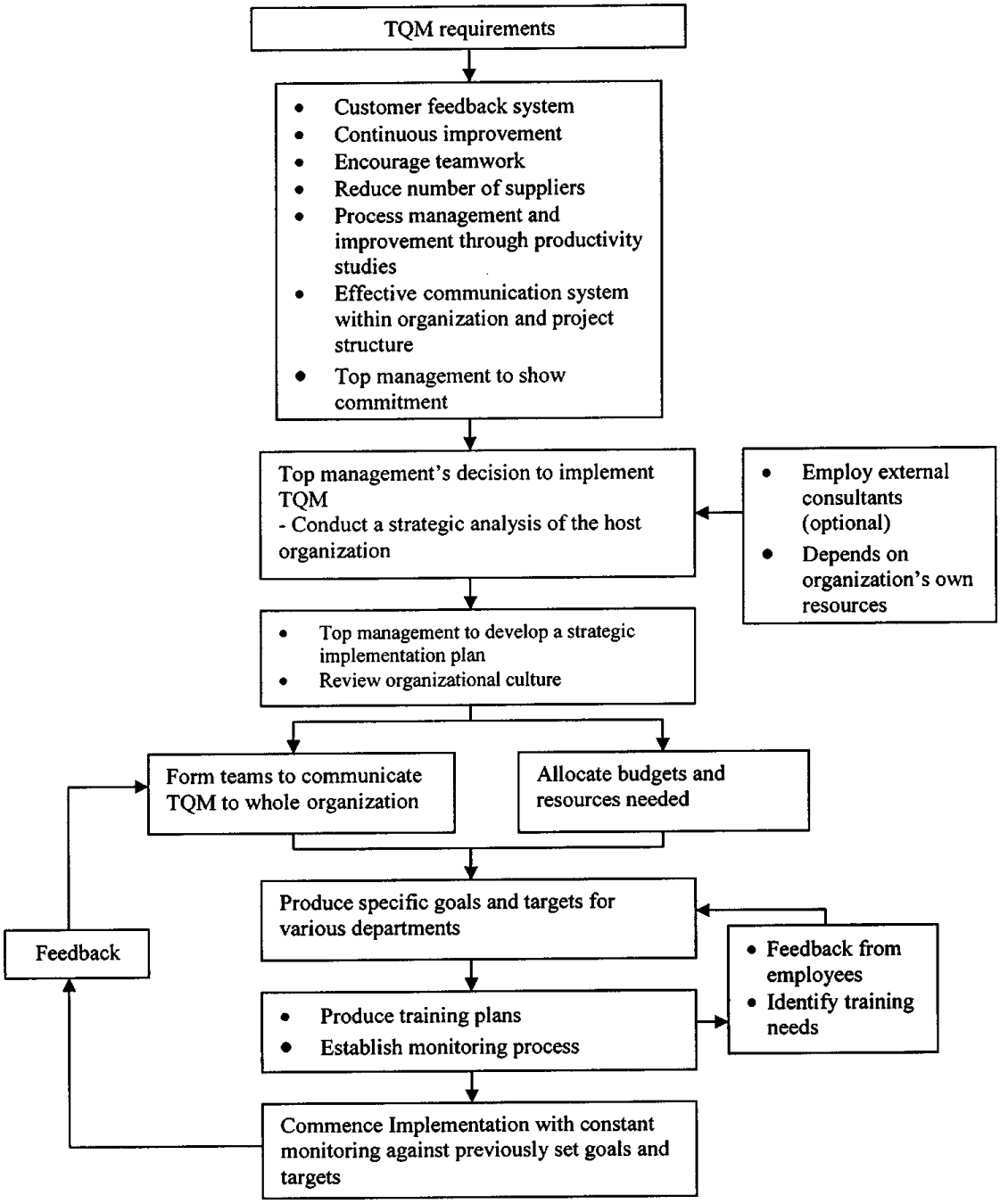

Figure 2.2: Framework for TQM implementation in construction

Source: Pheng & Teo (2004, p. 14)

2.2.4 Concerns about Implementing TQM in Construction

Due to the fact that the construction industry is different from manufacturing industry, in which TQM was first implemented, effectively utilised and proved successful and beneficial (Kuprenas *et al*, 1996), the construction industry encounters problems in implementing TQM. Authors reported some of the factors that may serve as obstacles to implementing TQM in construction: (1) product diversity; (2) organisational stability; (3) misconception of the cost of quality; (4) organisational perception of ISO-9000; (5) customers' perspective of quality; priority given to price rather than quality; (6) the lack of benchmark metrics; (7) internal cultural aspects of the organisation. Each of these is elaborated below.

The industrial and civil facilities in construction are diversified in terms of quality (Pheng & Teo, 2004). Every facility built is unique in terms of the features it contains to meet the personalized needs of the customers, with a condition to be free from any defects and thereby provide product satisfaction (Sommerville and Robertson, 2000). Chini and Valdez (2003) point to the same fact that the construction end product is a final built facility and not a repetitive unit. It is unique in its design and composition; hence, it differs greatly from the large volume production industries to which TQM model was first applied. The TQM model can be implemented in the manufacturing industry, which is a repetitive process of production and where a feedback loop can be formed, but in the construction industry, the scope is limited, it is claimed, because construction operations are short lived and diverse (Jaafari, 2000).

Organisational stability is problematic in the construction industry. Sommerville and Robertson (2000) argue that a large number of organisational collapses have been witnessed in the construction industry, especially during a downturn in the economy and that in this situation, adopting TQM may be perceived as a misdirection of resources, since TQM implementation may take several years to provide "payoffs". Love *et al* (2000) add that some construction firms may be reluctant to implement TQM because they expect relatively low benefits in the short term. Pheng and Teo (2004) point to that fact that the groups assigned for a certain project may not move to another project. This discontinuity can serve as an obstacle to TQM implementation.

Regarding concerns about cost, the cost of quality is defined as costs associated with conformance to requirements and costs associated with non-conformance to requirements (Baden-Hallard, 1993). Cost of quality in construction is composed of prevention and appraisal costs in addition to the non-conformance cost (Pheng & Teo, 2004). TQM is perceived by many contractors as extra cost, but they show little awareness of the fact that non-conformance to quality is costly (Elghamrawy & Shibayama, 2008). Costs of non-compliance with quality specifications and requirements include the cost of rework, waste, rectifying errors, responding to customer complaints, having budget deficiencies, and financial penalties and consequences associated with delays in the work schedule. Aoieong *et al* (2002) argue that measuring the cost of quality in construction projects is often difficult, and most of the times limited to failure costs. This is due to the complex nature of these projects (Aoieong *et al*, 2002). Love *et al*. (2000) report a survey carried out in Honk

Kong indicating that construction firms very rarely measure the costs of rework and defects.

Another concern that may serve as an obstacle to implementing TQM in construction is the organisational perception of the ISO-9000 series of quality standards. It is sometimes perceived by organisations as sufficient (Pheng & Teo, 2004). They may not want to subject their staff to a change in the organisation mindset and culture as an implication of TQM imposition (Pheng & Teo, 2004). The organisation mindset and the internal cultural aspects of the organisation are critical factors of TQM.

McAdam and Jackson (2002), however, argued that the misapplication of ISO standard and the excessive focus on the standard by organisations have neglected the real benefits that could be achieved by organisations applying the standard. Reimann and Hertz (1996) add that a limitation of ISO is that it focuses on conformance to practice more than continuous improvement. Kanji (1998) also criticized the lack of an explicit focus on continuous improvement and customer satisfaction within the ISO standards of quality, however, these concerns may be addressed in the 2000 revision of the standards, which correspond more clearly to TQM principles.

A further obstacle to TMQ implementation is customer preoccupation with price. Clients follow a usual practice of awarding tenders to the lowest price (Pheng & Teo, 2004). So, customer's perspective of quality can be an obstacle to implementing TQM when customers choose their suppliers based on price rather than quality (Pheng & Teo, 2004).

Jaafari (2000) states that benchmarking is difficult in the construction industry because project orders are diversified in terms of project characteristics. Every project is unique in quality features, the project's environment, owner expectations and other variables. According to Love *et al*. (2000), this lack of benchmark metrics in the construction industry has made it difficult for organisations to identify segments to target for process improvement. However, there is a relation between competition pressures in the market and the adoption of TQM (Mohrman *et al*, 1995). Commitment to TQM requirements is a tool for organisations to face competition pressures in the market.

At a cultural level, the transient nature of building and construction, the lack of standardization and the many stakeholders involved make it difficult to implement TQM in this industry. The construction industry is conservative by nature in the sense that it does not innovate, trying instead to borrow solutions from past experience or from others (Lansley, 1983).

Emperical evidence for the above concerns comes from Kirschenman & Members' (2000) large study on 1500 firms in construction, in which contractors reported various concerns about implementing TQM, identifying a number of implications and prerequisites of TQM which would be difficult to satisfy without considerable change: (1) effective teawork and team building skills; (2) education and training in the fundamental concepts of TQM; (3) serious commitment from upper management concerning the TQM philosophy; (4) developing a clear and sound mission statement; (5) identifying processes or work functions that are specifically applicable to TQM; (6) setting attainable goals for quality and developing meaningful measures

of quality; (7) in-house workshops focusing on teamwork and team building skills; (8) more attention to customer satisfaction.

This section shows the difficulties and problems encountered by construction firms while trying to implement change through embracing TQM in their system. However, adopting the best practice is very important for those firms to reduce their costs and achieve business excellence. Biggar (1990) highlights the need for a flexible management system and policy that support effective communication and continual improvement. This is in order to cope with the complex nature and turbulent environment of construction projects. In order to motivate companies to implement this change, best practices and guidance for implementing TQM are required.

2.2.5 Benefits of Implementing TQM in Construction

The effects and benefits of TQM implementation in the construction industry have been investigated by a few studies. McIntyre & Kirschenman (2000) conducted a large study on 1500 construction firms in the Upper Midwest in USA. They concluded that major economic benefits can be achieved through the implementation of TQM. Contractors who used TQM reported that higher customer satisfaction and improved schedule performance were the primary benefits of adopting TQM. In addition, other benefits include: (1) improving company competitiveness through profitability, job quality, effectiveness and market share; (2) reduced rework; (3) improved safety; (4) higher productivity; (5) lower employee turnover; (6) improved relationship with subcontractors, suppliers and clients; (7) employees' job

satisfaction; they would be less exposed to complaints about quality from the client (McIntyre & Kirschenman, 2000). Chase (1993) concluded that implementing TQM in construction would assure timely delivery of projects and increased profitability. Torbica & Stroh (1999) emphasised through an empirical study the benefit of customer satisfaction achievement through implementing TQM.

Pheng & Teo (2004) also reported the benefits of implementing TQM, based on case studies that illustrated the success of TQM implementation in construction. Such benefits include: cost saving by maintaining quality, higher satisfaction by employees as they would be less exposed to complaints from clients, work done correctly from the start and once, improved relationships with suppliers and subcontractors. Other measures of TQM performance were: " top management commitment, customer involvment and satisfaction, employee involvement and empowerment, customer-supplier relationships, and process improvement and management"(Pheng & Teo, 2004, p. 1). However, Eskildson (1995) argued that TQM does not represent a remedy to all problems in an organisation. He adds that TQM is not the only way to organisational success.

Chapter Three

Research Methodology

- 3.1 Research Methodology and Approach
- 3.2 Research Methods
- 3.3 Data Collection
- 3.4 Validity and Reliability
- 3.5 Ethical Considerations
- 3.6 Analysis Procedures

Chapter 3 – Research Methodology

The aims of this chapter are to: (1) outline and justify the methodology and approach utilised to conduct this research; (2) illustrate and justify the research methods used for data collection and analysis; (3) discuss the research validity and reliability, ethical considerations and analysis procedures.

3.1 Research Methodology and Approach

A reasearch methodology is defined as: " an approach to the process of the research encompassing a body of methods"(Collis & Hussey, 2009, p. 73). There are two approaches for conducting any reasearch: (1) a dedeuctive approach with "a view to providing explanatory theories to understand social phenomena" (Collis & Hussey, 2009, p. 56). Researchers in this approach deduce their study's hypothesis from existing facts or theories. They test their hypothesis by using quantitative and objective methods of data collection and analysis. Then, they compare their findings to the theory in order to confirm, modify or reject that theory; (2) an inductive approach with "a view to providing interpretive understanding of social phenomena within a particular context" (Collis & Hussey, 2009, p. 57). Researchers in this approach build a theory based on a set of observations. Qualitative and subjective methods of data collection and analysis are used within this approach.

A case study of a construction company with an inductive approach is used to carry out this research, although it can be argued that any research involves a degree of deduction, as it is difficult to collect data without some initial ideas as to relevant

issues (Veal, 2005). A case study is defined as: "a methodology that is used to explore a single phenomenon (the case) in a natural setting using a variety of methods to obtain in-depth knopwledge" (Collis & Hussey, 2009, p. 82). Since the nature of this research, as highlighted by the research questions, is exploratory, exploring and investigating key issues of TQM implementation embraced in a construction company, a case study with an inductive approach is utilised to conduct this type of research. The researcher, by using such a methodology, would also be able to gain in-depth knowledge sufficient for answering the organisation-related questions represented by the research focus questions in chapter 1. The inductive approach emphasises the quality and depth of the data collected about a phenomenon (Collis & Hussey, 2009). For this reason, qualitative data are dominantly used within the inductive approach and they tend to be rich in detail and nuance (Collis & Hussey, 2009). The author has chosen a deep case study of his company, in preference to a survey of several companies, for example, because, this research explores company related-issues that can be best revealed in depth through intensive examination of the phenomenon of interest in a natural setting, to obtain information-rich qualitative data to answer the research questions posed in chapter 1.

3.2 Research Methods

According to Collis & Hussey, a research method is "a technique for collecting and /or analysing data" (2009, p.73). Research methods and techniques for data collection and analysis are diverse, but, since the nature of this research is explanatory and descriptive, qualitative and subjective, it was initially decided to carry out the case study through two sources of data collection; conducting semi-

structured interviews with management and staff, besides accessing the company's website and documents.

Interviews have been chosen as the primary source of data collection since they go in-depth to provide content-rich qualitative data that fit the research questions. Interviews were chosen for this research, because of their great flexibility compared to other qualitative methods and capability to reach the target respondents with more certainty than the survey approach (Leedy and Ormrod, 2001). According to Saunders *et al.* (2007), there are three types of interviews; structured, semi-structured and unstructured interviews. Since this is an exploratory study without predetermined foci, semi-structured interviews were adopted. Semi-structured interviews are non-standardised. They are particularly suitable for exploratory and explanatory studies, because although the researcher has a list of themes and questions to be covered, there is freedom to vary the questions from one interview to another. As Saunders *et al*. (2007) comment, semi-structured interviews enable the researcher not only to find out what is happening and how, but also enable exploration of reasons and motivations underlying people's attitudes and behaviours.

The interviewees included management and staff from different disciplines and departments in one of the construction projects currently run by the company. The researcher worked for one year on this project, and knows most of the management, staff and employees, which facilitated access. The interviewees were: the project manager, two construction managers, one procurement manager, one contracts manager, one technical manager, one quality manager and two staff of a project engineer and a section engineer from mechanical and electrical departments

respectively. The sample of participants was selected to cover as many departments as possible in the company and to include a manager or a representative from each department.

During one of the interviews and while answering one of the questions about the employees' awareness of TQM, the participant (the manager) suggested investigating the employees' perceptions and awareness of quality, job satisfaction and teamwork as critical factors and issues in implementing TQM in the company. Since it would be difficult and impractical to conduct interviews with 50 employees and to do so would, moreover, cause work disruption in the company, it was decided to conduct a survey by a questionnaire. Quantitative data collection and analysis was used for this specific part within the overall inductive and dominant qualitative context of the study.

3.2.1 Interviews

Based on the research aims and objectives and the research questions posed in chapter 1, the interviews were conducted with management and staff to explore the CSFs, concerns and benefits of implementing TQM in the company. The interviews cover the following topics and find out: (1) to what extent TQM is currently implemented and used in the company; (2) the critical success factors for implementing TQM in the company; (3) the main concerns about implementing TQM in the company; (4) what appropriate methods and framework for TQM implementation can successfully be applied in the company; (5) how HR can be linked with TQM to attain continuous improvement in the company; (6) whether the

employees are aware of the aspects of TQM; (7) what would be appropriate performance measures for TQM; (8) the anticipated benefits of implementing TQM in the company. The research and the interview questions were reviewed, agreed and finalised with the researcher's supervisor and participant managers prior to conducting the interviews. A brief summary of the study explaining the aims, objectives, value of the research, general guidelines and examples of general points and factors were provided to each of the interviewees to guide him through the interview. **The full interview questions are attached in appendix A.**

3.2.2 Questionnaire

The questionnaire was designed and multiple-choice questions were formulated by the researcher together with assistance from one of the interviewed staff; moreover, the questions were reviewed, amended and finalised with the researcher's supervisor and management of the company. The questionnaire contains four sections: (1) section A: to gain general information about the employees including their age, permanent place of residence, job title, years of experience and their work band; (2) section B: to gain information about the employees' awareness of quality. Two multiple choice questions were asked within this section; (3) section C: to gain information about the employees' teamwork potential and ability. Four multiple choice questions were asked within this section; (4) section D: to gain information about the employees' job satisfaction in career, salary, professional development and work setting. Nine multiple choice questions were asked within this section. **The questionnaire is attached in appendix B.**

3.3 Data Collection

3.3.1 Interviews

Nine open-ended semi-structured face to face interviews were conducted with management and staff from different disciplines and departments at the main office in one of the construction projects currently run by the company. Each participant manager was met individually prior to each interview through a personal visit to his office to explain to him about the research, its benefits for the company and the interview purpose and to arrange an appointment at a convenient time to conduct the interview. Moreover, each participant was provided with a summary of the study, general themes and guideline about the topic and the interview questions for him to prepare himself prior to conducting the interview.

Each interview was conducted face to face with each one of the participant managers in his office. Each interview lasted for about one hour on average, although it was planned to be an open-ended. The questions were asked according to the list of prepared questions, although sometimes some follow up questions emerged and sometimes some of the interviewees expanded their discussion to encompass related issues from which useful information for the research could be concluded. Written notes were taken by the researcher for each interview; in addition, some of the interviews were recorded, with the permission of the participant. As well as answering the questions, interviewees were asked to provide any related supporting documents, reports, records…etc

3.3.2 Questionnaire

After finalizing the questions and the questionnaire, the sample of participants was chosen to represent different employees from the company working in the project in which the research took place. The sample included both site and office employees. Employees were selected based on their job title and work band. They included engineers, superintendents, supervisors, foremen, charge hands and technicians. 50 employees' names were selected by the researcher, with assistance from a section engineer in the project. They both tried to choose the sample to cover equal numbers, as far as possible, representing each position or job title. 50 copies of the questionnaire sample were printed and personally distributed by the researcher and some work colleagues on the project to each selected employee. The responses were collected personally by the researcher and his colleagues. 44 employees responded to the questionnaire.

3.4 Validity and Reliability

The accuracy and precision of research are assessed in terms of validity and reliability. Validity is concerned with the degree to which an instrument measures what it is supposed or intended to measure (Oppenheim, 1992). The validity of semi-structured interviews is very high due to the flexible and responsive interactions between the interviewer and interviewee. The researcher took care to ensure the validity of the interviews by making a personal visit to the office of each interviewee and building trust with him prior to each interview. This was to explain the purpose

of the research and its benefits for the company. Moreover, interviewees were given enough time to answer the questions during the interview.

Regarding the questionnaire, it was distributed and collected in person. This gave a chance to the researcher to explain the research to respondents and to clarify any ambiguity in any question, moreover, to check that all the questions had been answered by the respondents. While selecting the sample for the questionnaire, the researcher attempted to select the sample based on equal distribution of different characteristics of employees such as work band, although, this was not exactly achieved, which could create a concern about the precision of the questionnaire results.

Reliability of a measure reflects the extent to which it is free from bias or error, and can be viewed in terms of consistency, both across items and over time (Sekaran, 2003). For semi-structured interviews Easterby-Smith *et al* (2002) suggest that reliability is concerned with whether different interviewers would reveal similar information. The researcher's procedure to promote reliability was to provide the interviewees with a list of themes and questions prior to each interview, moreover, giving them enough time to prepare answers and appropriate documents where applicable. In addition to that, notes were taken and some interviews were recorded. Reliability is also related to the issue of bias (Saunders *et al*., 2007). The researcher was concerned about avoiding interviewer bias which will affect the interviewees' response to the questions being asked. He left the interviewees to express themselves as they wished and obtained their permission to record the interviews (Saunders *et al*., 2007).

Regarding the questionnaire reliability, the researcher distributed and collected the questionnaire in person and made sure that the respondents themselves answered the questions. In addition to that, related topics were posed in different parts of the questionnaire, to provide a test of consistency.

3.5 Ethical Considerations

It was decided by the researcher not to disclose the name of the company for this research, or the participants' names. A research ethics form provided by the university was completed by the researcher, approved and signed by the supervisor. **The research ethics form is attached in appendix C.** The Interviewees were asked to sign a participant's consent form as part of the ethical procedure of the university prior to each interview. **A sample of the participant consent form used for the interviews is attached in appendix D.** Moreover, prior to each interview, the participant's consent to record the interview was requested. While some agreed, others disagreed.

Employees were made aware that their participation in the survey was voluntary. Moreover, they were informed that it would be used solely for the study purpose and their feedback would be treated anonymously. Only aggregated results would be reported in the study. They were also made aware that if they did not feel comfortable while answering, they could withdraw at any point.

3.6 Analysis Procedures

Manual analysis was used by the researcher for the qualitative data collected from the interviews. The concepts and themes related to the answers of the research questions about the CSFs, concerns and benefits of implementing TQM were concluded from the interviewees' responses and presented in chapter 4. Moreover, each of the CSFs, concerns and benefits were listed in a table showing the frequency or number of responses that recognised the same issue. The quantitative data from the questionnaire were analysed by excel using frequency tables and percentages.

Chapter Four

Results Analysis and Discussion

- **4.1 Interview Results Analysis and Discussion**
- **4.2 Questionnaire Results Analysis and Discussion**

Chapter 4 – Results Analysis and Discussion

The aims of this chapter are to: (1) analyse and discuss the results and findings of this study in relation to the research questions posed in chapter 1; (2) discuss the organisational and managerial implications of the results for implementing TQM in the company under study. Moreover, the results will be considered in the light of the literature about TQM in construction presented in chapter 2. This is to answer the research questions posed in chapter 1 about exploring and investigating the critical success factors, main concerns and benefits of implementing TQM in the construction company considered for this study. This chapter is divided into two main sections. The first section presents the analysis and discussion of the results that emerged from the interviews. The second section presents the analysis and discussion of the results that emerged from the questionnaire, linked with those of the interviews.

4.1 Interview Results Analysis and Discussion

4.1.1 CSFs for TQM Implementation in the Company

The intra-organisational critical success factors (CSFs) for TQM implementation, that need to be incorporated in the company, were identified from the nine interviews conducted with management and staff. Table 4.1 illustrates the interviewees' responses about these factors. The table shows the frequency of each response which represents the number of interviewees who recognised the same issue, presented in descending order of the responses based on their frequency from the most recognised to the least recognised by the interviewees:

S.N	Interviewees' responses about the internal CSFs for TQM implementation in the company	Number of responses
1	Process approach and quality management procedure	9
2	Employees' involvement, training and professional development	8
3	Employees' awareness and education	6
4	Employees' satisfaction in career, salary and professional development	5
5	learning and knowledge management	5
6	Top management leadership	4
7	Organisational culture	3
8	Managerial skills of decision making, delegation, motivation, teamwork, communication and coordination	2

Table 4.1: The intra-organisational CSFs for TQM implementation in the company

According to Table 4.1, the critical success factor most recognised by all the interviewees pertains to adopting a process approach in the construction work, moreover, enhancing the quality of work in the different processes and stages of construction in the company. This is accomplished by complying with the Quality Management Procedure (QMP) which was established in the company, and adopting a risk analysis system to accomplish the different tasks in the company.

The process approach, in turn, requires employees' management, which entails employees' involvement, awareness of quality, education, training, professional development, satisfaction, motivation, delegation of decision making, teamwork, communication, coordination, organisational learning and knowledge management.

Employees' management factors were identified by the interviewees as the second most important CSFs for TQM after the process approach, followed by an emphasis on top management leadership with consideration to the internal cultural aspects of the company. All these are recognised by the interviewees as CSFs for implementing TQM to be incorporated in the company. The identified CSFs and their implications are discussed as follows:

4.1.1.1 Process Approach

It is very important for the company to identify, manage and constantly boost the effectiveness of processes that add to its success. The interface of processes should also be controlled in order to meet the client requirements. The organisational and managerial implications of adopting a process approach for implementing TQM in the company include saving money and time through efficient exploitation of resources; identification of how to achieve targets; creating sound accountability for controlling critical tasks; identifying the linkage between main tasks within and across organisation functions; ensuring that contributory factors such as resources, methods and materials are taken into consideration; assessing risks, consequences and the impact of activities on a variety of stakeholders. In this context, process management has been indicated, in the literature about TQM in construction, by Koh & Low (2010) as a key construct of TQM.

4.1.1.2 Training and Development

The company realises the need to train and develop its employees to attain career development, promote its technical and supervisory/managerial skills requirements to meet growth in the social, economic, and technological aspects of the business world. The implications and objectives are an organisational objective to facilitate achievement of the company's objectives by giving employees the required training to equip them with the knowledge and skills to perform present and future duties; enhancing productivity by providing the training to develop efficiency and effectiveness and assist employees to give of their best; to enhance job satisfaction by promoting health and safety, maintaining a climate of respect for all staff, and providing opportunities for personal fulfilment in work and career development. One manager stated, "The company will assist and support staff to develop their personal potential and to enhance their capability to contribute to the work and success of the organisation". In this context, training and education for employees has been described by Goetsch and Davis (2003) as essential to enable the organisation's rapid and continual change.

4.1.1.3 Employee Satisfaction

The interviews revealed the centrality of employees in the process of improvement, and that their satisfaction has a great effect on implementing TQM in the company. The company has to take care of its employees in order for them to follow their management lead, and be able to satisfy the client. Apart from the traditional view of TQM as being mainly customer focused, the interviews with management revealed that employees' participation, involvement, and centrality are important for the successful implementation of TQM in the company. This, in turn, would generate increased satisfaction for other parties and stakeholders including the client. This matches what has been stated by Rogovsky and Sims (2003), that employees' management necessitates the centrality of employees in management practices as a way for an organisation to be more successful.

4.1.1.4 Knowledge Management

The interviews with management revealed that the knowledge management principle is being used in the company. According to the interviewees, it is applied through a number of committees, including safety, quality and commissioning. One manager described knowledge management as "library-like" in the company. He added, "Applying the principle in the company started in 2006 where few people contributed and now it is open to the entire staff". Another manager said, "There is a huge body of valuable knowledge in the company". According to the interviewees, different organisational learning tools are being used in the company: internal and external project seminars; quality meetings with the client; lessons learned from

current projects to improve the performance in future projects. In the same context, the significance of knowledge management in implementing TQM had been asserted by Anderson *et al*. (1994), who mentioned that the role of learning that is implemented in orgnisational systems through knowledge management motivates staff for continuous improvement.

4.1.1.5 Leadership

Leadership, the effective participation and dedication of senior management are necessary in the company for promoting and sustaining a competent management to attain and maintain interests for the various stakeholders. To attain these interests, it is important to found, maintain and boost clients' satisfaction. This entails various organisational and managerial practices, including: (1) building the company's strategy and policy; (2) creating awareness of organisational culture; (3) contributing to improvement of projects; (4) acquiring feedback on performance of the management system; (5) establishing an environment that supports employees' participation; (6) building the structure and providing the resources to sustain the company's strategic objectives. The role of leadership in TQM implementation has been emphasised, in the literature about TQM in construction, by Ahire *et al*. (1996). They stated that quality values and goals are created by top management. However, based on the results of the interviews with management, a more extensive role of leadership is induced through the points 1 to 6 mentioned above.

4.1.1.6 Organisation Culture

The interviews with management revealed that the organisation culture is a key factor for the successful implementation of TQM in the company. An organisation culture that includes everyone in TQM is required. Moreover, a culture that supports trust, teamwork and collaboration among employees themselves and between employees and management is needed. One manager mentioned that the company's management is 'liberal', and applies an open door policy, which facilitates communication between employees and management. This, in turn, supports TQM implementation in the company. In this context, Bansal *et al*. (2001) argue that attracting and retaining customers to ensure a sustainable competitive advantage necessitates organisational emphasis on creating and sustaining an organisational culture that pays attention to the welfare of internal customers as a means to attract and retain external customers.

Management realised that some of these factors, such as training and development for employees, are not sufficiently applied in the company, and it is necessary to enhance the integration of such factors in the company for the successful implementation of TQM. However, the extent to which these factors differed in terms of frequency, as shown in Table 4.1, raises a question of whether this order reflects the actual weight of these factors or indicates a lack of awareness by management of the significance of some of these factors in implementing TQM in the company.

4.1.2 Concerns about Implementing TQM in the Company

Table 4.2 illustrates the interviewees' responses about the concerns serving as obstacles to implementing TQM in the company, in descending order based on frequency from the most recognised to the least recognised.

S.N	Interviewees' responses about the internal concerns about implementing TQM in the company	Number of responses
1	Lack of employees' participation, awareness and education, and lack of a qualified staff	9
2	nature of the construction projects; transient, variable, dynamic and fast track	9
3	internal cultural issues of the company	7
4	Lack of managerial skills of delegation of decision making, motivation, teamwork, communication and coordination	5
5	Insufficient training and professional development	4
6	Lack of employees satisfaction	3
7	the role of Human Resources and the human resources appraisal of employees' performance	2

Table 4.2: The intra-organisational concerns about implementing TQM in the company

According to Table 4.2, one of the highly recognised concerns by all the interviewees is "the variable and dynamic construction model of work" (as stated by one of the interviewees). Another is the transient nature of construction projects, where employees are not permanent. This concern about TQM had been recognised, in the literature about TQM in construction, by Pheng and Teo (2004) when they argued that the groups assigned for a certain project may not move to another project. This discontinuity can serve as an obstacle to implementing TQM in construction companies. In the same context, the interviewees identified lack of time and "rush of work" as further impediments to implementing TQM in construction. Most construction projects are fast track, and require timely delivery to the client in order for the contractor to avoid any financial and reputational implications.

All the interviewees identified lack of employees' awareness, education and quality of staff as concerns about implementing TQM in the company. In this context, Jaafari (2000) views training and education as the key to success in any development where human beings are involved. Another identified concern by most of the interviewees about TQM is the internal cultural issues in the company. One manager stated that "the mood of the company is always busy". Another manager identified "the general lack of willing from the top to bottom" as a cultural concern about TQM. Another manager commented about "employees' resistance to change, fixed way of doing the job and lack of innovation", which are all concerns at a cultural level, and serve as impediments to implementing TQM in the company. Lack of innovation in construction was similarly recognised by Lansley (1983), who claimed

that the construction industry is conservative by nature in the sense that it does not innovate, trying instead to borrow solutions from past experience or from others.

Some of the interviewees recognised lack of managerial skills such as motivation, delegation of decision making, teamwork, communication and coordination as an obstacle to implementing TQM in the company. Moreover, insufficient training and professional development were identified by some of the interviewees as obstacles. One of the interviewees said, “Professional development programmes are not taken seriously in the company”. Lack of employees’ satisfaction with career, salary, professional development and the work setting was also recognised by some of the interviewees as an impediment to implementing TQM in the company. One manager said, “People don’t have full satisfaction to sustain the trend of quality”. Such concerns about training and development, employees’ satisfaction, organisation culture and the various managerial skills were similarly identified by the interviewees and presented in 4.1.1 as CSFs for TQM, which are not being sufficiently applied in the company. This necessitates enhancing and effectively incorporating such factors in the company.

The role of HR was highlighted by only two interviewees as a concern about implementing TQM in the company. One said that HR is required to contribute more in TQM implementation. Another argued that HR people are working on TQM development but it is not yet linked with promotion. According to the two interviewees, the current HR appraisal form does not cover all aspects of TQM, and there is a “lack of guidance” on some aspects of the appraisal. It was stated by one of these interviewees that appraisal should also be conducted by the employees for the

management. The other interviewee suggested that HR can create a data base that contains the entire staff. This can be used to overcome one of the main obstacles to TQM in construction projects, which is maintaining continuity of employees. Such a data base can be used to find employees for forthcoming projects. Other contributions by HR suggested by the two interviewees include HR contributions to recommend training and development programmes for the staff; implement a job description policy and develop a centralized HRM system to link all the members of the organisation with the payroll system of the accounting department, which should be interlinked with the head office. The role of HR in TQM implementation was emphasised in the TQM literature by Giles and Williams (1991), who pointed out the high personnel element within TQM, which emphasises the strategic importance of policies and processes traditionally associated with personnel. However, such a factor being identified by only two interviewees might point to a lack of consideration by management of the HR role in TQM.

In addition to the concerns mentioned above, it was stated by one of the interviewees that “understanding TQM is still a novelty and what it means is still unknown in the company”. This is also considered as an impediment to implementing TQM in the company.

4.1.3 Benefits of Implementing TQM in the Company

Table 4.3 illustrates the interviewees' responses about the anticipated benefits of implementing TQM in the company, in descending order based on frequency, from the most recognised to the least recognised.

S.N	Interviewees' responses about the benefits of TQM implementation in the company	Number of responses
1	TQM is economical in the long run	5
2	improved job and staff quality, safety and productivity	4
3	reduced rework	2
4	timely delivery of the project	2
5	win new tenders and projects	2

Table 4.3: The anticipated benefits of implementing TQM in the company

According to Table 4.3, the most recognised benefit of implementing TQM by the interviewees is cost saving in the long run. One manager stated, "A cost-benefit analysis case demonstration would show that TQM is economical in the long run". In this context, the study by McIntyre & Kirschenman (2000) concluded that major economic benefits can be achieved through the implementation of TQM. Pheng & Teo (2004) also reported the benefits of implementing TQM, based on case studies that illustrated the success of TQM implementation in construction. Such benefits include cost saving by maintaining quality. Introducing TQM can be costly,

however, doing things right from the start and once would save rework, and ensure timely delivery of the project. This, in turn, would save cost for the company; moreover, increase profitability and market share in the long run. This would also improve quality of the whole staff, improve productivity, and enhance safety as part of TQM implementation in the company. As a result of the enhanced quality in construction, increased customer satisfaction is achieved, and the company's reputation is promoted. This would enable the company to win tenders for future projects. These benefits match what has been suggested in the TQM literature by Chase (1993), who concluded that implementing TQM in construction would assure timely delivery of projects and increased profitability. Torbica & Stroh (1999) emphasised through an empirical study the benefit of customer satisfaction achievement through implementing TQM.

4.2 Questionnaire Results Analysis and Discussion

According to Tables 4.1 and 4.2 in section 4.1, the majority of the intra-organisational CSFs and concerns about implementing TQM in the company, as identified by the interviewees, are related to employee management, which entails employees' involvement, awareness, education, training, professional development, satisfaction, motivation, delegation, teamwork, communication, coordination, organisational learning and knowledge management. Hence, it was suggested by one of the interviewed managers that it would be useful to investigate the level of employees' awareness of quality, teamwork and employees' job satisfaction in career, salary, training, professional development and work setting. This is to investigate whether these factors are the primary issues and concerns about implementing TQM in the company. The investigation was carried out through distributing a questionnaire among the employees. **The frequency tables of the questionnaire data analysis are reported in Appendix-E** under four sections: characteristics of the respondents (section A); employees' awareness of quality (section B); teamwork experience (section C), and employees' job satisfaction (section D). The results and findings of the questionnaire data are analysed and discussed as follows:

Table A-1 in Appendix E (section A) shows the respondents' age and place of residence. It shows that 45.5% of the respondents were aged between 20-30 years, 34.1% were aged between 31-40 years, 18.2% were aged between 41-50 years and 2.3% were aged more than 50 years. The majority of the respondents came from

Jordan, Philippines, Lebanon, Egypt and India. Other respondents came from the United Kingdom, Australia, Bangladesh, Canada and Pakistan.

Table A-2 shows the respondents' work band. 61.4% of the respondents were of bands 8, 9 and 10, 25% were of bands 5, 6 and 7, 9.1% were above band 10, and 4.5% were below band 5. Table A-3 shows the respondents' job title. 50% of the respondents were engineers and supervisors of bands 8 and 9, 20.5% were project engineers, section engineers and one superintendent, all of band 10 and above, 25% had job titles of foreman, chargehand, draftsman, operator and assistant, all of bands 5, 6 and 7, and 4.5% were technicians of below band 5.

According to Table 4.2, lack of employees' awareness of quality, education and lack of a qualified staff were the interviewees' most recognised concerns about implementing TQM in the company, although, Table B in Appendix E (section B), which illustrates the employees' awareness of quality section of the questionnaire, shows that around 82% of the respondents were aware of the fact that maintaining quality of work is important to do the work right from the start and once. This shows that most of the respondents were aware of one of the basic concepts of TQM. Moreover, Table C in Appendix E (section C) shows that most of the respondents were aware of the importance and benefits of teamwork, which is also an essential part of TQM. These results contradict what was suggested by the interviewees about lack of employees' awareness of quality as a concern about implementing TQM in the company. In the same context, Table B shows that around 44% of the respondents replied that: (1) management urged them to maintain quality but not at

the expense of the task's completion time; (2) management considered timely delivery of the task as the key factor. This shows that there is a conflict between the employees and the management about the responsibility for issues of quality problems in the company, which could be another concern that would render TQM implementation difficult in the company. Hence, what is required is to enhance a culture of trust, commitment, teamwork and collaboration between employees and management in the company. This matches what has been recognised, in the literature about TQM in construction, by Bou and Beltran (2005) when they stressed the need for an organisational culture that fosters employees' trust, commitment and participation. However, the respondents' feedback about the management emphasis on time was also recognised by the management itself as a concern about implementing TQM in the company, as illustrated in Table 4.2. The management admitted that the fast track nature of construction projects can serve as an obstacle to implementing TQM in the company.

Table D in Appendix E (section D) illustrates the respondents' satisfaction in career, salary, professional development and the work setting. Around 86% of the respondents replied that they were appreciated and rewarded for their time of service in the company. More than 60% of the respondents replied that they would respond immediately and with full satisfaction to accomplish an urgent task, which required them to spend extra time beyond the formal working hours. Table D shows that more than 90% of the respondents assessed the different services and facilities provided by the company as fair and above. Table D also shows that around 90% of the respondents assessed the company's policy towards teamwork, communication and

coordination between members of the project as fair and above. In the same context, Table C shows that the employees had good teamwork experience. These results support the implementation of TQM in the company. According to the literature about TQM in construction, as TQM grows in a teamwork environment, the selection and recruitment of employees should be based on their teamwork potential (Flynn *et al*, 1994). Henderson and McAdam (2003) added that effective employee management requires communication, and the quality of communication between people within an organisation is a critical factor in organisational success. However, the questionnaire results contradict what was stated by the interviewees about the lack of teamwork and communication being an obstacle to implementing TQM in the company.

On the other hand, Table D shows that around 70% of the respondents were not satisfied with the management fulfilment of their administrative and financial needs, and 75% were not satisfied with the management fulfilment of their personal needs. Regarding the training and professional development in the company, around 23% of the respondents replied that they had never received any training programmes during their service in the company. Around 11% reported that they had received only one programme, and around 40% replied that they had received two to four programmes, while only 25% of the respondents replied that they had received more than four programmes. Most of the respondents who had received training were of band 8 and above, while most of the respondents who had never had any training were below band 8. This result shows that there is a lack of training and professional development for all employees, especially for those who are below band 8. This

result matches what was recognised by the interviewees about the lack of training and development for all employees as a concern about implementing TQM in the company, as illustrated in Table 4.2. Moreover, some of the interviewees highlighted the lack of training for lower band workers as a main concern about implementing TQM in the company.

Table D shows that around 50% of the respondents had received 2-4 salary increments during their service in the company, and around 30% had received more than four, while 20% had received one increment or had never received any increment. Most of the last category respondents were below band 8. These results alert the company management to a serious concern about the lower band workers' status in the company, and their lack of satisfaction with both training and salary. The employees of below band 8 are not being treated as fairly as the employees of band 8 and above. Slack, *et al*.(2010) stated, in the TQM literature, that TQM basically entails totality, which necessitates involvement and satisfaction of all employees in the organisation, in order for them to be able to satisfy the client. The company management is required to provide more training programmes and salary increments for all employees, and ensure fair treatment for all employees in the company.

Finally, Table D shows that around 66% of the respondents expected to change their jobs in the near future. This could reflect a lack of employees' satisfaction in their career. Lack of employees' satisfaction was also recognised by the interviewees as an impediment to implementing TQM in the company, according to Table 4.2. This matches what has been said, in the literature about TQM in construction, by Vora

(2004) who argued that, if employees are not sufficiently looked after through trust and care, they cannot be expected to demonstrate the same towards customers. Moreover, TQM implementation necessitates the centrality of employees and their satisfaction is required to attain continuous improvement as part of TQM implementation in the company. In the same context, Bou and Beltran (2005) emphasised, in the literature about TQM in construction, that employees' involvement in the attainment of continuous improvement is related to their job satisfaction level.

Chapter Five

Conclusion and Recommendations

- **5.1 Research Conclusion**
- **5.2 Recommendations**
- **5.3 Research Limitations and Boundaries**
- **5.4 Recommendations for Future Research**

Chapter 5 – Conclusion and Recommendations

Based on the results and findings analysis and discussion in chapter 4, the aims of this chapter are to: (1) draw a conclusion about the research; (2) suggest practical and realistic recommendations to assist and facilitate the adoption of TQM in the company considered for this study and similar companies in the construction industry; (3) review the research limitations and boundaries; (4) give directions for future research.

5.1 Research Conclusion

Based on the results analysis and discussion in chapter 4, summary of the research findings is presented as follows:

Conclusion of objective 1: identified CSFs for TQM implementation in the company

After analysing the results of the research, the most recognised CSFs for TQM implementation, to be incorporated in the company are: (1) process approach; (2) employees involvement and training; (3) employees education (3) employees' satisfaction in career, salary and professional development; (4) leadership skills; (5) organisational learning and knowledge management.

Conclusion of objective 2: identified concerns about TQM implementation in the company

The most recognised concerns serving as obstacles to implementing TQM in the company are: (1) insufficient training and professional development for employees, especially for lower band workers; (2) lack of employees' satisfaction with career, salary, professional development and the work setting; (3) conflict between employees and management as to issues of quality problems in the company, and the internal cultural issues of the company; (4) lack of managerial skills of motivation, delegation of decision making, teamwork, communication and coordination; (5) the nature of construction projects; transient, variable and fast track.

Conclusion of objective 3: identified benefits of implementing TQM in the company

Benefits of implementing TQM in the company are: (1) reduced rework and cost saving; (2) improved job and staff quality, improved safety and productivity; (3) winning new tenders and projects.

Based on this summary of the research findings, recommendations to assist the adoption of TQM in the company considered for this study and similar companies in the construction industry are suggested in 5.2

5.2 Recommendations for the Company under Study and Similar Companies in the Construction Industry

It has been concluded from chapter 4 that the main intra-organisational concerns about implementing TQM in the company are related to: (1) the level of training and development of the entire staff in the company; (2) the level of employees' satisfaction in career, salary, professional development and the work setting; (3) the conflict between the employees and management, and the internal cultural issues of the company; (4) the lack of managerial skills of decision making, motivation, delegation of decision making, teamwork, communication and coordination. Based on these concerns about TQM, the following recommendations are suggested for the company considered for this study: (1) to enhance training and professional development for all employees, including lower band workers; (2) to enhance promotions and salary increments for all employees including lower band workers; (3) to improve facilities, and all administrative, financial and personal satisfaction factors for all employees, in order to increase the individual and group satisfaction level in the company, which would support TQM adoption in the company significantly; (4) a change in the organisation culture to support trust, teamwork and collaboration among employees themselves, and between employees and management; moreover, to include everyone in TQM, and to ensure everyone's satisfaction in career, salary, professional development and the entire work setting. This would enhance employees' loyalty to the company; (5) increase the number of seminars and workshops on various technical and managerial topics and skills for all employees to enhance their level of awareness, education and to (6) improve the

different managerial skills of teamwork, motivation, delegation, communication and coordination for all employees.

The researcher then reviewed these recommendations with the management. The management agreed with them, and promised to form action plans to attain continuous training and professional development for the entire staff and employees at all levels; improve the employees' satisfaction in career, salary, professional development and the entire work setting. The management also suggested further recommendations to assist the adoption of TQM in the company: (1) enforcement of procedures and rules by the company's owners and CEOs; (2) attaining continuous training and professional development for the entire management, staff and employees at all levels, including the staff of the quality management and quality department; (3) enhancement of the Quality Control (QC) department's role in the company by reporting to the area management, a formed committee or the head office management, besides reporting to the projects' management; (4) developing a rewarding/ accountability system by the quality department, to be linked with human resources; (5) measuring the cost of quality by using a quality index, which involves rework and defects; (6) focus on lessons learned at the end of every project, in order to improve the quality aspects in future projects; (7) investigating the various problems of quality, and measuring the staff's performance by developing and using Key Performance Indicators (KPIs), in order to improve the entire staff's performance in the future; (8) conducting internal quality meetings within the company, and external quality meetings between the company and the client; (9) enforcement of compliance with quality and safety standards, by having implications

of non-implementation, and issuing reports of violation by QA/QC inspectors, safety officers, internal and external quality and safety audits; (10) developing a framework for TQM implementation as follows: (a) set out the TQM objectives; (b) examine the implementation of objectives; (c) compare performance to objectives to spot the shortfalls; (d) modify the system to incorporate TQM as seamlessly as possible, provided that substantial system is already in place. This is through few modifications to ensure quick implementation with minimum cost, however, the management gains the required information and output results; (11) learning from successful models and examples, and trying to apply them to the company; (12) enhancement of employees' awareness and education through various internal and external seminars and workshops; (13) explaining what is required, and gaining feedback from people to find out what can be done; (14) staff involvement, clarity about requirements, publishing and distribution of requirements, and (15) designating specialists in TQM. Furthermore, one manager stated: "Management should establish a culture of performance enhancement among employees. This may be achieved by: (1) setting objectives at all levels of the organisation; (2) recognition and reward for achievement of improvement. Continual Improvement is a state of mind that continually forces employees to search and close the gap between desired results and achieved results". Such recommendations may also be applicable to similar companies in the construction industry.

5.3 Research Limitations and Boundaries

The outcomes of this research are company specific and cannot be generalized for the entire construction sector. However, some guidelines concluded from the study can still be applied at a broader level. Another research limitation is that some of the participants from management level refused to disclose business information and documents they considered as confidential. In addition, the researcher could not conduct interviews with all disciplines' and departments' managers and staff as was planned. Some of those managers were not available. Others could not participate due to either work load or time schedule. One example is the interview with a representative from the Human Resources (HR) department. This interview was not conducted; the HR manager could not take part due to his work load and full time schedule. Another HR representative was not available. A third one refused to take part in the research. The questionnaire was conducted on a relatively small sample of employees, furthermore, some of the employees refused to respond to the questionnaire because they did not feel comfortable with it. In addition, there might have been some participant employees who did not feel comfortable while answering, which might have affected the transparency of their response. There is a concern about covering as representatively as possible different characteristics of employees such as work band. This might have affected the precision and accuracy of the questionnaire results. Due to the non-feasibility of interviewing people in different projects and different countries, the research was conducted in only one of the company's projects; therefore, the interviewees might have been affected by the situation specific to that project. Consequently, the results might not reflect the

whole company, although the research aimed at investigating key issues of TQM in the entire company and most of the interviewees had worked in many projects for the company and experienced different issues of quality in those projects. Another limitation was the non-feasibility and difficulty of conducting interviews with external parties such as clients, suppliers, subcontractors and other stakeholders, due to constraints of time and resources. For this reason, it was decided to explore and investigate only the intra-organisational issues of TQM implementation in the company.

5.4 Recommendations for Future Research

Future research can be conducted about TQM implementation in the same construction company at a broader level, to explore and investigate the external issues outside the company, which are within the macro and micro environment of the company. Such issues are related to governments, clients, suppliers, competitors, third party and subcontractors, besides the political, economic, social and environmental factors within which the construction company operates. Furthermore, future research can investigate issues of TQM in different projects of the company in different countries.

APPENDIX

Appendix A-Interview Questions

1- To what extent is TQM currently implemented and used in the company?
2- How does the company currently practise TQM and what tools are used to assist the company in doing so?
3- What are the methods currently used to measure the performance of TQM in the company?
4- What are the possible factors that may facilitate the successful implementation of TQM in the company?
5- What are the possible concerns serving as obstacles to implementing TQM in the company?
6- What are the anticipated benefits of implementing TQM in the company?
7- Are employees aware of the aspects of TQM?
8- How can HR be linked with TQM to measure the performance of TQM through staff appraisal and to attain continuous improvement?
9- What would be appropriate performance measures of TQM?
10- To what extent can TQM be successfully implemented in the company?
11- How can a framework be developed for TQM implementation in the company projects?

Appendix B-Questionnaire

Thank you for your interest in taking part of this study. This questionnaire forms part of an MBA dissertation project at the University of Hull to explore and investigate the critical success factors, concerns and benefit of implementing Total Quality Management (TQM) in your company, and subsequently to propose recommendations to assist the adoption of TQM in the company. As part of TQM implementation, employees' awareness of quality, teamwork and job satisfaction are investigated in this questionnaire. Data collected will be used solely for the study purpose. Your feedback will be treated anonymously. Your participation is very important to us. If you feel uncomfortable answering any questions, you may withdraw from the questionnaire at any point.

SECTION A – General Information

1. Age:
2. Place of permanent residence:
3. Job title:
4. Number of years you have been working for the company:
5. Employee's background:
6. Employee's work band:
   a. below band 5
   b. band 5-7
   c. band 8-10
   d. above band 10

SECTION B – Employees' awareness of quality information

7. To what extent do you think maintaining quality of work is important to do the work considering the time line of the project:
   a. Very important to do the work right from the start and once
   b. Important but not at the expense of the task's completion time
   c. Timely delivery of tasks is the key factor
8. How do you assess management instructions in the context of question 7 above:
   a. Supporting point a
   b. Supporting point b
   c. Supporting point c

SECTION C – Teamwork experience information

9. Team benefits are more important than individual rewards.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree
10. Team success is more important than individual success.
   a. Strongly Agree
   b. Agree
   c. Neither Agree or Disagree
   d. Disagree
   e. Strongly Disagree

11. Individuals may be expected to give up their goals to benefit team success.
    a. Strongly Agree
    b. Agree
    c. Neither Agree or Disagree
    d. Disagree
    e. Strongly Disagree
12. Being accepted by the members of your task team is very important.
    a. Strongly Agree
    b. Agree
    c. Neither Agree or Disagree
    d. Disagree
    e. Strongly Disagree

SECTION D – Employees' job satisfaction information

13. How do you assess management fulfilment of employees' administrative and financial needs?
    a. Full care and responsibility are exhibited to fulfil employees' needs on time if possible
    b. Applications are dealt with according to the company's rules and procedures regardless of the time factor
    c. Priority is given to the company's interest in dealing with such applications

14. How do you assess management fulfilment of employees' personal needs?
    a. Full care and responsibility are exhibited to fulfil employees' personal needs on time if possible
    b. Applications are dealt with according to the company's rules and procedures regardless the time factor
    c. Priority is given to the company's interest in dealing with such applications
15. Do you feel that you are being appreciated and rewarded the more years you spend working for the company?
    a. Yes
    b. Sometimes
    c. No
16. If your supervisor at work asked you to accomplish an urgent task that required spending extra time, how would you deal with such a request?
    a. Immediate response and execution of the task with full satisfaction
    b. Execution of the task provided that you are rewarded for the extra time
    c. Execution of the task, but feeling obliged and dissatisfied
    d. Refusal to execute the task beyond the formal working hours
17. How many times have you received training and development in the different fields of work during your service in the company:
    a. Never
    b. Once
    c. 2 to 4
    d. More than 4

18. How many times have you received a promotion and/or salary increment during your service in the company?
    a. Never
    b. Once
    c. 2 to 4
    d. More than 4
19. How do you assess the different services and facilities provided by the company to its employees?
    a. Excellent
    b. Very good
    c. Fair
    d. Poor
    e. Very poor
20. How do you assess the company's policy towards teamwork, communication and coordination between members of the project?
    a. Excellent
    b. Very good
    c. Fair
    d. Poor
    e. Very poor
21. Do you expect to change your current job in the near future?
    a. Yes
    b. No

Appendix C- Research Ethics Form

Appendix C

A PROFORMA FOR

STAFF AND STUDENTS BEGINNING A RESEARCH PROJECT

HULL UNIVERSITY BUSINESS SCHOOL

This proforma should be completed by all staff and research students undertaking a research project and by taught students undertaking a research project as part of a taught module.

Part A (compulsory)

Research Proposer(s): Mazin Mahmoud
Programme of Study: MBA
Research (Working Dissertation/Thesis) Title: Key issues of Total Quality Management (TQM) implementation in Construction industry & case study
Research (brief): The overall aim of this study is to explore and investigate the intra-organisational issues of TQM implementation within a Construction Company and subsequently, to propose recommendations to assist the adoption of TQM in the Company. A case study is used in this research to address the key issues of TQM. This carried out through 1- interviews with management 2- questionnaire for employees 3- accessing Company's data
Proforma Completion Date: 5/7/2011

Tick and sign by one of the following statements:

☐ 1) I confirm that *human participants are not involved in my research and no ethical considerations are envisaged.*

Signature of researcher.....

☑ 2) Human participants are involved in my research and/or there are other ethical considerations in my research.

Signature of researcher.....

If statement 1 is ticked and signed, there is no need to proceed further with this proforma, and research may proceed now.

If statement 2 is ticked and signed the researcher should complete part B of this proforma.

Part B

This proforma should be read in conjunction with the HUBS Principles for Ethics in Research and the HUBS flow chart of ethical consideration of proposals. It should be completed by the researchers. It should be sent on completion, together with a brief (maximum one page) summary of the issues/problems in the research (and how they are proposed to be dealt with), for approval to the Chair of the HUBS Research Ethics Committee (or nominated Committee member) or in the case of research being completed as part of a taught module to the student's supervisor or module leader prior to the beginning of any research.

NOTE

If this research has a research population of those under 18 years of age it requires specific authorisation, including that from authorities outside the University. It should not proceed until such authorisation has been obtained.

1. Will you obtain written informed consent from the participants? Y (Y/N)
   If yes, please include a copy of the information letter requesting consent. In the case of electronic surveys it is acceptable to advise participants that completion of the survey constitutes consent. Please provide a printout of the survey template.
   If no, the research should not proceed unless you can specifically satisfy the Research Ethics Committee with the measures you will take to deal with this matter.

2. Has there been any withholding of disclosure of information regarding the research/teaching to the participants? N (Y/N)
   If yes, please describe the measures you have taken to deal with this.

3. Issues for participants. P*lease answer the following and state how you will manage perceived risks if any answer is YES:*

a)	Do any aspects of the study pose a possible risk to participants' physical well-being (e.g. use of substances such as alcohol or extreme situations such as sleep deprivation)?	YES	(NO)
b)	Are there any aspects of the study that participants might find humiliating, embarrassing, ego-threatening, in conflict with their values, or be otherwise emotionally upsetting?*	YES	(NO)
c)	Are there any aspects of the study that might threaten participants' privacy (e.g. questions of a very personal nature; observation of individuals in situations which are not obviously 'public')?*	YES	(NO)
d)	Does the study require access to confidential sources of information (e.g. medical records)?	YES	(NO)
e	Could the intended participants for the study be expected to be more than usually emotionally vulnerable (e.g. medical patients, bereaved individuals)?	YES	(NO)
f	Will the study take place in a setting other than the University campus or residential buildings?	(YES)	NO
g	Will the intended participants of the study be individuals who are not members of the University community?	(YES)	NO

*Note: if the intended participants are of a different social, racial, cultural, age or sex group to the researcher(s) and there is **any** doubt about the possible impact of the planned procedures, then opinion should be sought from members of the relevant group.

4. Might conducting the study expose the researcher to any risks (e.g. collecting data in potentially dangerous environments)? YES (NO)
Explain your method of dealing with this.

5. Is the research being conducted on a group culturally different from the researcher/student/supervisors? N Y/(N)
If yes, are sensitivities and problems likely to arise? Y/N?
If yes, please *describe how you have addressed/will address them.*

6. Does the research/teaching conflict with any of the HUBS's research principles? N Y/(N)
If YES do not proceed, for the Research Ethics Committee describe what action you have taken to address this?

7. If the research/teaching requires the consent of any organisation, have you obtained it? Y
(Y)/N
If NO do not proceed, for the Research Ethics Committee describe what action you have taken to *overcome this problem.*

8. Have you needed to discuss the likelihood of ethical problems with this research with an informed colleague? N Y/(N)
If yes, please name the colleague and provide the date and results of the discussion.

Thank you for completing this proforma. This form must be signed by you, your supervisor/colleague and the HUBS Research Ethics Committee representative for your area or in the case of students undertaking research as part of a taught module, by you and your supervisor or module leader. Once signed, staff and research students should send copies of this form, and the proposal must be sent to the Secretary of the Research Ethics Committee, Hull University Business School (see flow chart), including where possible examples of letters describing the purposes and implications of the research, and any Consent Forms (see appendices).

Name of Researcher/Student ..Mazin Mahmoud.....

Signature ..... Date 5/7/2011

Name of Supervisor/Colleague/Module leader .....

Signature ..... Date 8 July 2011

For proformas completed by staff and research students only:

Name of Research Ethics Committee member .....

Signature ..... Date .....

For proformas relating to research funded by grants, please complete the following:

pFact no: .....

RAR no: .....

Funder/sponsor.....

Appendix D- Interviewee Consent Form

Participant Consent Form

Title of research project: Key issues of Total Quality Management (TQM) implementation in construction industry: Case Study

Name of researcher: Mazin Mahmoud

Supervisor: Dr Zhichang Zhu

Please put a cross (X) in the box if you agree with the statement:-

1. I confirm that I understand the information explaining the above research project and I have had the opportunity to ask questions about the project. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. ☐
3. I give permission for members of the research team to have access to my responses. ☐
4. I agree for the data collected from me to be used in future research ☐
5. I agree to take part in the above research project. ☐

Name of Participant:

Company:

Position:

Date:

Appendix E- Questionnaire Results

Section A: Characteristics of the Respondents

Age	Frequency	Percentage
20-30	20	45.5%
31-40	15	34.1%
41-50	8	18.2%
more than 50	1	2.3%
Sum	44	100.0%
Place of Residence		
Australia	1	2.3%
Bangladish	1	2.3%
Canada	1	2.3%
Egypt	5	11.4%
India	5	11.4%
Jordan	14	31.8%
KSA	3	6.8%
Lebanon	5	11.4%
Pakistan	1	2.3%
Philippines	7	15.9%
UK	1	2.3%
sum	44	100.0%

Table A-1: Respondents' age and place of residence

Work Band	Frequency	Percentage
below band 5	2	4.5%
band 5 - 7	11	25.0%
band 8 - 10	27	61.4%
above band 10	4	9.1%
sum	44	100.0%

Table A-2: Respondents' job title and experience

Job Title	Frequency	Percentage
Project Engineer	4	9.1%
Section Engineer	4	9.1%
Engineer	19	43.2%
QC Inspector	2	4.5%
Superintendent	1	2.3%
Supervisor	3	6.8%
Foreman	1	2.3%
Charge Hand	4	9.1%
Draftsman	2	4.5%
Technician	2	4.5%
Operator	1	2.3%
Assistant	1	2.3%
sum	44	100.0%
Experience		
less than 3 years	6	13.6%
3-6 years	23	52.3%
7-10 years	6	13.6%
more than 10 years	6	13.6%
blank	3	6.8%
sum	44	100.0%

Table A-3: Respondents' work band

Section B: Employees' Awareness of Quality Results

Q7	To what extent do you think maintaining quality of work is important to do the work considering the time line of the project:		
No	**statement**	**Frequency**	**Percentage**
a	Very important to do the work right from the start and once	36	81.8%
b	Important but not at the expense of the task's completion time	8	18.2%
c	Timely delivery of tasks is the key factor	0	0.0%
sum		44	100.0%

Q8	How do you assess management instructions in the context of Q.7:		
No	**statement**	**Frequency**	**Percentage**
a	supporting point a	25	56.8%
b	supporting point b	13	29.5%
c	supporting point c	6	13.6%
sum		44	100.0%

Table B: Employees' awareness of quality results

Section C: Teamwork Experience Results

Q.9	Team benefits are more important than individual rewards		
No	statement	Frequency	percentage
a	strongly agree	17	38.6%
b	agree	18	40.9%
c	neither agree nor disagree	7	15.9%
d	disagree	2	4.5%
e	strongly disagree	0	0.0%
sum		44	100.0%

Q.10	Team success is more important than individual success		
No	statement	Frequency	percentage
a	strongly agree	20	45.5%
b	agree	18	40.9%
c	neither agree nor disagree	5	11.4%
d	disagree	1	2.3%
e	strongly disagree		0.0%
sum		44	100.0%

Q.11	Individuals may be expected to give up their goals to benefit team success		
No	statement	Frequency	percentage
a	strongly agree	6	13.6%
b	agree	18	40.9%
c	neither agree nor disagree	13	29.5%
d	disagree	6	13.6%
e	strongly disagree	1	2.3%
sum		44	100.0%

Q.12	Being accepted by the members of your task team is very important		
No	statement	Frequency	percentage
a	strongly agree	20	45.5%
b	agree	22	50.0%
c	neither agree nor disagree	1	2.3%
d	disagree	0	0.0%
e	strongly disagree	1	2.3%
sum		44	100.0%

Table C: Teamwork experience results

Section D: Employees' Job Satisfaction Results

Q.13	How do you assess management fulfilment of employees' administrative and financial needs?		
No	statement	Frequency	Percentage
a	Full care and responsibility are exhibited to fulfil employees' needs on time if possible	14	31.8%
b	Applications are dealt with according to the company's rules and procedures regardless of the time factor	22	50.0%
c	Priority is given to the company's interest in dealing with such applications	8	18.2%
sum		44	100.0%

Q.14	How do you assess management fulfilment of employees' personal needs?		
No	statement	Frequency	Percentage
a	Full care and responsibility are exhibited to fulfil employees' needs on time if possible	11	25.0%
b	Applications are dealt with according to the company's rules and procedures regardless the time factor	22	50.0%
c	Priority is given to the company's interest in dealing with such applications	11	25.0%
sum		44	100.0%

Q.15	Do you feel that you are being appreciated and rewarded the more years you spend working for the company?		
No	statement	Frequency	Percentage
a	yes	18	40.9%
b	sometimes	20	45.5%
c	no	5	11.4%
d	blank	1	2.3%
sum		44	100.0%

Q.16	If your supervisor at work asked you to accomplish an urgent task that required spending extra time, how would you deal with such a request?		
No	statement	Frequency	Percentage
a	Immediate response and execution of the task with full satisfaction	28	63.6%
b	Execution of the task provided that you are rewarded for the extra time	7	15.9%
c	Execution of the task, but feeling obliged and dissatisfied	5	11.4%
d	Refusal to execute the task beyond the formal working hours	3	6.8%
e	blank	1	2.3%
sum		44	100.0%

Q.17	How many times have you received training and development in the different fields of work during your service in the company:		
No	statement	Frequency	Percentage
a	Never	10	22.7%
b	Once	5	11.4%
c	2 to 4	17	38.6%
d	More than 4	11	25.0%
e	blank	1	2.3%
sum		44	100.0%

Q.18	How many times have you received a promotion and/or salary increment during your service in the company:		
No	statement	Frequency	Percentage
a	Never	3	6.8%
b	Once	6	13.6%
c	2 to 4	21	47.7%
d	More than 4	13	29.5%
e	blank	1	2.3%
sum		44	100.0%

Q.19	How do you assess the different services and facilities provided by the company to its employees?		
No	statement	Frequency	Percentage
a	Excellent	8	18.2%
b	Very good	16	36.4%
c	Fair	17	38.6%
d	Poor	3	6.8%
e	Very poor	0	0.0%
sum		44	100.0%
Q.20	How do you assess the company's policy towards teamwork, communication and coordination between members of the project?		
No	statement	Frequency	Percentage
a	Excellent	7	15.9%
b	Very good	17	38.6%
c	Fair	15	34.1%
d	Poor	3	6.8%
e	Very poor	2	4.5%
sum		44	100.0%
Q.21	Do you expect to change your current job in the near future?		
No	statement	Frequency	Percentage
a	Yes	29	65.9%
b	No	15	34.1%
sum		44	100.0%

Table D: Employees' job satisfaction results

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