

The Adoption of Total Quality Management (TQM) in Dubai Manufacturing Firms

Majed S. Smadi and Khleef A. Al-Khawaldeh

ABSTRACT

With the increasing competition in today's business environment, firms are keen to seek every opportunity to improve their business results. TQM has been a widely applied process for improving competitiveness around the world. Many organizations claim to "have TQM". This study attempted to develop a generic framework that can be used by the management and industrial practitioners to self-assess TQM implementation and initiatives in their firms, and also, to self-assess and the extent to which firms indeed "have TQM". Such a framework can be effectively used by management to obtain a better understanding of their efforts toward TQM implementation, and to spot areas that must be targeted by managers for improvement to help the organization in its quality mission and in identifying the level of training needed. The framework incorporated, interpreted and operationalized the implicit concepts of TQM as proposed by TQM gurus, national and international quality awards and three famous studies among the vast TQM literature. The reliability and validity of the proposed framework were tested and validated using the data obtained from 126 manufacturing firms working in Dubai – United Arab Emirates (UAE). The results indicated that manufacturing firms in Dubai moderately adopt the constructs of TQM and there are no significant differences in TQM implementation among these firms according to their characteristics. The study showed clear patterns where firms stress certain TQM practices as; flexible manufacturing, employee empowerment and leadership, but they ignore other Practices like customer focus and benchmarking. The importance of behavioral practices that are not implemented was highlighted in order to be taken as a serious signal by management.

KEYWORDS: Total Quality Management, Quality, Management, Manufacturing Firms, Dubai.

1. INTRODUCTION

Total Quality Management (TQM) is considered to be an important management philosophy as well as a set of guiding principles and practices that address not only the management of quality but also the quality of management, which sustains the organizations in their efforts towards quality improvement and satisfying customers, internally and externally (Deming, 1986). TQM has been widely implemented throughout the

world. Many firms have arrived at a conclusion that effective TQM implementation can improve their competitive stability and provide strategic advantages for them in the market place (Anderson *et al.*, 1994; Mele and Colurcio, 2006; and Bhat, 2006).

TQM has been acknowledged as an important subject in management theory and practices during the last decades. The use of TQM among many Western organizations has been relatively high during the 1990s (Lawler *et al.*, 1995; and Sun *et al.*, 2004) and the literature is full of prescriptions that offer various remedies to improve the quality products. Such remedies range from behavioral approaches emphasizing teamwork

Received on 28/12/2005 and Accepted for Publication on 10/10/2006.

and participative management, to technical approaches using statistical techniques, both to control the processes and design of experiments that identify the critical factors affecting quality. Researchers advise that the integration of TQM philosophy and methods is the success factor behind enhancing quality performance (Hurang and Chen, 2002). There is less agreement as to what the primary constructs of TQM are, or what the overall concept of TQM concepts is. No uniform view to TQM exists today and TQM has come to mean the different things to the different people (Rahman and Sohal, 2002), one of the most influential factors in ensuring TQM adoption's success is the formulation of a sound implementation framework prior to embarking on such a change process (Yusof and Aspinwall, 2000).

Dubai has changed dramatically over the last three decades, becoming a major business center with a more dynamic and diversified economy. Dubai enjoys a strategic location and serves as the biggest re-exporting centre in the Middle East. Its low logistical and operational costs and excellent infrastructure, international outlook and liberal government policies are attracting investors in a remarkable way. Activities such as trade, transport, tourism, industry and finance have shown steady growth and helped the economy to achieve a high degree of expansion and diversification.

At the country level, the manufacturing sector in Dubai is considered a driving force of industrial development in the United Arab Emirates (UAE). This sector produces annually more than 25% of the country's manufactured goods. At the Emirate level, the manufacturing sector represents an important element of a diversified economic base. Since 1992, the sector witnessed a rise in its contribution to the Emirate's Gross Domestic Product (GDP) (Shalhoub and Al Qasimi, 2004).

Although great efforts have been made by Dubai government to stimulate firms to implement TQM and improve product quality, there have not been any empirical investigations to capture progress. A number of quality management issues still remain ambiguous. After reviewing the literature related to Dubai quality

management, it became very clear that little empirical research has been conducted in the area of TQM implementation in Dubai manufacturing firms. The current situation of TQM implementation in manufacturing firms still remains unclear. Due to the lack of empirical studies in the field of TQM, it is difficult for managers to obtain sufficient information that helps them support their TQM implementation practices. In order to bridge the gap and provide these firms with practical assistance in the area of TQM implementation, this research aimed at identifying TQM implementation constructs, developing a generic framework for measuring these constructs, and empirically validating the framework using data from Dubai manufacturing firms. Researchers will be thus able to use this framework for developing quality management implications related to Dubai manufacturing firms. Also, Dubai industrial practitioners will be able to use this framework as a tool to evaluate the status of their TQM implementation so as to target improvement areas.

This framework is based on interpreting and operationalizing TQM philosophies from TQM gurus (such as: Deming, Juran, Crosby), national and international excellence awards (such as Baldrige Award, Deming Prize, King Abdullah II Award for Excellence, and Dubai Quality Award) as well as three of the principal models from previous literature dealing with empirically validated scales for integrated quality management (Saraph *et al.*, 1989; Flynn *et al.*, 1994; and Ahire *et al.*, 1996).

Problem Definition

Organizations' top management is questioning the lack of empirically sound models to assist in effective quality management (Baidoun and Zairi, 2003). The lack of generic validated frameworks that can be used by practitioners to assess their efforts in the journey toward TQM can be attributed to two reasons: the existing theoretical base of TQM to support research on total quality is not sufficient, and the fact that TQM is relatively a recent philosophy outside Japan (Zhang, 2000; and Thiagarajan *et al.*, 2001).

The increasing interest in quality has reached several developing countries due to globalization and other strategic reasons. Therefore, it is appropriate for studies on TQM adoption to be conducted for the benefits of the economy of these developing countries. The achievement of Dubai during the last decade has been impressive. The manufacturing sector has made the most significant contribution to the spectacular economic growth in Dubai (details are available at: www.uae.gov.ae).

However, this sector is now in a critical stage of its development. The business environment in the global market is very turbulent, reflecting keen competition both in price and other product values. Furthermore, customers from all over the world are becoming more quality conscious. The new wave of quality awareness and emphasis has given a significant impact on business operations in the world. In the year 2006, Dubai was officially recognized as the fifth quality hub of the world and the headquarters of the Middle East Quality Association (details are available at: www.arabwideweb.com).

This recognition for Dubai is a reflection of the emirate's commitment towards quality and also highlights the significant role played by the UAE in propagating Total Quality Management principles in the region. This stimulates Dubai manufacturing firms to move away from its reactive, low-cost –based strategy that relies on cheaper labor toward developing a new competitive edge based on quality. However, there are few studies about TQM adoption in Dubai manufacturing firms. This study addresses a gap in the literature by empirically investigating TQM adoption in a developing country throughout a generic proposed framework.

Study Objectives

Facts mentioned above suggest that expanding the current available knowledge of TQM adoption is a valid topic for research and still under consideration. This is essential for the benefits of developing economics in particular. Theoretically, the main objective of this study is constructing a generic framework for TQM adoption in order to provide managers and practitioners with

guidelines to assess their efforts in adopting TQM. Empirically, the study aims at:

1. Examining the extent to which manufacturing firms in Dubai adopt TQM.
2. Investigating if there are significant differences in the level of TQM adoption among these firms.

Hypotheses and Operational Definitions

In order to achieve the study objectives, the following main hypotheses and their sub-hypotheses were developed and tested:

HO1: Manufacturing firms in Dubai don't adopt the constructs of TQM.

Ho (1-1): Manufacturing firms in Dubai don't adopt Continuous Improvement (CI).

Ho (1-2): Manufacturing firms in Dubai don't adopt Vision and Plan Statement (VPS).

Ho (1-3): Manufacturing firms in Dubai don't adopt Customer Focus (CF).

Ho (1-4): Manufacturing firms in Dubai don't adopt Leadership (L).

Ho (1-5): Manufacturing firms in Dubai don't adopt Employee Empowerment (EE).

Ho (1-6): Manufacturing firms in Dubai don't adopt Zero Defect Mentality (ZDM).

Ho (1-7): Manufacturing firms in Dubai don't adopt Benchmarking (B).

Ho (1-8): Manufacturing firms in Dubai don't adopt Flexible Manufacturing (FM).

Ho (1-9): Manufacturing firms in Dubai don't adopt Evaluation And Measurements (EAM).

Ho (1-10): Manufacturing firms in Dubai don't adopt Education And Training (EAT).

HO2: There are no significant differences in TQM implementation among manufacturing firms in Dubai.

Ho (2-1): There are no significant differences in TQM implementation among manufacturing firms in Dubai according to their establishment date.

Ho (2-2): There are no significant differences in TQM implementation among manufacturing firms in Dubai according to their capital investment.

Ho (2-3): There are no significant differences in TQM

implementation among manufacturing firms in Dubai according to their number of employees.

Operational Definitions

TQM: TQM is an approach to performing business, that attempts to maximize the competitiveness of an organization through the continual improvement of the quality of its products, services, people, processes and environment (Goetsch and Davis, 2006). TQM was measured through the extent to which firms are setting vision and plan statement focusing on customer, leading toward employee empowerment, zero defect mentality, benchmarking's best practices, adopting flexible manufacturing, institutionalizing evaluation and measurements, and education and training.

Vision and Plan Statements: Vision statement is intent to communicate the firm's values, aspirations and purpose, so that employees can make decisions that are consistent with and supportive to these objectives (Meredith and Shafer, 1999). A plan statement is a formalization of what is intended to happen at some time in the future. A plan cannot guarantee that an event will actually happen; it is a statement of intention that "will happen" (Slack *et al.*, 1995). Vision and plan statements were measured through asking questions regarding: having a clear documented long-term vision statement; vision statement should effectively encourage employee commitment to quality issues; having a clear documented quality policy and detailed quality goals; having a clear short-term organizational performance plan; and the ability of various policies and plans to be well communicated to the employees.

Leadership: Leadership is the ability of top management to establish, practice, and lead a long-term vision for the firm, driven by changing customer requirements, as opposed to an internal management control role exemplified by clarity of vision, long-term orientation, coaching management style, participative change, employee empowerment, and planning and implementing organizational change (Anderson *et al.*,

1994). Leadership is the ability to inspire confidence and support among those needed to achieve organizational goals (DuBrin, 1995). Leadership was measured through asking questions regarding: top management commitment to quality improvement as a way to increase competitiveness; top management active participation in quality management activities, forums and conferences; top management encouragement for employee involvement in quality management activities; discussions of quality-related issues in top management meetings; and top management pursuing of long-term business success.

Customer Focus: Customer focus is the efforts toward making customer satisfaction the top priority in the organization. Total Quality Management cannot exist without a strong customer focus. Systems and processes devoted to acquiring the customers' needs, desires and perspectives must be in place to assure continued customer satisfaction (Heizer and Render, 2001). Customer focus was measured through asking questions regarding: seeking customer inputs to determine their requirements and using them as the basis criteria of product quality; and encouraging direct personal contact with customers and involving customers in the design of the product.

Zero Defect Mentality: zero defect mentality is a system in place to spot defects as they occur, rather than through inspection and rework (Powel, 1995). Zero defect mentality was measured through asking questions regarding: the existence of an announced goal of zero-defects in the firm as well as an ongoing program for reduction of defects; and the existence of a plan for the reduction of rework drastically and designing processes to be "fool proof" in order to minimize the chance of employee error.

Benchmarking: Benchmarking is the continuous process of measuring products, services, and practices against those of the toughest competitors or leading firms (DuBrin, 1995). Benchmarking was measured through asking questions regarding: the existence of an active

competitive benchmarking program; firm efforts to research best practices of other organizations; and regular visits to other organizations to investigate best practices.

Flexible Manufacturing: Flexible manufacturing involves applying Just-In-Time (JIT) inventory system, adopting manufacturing cells, and using statistical process control (Womack *et al.*, 1990). Flexible manufacturing was measured through asking questions regarding: the tendency to apply Just-In-Time (JIT) inventory system; adopting manufacturing cells rather than straight manufacturing lines; conducting process capability studies; and using statistical process control heavily in the firm.

Evaluation and Measurements: Evaluation and measurements are systematic examination of the extent to which an entity is capable of fulfilling specified requirements (Zhang, 2000). Evaluation and measurements were measured through asking questions regarding: firm usage of charts and graphs to measure and monitor quality; using statistical methods extensively to audit various business strategies; regularly conducting quality audits; using quality-related costs extensively; and setting the aims of evaluation to be for improvement rather than criticism.

Continuous Improvement: Continuous improvement is a never-ending process of improvement for streamlining processes, simplifying procedures, activating communications, enhancing employee skills, and improving customer satisfaction (Feigenbaum, 1991). Continuous improvement was measured through asking questions regarding: adoption of a program to reduce order-processing cycle; efforts toward minimizing paper work in the firm; adoption of a program to develop effective communications between employees; adoption of a program to develop employee's conflict resolution skills; and analyzing customers' requirements in the product development phase.

Employee Empowerment: Employee empowerment

is giving workers the training and authority they need in order to manage their own jobs (Raiborn *et al.*, 1996). Employee empowerment was measured through asking questions regarding: the existence of an active employee suggestion system; giving employees the authority to prepare and maintain the machines they use; giving them the right to analyze data obtained in their job; releasing pressure for short-term results; and making them able to interact effectively with customers and suppliers.

Education and Training: Education and training means providing all employees with information, knowledge and skills in both Total Quality concepts and tools, and with job specific information so that they can be committed, innovative, and productive (Ishikawa, 1985). Education and training were measured through asking questions regarding: adoption of a program for training management and employee in quality-related matters; training and supporting teamwork skills at different managerial levels; educating and training supervisors in statistical improvement techniques; and encouraging employees to accept continuous training.

2. CONCEPTUAL FRAMEWORK

A review of literature was carried out to identify the concept of TQM from quality gurus such as Deming (1996), Juran (1993), Crosby (1979), Feigenbaum (1991), and Ishikawa (1985). Their propositions form the foundation for understanding the concept of TQM. It has become evident that each has his own distinctive approach. Nevertheless, the principles and practices of TQM proposed by these quality gurus present a better understanding of the concepts of TQM. Their insights still play a primary role in offering a solid foundation for conducting any study (Goetsch and Davis 2006; and Heizer and Render, 2001).

TQM Gurus

Although their approaches to TQM are not identical and reflect their perceptions (Silaand Ebrahimpour, 2003), they do share some common implicit points which

are summarized as follows:

- Quality is a systematic firm-wide activity from suppliers to customers.
- All functional activities should be involved in quality improvement efforts, and it is the management's responsibility to provide commitment, leadership, empowerment, encouragement, and the appropriate support to technical and human processes.
- They emphasized the strategy, policy, and firm-wide evaluation activities as well as the importance of employee education and training in changing employees' beliefs, behavior, and attitudes.
- In order to enhance employees' abilities in carrying out their duties, employees should be recognized and rewarded for their quality improvement efforts.
- It is very important to control the processes and improve quality system and product design. The emphasis is on prevention of product defects rather than inspection after the event took place.

Quality Awards

Worldwide, there are several national and international Quality Awards, such as the Deming Prize in Japan (1996), the European Quality Award in Europe (1994), the Malcolm Baldrige National Quality Award in the United States of America (1999), Dubai Quality Award and King Abdullah II Award for Excellence in Jordan.

Each award model is based on a perceived model of TQM (Hindawi, 1994). The award models do not focus solely on either product or service perfection or traditional quality management methods, but they consider a wide range of management activities, behavior and processes that influence the quality of the final offerings (Bhat, 2006). They provide a useful audit framework against which firms can evaluate their TQM implementation practices, seek improvement opportunities, and evaluate the end results. These quality award models provide an insight into the practical way of applying TQM, as well as a solid foundation for this research, and give a better understanding of the concept of TQM (Hackman and Wageman, 1995).

Although each award has its own unique categories and emphasis, there are some common areas such as the emphasis on the importance of leadership, human resources management, employee participation, employee education and training, process management, strategy and policy, information, supplier quality management, and customer focus.

Famous Models from Literature

In the last few years, there were many similar studies that empirically validated the constructs of TQM. On the whole, they are based on data from American firms and almost all the cases centered exclusively on one sector of manufacturing (Temtime, 2004). Among these studies there are three widely used models in literature that cannot be ignored in any study (Hansson and Klefsjo, 2003), these models were developed by Saraph *et al.* (1989) (8 constructs); Flynn *et al.* (1994) (11 constructs); and Ahire *et al.* (1996) (12 constructs). Ahire *et al.* (1996) strongly recommended that any study should make use of the combination of these three frameworks.

Therefore, the proposed TQM framework, as seen in Figure (1), covers a broader scope of TQM in comparison with their frameworks. In general, TQM gurus, quality awards, key previous studies consent that TQM is a managerial philosophy for continuously improving firm's, business throughout setting vision and plan statement, focusing on customer, leading toward employee empowerment, zero defect mentality, benchmarking's best practices, adopting flexible manufacturing, instituting evaluation and measurements systems, and education and training. Accordingly, this study focused on the following TQM constructs: Continuous Improvement (CI), Vision and Plan Statement (VPS), Customer Focus (CF), Leadership (L), Employee Empowerment (EE), Zero Defect Mentality (ZDM), Benchmarking (B), Flexible Manufacturing (FM), Evaluation And Measurements (EAM), Education And Training (EAT). This study also aims at investigating the degree of adoption of these constructs in the manufacturing sector of Dubai. A clear need existed for empirical studies in this field.

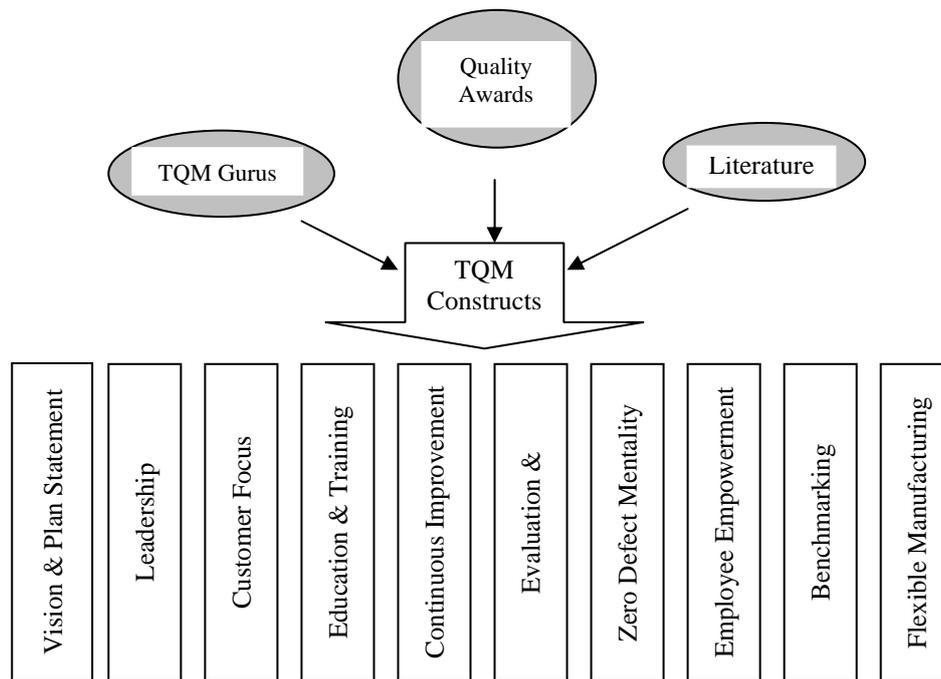


Figure 1: Constructs of TQM Framework.

3. LITERATURE REVIEW

Despite the fact that TQM literature is vast, most of the literature is heterogeneous, perceptual and not formulated on empirical basis (Dale *et al.*, 2001; Thaigarajan, 2001; Zhang, 2000; and Baidoun and Zairi, 2003), so it will be beneficial to survey some Arabic and international studies in this field.

Arabic Studies

AL-Neyadi (1999) investigated some of the facts which are related to TQM practices in the service organizations in United Arab Emirates (UAE) as one of the developing countries. The study found a significant difference in the implementation of TQM initiatives between public and private firms, and a significant correlation between the size of the firm and TQM practices.

In a study conducted on pharmaceutical industry in

Jordan, Tarawneh (1999) investigated the relationship between TQM and competition policies and competitiveness. Findings of this study showed moderate level of application of the TQM dimensions as defined by the researcher and no significant relationship between TQM and competitiveness.

Jordanian banking sector is also examined by Belbessi (2000) throughout a study aimed at identifying the relationship between the elements of TQM and the performance of these banks. The study revealed that commercial banks adopt TQM in all of its elements and these elements combined affect towards improving the institutional performance as measured by profitability.

Al-Dabal (2001) analyzed failures and success of TQM efforts and discussed a model that fits the service sector in Saudi Arabia. It was concluded that Saudi organizations should conduct a full assessment for the application of new change initiatives originating from Western countries to suit

the cultural context in Saudi Arabia

In a study on Jordanian insurance companies, Lukashah (2002) explored the extent to which TQM is implemented in the insurance sector, and he associated TQM variables with competitiveness as measured by ROI and market share. The study advised policy makers in insurance companies to be aware of TQM elements and pay more attention to satisfy customer.

Baidoun and Zairi (2003) proposed a model of TQM implementation in the Palestinian context aiming at identifying critical quality factors for effective TQM implementation. The study outcomes constructed some practical guidelines and steps for top management to deploy in their organizations.

International Studies

Terziovski (1997) studied 1341 manufacturing firms in Australia and Newzeland using ISO 9000 certification as a TQM indicator and operational and financial performance. Empirical results of this study showed negative relationship between TQM indicator and performance.

Samson and Terziovski (1999) studied 1024 manufacturing firms in Australia and Newzeland, that are extending TQM dimension to six and performance as measured by operational performance, customer's satisfaction and employee satisfaction. They found that three dimensions were positively related (leadership, human resources and customer focus), the rest are not.

Raham and Sohal (2002) reviewed and classified TQM research in Australia and suggested an agenda for future research. The researchers concluded that whatever research has been done, it is fragmented and at low level and further research is necessary to develop a conceptual underpinning and analytical models based on large empirical data.

Trying to examine the issues companies may be faced with in their attempts to embrace TQM in the service sector in Singapore, Yong and Wilkinson (2003) utilized aspects of Baldrige criterion in order to determine the progress of QM- practicing companies. In this study doubts have been raised as to whether partial

quality management-and not TQM- is being practiced in organizations.

A study conducted by Sila and Ebrahimpour (2003) on 76 empirically validated TQM factors within the context of contingency approach to make a comparison of TQM critical factors across countries, revealed that regardless of TQM gurus (Deming , Juran and Crosby) beliefs that quality management concepts are universally applicable , but this is only their personal perceptions and must be validated empirically. The findings of the study showed some "of the most commonly extracted factors" of TQM.

The study of Sun *et al* (2004) investigated the pattern or trajectory of implementing ISO 9000 versus TQM in Western Europe from a longitudinal perspective using empirical data. The results showed that European companies have put considerable efforts into ISO 9000 certification. However, the result of the planned " go beyond ISO to TQM " fell short of the anticipated extent , indicating that the adoption of TQM in Eouroe was slower than expected. The researchers concluded that how to best incorporate the standards of ISO 9000 with TQM principles remain the major tasks of quality management in the future.

Lee (2004) investigated the present status of TQM and its perception in manufacturing industries in China. The study showed that although there are few studies conducted about TQM implementation by manufacturing firms in China, TQM has recently attracted increasing interest and its programs have been widely implemented.

Kayis and Paipetis (2005) used Deming 14 points to explore the extent of TQM adoption in Australia in their research regarding validation of organizational learning models. The researchers recommended vital attributes required for creating successful learning organization in the journey of transformation toward TQM.

In the United States, Mele and Colurcio (2006) analyzed the present level of the adoption of TQM in firms, and outlined an evaluation of its evolving path using qualitative method in detailed multiple case studies on 21 firms. Findings of this study claimed that TQM was characterized by stronger and stronger cultural and

behavioral features, stressing the need for future “composite” research based on all TQM principle, elements and values.

Bhat (2006) examined the influence of the legal system of a country on the degree to which TQM is comprehensively applied, as measured by the criteria of the European Foundation for Quality Management (EFQM). The analysis found higher adoption of TQM in countries with English, German and Scandinavian legal origins than in countries with French and socialist legal origins.

As seen above, there is less agreement throughout the literature as to what the main factors of TQM are; they are not formulated on the basis of empirical research. Various quality factors are defined and identified by researchers according to their own experiences and perceptions and still no uniform or universal framework exists.

4. POPULATION AND SAMPLE OF THE STUDY

Manufacturing firms working in Dubai-UAE represent the population of this study. These firms are registered in Economic Development Department (EDD) and Dubai Chamber of Commerce and Industry according to the latest published records in 2004 with total number of (1584) firms. Manufacturing firms are clearly defined as those firms that transform raw materials or add value to a tangible product into finished goods. A stratified proportional-random sample of (300) firms representing (20%) of the whole population constitute the sample of the empirical study. The selected size of sample satisfies the statistical requirements of the representative sample (Berenson et. al., 2003). The unit of analysis in this study is the firm. The distribution of the population and sample is shown in Table (1) while Table (2) shows the characteristics of the sample according to their rigor (establishment date), capital investment in million dollars and their size (number of employees).

5. METHODOLOGY

The study utilized both primary and secondary

methods of data collection. A questionnaire consists of two parts scored on five-point Likert scale is developed and handed over to the participating firms. The first part measures TQM constructs as defined in this study while the second part collects information about the structure of the respondents firms.

The survey questionnaire was distributed to 300 firms. A follow-up questionnaire was mailed to those who had not responded about two weeks later. A third follow-up questionnaire was e-mailed to those who had not responded about three weeks later. The questionnaire was addressed to the top manager in charge of quality department. (132) responses were received representing a response rate of (44%). The validity of responses were checked by comparing the answers provided by respondents with those published in annual reports. Also, rationality is checked by negative worded questions in the questionnaire. According to that (126) questionnaires are considered usable.

Construct validity is the degree to which the empirical definition of a construct corresponds to the conceptual definition of it. For that, five experts who have published articles in the field of total quality management and Kaizen Regional Manager are consulted with the questionnaire and their remarks and directions were taken into consideration. Variables with composite measures were evaluated for their internal consistency through the Cronbach's Alpha measure. The higher the Cronbach's Alpha value is, the greater is the internal consistency of the items making up a composite measure (Litwin, 1995). The Alpha's for the constructs ranged from (0.7134) to (0.8781) as shown in Table (3). Descriptive statistics (means, standard deviations, and frequencies) were used to analyze data, and t-tests and analysis of variance (ANOVA) were used to test hypotheses.

6. RESULTS

The first main null hypothesis and its sub-hypotheses were tested using t-test. Since the questionnaire is Likert-type, the standard mean of answers is (3) then the null hypothesis will be $M < 3$ at a confidence level (95%) and

(125) degrees of freedom. The criteria for acceptance of the null hypothesis when calculated t is less or equal tabulated (t) = 1.645 and if calculated $p > 0.05$.

As shown in Table (4), the result of the test indicates that calculated “ t ” is (3.12) which is greater than the tabulated “ t ” value (1.645) at degree of freedom (125) and (95%) level of confidence, the significant of the “ t ” value is (0.009). Therefore, the main null hypothesis is rejected and the alternative hypothesis that states: “Manufacturing firms in Dubai adopt the constructs of TQM “is accepted.

The results of sub-hypothesis testing are summarized in Table (4). As can be inferred from the results, manufacturing firms in Dubai adopt all the constructs of TQM except benchmarking and customer focus. The degree of implementation to all TQM constructs together is (67.5%). Results pinpoint weakness of interest in these firms regarding the construct of benchmarking. Competitive benchmarking as a tool is not a priority for these firms, may be due to the ambiguity of the term and the lack of information on how to utilize imitation and adaptation to achieve business and competitive objectives of the firm; however, it should be conducted in order to understand competitors’ offerings. Such information will be valuable for the firm in improving product design, product quality, and service quality.

Evaluation and measurements is merely adopted (58.8%), firms find difficulties in setting out measures which are measurable, attainable, actionable, and relevant. This is the case in firms that don’t have the capability to make use of statistical methods to measure and control quality and to make regular internal auditing aligned with business strategies.

The highest percentages of adoption are in flexible manufacturing, employee empowerment and leadership. Flexible manufacturing is adopted as a strategy, given the structural constraint of limited labor supply that characterizes the UAE economy. The manufacturing sector must rely on and intensify its use of capital-intensive technology. Evidence shows that industries with more capital per worker possess highest levels of productivity among the sector's industries (Arnheiter and

Maleyff, 2005). Furthermore, the government believes that capital-intensive industries with tendency to apply Just-In-Time usually show greater growth performances related mainly to learning-by-doing effects. In the final analysis, higher growth rates in productivity mean higher future growth rates for the economy as a whole.

The role of leadership is recognized and adopted highly in these firms, especially in creating a quality planning environment that complements and facilitates the use of the tools of Total Quality Management (TQM). Such an environment encourages teamwork, communication, pride of workmanship, leadership, and continuous improvement, and emphasizes the role of the employee and the customer. Furthermore, although top management appeared to be active towards executing its quality improvement policies, the degree of reliance on using internal or external consultants to implement such policies is lacking.

The first hypothesis results illustrate clear patterns where companies stress certain TQM practices but ignore others. The importance of behavioral practices that are not implemented should be taken as a serious signal by management. Failure to incorporate these practices undermines the positive efforts they are implementing.

The second null hypothesis is tested using analysis of variance (ANOVA), it is appropriate when dealing with differences between groups (more than two). The main hypothesis is tested according to characteristics of the sample (Establishment Date, Capital Investment and Number of Employees), each characteristic has four groups. Since between groups degree of freedom is (3) ($j-1$) and within group degree of freedom is (122) ($n-j$), the null hypothesis will be accepted at a confidence level (95%) and (3.122) degrees of freedom if calculated (F) is less or equal to tabulated (F) = (2.6) and if calculated $p > 0.05$.

As shown in Table (5), The result of testing $H_0(2-1)$ shows that calculated “ F ” is (1.96) which is less than the tabulated “ F ” value (2.6) at degree of freedom (3.122) and (95%) level of confidence, also the significant of the “ F ” value is (0.12). Therefore, the null hypothesis that states “There are no significant differences in TQM

implementation among manufacturing firms in Dubai according to their establishment year” is accepted.

The result of testing H_0 (2-2) shows that calculated “F” is (0.78) which is less than the tabulated “F” value (2.6) at degree of freedom (3.122) and (95%) level of confidence, also, the significant of the “F” value is (0.632); the null hypothesis that states “There are no significant differences in TQM implementation among manufacturing firms in Dubai according to their capital investment” is accepted.

The result of testing H_0 (2-3) shows that calculated “F” is (1.04) which is less than the tabulated “F” value (2.6) at degree of freedom (3.122) and (95%) level of confidence, also, the significant of the “F” value is (0.458); the null hypothesis that states “There are no significant differences in TQM implementation among manufacturing firms in Dubai according to their number of employees” is accepted.

The study results show that there are no differences in adoption of TQM principles among manufacturing firms in Dubai according to their age, number of employees and capital. A central notion in TQM training and literature concerns the need to adopt a longer time horizons, assimilate and stabilize under the new approach (Deming, 1986). This notion suggests the logical assumption that elder firms may exceed younger firms in their adoption of TQM principles. This result contradicts the results of AL-Neyadi (1999) who found significant difference in implementation of TQM initiatives between service organizations in Dubai according to their ages. This result enhances the belief that manufacturing firms in Dubai are similar in their strategies and policies toward TQM implementation within the conditions, laws and legislations that govern the activities of these firms.

The results regarding number of employees and the capitals of these firms stress the reality that TQM philosophy, methods and tools are applicable in different scales regardless whether the firm is large or small, rich or poor. These results are consistent with the results of Powell (1995) in analyzing American manufacturing firms.

7. CONCLUSIONS

Prior to assessing the adoption of TQM in Dubai manufacturing firms, the proposed framework in this study was empirically tested and evaluated to provide managers and practitioners with a useful guideline to evaluate their efforts in implementing and creating TQM culture in their firms. By identifying areas for improvement, managers can allocate resources efficiently, targeting areas in need for improvement. The results of this study suggest that TQM is applicable to the manufacturing sector of economy. Critical factors that can determine the success of TQM are determined and an operationalized framework which can be used for internal assessment by managers is proposed.

Dubai firms’ current TQM implementation practices showed that they did not implement the full package of the TQM implementation framework. It is better to say that firms only implement part of TQM, or that they are on the journey to full implementation of TQM. Although this framework was initially developed for manufacturing firms in Dubai, firms in other countries also can use it as reference, since existing quality management knowledge was used in its development. Therefore, some principles and practices presented in this framework can be used for firms in other countries.

Implications

The proposed framework is not a universal panacea, but is only for users’ reference. Firms are different in terms of their people, culture, history, goals, structure, products, services, technologies, processes, and operating environments. In fact, implementing TQM is a continuous improvement process. It is a never-ending journey. Implementing TQM requires patience, tenacity, and commitment from people at every level in firms. It is worth noting that there are no quick fixes. It will take some time to see the effects of implementing this model. Firms should combine their own uniqueness with the developed constructs and consequently develop their own ways to excellence. Thus, firms can optimize the use of these constructs by blending it with and applying it to

their own situations, allowing their own methods to better suit their situations.

Table (1)
Population and Sample According to Categories.

	CATEGORY	Pop.	Sam.
1	Food and Beverage and Tobacco	186	37
2	Textiles, Leather and Ready-made Garment	76	15
3	Wood, Wooden Product and Furniture	181	20
4	Paper , Paper products ,Printing and Publishing	102	20
5	Chemicals ,Petroleum ,Coal, Rubber and Plastic	181	35
6	Non-metal Mineral Products	148	30
7	Basic Metal Ind.	34	7
8	Metal Products ,Machinery and Equipment	653	130
9	Other Manufacturing Ind.	23	6
TOTAL		1584	300

Table (2)
Characteristics of the Sample.

Establishment Year	2004-1994	1994-1984	1984-1974	<1974
Frequency	48	26	39	13
Capital Investment (M \$)	>5M\$	3-5 M\$	1-3 M\$	<1M\$
Frequency	39	49	26	12
Number of Employees	>150	100-150	50-100	<50
Frequency	37	40	34	15

Table (3)
Cronbach's Alpha for Study Constructs.

S.N	Construct	Alpha
1	Vision and Plan Statement	0.8202
2	Leadership	0.8157
3	Education and Training	0.7925
4	Continuous Improvement	0.8597
5	Evaluation and Measurements	0.8510
6	Zero Defect Mentality	0.7669
7	Employee Involvement	0.7134
8	Customer Focus	0.8539
9	Benchmarking	0.8781
10	Flexible Manufacturing	0.7305

Table (4)
Results of Hypotheses Testing.

TQM constructs	Mean	Degree of Implementation	s.d.	t	Sig.	The result
CI	3.43	68.6%	0.94	3.05	0.001	Rejecting the null hyp.
VPS	3.87	77.4%	0.67	4.85	0.004	Rejecting the null hyp.
CF	2.45	49.0%	0.89	1.28	0.270	Accepting the null hyp.
L	3.95	79.0%	1.26	5.45	0.000	Rejecting the null hyp
EE	3.98	79.6%	0.91	5.05	0.002	Rejecting the null hyp.
ZDM	3.43	68.6%	1.22	3.56	0.000	Rejecting the null hyp.
B	2.34	46.8%	1.01	1.46	0.090	Accepting the null hyp.
FM	4.05	81.0%	0.38	2.77	0.000	Rejecting the null hyp.
EAM	2.94	58.8%	1.81	2.07	0.007	Rejecting the null hyp.
EAT	3.32	66.4%	1.66	2.79	0.000	Rejecting the null hyp.
All TQM Constructs	3.37	67.5%	0.86	3.12	0.009	Rejecting the null hyp.

Table (5)
Results of Analysis of Variance (ANOVA).

Characteristics of the sample	Calculated f	Tabulated f	df	Sig.	result
Establishment Date	1.96	2.6	3.122	0.12	acceptance
Capital Investment	0.78	2.6	3.122	0.632	acceptance
Number of Employees	1.04	2.6	3.122	0.458	acceptance

REFERENCES

- Ahire, S. L. Golhar, D. Y. and Waller, M. A. 1996. Development and Validation of TQM Implementation Constructs. *Decision Sciences*, 27(1):23-56.
- Al-Dabal, K.M. 2001. *Total Quality Management in Saudi Arabia*. Proceeding of the Sixth Conference On Training and Managerial Development, Cairo, Egypt.
- Al-Neyadi, H. 1999. *Total Quality Management Practices in the Service Organizations in UAE*, Unpublished MBA thesis, Yarmouk University, Irbid, Jordan.
- Anderson, E. W. Fornell, C. and Lehmann, D.R. 1994. Customer Satisfaction, Market Share, and Profitability: Findings from Sweden. *Journal of Marketing*, 58:53-56.
- Arnheiter, E.D. and Maleyff, J. 2005. The Integration of Lean Management and Six Sigma", *The TQM Magazine*, 17 (1):5-18.
- Baidoun, S. and Zairi, M. 2003. A Proposed Model of TQM Implementation in the Palestinian Context". *Total Quality Management and Business Excellence*, 14:1193-1211.
- Belbissi, B. 2000. *Total Quality Management and Performance, a field Study on Commercial Banks*. Unpublished MBA thesis, University Of Jordan, Amman, Jordan.
- Berenson, M. Levine, D. and Krehbiel, T. 2003. *Basic*

- Business Statistics: Concepts and Applications*, 9th Edition. New Jersey: Prentice-Hall.
- Bhat, N.V. 2006. TQM Implementation: Does the Legal System Matter? Through Business Planning Western Europe”, *Total Quality Management and Business Excellence*, 17:685-690.
- Crosby, P. B. 1979. *Quality Is Free*. New York: McGraw-Hill, Inc.
- Dale, B., Y-Wu, P., Zairi, M., Williams, A. and Van Der Wiele, T. 2001. The Total Quality Management and Theory: an Exploratory Study of Contribution”, *Total Quality Management*, 12(4):439-449.
- Deming Prize. 1996. *Guide for Overseas Companies*, Tokyo: Union of Japanese Scientists and Engineers.
- DuBrin, A.J. 1995. *Leadership: Research Findings, Practice and Skills*. Houghton Mifflin Company, Boston, USA.
- EFQM-European Foundation for Quality Management. 1994. *Self-Assessment Based on the European Model for Total Quality Management: Guidelines for Identifying and Addressing Business Excellence Issues*. Brussels, Belgium.
- Feigenbaum, A. V. 1991. *Total Quality Control*. Third edition, New York: McGraw-Hill, Inc.
- Flynn, B. B., Schroeder, R. G. and Sakakibara, S. 1994. A Framework for Quality Management Research and an Associated Measurement Instrument. *Journal of Operations Management*, 11:339-366.
- Goetsch, D. and Davis S. 2006. *Quality Management: Introduction to Total Quality Management for Production, Processing and Services*, 5th Edition. New Jersey: Prentice-Hall International, Inc.
- Hackman, J. R. and Wageman, R. 1995. Total Quality Management: Empirical, Conceptual, and Practical Issues. *Administrative Science Quarterly*, 40:309-342.
- Hansson, J and Klefsjo, B. 2003. A Core Value Model for Implementing Total Quality Management in Small Organizations. *The TQM Magazine*, 15:71-81.
- Heizer, J. and B. Render. 2001. *Operations Management*. 6th Edition. New Jersey: Prentice-Hall, Upper Saddle River.
- Hindawi A.1994. *The International TQM Measurements Models: Analysis, Comparison and Criticism* Proceeding of the ISO Seminar, Jordan Export Development and Commercial Centers Corporation, Amman, Jordan.
- Hurang, F. and Chen, Y.2002. Relationships of TQM Philosophy, Methods and Performance: a Survey in Taiwan. *Journal of Industrial Management and Data Systems*, 102:226-234.
- Ishikawa, K. 1985. *What is Total Quality Control? The Japanese Way*. London: Prentice-Hall.
- Juran, J. M. 1993. *Quality Planning and Analysis*. Third edition, New York: McGraw-Hill, Inc.
- Kayis, B. and Paipetis, N. 2005. Validation of Organizational Learning Models: Theoretical Framework and Empirical Analyses. *International Journal of Learning and Intellectual Capital*, 2:180-205.
- Lawler III, E. E., Mohrman, S. A. and Ledford Jr., G.E. 1995. *Creating High Performance Organizations: Practices and Results of Employee Involvement and Total Quality Management in Fortune 1000 Companies*. San Francisco: Jossey-Bass Publishers.
- Lee, Y. C. 2004. TQM in Small Manufacturers: An Exploratory Study in China. *International Journal of Quality and Reliability Management*, 21:175-197.
- Litwin, M. S. 1995. *How to Measure Survey Reliability and Validity*, Thousand Oaks: Sage Publications, USA.
- Lukashah, L.2002. *Total Quality Management and Competitiveness: Applied Study on Jordanian Insurance Companies*. Unpublished MBA thesis, University Of Jordan, Amman, Jordan
- Malcolm Baldrige National Quality Award. 1999. *Criteria for Performance Excellence*. National Institute of Standards and Technology, United States Department of Commerce, Gaithersburg, MD.
- Mele, C. and Colurcio, M. 2006. The Evolving Path of TQM: Toward Business Excellence and Stakeholder Value. *International Journal of Quality and Reliability Management*, 23:464-489.
- Meredith, J.R. and Shafer, S.M. 1999. *Operations Management for MBAs*. John Wiley and Sons, Inc., New York, USA.
- Powell, T. C. 1995. Total Quality Management as Competitive Advantage: A Review and Empirical Study.

- Strategic Management Journal*, 16:15-37.
- Rahman, S. and Sohal, A. 2002. A Review and Classification of Total Quality Management Research in Australia and an Agenda for Future Research. *International Journal of Quality and Reliability Management*, 19:46-66.
- Raiborn, M., Forza, C., Filippini, R. and Anderson, J.C. 1996. A Replication Study of a Theory of Quality Management Underlying the Deming Management Method: Insights from an Italian Context. *Journal of Operations Management*, 17 (1): 77-95.
- Samson, D. and Terziovski, M. 1999. The Relations between Total Quality Management Practices and Operational Performance. *Journal of Operations Management*, 17:393-409.
- Saraph, J. V., Benson, G. P. and Schroeder, R. G. 1989. An Instrument for Measuring the Critical Factors of Quality Management, *Decision Sciences*, 20:810-829.
- Shalhoub, Z. and Al-Qasimi, L. 2004. Crafting the Environment for High Tech Incubation Projects: The Case of Dubai. *International Journal of Management Practice (IJMP)*, 1(1):23-45.
- Sila, I. and Ebrahimpour, M. 2003. "Examination and Comparison of Critical Factors of Total Quality Management (TQM) Across Countries". *International Journal of Production Research*, 41:235-268.
- Slack, N., Chambers, S., Harland, C., Harrison, A. and Johnston, R. 1995. *Operations Management*. PITMAN Publishing, London, UK.
- Sun, H., Li, S., Ho, K., Gertson, F., Hansen, P. and Frick, J. 2004. The Trajectory of Implementing ISO 9000 Standards Versus Total Quality Management in Western Europe. *International Journal of Quality and Reliability Management*, 21:131-153.
- Tarawneh, M. 1999. The Total Quality and Competitiveness: Study on Pharmaceutical Companies In Jordan. *Dirasat-Managerial Sciences*, 6 (2): 32-47.
- Temtime, Z. T. 2004. Linking Environmental Scanning to Total Quality Management Through Business Planning Western Europe. *Journal of Management Development*, 23:219-233.
- Terziovski, M., Samson, D. and Dow, D. 1997. The Business Value of Quality Management Systems Certification. Evidence from Australia and New Zealand, *Journal of Operations Management*, 15:1-18.
- Thiagarajan, T., Zairi, M. and Dale, B. 2001. A Proposed Model of TQM Implementation Based on An Empirical Study of Malaysia Industry. *International Journal of Quality and Reliability Management*, 18:289-306.
- Womack, J. P., Jones, D.T. and Roos, D. 1990. *The Machine That Changed the World*. Massachusetts Institute of Technology, Rawson Associates, New York, USA.
- Yong, J. and Wilkinson, A. 2003. From Kyoto to Singapore: The Adoption of Quality Management in Service Sector in Singapore. *Total Quality Management and Business Excellence*, 14:849-873.
- Yousof, S. M. and Aspinwall, E. 2000. Total Quality Management Implementation Frameworks: Comparison and Review. *Total Quality Management*, 11(3):281-294.
- Zhang, Z. 2000. An Instrument for Measuring TQM Implementation for Chinese Manufacturing Companies. *International Journal of Quality and Reliability Management*, 178:730-755.

تبني تطبيق مبدأ إدارة الجودة الشاملة في الشركات الصناعية بإمارة دبي

ماجد الصمادي، وخليف الخوالدة

ملخص

هدفت هذه الدراسة إلى التعرف على مدى تطبيق إدارة الجودة الشاملة في الشركات الصناعية بإمارة دبي من خلال إطار عملي يمكن الإداريين والصناعيين من تقييم تطبيقات ومبادرات إدارة الجودة الشاملة في شركاتهم، وتسهيل الضوء على مجالات وفرص التحسين الممكنة، وتحديد مستوى التدريب المطلوب. طور هذا الإطار اعتماداً على مساهمات الرواد الأوائل في إدارة الجودة الشاملة وجوائز التميز العالمية والمحلية والدراسات السابقة في هذا المجال. وقد تم قياس درجة وثوقية ومصداقية الأداة باستخدام بيانات تم جمعها من 126 شركة صناعية في إمارة دبي بدولة الإمارات العربية المتحدة. وأشارت نتائج الدراسة إلى أن الشركات الصناعية في دبي تتبنى عناصر إدارة الجودة الشاملة بدرجة متوسطة وأنه لا يختلف مستوى تطبيق إدارة الجودة الشاملة في هذه الشركات بشكل ملموس باختلاف خصائصها من حيث سنة التأسيس وعدد العاملين ورأس مالها. وبينت الدراسة أن مستوى تطبيق الشركات لأبعاد إدارة الجودة الشاملة يختلف من بعد إلى آخر.

Khleef A. Al-Khawaldeh

Assistant Professor/ Department of Business Administration,
The Hashemite University, Al-Zarqa, Jordan.

Majed S. Smadi

MSc in Production and Process Management,
The Hashemite University, Al-Zarqa, Jordan.

تاريخ استلام البحث 2005/12/28، وتاريخ قبوله 2006/10/10.