TQM Core Elements and Knowledge Sharing: An Empirical Study of Iraqi HEIs

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Abstract

This study aimed to explore empirically the relationship between the core elements of Total Quality Management (TQM) and knowledge sharing as perceived by academic leadership in Iraqi higher education institutions (HEIs). The study was based on a survey design and time horizon was cross-sectional with least researcher’s interference. Considering the domain of this study, the survey was carried out in 64 colleges selected randomly from four public universities in Iraq, which adopted quality improvement practices. The final number of participates for this study was 40 colleges. The study hypotheses were tested using correlation and multivariate analyses. The results supported all hypotheses posited for the study, suggesting that HEIs can benefit from TQM core elements. The correlation analysis indicated that all core elements of TQM have significant correlations with knowledge sharing. Regression analyses indicated significantly positive relationships among the study’s constructs. Furthermore, statistical analysis also indicated that the TQM core elements should be implemented holistically rather than individually. In conclusion, this study provided insight and further understanding of the effect of TQM core elements on knowledge sharing, and therefore, allows practitioners to get in depth knowledge about the impact of TQM core elements in HEIs context.

Keywords: TQM core elements, Knowledge sharing, Iraqi HEIs

Introduction

To date, organizations are facing a common challenge consequential from rapid changes in the business environment. Organizations need to improve their activities in order to gain sustainable competitive advantages to survive in today’s competitive environment. Many organizations adopt TQM as a management paradigm world-wide in order to cope with the changing expectations of the organization. TQM has its own roots established predominantly in industry. This paradigm was adapted, spread later for the profit-making organizations (such as banks, insurance companies), and ultimately to non-profit organizations, including government and public organizations (such as health and education institutions).

The concept of TQM is not that new. It has been used prominently since 1980s as a revolutionary instrument for managing change. The history of TQM can be traced to the early 1920s through the emergence of the quality control thoughts; it originated from a statistician named Shewhart using the Statistical Quality Control (SQC). The work is later adopted and expanded by Deming, Crosby and Juran (McAdam, 2000). While, some believed that the concept of TQM started from the initiatives of Union of Japanese Scientists and Engineers (JUSE) after World War II. Despite TQM has its origins in the industrial sector, there has been a strong push for adopting TQM in educational organizations (Bayraktar, Tatoglu, & Zaim, 2008; Lim, Rushami, & Zainal, 2004; Owlia & Aspinwall, 1998; Sirvanci, 2004; Srikanthan & Dalrymple, 2004; Venkatraman, 2007).
In this knowledge era, educational sector is also affected by the rapid changes in the business environment. According to Amin (2006), profound changes resulting from the business environment have made us think the same way like business organizations. Thus, efficient knowledge sharing among members of such knowledge-driven organization is highly essential. Accordingly, HEIs should support the practices of knowledge sharing towards sequentially surviving in today's knowledge-based competition.

According to Sallis and Jones (2002), the challenge now for educational organizations is to establish principles and guidelines on how relevant knowledge can be created, collected, and shared. This perspective has inspired the researchers of this paper to investigate empirically the impact of TQM core elements on knowledge sharing in Iraqi HEIs context.

Problem Statement

In the past, Iraqi higher education system was ranked the best in the Middle East and Gulf region not until after the economic sanction when Iraqi HEIs suffered from a prolonged period of relative isolation due to the sanctions imposed by UN (Kaghed & Dezaye, 2009; UNESCO, 2008). According to the International Conference on Higher Education in Iraq (2007), Iraqi universities have suffered more than necessary in terms of the resources, teaching methods, modern technology and research. It was emphasized that there is an urgent need to bring the lost glory to the Iraqi educational institutes.

The establishment of TQM program in Iraqi HEIs started in 1993, in order to achieve better educational quality (Yousif, 2007). The author emphasized that a lot of research is needed in the TQM and quality practices field regarding accurate application of TQM in Iraqi universities. According to Al-Hakim, Zwain and Al-kafaji (2009), knowledge management practices in Iraqi HEIs are still a new application, but its possibility of acceptance is high. The fact is the universities are basically knowledgeable organizations. Unfortunately, very few studies have been conducted to examine the knowledge sharing capability in Iraqi HEIs context.

In general, empirical evidence to clarify the pattern of relationship between TQM and the process of knowledge sharing is surprisingly sparse (Ooi, Cheah, Lin, & Teh, 2010). Other than, the studies who linked TQM and knowledge sharing were conducted in the manufacturing industry and do not reflect the service sector, particularly the educational sector which is of interest in this study. This study opens up research opportunities to fill the gap, especially in developing countries.

Research Importance and Objective

This study is significant for academic leadership of HEIs that want to architecture a knowledge sharing capability. Academician leaders could focus their efforts on establishing TQM core elements for building effective knowledge sharing capabilities. However, the main objective of present study is to explore the relationship between the core elements of TQM and knowledge sharing as perceived by academic leadership in Iraqi HEIs. Specifically, this study will be guided by the major question that arises here and needs to be answered is: To what extent, do the core elements of TQM affect knowledge sharing in Iraqi HEIs context?
Literature review and Research hypotheses

TQM core elements

There are numerous definitions of TQM; interestingly, no sole definition can explain the whole picture (Eriksson & Hansson, 2003) as different authors viewed TQM from a number of perspectives, which dictates the way they define it. According to Sallis (1996), TQM is defined within the education context as a philosophy behind continuous improvement, that is capable of providing any educational institution with a set of necessary tools for meeting and exceeding present and future customers’ needs, wants, and expectations.

From quality literature, the concept of TQM is generally described based on a number of core elements or values of TQM. Whitney and Pavett (1998) pointed out that advocates of TQM agreed that there is an essential set of elements that, if established will lead to high performance. Such core elements have several interpretations; the term of *core elements* is sometimes referred to as *principles, dimensions* or *core values*. Whichever way it is addressed, it still refers to the same thing which is the determinants of a TQM and in this study, the term *core elements* are used, since it is a way to emphasize that these elements are basic and should work together to improve organization’s activities.

Various studies have been carried out to identify those elements that can be used in constituting the TQM paradigm (Karia & Asaari, 2006; Vouzas & Psychogios, 2007; Whitney & Pavett, 1998; Zhu & Scheuermann, 1999). This is viewed from three different perspectives as follows: contributions from quality gurus, empirical studies and quality standardized models (Tari, 2005). Generally, however, the literature does not identify a single, meaningful definition for core elements of TQM, but rather presents a set of elements, which are considered essential for the TQM establishment (Karia & Asaari, 2006; Montes, Jover, & Fernandez, 2003; Rungtusanatham, Forza, Koka, & Salvador, 2005).

Based on thorough review and synthesis of TQM literatures, the researcher has identified nine initial core elements of TQM. These core elements of TQM are namely: leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact (Babbar, 1995; Bayraktar, et al., 2008; Crosby, 1979; Deming, 1986; EFQM, 2009; Evans, Dean, & J.W., 2003; Juran & Gryna, 1988; Kanji & Tambi, 1999; Lim, et al., 2004; London, 2002; MBNQA, 2004; Oakland, 2000; Sallis, 1996; Samson & Terziovski, 1999; Taylor & Wright, 2003; Venkatraman, 2007).

Knowledge sharing

Knowledge has been considered to be a strategic resource in any organization used in sustaining competitive advantage (Amin, 2006). Such knowledge resources vary from one organization to another but in any case it includes all forms of knowledge that is found useful to the organization in various forms of document. Similarly, Kidwell, Linde and Johnson (2000) revealed that knowledge being the hub of any higher institution, and hence, educational organizations should take the advantage of knowledge sharing to enhance innovation, promoting good customer service and gaining competitive advantage over their competitors.
Knowledge sharing can be defined as transfer of information and knowledge from one source (person, group or organization) to another (Fugate, Theodore, & Mentzer, 2009; Liao & Wu, 2009). Therefore, knowledge sharing plays an intermediate role to support knowledge exchange in the organization and aids the achievement and sustenance of their competitive advantage.

According to Peter (2005), the sharable knowledge could be categorized into any of the following three categories: the data, documents and employees. Therefore, employees need to understand how to access and work with information and sharable knowledge in order to get its values. To maximize the knowledge sharing, many researchers revealed that the organization needs to consider several organizational components such as the accessible technology, effective communication channels, organizational culture and reward system (Asoh, Belardo, & Crnkovic, 2007; Daud & Abdul Hamid, 2006; Fugate, et al., 2009; Liao & Wu, 2009; Safa, Shakir, & Boon, 2006; Sallis & Jones, 2002). The same factors are applicable to HEIs. Hence, for exploitation and application of such knowledge in the development of the educational process, it is very important for academic leadership to understand effectively the nature of knowledge and should be involved fully in the knowledge sharing process in order to provide tangible additional value to their organizations.

The relationship between TQM core elements and knowledge sharing

**Leadership commitment:** Many researchers stated in their studies that leadership commitment is the most crucial and vital prerequisite for organization achievement when constituting TQM (Bayraktar, et al., 2008; Lim, et al., 2004; Sallis & Jones, 2002; Vouzas & Psychogios, 2007). These researchers agreed that leadership commitment provides a focal point for the visors, wishes and aspirations of employees in organizations where TQM is implemented. Thus, Leadership can create an excellent environment in influencing the rate of success for knowledge sharing (e.g., Wong, 2006; Ooi et al., 2010), and enhancing the organizational knowledge (Bryant, 2003). Leadership commitment through TQM is capable of generating a set of quality-oriented practices and standards via the processes of sharing and application of knowledge (Tena, 2004; Ooi, 2009). In this regard, the following hypothesis is suggested:

_Hypothesis 1: Leadership commitment has a positive relationship with knowledge sharing._

**Strategic planning:** This element has to do with quality planning with organization’s strategy. So, this element provides a foundation for how an organization can manage its efforts and resources to achieve its quality purposes. Thus, all efforts to link knowledge sharing with strategic planning have become an essential source of organization’s competitiveness (C. W. Chong, Chong, & Yeow, 2006; Ooi, et al., 2010). Wong (2006) stated that the associated closely to the plan of strategy, is the arrangement of a convincing and shared such knowledge about strategic vision. Moreover, George and Weimerskirch (1998) mentioned that strategic planning for quality defines who we are and where we are trying to go. In doing this, knowledge sharing among organization’s members must be established. Therefore, the following hypothesis is recommended:

_Hypothesis 2: Strategic planning has a positive relationship with knowledge sharing._

**Continuous improvement:** From the core elements of TQM, all are highly structured towards one philosophy that is the continuous in order to achieve better performance (Adair, 2004). From the writings of the three quality gurus Deming (1986), Juran (1988) and Crosby (1979), continuous improvement has been encouraged as a fundamental in a worldwide competitiveness well-known by rapidly changing technology
and customer demand for higher level of value. Based on this fact, this element has become a fundamental part of TQM since the customer satisfaction is regarded as the objective of TQM practices (Antony, Leung, Knowles, & Gosh, 2002). It is very important to know that the success of continuous improvement; It requires everyone to know what to be done at it requires time and how to do it. This involves continuous evaluation of standardized operations and utilization of diverse tools for improvement purposes. In order to achieve this, specific information and knowledge must be shared through benchmarking and self-assessment (Linderman, Schroedera, Zaheera, Liedtkeb, & Choo, 2004; A. B. E. Tena, Llusar, & Puig, 2001). Hence, the following hypothesis is formed:

Hypothesis 3: Continuous improvement has a positive relationship with knowledge sharing.

**Customer focus:** Customer focus is a core element of TQM that stresses the significance of knowing and understanding customers’ requirements, and such understanding will guarantee customer satisfaction (Samson & Terziovski, 1999; Venkatraman, 2007). This is in line with the perception made by Ooi et al. (2010), which revealed that this element involves efforts to identify customer’s needs. These efforts include the gathering of information about the customer satisfaction, suggestions or complaints, and then to share such information/knowledge within the organization itself. In simple terms, organization’s attitude for customer focus makes knowledge sharing practices highly heartened among its employees (Tena et al., 2001; Tena, 2004; Linderman et al., 2004; Ooi, 2009). In this regard, the following hypothesis is proposed:

Hypothesis 4: Customer focus has a positive relationship with knowledge sharing.

**Process focus:** In effectively all organizations, the activities follow number specific processes. The aim of a process is retracing the past events for possible improvement. A good process will always lead to a good product or service (Bergman & Klefsjo, 2003). This element stresses the value adding to the core process, increasing the productivity of every employee and improving the performance of organization. The essential requirements of the core process are to lower down costs, reducing the cycle-time and enhance efficiency, which all can be applied to knowledge sharing (Ju, Lin, Lin, & Kuo, 2006; Molina, Montes, & Ruiz-Moreno, 2007; Ooi, 2009). Consequently, the following hypothesis is proposed:

Hypothesis 5: Process focus has a positive relationship with knowledge sharing.

**Employee involvement:** There is no way we talk about employee involvement without mentioning working together as a team within an organization. A high value was placed on teamwork to achieve better performance at organizations (Santos-Vijande & Alvarez-Gonzalez, 2007). The authors underpin that employees with diverse knowledge and special skills should be placed together in order to obtain cooperation and interaction. Similarly, Ooi et al. (2010) revealed that the employees working as a team in their jobs had more opportunities to combine dispensed capabilities more effectively through knowledge sharing. In short, this element involves employees’ participation in making decisions related to their work, and working as teamwork that will lead to improve sharing knowledge process (Tena et al., 2001). Hence, the following hypothesis is proposed:

Hypothesis 6: Employee involvement has a positive relationship with knowledge sharing.
Training and learning: The seventh core element of TQM has to do with the concept of training and learning. A lot of studies have included employee training and learning as one of the core elements of TQM (Bayraktar et al., 2008; Ooi et al., 2010). Only high-quality people cannot guarantee successful achievement of TQM within an organization, but rather, people are continuously improving with training and learning (Kanji & Sa, 2003). Definitely, effectiveness at work is assumed to increase if the individuals’ knowledge about their job-skills is improved. This involves improving the required skills through specific training and learning programmes (Tena et al., 2001; Tena, 2004; Linderman et al., 2004; Ooi et al., 2010). In this case, training and learning plays a vital role in creating an appropriate environment which encourages every employee to share their knowledge. Since training and learning helps to improve the process of knowledge sharing, the following hypothesis is formed:

Hypothesis 7: Training and learning has a positive relationship with knowledge sharing.

Rewards and recognition: Organizations and managers always acknowledge reward and recognition as a key element in motivating individual employees (Kerrin & Oliver, 2002). Several scholars and researchers have also mentioned the importance of the reward and recognitions in the quality improvement activities (Crosby 1979; Lim et al., 2004; Santos-Vijande & Alvarez-Gonzalez, 2007). It is acknowledged that such an act will motivate the employee to work more effectively without forcing it to do so (Eng & Yusof, 2003). Efficiency at work can be enhanced by motivating individuals to assist each other in carrying out organizational duties. With the support from top management and suitable organizational rewards, it could further enhance the knowledge sharing (Lin, 2007; Ooi, 2009). As a result, Rewards and recognition as the core element of TQM is linked to knowledge sharing process, and a hypothesis is formed:

Hypothesis 8: Rewards and recognition has a positive relationship with knowledge sharing.

Management by fact: In TQM, knowing the current performance levels of the products or services is the business of the customers and of all employees’ improvement is considered to be the most necessary. If we know where we are starting from, we can measure our improvement. It is argued that the knowledge to be shared among people needs to be based on facts (Hsu & Shen, 2005; Talavera, 2004). In simple terms, the most relevant meaning of this element is following a systematic process of performance assessment. In doing this, performance indicators must be established and reliable data, information, and knowledge must be obtained, this is where knowledge sharing comes in (Tena et al., 2001; Ooi, 2009). For this reason, the following hypothesis is proposed:

Hypothesis 9: Management by fact has a positive relationship with knowledge sharing.

Research framework

The objective of this study is to examine the relationship between TQM core elements and knowledge sharing. Based on the above literature review, a research framework was developed. Figure 1 illustrated this relationship. In this framework, TQM core elements are independent variables and knowledge sharing is a dependent variable correspondingly.
Methodology

Research Design

The study was based on a survey design and time horizon was cross-sectional with minimal researcher’s interference. Since the main objective of this study is to investigate the actual level of each of the TQM core elements on knowledge sharing practice in Iraqi HEIs, academic leadership (dean or assistant dean) which was knowledgeable about organizational practices considered appropriate subject. The study hypotheses were tested using correlation and regression analyses. The academic leadership as respondents were requested to focus on questions related to degree or extent of practices TQM core elements and knowledge sharing in their organizations with items followed a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree.

Measures

To measure the two constructs of importance of this study, the researchers adopted the items of instrument from relevant literature. Table 1 showed these sources.
Table 1: The number of adopted items and its sources

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Code</th>
<th>No. of Items</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership Commitment</td>
<td>LC</td>
<td>8</td>
<td>Lim et al., 2004; Sirvanci, 2004; MBNQA, 2004; and Bayraktar et al., 2008</td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>SP</td>
<td>6</td>
<td>Lim et al., 2004; MBNQA, 2004; Venkatraman, 2007; and Ooi, 2009</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>CI</td>
<td>7</td>
<td>Venkatraman, 2007; Lim et al., 2004; MBNQA, 2004; and Bayraktar et al., 2008</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>CF</td>
<td>6</td>
<td>Lim et al., 2004; MBNQA, 2004; and Bayraktar et al., 2008</td>
</tr>
<tr>
<td>Process Focus</td>
<td>PF</td>
<td>6</td>
<td>MBNQA, 2004; Lim et al., 2004; and Bayraktar et al., 2008</td>
</tr>
<tr>
<td>Employee Involvement</td>
<td>EI</td>
<td>5</td>
<td>MBNQA, 2004; Lim et al., 2004; Bayraktar et al., 2008; and Venkatraman, 2007</td>
</tr>
<tr>
<td>Training &amp; Learning</td>
<td>TL</td>
<td>5</td>
<td>Lim et al., 2004; MBNQA, 2004; Bayraktar et al., 2008; and Ooi et al., 2010</td>
</tr>
<tr>
<td>Rewards &amp; Recognition</td>
<td>RR</td>
<td>5</td>
<td>Lim et al., 2004; Bayraktar et al., 2008; and Ooi, 2009</td>
</tr>
<tr>
<td>Management by Fact</td>
<td>MF</td>
<td>7</td>
<td>Lim et al., 2004; MBNQA, 2004; Venkatraman, 2007; and Ooi, 2009</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>KS</td>
<td>8</td>
<td>Daud &amp; Abdul Hamid, 2006; ; Ooi, 2009; and Ooi et al., 2010</td>
</tr>
</tbody>
</table>

The instrument was pre-tested and reviewed by several academicians who are specialists in the field of TQM and KM. Subsequently, the instrument was subjected to a pilot study. 24 respondents (heads of departments) in two Iraqi public universities were involved in the pilot study. The participants were involved to evaluate the questionnaire in terms of readability, accuracy, and brevity of the instrument.

In the main test, the survey was carried out in 64 colleges selected randomly from four public universities in Iraq, which were adopted educational quality improvement. The final number of colleges participated in this study was 41 colleges. The sample size comprised about 63 % of the total population.

Data analysis and Results
Profiles of Respondents
The sampled population was composed of 18 deans of colleges representing 43.9% of the total population, 15 assistant deans representing 36.6% of the respondents and 8 respondents (19.5%) were representatives of Deans. Out of the 41 respondents involved in the present study, 29 (70.7%) were male while, the remaining 12 respondents (29.3%) were female. All age ranges were represented in this study as 1 respondent (2.4%) is less than 30 years of age, 8 respondents (19.5%) were between 30-39 years old, 15 respondents (36.6%) fall between 40-49 years of age, and 11 respondents (26.8%) fall between 50-59 years old while, the remaining 6 respondents (14.7%) were above 60 years of age. The respondents fall within four ranks, 12 (29.3%) professors, 16 (39.0%) assistant professors, and 13 (31.7%) senior lecturers. All the respondents were experienced members of the academic colleges, only 4 (9.8%) have three years of experience and below, 37 (90.2%) have more than three years experience. Nevertheless, 38 (92.6 %) of the sample respondents have worked more than three years in their current position.

Table 2: Construct validity and reliability for the latent constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>No. of Items</th>
<th>Factor Loading</th>
<th>KM O</th>
<th>Eige n Value</th>
<th>% of Varian ce</th>
<th>Cronbac h's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variable</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership Commitment</td>
<td>8</td>
<td>.803, .878, .970, .895, .780, .813, .653, .769</td>
<td>.876</td>
<td>4.97</td>
<td>73.405</td>
<td>.788</td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>6</td>
<td>.824, .817, .820, .760, .642, .759</td>
<td>.757</td>
<td>3.48</td>
<td>69.706</td>
<td>.782</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>7</td>
<td>.807, .861, .794, .771, .605, .659, .723</td>
<td>.881</td>
<td>4.45</td>
<td>64.534</td>
<td>.851</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>6</td>
<td>.752, .796, .861, .921, .908, .648</td>
<td>.837</td>
<td>4.04</td>
<td>67.746</td>
<td>.805</td>
</tr>
<tr>
<td>Process Focus</td>
<td>6</td>
<td>.837, .880, .762, .783, .884, .702</td>
<td>.857</td>
<td>4.13</td>
<td>69.965</td>
<td>.793</td>
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<td>Employee Involvement</td>
<td>5</td>
<td>.838, .846, .754, .672, .812</td>
<td>.786</td>
<td>3.43</td>
<td>68.673</td>
<td>.897</td>
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<tr>
<td>Training &amp; Learning</td>
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<td>.815, .793, .794, .897, .889</td>
<td>.867</td>
<td>3.51</td>
<td>61.272</td>
<td>.780</td>
</tr>
<tr>
<td>Rewards &amp; Recognition</td>
<td>5</td>
<td>.718, .786, .849, .882, .706</td>
<td>.847</td>
<td>3.42</td>
<td>72.762</td>
<td>.817</td>
</tr>
<tr>
<td>Management by Fact</td>
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<td>.778, .842, .780, .777, .745, .824, .832</td>
<td>.834</td>
<td>4.48</td>
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<td>.834</td>
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<td>Dependent Variable</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>8</td>
<td>.703, .645, .837, .704, .882, .699, .908, .930</td>
<td>.846</td>
<td>5.06</td>
<td>74.750</td>
<td>.853</td>
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</tbody>
</table>

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In order to assess the goodness of the instrument measures, the instrument was subjected to the construct validity and reliability tests. The construct validity was evaluated by factor analysis with eigenvalues of at least 1.0, and factor loading of at least .40. Meanwhile, the reliability was evaluated by the coefficient of Cronbach’s alpha with acceptable value of .70 and above (Hair, Black, Babin, & Anderson, 2010; Sekaran & Bougie, 2010). Table 2 summarized the results of construct validity and reliability for the latent constructs.

Based on the exhibited in the Table 2, the results indicate that factor loadings for all constructs were more than .4, and all constructs explain more than 50% of total variance. According to Pallant (2007), KMO value should be greater than .60. KMO values are greater than .60. Other than that, the Bartlett’s test of sphericity was significant at $\alpha = .05$. Moreover, the results also show that all the values of Cronbach’s alpha were greater than .70. In short, the instrument measures used in this study was valid and reliable.

After confirming the instrument validity and reliability, the next step was analysing the data. Normality of the observed variables was evaluated through the examination of skewness and kurtosis values. None of the observed variables are significantly skewed or highly kurtosis. Meanwhile, all observed variables shown to be linearly related (via scatter plots). Moreover, using Mahalanobis distance, no apparent outlier was noticed. Table 3 shows results of Pearson’s product-moment correlation among TQM constructs. All the TQM core elements associate significantly with each other ($p < .01$).

In examining the correlation among the TQM constructs, much research noted that all the correlations among the constructs were positive indicating that the quality management strategies should be implemented holistically and comprehensively, not individually (e.g. Ahire et al., 1996; Lim et al., 2004).

Table 3: Pearson correlation among TQM core elements

<table>
<thead>
<tr>
<th>TQM core elements</th>
<th>LC</th>
<th>SP</th>
<th>CI</th>
<th>CF</th>
<th>PF</th>
<th>EI</th>
<th>TL</th>
<th>RR</th>
<th>MF</th>
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<tbody>
<tr>
<td>LC</td>
<td>1.000</td>
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<td></td>
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<tr>
<td>SP</td>
<td>.831**</td>
<td>1.000</td>
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<td></td>
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<tr>
<td>CI</td>
<td>.691**</td>
<td>.665**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1.000</td>
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</tr>
<tr>
<td>PF</td>
<td>.794**</td>
<td>.578**</td>
<td>.789**</td>
<td>.642**</td>
<td>1.000</td>
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<td>EI</td>
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<td>.606**</td>
<td>.867**</td>
<td>.655**</td>
<td>1.000</td>
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<tr>
<td>TL</td>
<td>.601**</td>
<td>.599**</td>
<td>.787**</td>
<td>.701**</td>
<td>.736**</td>
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<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>.732**</td>
<td>.596**</td>
<td>.813**</td>
<td>.667**</td>
<td>.795**</td>
<td>.761**</td>
<td>.857**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>MF</td>
<td>.712**</td>
<td>.690**</td>
<td>.651**</td>
<td>.684**</td>
<td>.754**</td>
<td>.679**</td>
<td>.631**</td>
<td>.748**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note.** $p < .01$

Table 4 exhibits the correlation between the core elements of TQM and knowledge sharing variable. Most of TQM core elements show moderate to strong correlation with knowledge sharing. Meaning that, all the TQM core elements are highly significant with knowledge sharing variable.
Table 4: Pearson correlation between TQM core elements and knowledge sharing

<table>
<thead>
<tr>
<th>TQM core elements</th>
<th>LC</th>
<th>SP</th>
<th>CI</th>
<th>SF</th>
<th>PF</th>
<th>ASI</th>
<th>TL</th>
<th>RR</th>
<th>MF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Sharing</td>
<td>.779**</td>
<td>.663**</td>
<td>.772**</td>
<td>.587**</td>
<td>.611**</td>
<td>.838**</td>
<td>.572**</td>
<td>.680**</td>
<td>.710**</td>
</tr>
</tbody>
</table>

Note. ** p < .01

Table 5 demonstrates the multiple regression analysis between TQM core elements and knowledge sharing variables. In this model, knowledge sharing acts as the dependent variable and TQM with the nine core elements: leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact as the independent variables. From the results in Table 5, the analysis shows that strong relationships existed as hypothesized; whereas the regression model has moderately high values of adjusted $R^2$ (.471), which means that 47.1 percent of the variation in knowledge sharing can be explained by leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact. Table 5 also shows that only two variables had a significant and positive effect on knowledge sharing, which are process focus ($β = .246$, $p = .004$) and employee involvement ($β = .248$, $p = .047$). It can be concluded that employee involvement has the greatest effect on knowledge sharing followed by process focus. Furthermore, the regression analysis result also revealed significant F value at level $α = .05$.

Table 5: Multiple regression between TQM core elements and knowledge sharing

<table>
<thead>
<tr>
<th>TQM core elements (Independent Variable)</th>
<th>Knowledge Sharing (Dependent Variable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.010</td>
</tr>
<tr>
<td>Leadership Commitment</td>
<td>.167</td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>.199</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>-.044</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>.054</td>
</tr>
<tr>
<td>Process Focus</td>
<td>.240</td>
</tr>
<tr>
<td>Employee Involvement</td>
<td>.194</td>
</tr>
<tr>
<td>Training and Learning</td>
<td>-.008</td>
</tr>
<tr>
<td>Rewards and Recognition</td>
<td>.196</td>
</tr>
<tr>
<td>Management by Fact</td>
<td>-.005</td>
</tr>
<tr>
<td>$R^2$</td>
<td></td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td></td>
</tr>
<tr>
<td>Significance of F</td>
<td></td>
</tr>
</tbody>
</table>

However, based on the results in Table 5, multicollinearity was emerged. This is in line with many researches position (Agus, 2000; Lim, et al., 2004; Miles & Shevlin, 2001). The regression model has one or more standardized regression coefficients taking on negative values when common sense and correlation analysis suggest a positive relationship exist between the independent and dependent variables (see Table 4). Notwithstanding, the F value is significant, many of the estimated regression coefficients are insignificant (see Table 5). In addition, the strong correlation among TQM core elements ($0.578 ≤ r ≤ 0.867$) also proposing
the occurrence of multicollinearity (see Table 3). Multicollinearity problem can affect the statistical
significance of the individual regression coefficients, and this definitely does not contribute to a good
regression model (Pallant, 2007; Hair et al., 2007). This is because when the independent variables are highly
correlated, the estimated standard errors for the coefficients will be large, and as a result the t-statistics will
be small (Agus, 2000). The estimated coefficients with large standard errors will be unstable and
consequently, weakened the analysis. In this study, the regression model has three variables with
standardized regression coefficients taken a negative value (see Table 5). For instance; continuous
improvement ($\beta = - .060, p = .818$) whereas, correlation analysis indicates a positive relationship with the
high coefficient of correlation (.772) between continuous improvement and knowledge sharing (see Table 4).
Moreover, some of the coefficients of correlation among TQM practices were above the cut-off of .80 for the
multicollinearity problem, for instance, correlation between continuous improvement and process focus (see
Table 3). For this reason, multicollinearity problem was appeared.

There are many techniques that researchers can utilize to reduce the effect of multicollinearity (Hair et al.,
2010). In this study, the Principal Component Analysis (PCA) was employed to handle multicollinearity.
TQM variables were analyzed collectively and principal component scores of TQM variables were retrieved
(Agus, 2000, Lim et al., 2004). A simple linear regression analysis was later carried out between knowledge
sharing and the first saved of principal component scores of TQM core elements as demonstrates in Table 6.

Table 6: Simple linear regression analysis between principal component scores of TQM core elements and
knowledge sharing

<table>
<thead>
<tr>
<th>Model</th>
<th>Model Beta</th>
<th>Std. Error</th>
<th>Std. Beta</th>
<th>t</th>
<th>Sig.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.229</td>
</tr>
<tr>
<td>Regression</td>
<td>.314</td>
<td>.093</td>
<td>.479</td>
<td>3.363</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>IV = Principal component scores of TQM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DV = Knowledge sharing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. IV = Independent variable; DV = Dependent variable; Principal component scores are resulted from
principal component analysis; * F-statistics are significant at the .05 level

From the result as shown in Table 6, the $R^2$ is .229, which means that 22.9 percent of the variation in
knowledge sharing can be explained by TQM variables. The results of simple regression analysis also point
to that TQM variables (collectively) have a significant relationship with knowledge sharing variable.
Regression coefficient ($\beta = .479$) of the regression model is statistically positive and significant at $\alpha = .05$.
Hence, based on $\beta$ value, the researchers conclude that TQM core elements have a significant and positive
effect on knowledge sharing. In short, data analysis results provide sufficient evidence to support all nine
alternative hypotheses.

Discussion and study implications

Indisputable, there is a growing number of literature reviews on TQM in education. However, there has been
almost anecdotal and no-methodologically rigorous research (Lim et al., 2004). Considering the study’s
domain, this study attempts to narrow the gap in literature, especially in developing countries. In Iraq
context, most HEIs have started to consider quality as a vital part of their activities in order to improve their
performance. Among all quality practices, increasingly educational organizations have focused on TQM core
elements (Lim et al., 2004; Venkatraman, 2007). In this regard, it has been noted that the implementation of TQM is inherently associated to knowledge management processes (Sallis & Jones, 2002; Hsu & Shen, 2005; Ju et al., 2006). Surprisingly, very few empirical studies have explored the relationship between TQM practices and knowledge sharing (Ooi et al., 2010).

The purpose of this study is to examine the relationship between TQM core elements and knowledge sharing within Iraqi HEIs. Throughout testing the research hypotheses, which were developed based on a comprehensive literature review, the purpose was accomplished. The significant implications of the results for researchers and practitioners, correspondingly, are discussed in the rest of this section. Results of Pearson correlation pointed out that all the correlations among the TQM core elements were significantly positive with each other. The findings also consistent with those in literature that have demonstrated that TQM practices should be implemented collectively rather than separately (Ahire et al., 1996; Lim et al., 2004).

In addition, correlation results indicated that the TQM core elements had a strong association with knowledge sharing (see Table 4). This study is consistent with the prior research conducted by Ooi et al. (2010). In this regard, it is found that Iraqi HEIs can benefit from TQM core elements. The correlation results of this study also revealed that employee involvement recorded highest correlation with knowledge sharing (.838), followed by leadership commitment (.779), continuous improvement (.772), management by fact (.710), and rewards and recognition. Thus, focusing on these practices will enhance the capability of knowledge sharing within Iraqi HEIs context. More detail, for example, employee involvement had the greatest correlation with knowledge sharing as compared to the other TQM core elements. One possible reason is that the purpose for employee involvement is to encourage creative thoughts via teamwork activities (Sallis & Jones, 2002; Venkatraman, 2007; Bayraktar et al., 2008). Such teamwork creates opportunities for employees to disseminate their knowledge, which in turn leads to enhance their capabilities for knowledge sharing.

Leadership commitment can be embodied through establishing a quality culture and provide adequate internal communication through the organization (Venkatraman, 2007). Thus, academic leadership must be committed as much as necessary in terms of providing adequate resources and creating an excellent environment in order to support the process of knowledge sharing.

Within TQM core elements, management by fact also recorded great association with knowledge sharing. As mentioned by Venkatraman (2007), TQM is a fact-based system that stresses the importance of the measurement and analysis of performance. Such criteria for measuring performance should be derived from the organization’s needs and strategy, which should provide critical knowledge about key processes and results (MBNQA, 2004). For this reason, the sharing of the relevant knowledge to organization’s needs is essential for performance measurement.

As for the relationship between management by fact and knowledge sharing, the findings also highlight the importance of rewards and recognition, which is found to have a significantly positive and high correlation with knowledge sharing. Therefore, a rewards and recognition is a significant factor and very imperative in better sharing of organizational knowledge. It then becomes essential for HEIs to integrate staff performance and rewards/recognition system capable of recognizing academic staff that has performed extraordinarily in order to enhance the process of knowledge sharing among others.
In regard to identifying the effect of the TQM core elements on knowledge sharing, the regression model has moderately high values of $R^2$, adjusted $R^2$ and significant F-values. Results of multiple regression indicated that employee involvement was positively related to knowledge sharing and had the greatest impact on the dependent variable as compared to the other eight practices. One plausible reason is that employee involvement creates an environment in which people have an impact on decisions and achievements that influence their works (Venkatraman, 2007; Ooi, 2009). According to Chong and Choi (2005), employee involvement is a group of techniques aimed at sharing knowledge. From the literature of TQM, there is no way to talk about employee involvement without mentioning working jointly as teamwork (e.g., Venkatraman, 2007; Santos-Vijande & Alivarez-Gonzalez, 2007). The authors underpin that employees with various knowledge and special skills should be placed together in order to obtain cooperation and interaction. This is considered as one of the advantages of employee involvement. Thus, employee involvement plays a major role in ensuring that the share information and knowledge throughout the organization.

However, the values of overall standard errors and many insignificant independent variables primed the researchers to the presence of multicollinearity problem. Multicollinearity could lead to incorrect variable estimations and eventually unstable regression models formation. Therefore, there is a need to employ other statistical technique to handle this problem. In this study, PCA technique was utilized to reduce the effect of multicollinearity as recommended by Hair et al. (2010). The results of the simple regression analysis implied that TQM practices (collectively) have a significant and positive effect on knowledge sharing. The results as well consistent with those in the literature that stated that TQM practices positively and significantly contribute to knowledge sharing (e.g., Ju et al., 2006; Molina et al., 2007; Ooi et al., 2010).

The implications of this study can be divided into three perspectives: theoretical contributions, robustness of research methodology, and practical contributions. From the theoretical aspect, this study confirmed the importance of TQM core elements in the education service sector. This study supports the studies (e.g. Samson & Terziovski, 1999; Lim et al., 2004; Bayraktar et al., 2008) in which TQM is operationalized as a multidimensional construct. In addition, it gives contribution to the literature in terms of the impact of TQM core elements on knowledge sharing and provides to a better understanding of the relationship between TQM and knowledge sharing in the educational organizations. Therefore, implementation of TQM is critical since the TQM core elements are found to have a significant positive impact on knowledge sharing. In brief, knowledge sharing will enhance the possibilities for reaching organizational excellence if there is a sound management base like TQM. Considering the study’s field, these findings have some important implications for theory. It is also important to note that this study attempts to enrich the literature review and make a contribution in TQM-related studies, especially in developing countries.

Indisputable, there is a growing number of literature reviews on TQM in education. However, there has been almost anecdotal and no-methodologically rigorous research (Lim et al., 2004). With regard to the research methodology, in this study, the survey instrument has achieved the validity and reliability criteria, thus leading to greater accuracy of results. The findings contribute by using HEIs in Iraq, which proves to be valuable as an example of a methodology that might be used to track the extent of TQM effects on organizational knowledge sharing.

In terms of practical implications, the study highlights management issues involving the influence of TQM core elements on knowledge sharing. In the other words, this study draws attention to the role of academic leadership in generating relevant organizational knowledge through TQM core elements. However, if HEIs
as knowledge-driven organizations need to leverage knowledge sharing capabilities, stress should be given to TQM core elements, which are: leadership commitment; strategic planning; continuous improvement; student focus; process focus; academic staff involvement; training and learning; rewards and recognition; management by fact. Hence, by implementing these elements collectively and effectively, academic leadership can use the items establishing TQM in this study to evaluate where their organization stand with regard to the use of TQM core elements or as a guideline in implementing them. Furthermore, they can use the items constituting the knowledge sharing as a check instrument to evaluate the results of knowledge sharing process over time.

The researchers believe this study contains findings that are useful to practicing managers not only in the educational service sector but also the non-educational organizations. This study has shed some light for managers how a plan to improve knowledge sharing capabilities into their organizations, whereby the top management will be able to gauge the effects of TQM core elements and the knowledge sharing process.

Conclusion and future research

This study explored the relationship between TQM core elements and organizational knowledge sharing. Results have shown that the TQM core elements had a significant effect on knowledge sharing; educational organizations, hence, need to find solutions on how to improve these elements in order to enhance the capabilities of knowledge sharing among academic staffs. On the other hand, the current study provides empirical evidence of the essential of implementing of TQM core elements holistically rather than individually.

Moreover, this study provides practical information, which assists the academic leadership to identify areas of concern and utilize corrective practices. Specifically, the academic leadership of the educational organizations should make efforts to identify the weakness in encouraging knowledge sharing practices among the academic staffs. The identified elements should be carefully adjusted to promoting knowledge sharing among the organizational members. Otherwise, the academic leadership should employ in the formulation and implementation of strategies that are consistent with the goals of encouraging the process of knowledge sharing among the educational partners. Currently, many Iraqi HEIs have been implementing quality management practices, especially TQM in order to improve their achievements. In this regard, the present study serves as a guide to decision makers, who seek to improve their organizational knowledge and capturing the particular knowledge via TQM programs. TQM program as a knowledge-based approach will guide and facilitate the process of knowledge sharing, thereby assisting the organization to achieve organizational excellence and better meet the changing necessities of their customers.

The findings indicate that HEIs should emphasize greater attention to the soft quality elements of TQM namely: leadership commitment; strategic planning; continuous improvement; customer focus; process focus; employee involvement; training and learning; rewards and recognition; and management by fact. To other researchers, future studies should attempt to identify the effect of hard quality elements of TQM that may produce such differences. The theoretical model used in this study can also be tested by conducting cross-country studies. In addition, this study would help the researchers to recognize imperative variables of TQM practices for educational organizations in developing countries, especially in the study of TOM in Iraq.
This study covers only 41 colleges within four public universities in Iraq. More variations of results could be obtained through a wider coverage of respondents. Otherwise, a comparison between public universities and private universities could provide additional insights. For future study in this line of research, the researchers believe that the analysis of the effect of TQM practices in other knowledge management processes (such as knowledge acquisition, knowledge creation, and knowledge application) is essential. The relation between TQM practices and knowledge management processes has been studied before (Ooi, 2009), but empirical studies in this field are very scant. Finally, the researcher hoped that this study would encourage or at least inspire attention towards further research in domain area as more empirical studies on this subject issue is required.

References


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