# TQM Practices and Organisational Knowledge Creation: An Empirical Study of Iraqi Higher Education Institutions

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## ABSTRACT

This study aims to investigate empirically the relationship between the key practices of total quality management (TQM) and organisational knowledge creation (OKC) as perceived by academic leadership in Iraqi Higher Education Institutions (HEIs). Based on a survey design, the study is conducted on 41 quality improvement-adoption colleges in Iraqi HEIs. The hypotheses of this study are tested through correlation and multivariate analyses. The results support the main hypotheses for the study, suggesting that Iraqi HEIs can benefit from TQM practices. Pearson correlation points out that all practices of TQM have significant correlations with OKC. Regression analyses show significant positive relationships. Additionally, statistical analysis also indicates that the TQM practices should be implemented collectively rather than individually. In conclusion, this study provides insight and further understanding of the effect of TQM practices on OKC, and therefore, allows practitioners to get in-depth knowledge about the impact of TQM practices in Iraqi HEIs context.

**Keywords:** TQM, Organisational Knowledge Creation, Iraqi HEIs
**JEL Classification:** M19, I32

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## 1. Introduction

Throughout the world, organisations are facing a common challenge resulting from rapid changes in a new knowledge economy. Hence, organisations need to improve their activities in order to gain sustainable competitive advantages. Many organisations accept Total Quality Management (TQM) as a management paradigm in order to cope with the changing expectations of the organisation. TQM has its own origins established primarily in the industrial sector. This paradigm was adapted, spread later on to profit-organisations (such as banks and insurance companies), and eventually to non-profit organisations, including public organisations (such as health and education institutions).

Since 1980s, TQM has been considered as a dominant management strategy and a revolutionary instrument for managing change. According to McAdam (2000), 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 (McAdam, 2000). Shewhart's work was later adopted and expanded by American experts (such as P. Crosby, E. Deming, and J. Juran). Whereas, some thought that the concept of TQM started from the initiatives of Japanese scientists (Taguchi, Ishikawa, and Shingo) after World War II (Sallis, 2005). Notwithstanding TQM has its establishment in the industrial sector, there has been a push to adopt TQM by educational organisations (Bayraktar, Tatoglu, & Zaim, 2008; Lim, Rushami, & Zainal, 2004; Sirvanci, 2004; Venkatraman, 2007).

According to Sirvanci (2004), higher education institutions (HEIs) are knowledge based organisations with research and teaching/ learning as the key functions. It is ironic that educational organisations were lagging behind other organisations in adopting TQM practices. Nevertheless, TQM philosophy had been applied by universities and colleges in the USA, UK, and in Asian countries. In Malaysia, TQM has been applied by the public universities (Lim et al., 2004). According to Yousif (2007), Iraqi universities consider adoption of TQM practices from the implementation of the national system of academic accreditation in 1993, in order to achieve better educational quality.

In the past, Iraqi universities were ranked the best in the Middle East and Gulf region countries. However, after the economic sanction, when Iraqi HEIs suffered from a prolonged period of relative isolation due to the sanctions imposed by the United Nations, their rankings deteriorated (Kaghed & Dezaye, 2009; UNESCO, 2008). According to

the International Conference on Higher Education in Iraq (2007), Iraqi universities have suffered in terms of the curricula, resources, teaching methods, modern technology and research. It was emphasised that there is an urgent need to bring back the lost glory to the Iraqi educational institutes (Iraqi–HEOC,2007).

In this knowledge age, educational organisations are affected by the rapid changes in the business environment. Sallis and Jones (2002) reveal that the challenge now for educational organisations is to establish attitudes and guidelines on how relevant knowledge can be created, acquired, and shared. According to Zwain, Lim, and Othman (2012), despite the fact that knowledge management initiatives in Iraqi universities are still in their infancy, it is highly possible to apply them as universities are knowledge-based organisations. Unfortunately, very few studies have been conducted to examine the knowledge creation capability in the context of Iraqi HEIs.

Notwithstanding the significant affinity that exists between TQM practices and knowledge creation, there are few empirical researches on the link between TQM and creating organisational knowledge (Colurcio, 2009). Thus, this study attempts to fill the gap in the TQM literature on the importance of organisational knowledge creation (OKC). More specifically, the main purpose of this study is to explore whether TQM practices have a significant impact on organisational knowledge creation in the Iraqi HEIs context.

## 2. Literature Review and Research Hypotheses Development

This section presents brief definitions of the two concepts included in this study, which are TQM practices and organisational knowledge creation; and provides a theoretical foundation to propose the study's hypotheses.

### *2.1 Practices of TQM*

There are numerous definitions of TQM; interestingly, no exclusive definition can explain the whole picture (Eriksson & Hansson, 2003) as different authors viewed TQM from a number of perspectives, which dictate the ways they define it. However, a review of the TQM literature suggests a blend of "soft" and "hard" quality elements of TQM. Vouzas and Psychogios (2007) reveal that all the definitions of TQM point out two important aspects, which include the hard side and the soft side. The hard or technical side refers to management systems tools and

techniques, while the soft or philosophical side relates to management concepts and principles (practices). This study is limited to the soft elements of TQM being the key practices of TQM.

In the education context, Sallis (2005) defines TQM as a philosophy behind continuous improvement, which is capable of providing any educational institution with a set of essential practices for meeting and exceeding present and future customers' needs, wants, and expectations.

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

Various studies have been carried out to identify those practices that can be used in constituting the TQM paradigm (Karia & Asaari, 2006; Montes, Jover, & Fernandez, 2003; Vouzas & Psychogios, 2007; Whitney & Pavett, 1998). Generally, however, the literature does not identify a single, meaningful definition for the practices of TQM, but rather presents a set of practices, which are considered essential for the establishment of TQM (Karia & Asaari, 2006; Montes et al., 2003).

According to Tari (2005), practices of TQM can be viewed from three different perspectives: contributions from quality gurus, empirical studies, and quality standardised models. On the basis of a thorough review and synthesis of TQM literature, researchers have identified nine key practices of TQM in the education context. These practices of TQM are namely: (1) leadership commitment, (2) strategic planning, (3) continuous improvement, (4) student focus, (5) process focus, (6) academic staff involvement, (7) training and learning, (8) rewards and recognition, and (9) management by fact. (Bayraktar et al., 2008; EFQM, 2009; Evans & Dean, 2003; Kanji & Tambi, 1999; Lim et al., 2004; MBNQA, 2004; Samson & Terziovski, 1999; Taylor & Wright, 2003; Venkatraman, 2007).

From resource-based view (RBV) theory, organisations perform well and create value when they implement strategies that exploit their internal resources and capabilities (Barney, 1991). Consistent with this view, TQM practices become resources that are valuable,

rare, inimitable, and non-substitutable for maintaining competitive advantage and better performance (Tena, 2004). Therefore, the practices of TQM are all resource-based, since they are tools for achieving a sustainable competitive advantage.

In the RBV, knowledge is seen as a strategic asset with the potential to be a source of sustainable competitive advantage for an organisation. Thus, the knowledge-based view of the firm (Grant, 1991) builds upon and extends RBV theory. In line with Tena (2004), the authors believe that the RBV perspective provides a useful theoretical basis for explaining the effects of TQM practices on organisational knowledge creation.

### *2.2 Creating Organisational Knowledge*

Knowledge has become a critical source for organisations to improve their performance and obtain sustaining competitive advantage (Liao & Wu, 2009; Mohammad, Hamdeh, & Sabri, 2010). According to Peter (2005) and Hawamdeh (2007), creating organisational knowledge can be viewed from the following two perspectives: epistemological and ontological.

*Epistemological dimension*: Organisational knowledge is created or derived from its distinction between tacit and explicit knowledge. Tacit knowledge is personal knowledge, context-specific, and then difficult to formalise and communicate. Tacit knowledge needs to be converted into words or numbers. Meanwhile, explicit knowledge refers to knowledge that is transmittable in systematic languages across the individuals officially and cleanly.

*Ontological dimension*: This views creation of the organisational knowledge as a process of improving the existing knowledge created by individual. This view is crystallised in the virtual knowledge network.

From the literature, the viewpoint of organisational knowledge creation has been broadly accepted and known to researchers as the *knowledge creation model* of Nonaka and Takeuch (Gunnlaugsdottir, 2003; Nonaka & Takeuchi, 1995; Sallis, 2005; Sallis & Jones, 2002; Small & Sage, 2006). It is shown in Figure 1 below.

Generally, organisational knowledge is created through particular conversions; these conversions are of four categories:

> ***Internalisation*** *(Explicit-to-Tacit)*: People learn by obtaining public (explicit) knowledge from books, the internet, or training to get an experience in a particular job. This organisational knowledge is internalised.

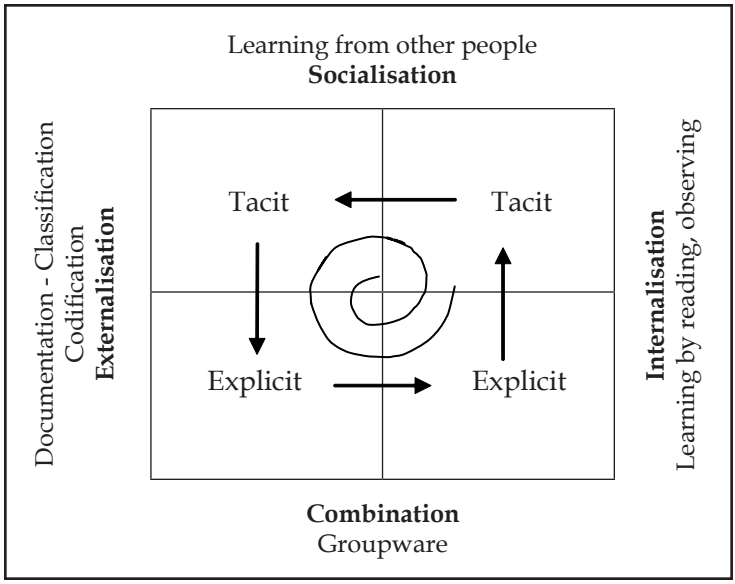


Figure 1: Process of Organisational Knowledge Creation
Source: Gunnlaugsdottir (2003) Adopted from Nonaka & Takeuchi, 1995

***Socialisation*** *(Tacit-to-Tacit)*: People learn by socialising with other people, sharing ideas and exchanging experiences through different means, such as a meeting or discussion forum.

***Externalisation*** *(Tacit-to-Explicit)*: Personal (tacit) knowledge gets to be public (explicit) knowledge through documentation. Individuals' knowledge is accumulated, documented and categorised to be available for reuse by others.

***Combination*** *(Explicit-to-Explicit)*: In this form of knowledge creation, it requires transforming an explicit knowledge to another explicit form. Such conversion could be achieved via groupware to create new organisational knowledge.

However, knowledge can be created based on three levels; these include the individual, the group or team and the organisational level (Frappaolo, 2006). Since there are several forms of knowledge creation,

researchers are interested in the organisational form of knowledge, which combines all three levels of knowledge. According to Small and Sage (2006), organisational knowledge is defined as a dynamic combination of personal, group, organisational and inter-organisational experiences, values, information and specialist insights. In the context of the HEIs, such a knowledge creation process also depends on inter-organisational experiences of their staffs.

Based on the above discussion, knowledge creation can be defined as a process of updating existing knowledge based on continuing experience in a specific domain, where the new knowledge can then be used in combination with the existing knowledge to come with an updated knowledge (Frappaolo, 2006; Liao & Wu, 2009; Peter, 2005). In other words, organisational knowledge creation can be viewed as outcomes of performing a particular work, where the comparison between the initial experience before performing the work, and the outcome is translated into organisational knowledge. Hence, the organisational knowledge of this nature can be valuable as a guide to create new knowledge in the future.

### *2.3 Research Hypotheses Development*

In spite of the large body of literature in TQM, empirical evidence supporting the relationship between TQM and knowledge creation is surprisingly sparse (Colurcio, 2009). Nevertheless, most of the prior empirical studies were conducted in the manufacturing industry and did not reflect the service sector (such as Colurcio, 2009; Linderman, Schroedera, Zaheera, Liedtkeb, & Choo, 2004; Tena, 2004; Ooi, 2009), particularly the educational sector. Although these studies contain valuable and insightful information that can help understand the relationship between TQM and knowledge creation; it is essential to advance these works using a more methodologically rigorous research to explain the pattern of the relationship between TQM and OKC empirically. Based on the relevant literature, the research hypotheses are developed as follows:

> ***Leadership commitment*:** Several researchers revealed that leadership commitment is considered the main element for adopting TQM; without this commitment, no TQM programme can be successful (Lim et al., 2004; Ooi, 2009; Venkatraman, 2007). Such commitment can be embodied through establishing a quality culture

and providing adequate internal communication throughout the organisation (Colurcio, 2009; Ooi, 2009; Venkatraman, 2007). Therefore, the top management (academic leadership) plays a fundamental role in creating an excellent environment for getting relevant knowledge and enhancing organisational knowledge creation. In this regard, the first hypothesis ($H_1$) of this study is that *leadership commitment has a direct positive effect on OKC.*

***Strategic planning*:** Strategic planning can be defined as the process which involves the top management of an organisation in planning its future by designing a number of required procedures in achieving the organisational objective (Evans et al., 2003). In other words, strategic planning for quality as managerial behavior delineates who we are and where we are trying to go. As a result, quality improvement is a strategic issue, rather than the technical aspects (Colurcio, 2009; Ooi, 2009; Santos-Vijande & Alvarez-Gonzalez, 2007). Regarding HEIs, strategic planning as organisational guidance provides a base for how educational organisations can organise their abilities and resources to create new organisational knowledge. Such knowledge is aimed at achieving organisational objectives (Lim et al., 2004; Linderman et al., 2004; MBNQA, 2004). Thus, the second hypothesis ($H_2$) of this study is that *strategic planning has a direct positive effect on OKC.*

***Continuous improvement*:** Several researchers clearly state that the organisation employing a TQM program becomes a learning organisation because it integrates attitudes of continuous improvement and knowledge creation capabilities (Colurcio, 2009; Linderman et al., 2004). Therefore, it is very important to know the process of continuous improvement; it requires everyone to know what to do at a given time and how to do it (Ahmed, 2008; Lim et al., 2004; Tena, 2004). In this belief, HEIs are tasked with the responsibility of demonstrating quality in their activities. Such quality is monitored through continuous improvement in order to create the newly organisational knowledge. Hence, the third hypothesis ($H_3$) of this study is that *continuous improvement has a direct positive effect on OKC.*

***Student focus*:** Since TQM practices are adopted in HEIs; there is much debate on who is the primary customer of HEIs (Sirvanci,

2004). Many researchers find that the primary customer in an education system is the student (Bayraktar et al., 2008; Kanji & Tambi, 1999; Lim et al., 2004; Sakthivel, Rajendran, & Raju, 2005; Sirvanci, 2004). However, student focus involves efforts to identify students' requirements. These efforts include getting information about students' satisfaction, suggestions or complaints; and subsequently create such knowledge within the educational organisation itself (Bayraktar et al., 2008; Kanji & Tambi, 1999; Lim et al., 2004; MBNQA, 2004; Sallis, 2005). In order to push forward these efforts, the process of knowledge creation is carried out among HEIs. In this regard, the fourth hypothesis ($H_4$) of this study is *that student focus has a direct positive effect on OKC.*

***Process focus*:** According to Bergman and Klefsjo (2003), a process is any activity or set of activities that take an input, adds value to it, and makes available the output to an internal or external customer. Since HEIs are established for three main purposes namely teaching/learning, research and community development, researchers concentrate on the teaching/learning process, because it is considered the core process in HEIs (MBNQA, 2004; Venkatraman, 2007). Thus, this practice stresses the value added to the educational process (teaching/learning) in order to increase students' achievements and improve the overall academic performance (Lim et al., 2004; Venkatraman, 2007). To improve these achievements, knowledge creation is supported among educational partners (Bayraktar et al., 2008; MBNQA, 2004). Consequently, the fifth hypothesis ($H_5$) of this study is that *process focus has a direct positive effect on OKC.*

***Academic staff involvement*:** In general, there is no individual involvement of an employee without working together as a team within an organisation. Therefore, in the higher education context, this practice involves academic staff's participation in making decisions related to their work and working as a team (Bayraktar et al., 2008; Colurcio, 2009; Lim et al., 2004; MBNQA, 2004; Venkatraman, 2007). Such teamwork creates opportunities for staff to disseminate their knowledge. Moreover, academic staff with various knowledge and special skills are considered professional knowledge workers in HEIs (Sallis & Jones, 2002). Undeniably, the process of knowledge creation will be enhanced since academic

staff work as teamwork. Based on the above discussion, the sixth hypothesis ($H_6$) of this study is that *academic staff involvement has a direct positive effect on OKC.*

***Training and learning*:** Many studies have included employee training and learning as one of the TQM practices (Bayraktar et al., 2008; Ooi, 2009). High-quality people cannot guarantee successful achievement of TQM within an organisation without constant improvement with training and learning (Kanji & Asaari, 2006). Organisational knowledge at work is assumed to increase if there is improvement in the academic staff's knowledge about their job-skills. The improvement could be achieved by upgrading the required skills through specific training and learning programme (Tena, 2004; Linderman et al., 2004; Ooi, 2009). In this case, training and learning play a vital role in creating an appropriate environment, which encourages every member of staff to create new knowledge. Since training and learning help to improve the process of organisational knowledge creation, the seventh hypothesis ($H_7$) of this study is that *training and learning have a direct positive effect on OKC.*

***Rewards and recognition*:** Several scholars and researchers have mentioned the importance of reward and recognition in the quality improvement activities (Everett, 2002; Lim et al., 2004; Santos-Vijande & Alvarez-Gonzalez, 2007). According to Sweins and Jussila (2010), it is important to recognise and reward those employees who play progressive roles within the organisation as a way of increasing efficiency at work. Similarly, in educational organisations, efficiency at work can be enhanced by motivating academic staff to assist each other in carrying out educational duties (Bayraktar et al., 2008; Lim et al., 2004; Lin, 2007). With the support from the top management and appropriate rewards, it could further enhance the process of knowledge creation. Consequently, the eighth hypothesis ($H_8$) of this study is that *rewards and recognition have a direct positive effect on OKC.*

***Management by fact:*** In TQM, knowing the current performance is considered to be necessary. If we know where we are starting from, we can measure our improvement. It is argued that information/ knowledge to be disseminated to people should be based on facts

(Hsu & Shen, 2005; Talavera, 2004). According to Nonaka and Toyama (2003), knowledge is not just part of reality. It is a reality viewed from a certain angle. Based on this viewpoint, HEIs like any organisation depend on the measurement and analysis of performance. Such criteria for measuring performance should be derived from the organisation's requirements and strategy, which should update the existing organisational knowledge based on reliable information (Lim et al., 2004; MBNQA, 2004; Ooi, 2009). This is where knowledge creation comes in. Hence, the nineth hypothesis ($H_9$) of this study is that *management by fact has a direct positive effect on OKC*.

## 3. Research Framework and Methodology

The main objective of this study is to investigate the relationship between the multidimensionality of TQM practices and OKC. Based on relevant literature (such as Bayraktar et al., 2008; Colurcio, 2009; Linderman et al., 2004; Lim et al., 2004; MBNQA, 2004; Ooi, 2009), a research framework was developed. According to Sekaran and Bougie (2010), the research framework presents a model that defines the logical relationships among

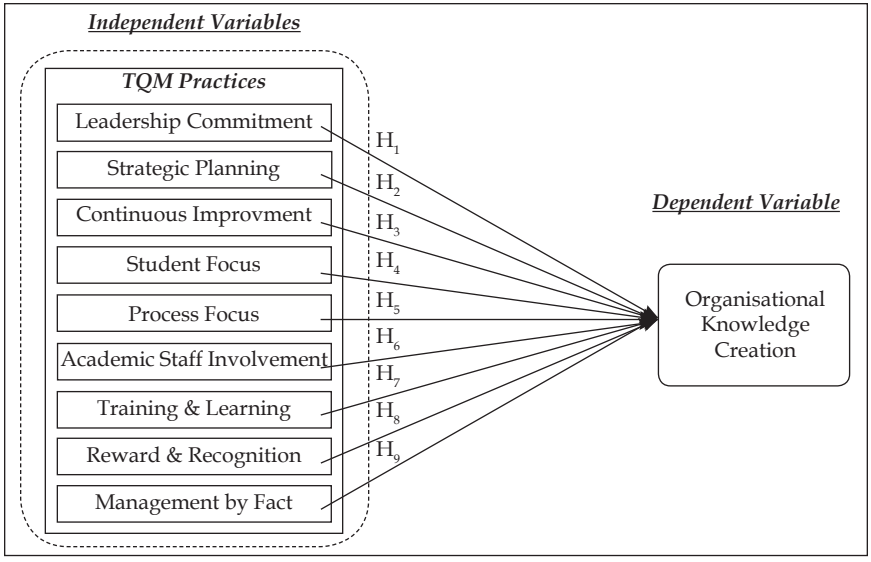


Figure 2: Research Framework

several factors that have been identified as important to the research problem. Therefore, based on the theoretical foundations which are reviewed in the literature, the research framework was developed to investigate the relationship between the study's variables; TQM practices and OKC. Figure 2 demonstrates these relationships. In this framework, TQM practices are the independent variables, whereas organisational knowledge creation is the dependent variable.

### *3.1 Research Design*

This study is based on a survey design and the time horizon was cross-sectional with minimal researcher's interference. Since the objective of this study is to identify the actual level of TQM practices on the process of OKC in Iraqi HEIs, academic leadership (dean or assistant dean) were considered appropriate respondents. The choice of respondents was based on the questionnaire's requirement of comprehensive information about TQM practices and OKC adopted by their colleges. Hence, such information cannot be expected from other people.

The population involved in this study was all colleges within four public universities (N=74 colleges). Out of 24 public universities, (in terms of quality improvement–adoption), these four universities were listed by Ministry of Higher Education and Scientific Research in Iraq. For data collection purposes 64 questionnaires[1] were distributed personally to the respondents, starting on 25 November 2010. After three weeks, a total of 47 questionnaires were returned; and six questionnaires were omitted from the analysis because they were not completed. Subsequently, the final number of participants in this study was 41 colleges; this led to a valid response rate of 64 per cent. The response rate is satisfactory, and exceeds the minimum of 30 per cent as recommended by Sekaran and Bougie (2010).

The study hypotheses were tested using correlation and regression analyses. The respondents were requested to rank the degree or extent of TQM practices and OKC in their organisations on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree.

### *3.2 Instrument Measures*

To measure the two variables which are the cornerstones of this study, we adopt the items of instrument from the relevant literature. We did

[1] Out of 74 colleges, 10 colleges were excluded from this study. These colleges were established recently; therefore, their quality practices were still in the infant stage.

not conduct a pilot study because of the limited number of colleges that were subjected to testing in this study (N=74). However, the instrument measures were subjected to a pre-test by a panel of experts and academicians. Table 1 shows the number of adopted items and its sources.

In order to improve the validity and reliability of the instrument measures, factor analysis (FA) and reliability test were employed. The suggested sample size for stable FA results is roughly 5-10 observations per item (Hair, Black, Babin, & Anderson, 2010). Thus, in this study, the FA for each construct was conducted independently. This method is supported by several researchers and statisticians (e.g., Ahire, Golhar, & Waller, 1996; Lim et al., 2004; Lee & Lee, 2007), that researchers should examine the FA on each construct separately, if the sample size is relatively small. Therefore, if the FA for all constructs were conducted jointly, at least 275 observations (55 items × 5 = 275) were required. This number was larger than the size of the study population (N=74).

Table 1: The Number of Adopted Items and its Sources

| Constructs | Code | No. of Items | Sources |
|---|---|---|---|
| *Independent Variables* | | | |
| Leadership Commitment | LC | 8 | Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007; Bayraktar et al., 2008 |
| Strategic Planning | SP | 6 | Lim et al., 2004; MBNQA, 2004; Santos-Vijande & Alivarez-Gonzalez, 2007 |
| Continuous Improvement | CI | 7 | Antony et al., 2002; Lim et al., 2004; Ahmad, 2008; Lynne & Rose, 2007 |
| Student Focus | SF | 6 | Lim et al., 2004; MBNQA, 2004; Bayraktar et al., 2008 |
| Process Focus | PF | 6 | Bergman & Klefsjo, 2003; MBNQA, 2004; Lim et al., 2004; Ahmed, 2008 |
| Academic Staff Involvement | ASI | 5 | Venkatraman, 2007; Lim et al., 2004; Bayraktar et al., 2008 |
| Training & Learning | TL | 5 | Antony et al., 2002; Lim et al., 2004; Bayraktar et al., 2008 |
| Rewards & Recognition | RR | 5 | Santos-Vijande & Alivarez-Gonzalez, 2007; Bayraktar et al., 2008 |
| Management by Fact | MF | 7 | Talavera, 2004; Lim et al., 2004; MBNQA, 2004; Venkatraman, 2007 |
| *Dependent Variable* | | | |
| Organisational Knowledge Creation | OKC | 8 | Sallis & Jones, 2002; Linderman et al., 2004 |

For this reason, the FA was performed separately on each construct to confirm its scale dimensionality (Hair et al., 2010).

The construct validity was evaluated by factor analysis with Eigen values of at least 1.0, and the factor loading of at least 0.50. Meanwhile, the reliability was evaluated by the coefficient of Cronbach's Alpha with acceptable values of 0.7 and above (Hair et al., 2010; Sekaran & Bougie, 2010). Table 2 illustrates the results of the validity and reliability tests for the latent constructs.

Table 2: Validity and Reliability for the Latent Constructs

| Constructs | No. of Items | Factor Loading | KMO | Eigen Value | % of Variance | Cronbach's Alpha |
|---|---|---|---|---|---|---|
| *Independent Variables* | | | | | | |
| LC | 8 | 0.703, 0.645, 0.837, 0.704, 0.882, 0.699, 0.908, 0.930 | 0.797 | 5.072 | 63.405 | 0.848 |
| SP | 6 | 0.824, 0.817, 0.820, 0.760, 0.642, 0.759 | 0.821 | 3.586 | 59.766 | 0.762 |
| CI | 7 | 0.707, 0.761, 0.894, 0.821, 0.705, 0.659, 0.737 | 0.839 | 4.309 | 61.553 | 0.755 |
| SF | 6 | 0.837, 0.880, 0.762, 0.783, 0.884, 0.702 | 0.837 | 3.942 | 65.696 | 0.855 |
| PF | 6 | 0.742, 0.796,0.861, 0.921, 0.908, 0.748 | 0.757 | 4.158 | 69.306 | 0.782 |
| ASI | 5 | 0.718, 0.786, 0.849, 0.882, 0.706 | 0.776 | 3.134 | 62.673 | 0.847 |
| TL | 5 | 0.812, 0.893, 0.894, 0.797, 0.789 | 0.827 | 3.514 | 70.272 | 0.752 |
| RR | 5 | 0.838, 0.946, 0.954, 0.672, 0.812 | 0.847 | 3.618 | 72.352 | 0.847 |
| MF | 7 | 0.678, 0.772, 0.680, 0.817, 0.845, 0.921, 0.732 | 0.834 | 4.285 | 61.216 | 0.769 |
| *Dependent Variable* | | | | | | |
| OKC | 8 | 0.903, 0.845, 0.837, 0.904, 0.882, 0.809, 0.908, 0.902 | 0.843 | 5.871 | 77.860 | 0.887 |

The results indicate that the factor loadings for all constructs were more than 0.5, and all constructs explained more than 50 per cent of total variance. According to Pallant (2007), the KMO value should be greater than 0.60. In the present study, the KMO values were greater than 0.60, and all the Eigen values of the constructs were above 1.00. Other than that, the Bartlett's test of sphericity was significant at $\alpha$=0.05. Moreover,

the results also show that all values of Cronbach's Alpha were greater than 0.70. Thus, these results provide evidence to support the theoretical conceptualisation of each construct. In short, it can be concluded that the instrument measures used in this study are valid and reliable.

## 4. Data Analysis and Results

The normality of the observed variables was evaluated through the examination of skewness and kurtosis values. None of the observed variables are significantly skewed or high 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 the results of Pearson's product-moment correlation among TQM constructs. All the TQM practices associate significantly with each other. In examining the correlation among the TQM constructs, there exists prior research which found all the correlations among the constructs were positive indicating that the quality management practices should be implemented holistically and comprehensively, not individually (e.g., Ahire et al., 1996; Lim et al., 2004).

In addition, Table 3 exhibits the correlation of TQM practices with organisational knowledge creation variable. All practices of TQM show a strong correlation with OKC. Meaning that, all the TQM practices are highly associated with OKC variable. Table 4 demonstrates the multiple regression analysis between TQM practices and organisational knowledge creation variables.

Table 3: The Correlations among TQM Practices, and between TQM Practices and OKC

| TQM Practices | | LC | SP | CI | SF | PF | ASI | TL | RR | MF |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | LC | 1.000 | | | | | | | | |
| 2 | SP | 0.829** | 1.000 | | | | | | | |
| 3 | CI | 0.701** | 0.565** | 1.000 | | | | | | |
| 4 | SF | 0.550** | 0.773** | 0.584** | 1.000 | | | | | |
| 5 | PF | 0.787** | 0.630** | 0.842** | 0.583** | 1.000 | | | | |
| 6 | ASI | 0.661** | 0.678** | 0.506** | 0.790** | 0.638** | 1.000 | | | |
| 7 | TL | 0.572** | 0.519** | 0.769** | 0.661** | 0.699** | 0.596** | 1.000 | | |
| 8 | RR | 0.705** | 0.666** | 0.613** | 0.597** | 0.805** | 0.661** | 0.757** | 1.000 | |
| 9 | MF | 0.687** | 0.590** | 0.521** | 0.631** | 0.754** | 0.689** | 0.531** | 0.847** | 1.000 |
| OKC | | 0.775** | 0.762** | 0.669** | 0.567** | 0.623** | 0.832** | 0.627** | 0.723** | .676** |

*Note*. Correlation is significant at 1% level (1-tailed).

In a regression model, OKC acts as the dependent variable and TQM with the nine practices: leadership commitment, strategic planning, continuous improvement, student focus, process focus, academic staff involvement, training and learning, rewards and recognition, and management by fact as the independent variables. From the results in Table 4, the analysis shows that strong relationships existed between the TQM practices and OKC as hypothesised; whereas the regression model has moderately high values of adjusted $R^2$ (0.451), which means that 45.1 per cent of the variation in OKC can be explained by all TQM practices.

Table 4 also shows that the majority of regression coefficients are insignificant at α = .05 level. In detail, only two variables have a significant and positive effect on OKC; they are *leadership commitment* ($\beta$=0.246, $p$=0.003) and *rewards and recognition* ($\beta$=0.164, $p$=0.028). The coefficient of *academic staff involvement* ($\beta$=-0.074, $p$=0.383) has a negative sign. Conversely, correlation analysis indicates a positive relationship with the highest coefficient of correlation (0.832) between *academic staff involvement* and *OKC* (see Table 3). Furthermore, the *F*-statistic which tests $H_0$: $R^2 = 0$ is significant at α = 0.05. These findings suggest the possibility for multicollinearity problem in the regression model. This issue is consistent with other researchers namely Agus (2000), Miles and Shevlin (2001), and Lim et al. (2004).

Table 4: Multiple Regression between TQM Practices and Knowledge Creation

| TQM Practices (Independent Variable) | Organisational Knowledge Creation (Dependent Variable) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Beta | Std. Error | Std. Beta | t | Sig. | Multicollinearity Diagnostic | |
| (Constant) | 0.842 | 0.267 | | 3.156 | 0.002 | Tolerance | VIF |
| LC | 0.240 | 0.080 | 0.246 | 2.989 | 0.003 | 0.470 | 2.126 |
| SP | 0.168 | 0.088 | 0.172 | 1.900 | 0.059 | 0.389 | 2.570 |
| CI | 0.085 | 0.083 | 0.097 | 1.022 | 0.308 | 0.356 | 2.812 |
| SF | 0.091 | 0.073 | 0.105 | 1.260 | 0.210 | 0.461 | 2.168 |
| PF | 0.006 | 0.080 | 0.007 | 0.080 | 0.936 | 0.375 | 2.667 |
| ASI | -0.075 | 0.086 | -0.074 | -0.875 | 0.383 | 0.442 | 2.264 |
| TL | 0.058 | 0.068 | 0.068 | 0.844 | 0.400 | 0.488 | 2.047 |
| RR | 0.138 | 0.062 | 0.164 | 2.219 | 0.028 | 0.580 | 1.723 |
| MF | 0.085 | 0.067 | 0.103 | 1.281 | 0.202 | 0.488 | 2.048 |
| $R^2$ | | | | 0.479 | | | |
| Adjusted $R^2$ | | | | 0.451 | | | |
| Significance of $F$ | | | | 0.000 | | | |

According to Hair et al. (2010), Tolerance Value and Variance Inflation Factor (VIF) are the two direct measures of multicollinearity in multiple regression analysis. In this regard, Miles and Shevlin (2001) clearly stated that the Tolerance Value of less than 0.40 and a VIF value of greater than 2.50 is enough to indicate a serious multicollinearity. Table 4 also indicates that the multicollinearity problem presents in the regression model, particularly for *strategic planning* (Tolerance = 0.389, VIF = 2.570), *continuous improvement* (Tolerance = 0.356, VIF = 2.812), and *process focus* (Tolerance = 0.375, VIF = 2.667).

Moreover, some of the coefficients of correlation among TQM practices were above the cut-off of 0.80 for the multicollinearity problem, for instance, the correlation between *leadership commitment* and *strategic planning* (see Table 3). For this reason, a multicollinearity problem existed.

According to Pallant (2007), the results of the multiple regression model with multicollinearity are not trustworthy. This is because when the independent variables are highly related, the estimated standard errors for the coefficients will be large, and as a result the t-statistics will be small (Agus, 2000). The estimated regression coefficients with sizeable standard errors will be unstable and hence, will diminish the analysis. Therefore, there is a need to reduce the multicollinearity effect in regression analysis.

There are several techniques that researchers can use 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 analysed collectively, and the principal component scores of TQM variables were retrieved (Agus, 2000; Lim et al., 2004). A simple linear regression analysis was later carried out between organisational knowledge creation and the first of principal component scores of TQM practices as shown in Table 5.

From the result as shown in Table 5, the $R^2$ is 0.401, which means that 40.1 per cent of the variation in organisational knowledge creation can be explained by TQM variables. The results of simple regression analysis also indicate that TQM variables (collectively) have a significant relationship with organisational knowledge creation variable. Regression coefficient ($\beta$=0.633) of the regression model is statistically positive and significant at $\alpha = 0.05$. Based on $\beta$ value, we conclude that TQM practices have a significant and positive effect on OKC. In brief, the data analysis results provide adequate evidence to support all nine alternative hypotheses.

Table 5: Simple Linear Regression Analysis between Principal Component Scores of TQM Practices and Organisational Knowledge Creation

| Model | Beta | Std. Error | Std. Beta | t | Sig. | $R^2$ |
|---|---|---|---|---|---|---|
| (Constant) | 1.169 | 0.260 | | 4.502 | 0.000 | |
| Regression IV = Principal component scores of TQM | | | | | | 0.401 |
| DV = Organisational knowledge creation | 0.243 | 0.023 | 0.633 | 10.727 | 0.000 | |

*Note*. IV = Independent variables; DV = Dependent variable; Principal component scores are resulted from principal component analysis; * F-statistics are significant at the 5% level.

## 5. Discussion and Study Implications

Recently, many educational organisations have become increasingly interested in making effective applications of TQM practices to improve their activities. From the RBV perspective, TQM is considered a valuable competitive factor, which is rare, inimitable and not substitutable (Tena, 2004). The ability to manage TQM practices in a way that facilitates the creation of organisational knowledge has become a substantial competitive asset. The important role played by organisational knowledge as an intangible resource in gaining a sustained competitive advantage has been highlighted by various studies (Colurcio, 2009; Liao & Wu, 2009; Mohammad et al., 2010; Sallis & Jones, 2002). Equally important, the significance of quality is a key concern for many educational organisations.

Most HEIs have started to consider quality as a critical part of their activities in order to improve their activities. Among all quality practices, increasingly educational organisations have focused on TQM practices (Bayraktar et al., 2008; Lim et al., 2004; Venkatraman, 2007). In this regard, it has been noted that the implementation of TQM is inherently associated with organisational knowledge creation (Linderman et al., 2004). Surprisingly, very few studies have adopted a resource-based view of TQM and its practices to influence organisational knowledge creation (Colurcio, 2009). The majority of these studies were conducted in the manufacturing industry and did not reflect the service sector (such as Colurcio, 2009; Linderman et al., 2004; Tena, 2004; Ooi, 2009), particularly the educational sector. This study opens up research opportunities to fill this gap.

The primary purpose of this study was to investigate empirically the effects of TQM practices on organisational knowledge creation within Iraqi HEIs context. Through 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, respectively, are discussed in the rest of this section.

The results of Pearson's correlation indicated that all the correlations among the TQM constructs were significantly positive with each other. The findings are also consistent with prior studies that have demonstrated that TQM practices should be implemented holistically rather than individually (Ahire et al., 1996; Lim et al., 2004).

Meanwhile, the correlation results indicated that the TQM practices have a strong association with organisational knowledge creation (see Table 3). This study is consistent with the prior research conducted by Linderman et al. (2004) and Colurcio (2009). In this regard, it is found that Iraqi HEIs can benefit from TQM practices. The correlation results of this study also revealed that academic staff involvement recorded highest correlation with OKC (0.832), followed by leadership commitment (0.775), strategic planning (0.762), and rewards and recognition (0.723). Thus, focusing on these practices will enhance the capability of OKC within the Iraqi HEIs context. More details, for example, leadership commitment, can be embodied through establishing a quality culture and provide adequate internal communication throughout the organisation (Venkatraman, 2007). Therefore, academic leadership must be committed to provide adequate resources and create an excellent environment in order to support the process of OKC.

Academic staff involvement has a large correlation with OKC as compared to the other TQM practices. One possible reason is that the purpose for staff involvement is to encourage creative thoughts via teamwork activities (Bayraktar et al., 2008; Sallis & Jones, 2002; Venkatraman, 2007). Such teamwork creates opportunities for staff to disseminate their knowledge, which in turn leads to enhancing their capabilities to create organisational knowledge.

Within TQM practices, strategic planning also recorded a great association with OKC. As mentioned by MBNQA (2004), strategic planning as organisational guidance provides a fundament for how educational organisations can organise its capabilities and resources to create new organisational knowledge. As for the relationship between strategic planning and OKC, the findings also highlight the

importance of the principle rewards and recognition, which is found to have a significantly positive and a high correlation with OKC. Thus, the rewards and recognition is a significant factor and is very important in creating organisational knowledge. In order to enhance the process of OKC, it is necessary for HEIs to integrate staff performance with the rewards/recognition system to recognise academic staff who has performed extraordinarily.

With regard to identifying the effect of the TQM practices on OKC, the regression model has moderately high values of $R^2$, adjusted $R^2$ and significant *F*-values. However, the values of overall standard errors and many insignificant independent variables primed the researchers to the presence of multicollinearity problems. Multicollinearity could lead to incorrect variable estimations and eventually unstable regression model formation. Hence, there is a need to employ other statistical techniques to handle this problem. In this study, the PCA technique was employed 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 organisational knowledge creation. The analytical results are also consistent with those in the literature that stated that TQM practices contribute positively and significantly to knowledge creation capability (Colurcio, 2009; Linderman et al., 2004).

The implications of this study can be divided into three aspects: theoretical contributions, robustness of research methodology, and practical contributions. From the theoretical perspective, this study demonstrated the importance of TQM practices in the education service sector. This study supports Bayraktar et al. (2008), Lim et al. (2004), and Samson and Terziovski (1999) which operationalised TQM as a multidimensional construct. In addition, it contributes to the literature in terms of the impact of TQM practices on organisational knowledge creation and provides a better understanding of the relationship between TQM and OKC in educational organisations. Thus, implementation of TQM is crucial since the TQM practices are found to have a significant positive impact on knowledge creation. In a nutshell, organisational knowledge creation will enhance the possibilities for achieving organisational excellence, if there is a sound management foundation like TQM practices. Considering the study's domain, these findings have some important implications for RBV theory. The philosophy of RBV-TQM strategy serves as guidelines to help in understanding the TQM practices that can maximise OKC process through its holistic

implementation. It is also imperative to note that this study attempts to enrich the literature and makes a contribution in Quality-related studies, especially in developing countries.

Indisputably, there is a growing number of literature reviews on TQM in education. However, they are mostly anecdotal and not methodologically and rigorously researched (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. Studying the extent of TQM effects on organisational knowledge creation proves to be valuable in Iragi HEIs. Iraqi HEIs were chosen because they suffered several problems, especially those related to teaching methods, modern technology and research. To date, Iraqi HEIs have gone through a series of reforms to face the challenges that hinder improving their activities. If the effects of globalisation are considered as well, all of these challenges put Iraqi HEIs under high pressure (UNESCO, 2008). Many researchers reveal that the solution to these challenges is by adopting the innovative and promising approach for sustainable improvement, that is TQM (Bayraktar et al., 2008; Lim et al., 2004; Sirvanci, 2004; Venkatraman, 2007).

In terms of practical implications, this study highlights management issues involving the influence of TQM practices on organisational knowledge creation. In other words, this study draws attention to the role of academic leadership in creating relevant organisational knowledge through TQM practices in Iraqi HEIs. However, if Iraqi HEIs as knowledge-driven organisations need to leverage knowledge creation capabilities, emphasis should be given to TQM practices, which are: leadership commitment; strategic planning; continuous improvement; student focus; process focus; academic staff involvement; training and learning; rewards and recognition; and management by fact. Hence, by implementing these practices collectively and effectively, academic leadership can use the items establishing TQM in this study to evaluate where their organisation stands with regard to the use of TQM practices or as a guideline in implementing them. This study also confirms that when TQM practices are implemented integrally, higher level of OKC can be achieved.

Moreover, if higher-education organisations in Iraq want to strengthen their OKC efforts over time, academic leadership must take into consideration the following points: obtaining needed knowledge from best sources; converting existing knowledge into a valuable form for developing new educational service; utilising feedbacks from

experiences; updating particular knowledge possessed by all academic staff; and generating helpful knowledge via virtual networking.

We believe the findings of this study are useful to practicing managers not only in the educational service sector but also in non-educational organisations. This study sheds some light for managers on plans to improve knowledge creation capabilities in their organisations, whereby the top management will be able to gauge the effects of TQM practices on knowledge creation process.

## 6. Conclusion and Future Research

This study explores the relationship between TQM practices and organisational knowledge creation. The results show that TQM practices have a significant effect on organisational knowledge creation. Educational organisations, therefore, need to find solutions on how to improve these practices in order to enhance the capabilities of creating organisational knowledge among their academic staff.

Currently, many Iraqi HEIs have implemented quality management practices, especially TQM in order to improve their performance and obtain a sustainable competitive advantage (Zwain, Lim, & Othman, 2011). In this regard, the current study serves as a guide to decision makers, who seek to improve their knowledge-creation mechanism and capture the particular knowledge via TQM programmes. TQM programme as a knowledge-based approach will guide and facilitate the process of knowledge creation, thereby assisting the organisation to achieve organisational excellence and better meet the changing requirements of their customers.

The findings indicate that HEIs should emphasis greater attention to the soft quality elements of TQM namely: leadership commitment; strategic planning; continuous improvement; student focus; process focus; academic staff involvement; training and learning; rewards and recognition; and management by fact. 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 researchers identify important variables of TQM practices for educational organisations in other developing countries.

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 sharing, 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 limited. Finally, we hope that this study would encourage attention towards further research in the domain area for more empirical studies.

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