THE IMPACT OF TOTAL QUALITY MANAGEMENT ON KNOWLEDGE MANAGEMENT AND ORGANIZATIONAL PERFORMANCE IN HIGHER EDUCATION INSTITUTIONS IN IRAQ

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By

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ABSTRACT

The purpose of this study was to investigate the relationship between Total Quality Management (TQM); Knowledge Management (KM) and Organizational Performance (OP) in Iraqi higher-education institutions (HEIs). TQM core elements included leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact. KM processes included knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. Meanwhile, measures of organizational performance included students related academic achievement and non-students related academic achievement. Based on the theoretical framework, four main hypotheses were developed, and statistically tested. The study used cross-sectional survey methodology. The samples were drawn from Iraqi HEIs (public universities) using a stratified random sampling procedure based on the directory provided by the Ministry of Higher Education and Scientific Research in Iraq (MHESR-I). The final number of respondents, involved in this study, was 174 colleges (faculties) within 24 public universities. The hypotheses of the study were tested by applying multivariate statistical data analyses. This study reported a significant relationship between TQM core elements and KM processes, between TQM core elements and OP measures, and between KM processes and OP measures. In brief, the results supported all the four main hypotheses, and provided evidence that both TQM core elements and KM processes should be implemented holistically, rather than piecemeal. In addition, the study found that the KM fully mediates the relationship between TQM and OP. The current study provided insight regarding the relationship between TQM, KM and OP. Hence, this study was able to expand the boundary of existing literature. Finally, the findings from this study provided empirical evidence that TQM has a significant and positive impact on KM, which in turn, significantly affect organizational performance.

Keywords: Total Quality Management, Knowledge Management, Organizational Performance, Higher Education

ABSTRAK

Tujuan kajian ini adalah untuk mengkaji hubungan antara Pengurusan Kualiti Menyeluruh (TQM), Pengurusan Pengetahuan (KM) dan Prestasi Organisasi (OP) di dalam konteks institusi pendidikan tinggi (IPT) di Iraq. Elemen-elemen teras TQM meliputi komitmen kepimpinan, perancangan strategik, penambahbaikan yang berterusan, tumpuan pada pelanggan, tumpuan pada proses, penglibatan pekerja, latihan dan pembelajaran, ganjaran dan pengiktirafan, dan pengurusan mengikut fakta. Proses KM termasuk identifikasi pengetahuan, pemerolehan pengetahuan, penyimpanan pengetahuan, perkongsian pengetahuan dan penerapan pengetahuan. Sementara itu, ukuran prestasi organisasi termasuk pencapaian akademik berkaitan dengan pelajar dan pencapaian akademik tidak berkaitan dengan pelajar. Berdasarkan kerangka teori, empat hipotesis utama telah dibangunkan, dan diuji secara statistik. Kajian ini adalah kajian keratan rentas dengan menggunakan kaedah tinjauan. Sampel diambil daripada IPT Iraq (universiti awam) menggunakan prosedur persampelan rawak berstrata berdasarkan direktori yang disediakan oleh Kementerian Pengajian Tinggi dan Penyelidikan Saintifik di Iraq (MHESR-I). Sebanyak 174 kolej (fakulti) dari 24 buah universiti awam telah mengambil bahagian dalam kajian ini. Hipotesis kajian ini telah diuji dengan menggunakan analisis data statistik multivariat. Kajian ini melaporkan hubungan yang signifikan di antara elemen-elemen teras TQM dan proses KM; antara elemen-elemen teras TQM dan ukuran OP; dan antara proses KM dan ukuran OP. Secara ringkas, keputusan analisis menyokong kesemua empat hipotesis utama, dan membekalkan bukti bahawa kedua-dua elemen teras TQM dan proses KM perlu dilaksanakan secara holistik, dan bukannya bahagian demi bahagian. Di samping itu, kajian mendapati bahawa KM menjadi pengantara sepenuhnya bagi hubungan antara TQM dan OP. Kajian ini telah menyumbang kepada peningkatan pengetahuan dan pemahaman tentang hubungan antara TQM, KM dan OP. Oleh itu, kajian ini mampu mengembangkan sempadan literatur yang sedia ada. Akhir sekali, dapatan kajian ini membekalkan bukti empirikal bahawa TQM mempunyai impak positif dan signifikan terhadap KM, yang seterusnya mempengaruhi prestasi organisasi dengan signifikan.

Kata kunci: Pengurusan Kualiti Menyeluruh, Pengurusan Pengetahuan, Prestasi Organisasi, Pendidikan Tinggi

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LIST OF ABBREVIATION

AACSB	Association to Advance Collegiate Schools of Business
AMOS	Analysis Moment of Structures
CFA	Confirmatory Factor Analysis
CMV	Common Method Variance
CSF	Critical Success Factor
EFMD	European Foundation for Management Development
EFQM	European Foundation for Quality Management
EQUIS	European Quality Improvement System
GOF	Goodness-of-Fit
GOFI	Goodness-of-Fit Index
HEI	Higher Education Institution
ISO	International Organization for Standardization
KBV	Knowledge -Based View
KM	Knowledge Management
MBNQA	Malcolm Baldrige National Quality Award
MI	Modification Index
MLE	Maximum Likelihood Estimation
NIST	National Institute of Standards and Technology
NSAA	Non-students Related Academic Achievement
OECD	Organization for Economic Co-operation and Development
OP	Organizational Performance
PCA	Principal Component Analysis
PIHE	Public Institutions of Higher Education
QAA	Quality Assurance Agency for Higher Education
RBV	Resource-Based View
SAA	Students Related Academic Achievement
SEM	Structural Equation Modeling
TQM	Total Quality Management
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER 1
INTRODUCTION

1.1 Background of the Study

Throughout the world, organizations are now facing a common challenge resulting from rapid changes in the business environment. Organizations need to improve their performance in order to gain sustainable competitive advantages to survive in today's competitive environment. This serves as the driving force for a number of innovative strategic changes in many organizations. To cope with the changing expectations of the organization, there is a need for continuous improvement of the organizational performance. Different innovations can be integrated to keep the performance above the competitors of all time. In enhancing the performance of any organization, in doing this effectively, the factors that drive such performance have to be well understood.

Both Total Quality Management (TQM) and Knowledge Management (KM) practices have been used for improving the performance of many organizations (Hung, Lien, Fang & McLean, 2010; Janpen, Palaprom & Horadal, 2005). The clear definition of TQM is not given until the 1980s (Crosby, 1979; Deming, 1986; Juran, 1986). Practitioners, researchers and the like have collectively defended the positive effects of TQM practices on organizational performance. Many organizations adopt TQM as a management paradigm worldwide. TQM has its own roots established predominantly in the industry. This paradigm was adapted, spread later for the profit-making organizations (such as banks, insurance companies), and ultimately to nonprofit organizations, including government and public organizations (such as health and education institutions).

Sirvanci (2004) cited that higher-education institutions (HEIs) are the knowledge base with research and teaching/learning as the fundamental functions. It is ironical that HEIs have been lagging behind other organizations in adopting and embracing this paradigm. TQM models in HEIs are based on the orientation of quality scholars, usually involves a number of “essential factors” or “core elements” such as leadership, customer focus, employee participation and development, training, continuous improvement and several other elements, which are all required for successful TQM achievement (Sirvanci, 2004).

In our modern world popularly referred as the information age, knowledge is the key resource in this era. The problem today is not how to find the information, but how to manage it; the most important challenge for organizations is how to process knowledge and to make it profitable in the recent knowledge-driven organization (Sallis & Jones, 2002). Thus, KM today is attracting great attention in both business and academic realms (Wong, 2005; Zack, McKeen & Singh, 2009). Organizations are viewing KM as a critical success factor in today’s dynamic environment (Ju, Lin, Lin & Kuo, 2006; Yeh & Ta, 2005).

Wang (2007) claimed that KM practice could help organizations in many areas like employee's training, project management, team communication and organizational performance. Understanding the link between KM and organizational performance is important for successful integration of KM into organizational strategy (Carlucci & Schiuma, 2006). Similarly, Iksan and Rowland (2004) emphasized that organizations should have the ability to convey knowledge from one unit/department to another to achieve an overall performance at minimum possible cost.

For an organization to survive and succeed, many researchers proposed that it's crucial to manage TQM well and to achieve KM objectives, both in terms of theory and practicality (Daud & Yusoff, 2011; Hsu & Shen 2005; Ju et al., 2006; Molina, Montes, Fuentes, 2004; Molina, Montes, & Ruiz-Moreno, 2007; Ooi, 2009; Ooi, Cheah, Lin, & Teh, 2012). Consequently, it is clear that both TQM and KM have played significantly in attaining optimum organizational performance.

1.2 The State of Higher Educational Institutes in Iraq

From ancient times, Iraq was known as Mesopotamia *"land between the rivers: Tigris & Euphrates*", and was the cradle of the first civilizations known to man; It wherein arose on the banks of the Euphrates and Tigris the Sumerian, Akkadian, Assyrian and Babylonian civilizations witnessed flourishing on the first forms of social, political and economic organizations. Since the dawn of Islam, Iraq has had a great significance in the regions for the Arabic Islamic civilization. Baghdad, the capital of Iraq remained throughout the ages the lighthouse of culture, civilization and ingenuity bound for by seekers of education from all places attracting men of thought and literature from all around the world (Issa & Jamil, 2010; UNESCO, 2000). Based on these facts, and the extension of the depth of Iraq's cognitive, Iraqi HEIs were considered among the best during the period beginning in the 1800s and extending into the 1990s (Cross, 2006; UNESCO, 2000).

According to Harb (2008) and Issa and Jamil (2010), Iraqi higher-education sector dates back a century; when the first college (College of Law) was established in Baghdad in 1908. Meanwhile, the modern higher-educational institutes were established their beginning with the University of Baghdad in 1957, after that, other universities, including the University of Technology, Al-Mustansiriyah, Basrah, Mousl, Sulaimaniah, and other universities were established during the 1960s and 1970s.

Over the last two decades, Iraq has faced many crises and hard conditions, such as the first and second gulf wars, economic sanctions and finally, the U.S. occupation. According to Kaghed and Dezaye (2009), Iraqi higher-education system was ranked the best in the Middle East and Gulf region countries, not until after the economic sanction when Iraqi educational institutes suffered from a prolonged period of relative isolation due to the sanctions imposed by United Nation. Once sanctions were imposed on Iraqi Government, they were both physically and intellectually isolated from the rest of the world. Some of the most talented academics began leaving the country, and it is estimated that about 10000 of them left during this period (UNESCO, 2000).

The economic sanctions affected all Iraqi sectors, including education system. According to a study entitled "*The economic sanctions imposed on Iraq*", which the Iraqi government submitted to the office of the United Nations High Commissioner for Human Rights on 15th June 1999, which mentioned, "The embargo on education has wound the scientific and technological development gap between Iraq and the outside world since the universities are considered as specialized academic institutions" (UN report, 1999). Following the U.S. occupation in 2003, much of the infrastructure of the Iraq higher education was destroyed; 84% of the higher-education institutions were burnt, looted or destroyed (Cross, 2006; UNESCO, 2003). Therefore, there is an urgent need to bring the lost glory to the Iraqi educational institutes.

A result of these crises and critical circumstances, Iraqi HEIs faced several challenges can be summarized as follows: repair and restore the infrastructure, lack of training programs to develop faculty, shortage of qualified teaching staff, and poor response from the international community in assisting the rebuilding of the Iraqi HEIs (Santisteban, 2005). Certainly, these challenges have caused a decline in the academic performance of Iraqi HEIs.

However, many international and Arab grants were received by the Iraqi HEIs e.g., $25 million offered by the Iraqi high commission for reconstruction of universities; $100 million by the Iraqi Government for scholarships and fellowships for Iraqi students; $20 million for partnerships between Iraqi and US universities; $25 million from Qatar through UNESCO. In addition, an annual funding of $125 million from the Iraqi Government for reconstruction (Cross, 2006).

In October 2008, UNESCO organized an international conference to define the fundamental rights to education in the crisis-affected nations, which Iraq was the target. The conference is titled "*Stop jeopardizing the future of Iraq*". It was gathered from all points of reference in the conference presentations that in developing the social, cultural and intellectual values of the country now and in the future, it is very important to first recover or gain the required capability of the higher educational system. Thus, there is no way a system can be improved if its performance is not of acceptable level (UNESCO, 2008).

Iraq of nowadays is different from the past. The country transformed from the war to development and reconstruction, with a view to closing the gap with the outside world and joining the march of progress and technology (Alhakim, Zwain & Alkafaji, 2009; Elameer & Idrus, 2010). Therefore, Iraqi higher-education institutions today is regarded as one of the most important organizations in the public sector and that its development will promote national peace.

In general, higher education should be given serious attention in virtually all parts of the world. It has been identified as the hub of national development. According to the Bureau of public information, the UNESCO report on higher education revealed that higher education is considered as the pillar for sustainable development in any country, meaning that, the results of improving the performance of higher education affect all other sectors of the national economy (UNESCO, 2006; UNESCO, 2009). It is also gathered from these reports that UNESCO is trying all possibilities to revitalize the Iraqi educational institutes from the current mess. It is then agreed upon that stakeholders in the educational institutes should define a strategy for improving the performance of the Iraqi educational organizations.

As presented above, there are serious problems related to the performance of Iraqi higher educational institutes. Therefore, there is a necessity to define solid performance improvement strategies of the Iraqi HEIs.

1.3 Problem Statement

Nowadays, there are a series of competitions among organizations of all kinds, and this can be traced to the innovation brought by the information technology. No doubt, it takes extra steps for organizations to survive in such a competitive environment. Thus, there is a need for constantly improving the organizational performance to achieve an acceptable level of performance capable of gaining and sustaining competitive advantage. Enhancing organizational performance is not a new thing but the perspectives have been different and most especially, the question is what is the best approach for improving organizational performance in this knowledge-driven economy.

Like other sectors, educational sector is also affected by the rapid changes in the business environment. According to Amin (2006), profound changes resulting from the emerging competitive business environment have made HEIs and universities to think the same way like business organizations. Meanwhile, educational markets are becoming global. Based on this fact, ability to compete and stay in business under such a condition depends largely on how the changes and improvement are managed by educational institutions.

As mentioned earlier, Iraqi HEIs have suffered several problems, especially those related to lower performance. According to the International Conference on Higher Education in Iraq (2007), the final report revealed that the HEIs are the most important aspects of any society. Therefore, what make the HEIs to function are the teaching faculties. It was further noted that Iraqi HEIs had suffered more than necessary in terms of the curricula, resources, teaching methods, modern technology and research. This thereby calls for an urgent improvement in the performance of the Iraqi higher educational organizations.

To date, Iraqi HEIs have been going through a series of reforms to face the challenges that hinder the performance improvement. In addition, the society needs for applying researches, skilled workforce, and variety of educational services. On the other hand, the number of students and research fields are increasing constantly. Hence, all of these challenges put Iraqi HEIs under high pressure if the globalization effects are considered as well (Issa & Jamil, 2010; UNESCO, 2008). Many researchers revealed that the solution to these challenges in higher-education environment is by adopting the innovative and promising approaches for performance improvement. They are TQM (e.g., Lim, Rushami, & Zainal, 2004; Najafabadi, Sadeghi, & Habibzadeh, 2008; Sabihaini et al., 2010; Sakthivel, Rajendran, & Raju, 2005); and KM (e.g., Chen & Burstein, 2006; Daud & Abdul Hamid, 2006; Kidwell, Vander Linde & Johnson, 2000; Sedziuviene & Vveinhardt, 2009).

From theoretical and practical aspect, both TQM and KM have witnessed a widespread acceptance as a means of obtaining better performance and maintaining a competitive edge (Hung et al., 2010; Ooi, 2009; Prajogo & Hong, 2008; Wong, 2006; Zetie, 2002). Hence, this study tries to investigate imperially the influence of these two management paradigms on the organizational performance of Iraqi HEIs.

In spite of the large body of literature in TQM, Venkatraman (2007) noted that the first main barrier for the application of TQM in educational organization is the misinterpretation of TQM philosophy. The lack of proper understanding due to the process of TQM implementation is different in the educational sector as compared to the industry; and the other reason may lie in the lack of necessary knowledge about TQM core elements in the higher-education context (Venkatraman, 2007). Hence, the current study will try to bridge this gap.

In addition, empirical evidences supporting the impact of TQM in higher education are surprisingly sparse (Koch & Fisher, 1998; Lim et al., 2004). Regarding to Iraqi, the HEIs considers implementation of TQM in order to achieve better educational quality (Al-Fatlawy, 2006). According to Yousif (2007), a lot of work is needed in TQM field regarding proper application of TQM with respect to education, research and performance development using the main TQM elements. However, there are very limited studies that touch TQM and its effects on the educational-institutes performance (Al-Fatlawy, 2006; Yousif, 2007). Moreover, most of these researches were conceptual researches and case studies.

From KM literature, it has been generally revealed that most of the KM-performance studies (e.g., Anantatmula, 2007; Darroch, 2005; Kalling, 2003; Kiessling, Richey, Meng & Dabic, 2009; Safa, Shakir, & Boon, 2006; Zack, McKeen, & Singh, 2009) have only been carried out in developed countries such as United States, Australia, and European countries. There are very limited empirical studies that have been conducted in developing countries (Daud & Abdul Hamid, 2006; Muhammad et al., 2011). This study opens up research opportunities to fill this gap.

Even though the KM concept is well-known among scholars, practitioners, and others in the field of business management (Martin, 2005); little quantitative empirical research has been conducted to measure the impact of KM on the performance (Kalling, 2003; Zack et al., 2009).

Kalling (2003) claimed that the managing knowledge should be related to utilization and development of an organization to get better performance. Zack et al. (2009) mentioned that there is a lack of empirical studies that investigated the relationship between KM and organizational performance. Nevertheless, the study was conducted in the manufacturing industry and does not reflect the service industry, especially education sector.

Sallis and Jones (2002) emphasized, there is much need for KM in education as there is in business. If excellent achievements are achieved in one area of the colleges or universities, there should be a process of knowing how they were achieved. However, very few empirical studies have been focused on KM in the field of higher education, especially, in the universities (Alzoubi & Alnajjar, 2010; Muhammad et al., 2011).

In 1993, the Ministry of Higher Education and Scientific Research (MHESR) in Iraq has created the national policies for enhancing the quality of Iraqi HEIs by employing TQM and quality assurance principles (Yousif, 2007), but the implementation of quality practices alone for improving the current level of Iraqi HEIs is not enough for the complete academic institutions' development. Therefore, as directed by the MHESR, Iraqi HEIs have moved towards the application of KM initiatives, along with quality practices to improve their performance, and in order to be agreement with the world technology developer. In fact, there is no specific date for the application of KM in Iraqi HEIs as in TQM. Nevertheless, based on academic researches that were conducted in this area (Aljanabi, 2007; Al-Shamary, 2006), it can be said that the application of KM initiatives was in the beginning of 2005.

KM in Iraqi HEIs is still a recent application, but its possibility of acceptance is high. The fact is the universities are knowledgeable organizations (Alhakim et al., 2009; Al-Shamary, 2006). However, the authors emphasized that the role of KM in improving the performance of Iraqi HEIs needs further studies. Hence, it is necessary to conduct extensive studies on the impact of the KM processes in higher education.

Several authors in the area of TQM and KM proposed stepped implementation models in their various disciplines (e.g., Levett & Guenov, 2000; Oakland, 2000). However, a number of other authors are of the notion that both TQM and KM can complement one another. TQM and KM synergistically combined lead to a cycle of improvement in achieving organizational excellence (Hsu & Shen, 2005; Ribiere & Khorramshahgol, 2004). From the empirical perspective, Ju et al. (2006) claimed that most of the related researches lack empirical evidence on the relationship between TQM and KM, and such that the relationship between both paradigms is, still not clear.

Similarly, Ooi (2009) revealed that the empirical studies to clarify the pattern of relationship between TQM and KM are surprisingly sparse and exceptional. Therefore, more detailed empirical studies are needed to demonstrate the interrelationship between TQM and KM (Daud & Yusoff, 2011; Ju et al., 2006). On the contrary, there has been limited effort done in investigating the relationship between TQM and KM, thus providing a significant gap that needs to be addressed in this study.

On the surface, there are a growing number of anecdotal accounts of the "*successes*" of TQM and KM in education. Nevertheless, there has been almost no theory-building and methodologically rigorous research to validate these evidences (Chen & Burstein, 2006; Venkatraman, 2007). In addition, the researches which linked TQM and KM were conducted in the manufacturing industry and do not reflect the service sector (such as Daud & Yusoff, 2011; Ju et al., 2006; Ooi, 2009; Ooi et al., 2012), particularly the educational sector, which is of interest in this study. Thus, methodologically rigorous empirical studies that examine the link between institutional outcomes and institutional management initiatives are needed to fill these gaps.

Given the above reasons, this study will investigate the following three aspects: 1) the effect of TQM and KM on the performance of educational organizations; 2) the theoretical and empirical evidence that established the relationship between TQM, KM and organizational performance; and 3) the practical aspect, that is, how TQM and KM impact on organizational performance in the Iraqi higher-education context.

1.4 Research Questions

Based on the background of the study as well as the research problem discussed in the preceding section, this study will be guided by four major research questions:

1. What is the relationship between TQM and KM?

2. What is the relationship between TQM and organizational performance?

3. What is the relationship between KM and organizational performance?

4. What is the interrelationship between TQM, KM and organizational performance?

1.5 Research Objectives

The purpose of the study is to examine empirically the impact of TQM on KM and organizational performance. This major objective is divided into four objectives as follows:

1. To investigate the relationship between TQM and KM.

2. To examine the relationship between TQM and organizational performance.

3. To determine the relationship between KM and organizational performance.

4. To ascertain the structural relationship between TQM and organizational performance through the presence of KM.

1.6 Significance of the Study

This study is able to significantly contribute towards extending the boundary of existing knowledge as well as providing valuable empirical evidence for practitioners as detailed in the succeeding paragraphs.

From the literature, a host of concepts as management paradigms have been examined and become the general management terminologies. For instance, TQM has survived and flourished through the efforts of researchers and practitioners. As mentioned earlier, the linkage between TQM and KM has been recognized, the studies have thus far rare and incomplete (Ju et al., 2006; Ooi, 2009).

The idea of this study, that both TQM and KM have great influence on organizational performance most especially in the emerging knowledge-economy where all organizations depend on knowledge, has opened up research opportunities to fill the gap. However, most of the studies that attempted to create a link between the two concepts lack empirical evidence, and the results are not practical enough to generalize.

In this study, the researcher takes a more theoretical and empirical approach to investigate the relationship between TQM, KM, and organizational performance by using quantitative research method. It is believed that the findings of this research will contribute immensely to the body of knowledge in this area by arriving at a better paradigm of improving organizational performance.

Although the proposition of the interrelationship between TQM, KM and performance has been addressed individually by many researchers, but only a few of them, if any, have investigated this interrelationship empirically using structural equation modeling (SEM) analysis, particularly for service organizations. SEM analysis, as carried out in this study, provides a big potential for instrument validation. By testing SEM model, this study offers a rigorous validating analysis of TQM, KM and organizational performance construct that is helpful for future research.

More so, this study could benefit the academic leadership and academicians in educational institutions by enhancing their awareness about the core elements of TQM and key processes of KM to be considered when implementing these two paradigms, that are, TQM and KM. Hence, the present study contributes to the betterment of the education system and the world as a whole. In a few words, this study is significant because:

- In today's uncertain and ambiguous environment, TQM and the management of knowledge in business is a necessary and critical factor for organizational survival; and
- To obtain and maintain sustainable competitive advantage, organizations need a TQM approach that considers KM as a potential source of organizational performance improvement.

The Ministry of Higher Education and Scientific Research in Iraq has promoted quality assurance and TQM program in all Iraqi HEIs with the objective to gain better performance. On the other hand, issues and problems related to the performance of Iraqi HEIs as reported in the UNSCO and Iraqi governmental reports, indicate the lack of ability of Iraqi HEIs to deliver good educational services. By integrating the KM literature together with TQM literature, this study can scientifically convince the decision-makers of Iraqi HEIs that the implementation of TQM is one essential but insufficient step in gaining high-level performance, unless supported by KM processes. Therefore, the outcomes from this study provide the much-needed information regarding the nature of TQM core elements of educational institutions and the intervening effect of KM on organizational performance by producing empirical evidence of these relations.

1.7 Scope and Limitations of the Study

This study is a quantitative and cross-sectional study, using the questionnaire as a research instrument and data were collected by using a self-administered approach. Regarding to the unit of analysis, this study focuses on higher-education institutes in Iraq offering undergraduate program, which include 322 colleges within 24 public universities. The researcher chooses "college level" as the unit of analysis, since the academic college considered an independent organizational unit based on the Iraqi law of the Ministry of Higher Education and Scientific Research numbered 40 of 1988. According to the law, article (10), paragraph (1) stated that colleges associated with the university are given autonomy to manage their own affair to achieve its objectives (ILD, 2011). Accordingly, diversity among educational organizations (colleges) within the university, as well as the variations in the management and performance, justifies the college level of analysis.

In addition, the college level varies from academic leadership perception. Academic leadership may differentiate the implementation of the core elements of TQM and KM processes among the colleges. For these reasons, the deans or assistants of the deans were chosen as the target respondent of the present study.

Typically, the higher education institutions are established for three main purposes namely teaching and learning, research and community services. In this study, the researcher focuses on teaching and learning process, because this process is the core of the educational system in any higher education institution (Venkatraman, 2007).

Iraqi HEIs have been selected as organizations to be surveyed for this study; firstly, because they are still developing organizations. In addition, there are many issues and problems associated with the performance of Iraqi HEIs. Therefore, it became necessary to improve the performance of these organizations. Secondly, the researcher himself is Iraqian, which facilitates the understanding of research data/information, as the researcher is familiar with the culture and educational environment in Iraq compare to other countries.

1.8 Definitions of Key Terms

This section describes briefly some important terms used in the context of this study. The detailed definitions of these terms can be found in chapter two and chapter three.

Total Quality Management (TQM): Is a systematic approach of managing quality aimed at achieving high performance in terms of academic achievement, which requires commitment from the academic leadership by adopting effective core quality elements (leadership commitment; strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact) to develop a cohesive academic environment, which infuses and enhances the continuous improvement for all educational related processes and activities.

Knowledge Management (KM): Is a dynamic combination of specific processes, which include knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. These processes are integrated into the organization's activities in order to exploit the definite knowledge that leads to optimum performance in terms of academic achievement.

Organizational Performance (OP): Is a broad construct, which captures what organizations are involved in, produce, and achieve for the various constituencies with which they interact. For this study, organizational performance is viewed at the level of the institution in terms of academic achievements.

Higher Education Institutes (HEIs): Public or private organizations, state-recognized, post-secondary educational and vocational training establishments which offer, within the framework of advanced training and learning, qualifications or diplomas of that level, whatever such organizations may be called (University, College or Institute).

1.9 Organization of the Thesis

The thesis is divided into six chapters where the first is the introductory chapter that gives the general overview of the entire research process, in summary. This chapter elaborates on the background of the study, the state of HEIs in Iraq, problem statement, research questions, research objectives, significance of the study, and organization of the thesis.

Reviews of the relevant literature on TQM, KM and organizational performance are presented in Chapter 2 with a view to establish the justification for the study.

Chapter 3 presents the research framework of this study. This provides a detailed discussion on the conceptual framework, related theories of the study and statement of hypotheses. Chapter 4 contains the research methodology, which explains how the research activities are conducted. The topics included research design, sampling design and data collection, operational definitions and measurement instrument, pre-test, as well as explanations of statistical tools for analysis of main data and hypotheses testing.

Chapter 5 presents the analysis and findings. Data of the respondents, items and constructs were descriptively analyzed. Construct validity was tested by the traditional approach of factor analysis and Cronbach Alpha using SPSS (Statistical Package for Social Science) software, as well as a more contemporary approach of measurement model. For the latter approach, the SPSS-AMOS (Analysis of Moment Structure) was employed. Hypotheses of the study were tested using regression analysis and structural equation modeling (SEM).

Chapter 6, the final chapter of this thesis, is devoted to discussion and conclusion from the study. This chapter, furthermore, presented the implications and contributions as well as the limitations to this study. Finally, avenues for future research were also suggested.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In this chapter, the basis for this research is evidenced through a detailed review of past related literatures. The review is carried out to identify important themes, concepts, variables, and significant findings, and to facilitate the development of the conceptual framework to be used in this study. Firstly, literature relevant to Total Quality Management (TQM) and its core elements are reviewed to reflect the position of the previous researchers. Furthermore, the concept of Knowledge Management (KM) and at the same time a comprehensive review of organizational performance is carried out for proper justification of the study.

2.2 Total Quality Management (TQM)

The concept of TQM is not particularly new; it has been used prominently since 1980s as an instrument for managing change; and according to Mann (2008), the first study on TQM was published in "*SAM Advanced Management Journal"* in 1984 by Rehder and Ralston. The paper is titled *"Total Quality Management: A revolutionary management philosophy"*. 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). Although, some believed that the concept of TQM started from the initiatives of Union of

Japanese Scientists and Engineers (JUSE) in order to improve the productivity of industries in Japan in the late 1940's, and 1950's (by inviting American experts Deming and Juran) after World War II (Ishikawa, 1985; Kondo, 1993). Rigby (2001) claimed that the TQM concept was founded in Japan and developed in the USA and in other countries is being tailored by many diverse cultures and economies.

Over the past few decades, several TQM gurus such as P. Crosby, E. Deming, J. Juran, A. Feigenbaum, K. Ishikawa, and G. Taguchi have advocated and developed knowledge in the area of quality management. Their previsions have made huge contribution to the total quality management field in different approaches, nevertheless; the spirit and core remained the same; and hence, they are worth being mentioned before embarking on definitions of TQM. Table 2.1 summarizes the individual contributions of TQM gurus.

Table 2.1
TQM Gurus and their Main Contributions

TQM gurus	Main contribution
W. Edwards Deming	- Stressed management's responsibility for quality. - Developed "14 Points" to guide companies in quality improvement. (see Deming, 1982; 1986)
Joseph M. Juran	- Defined quality as "*fitness for use*". - Emphasized the involvement of individual workers in quality improvement and developed concept of cost of quality. (see Juran, 1986; 1989)
Armand V. Feigenbaum	- Emphasized a total system approach to quality. - Introduced concept of total quality control. (see Feigenbaum 1986)
Philip B. Crosby	- Coined phrase "*quality is free*". - Introduced concept of zero defects (see Crosby, 1979).
Kaoru Ishikawa	- Originated quality circles and cause-and-effect diagrams. - Identified concept of "internal customer." (see Ishikawa, 1985)
Genichi Taguchi	- Focused on product/service design quality. - Originated the idea of quality loss on product from the time it was created quality loss function (QLF). (see Taguchi, 1999)

Crosby (1979) defined quality as *conformance to requirement*; he focused on people and organizational factors, emphasizing cultural change, training, top-management commitment, and the ongoing estimation of quality costs. He also coined the phrase '*Do it right the first time*' and best known for his advocacy of zero-defects management, his quality vaccine (which consists of three components: determination, education, and implementation), and fourteen points for quality implementation.

Deming (1986) viewed quality from a statistical perspective, emphasizing the reduction of variance through statistical process control techniques. He provided the Deming cycle, which is widely known as Plan-Do-Check-Act (PDCA) cycle, or problem-solving approach, with his famous fourteen points, and the Deming's seven deadly diseases for world-class companies. Deming philosophy can be applied to both small and large business organizations, both in the public, private and service sector. Thus, he is considered the father of modern quality.

Feigenbaum (1983) addresses the concept of total quality and total quality control from the quality management perspective, where is considered as Total Quality. The author identified three major components of total quality, which include leadership of quality, modern quality technology and organization's commitment.

Juran (1986) defines quality as *fitness for use*, the author has suggested ten steps for improving quality and such have been confirmed reliable by many organizations. Similarly, quality planning, quality control and quality improvement were identified as the three basic quality processes with more emphasis to planning and product design, quality audits, and supplier/customer relations (Juran, 1989).

In addition, the contributions offered by Japanese scholars are worthy of recognition, e.g., Shingo (1986) who further developed ‘zero defects’ into ‘zero quality control’ perception, accentuating a range of quality tools to expel defects at the time of the source processes. Taguchi stretched the quality improvement practices to include product and process design, by providing a system with mature customer requirements for the design of those specifications required of either a product and/or service (Taguchi & Clausing, 1990). Taguchi (1999) stressed that organizations should focus their quality efforts on product design stages, to have a *robust design*, as it is much easier to make changes during the design process rather during the production stage. This is expected to have minimized the risk largely.

Ishikawa (1990) is known for developing various statistical tools for quality problem solving (e.g., Pareto chart, Ishikawa diagram, etc.). The author advocated employee participation as the key to the successful achievement of TQM, and the idea of quality circles as a way to sustain continuous improvement. Quality circle is seen as a small team of employee’s experts who deal with many quality-related problems.

Despite the diverse views of gurus about TQM approaches, collective description of TQM can be still be achieved. In all these divergent views, it was established that TQM practices required top-management commitment, planning for quality, quality training, focus on processes and prevention, focus on customer, continuous improvement process, teamwork, and total employees' involvement. Tari (2005) equally buttressed this view. All these elements are equally regarded as the TQM core elements in this study.

2.2.1 TQM Definitions

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 Tari (2005), TQM can be studied from three diverse approaches: contributions from quality gurus, standard quality models and empirical studies. In other words, a definition of TQM varies from author to author and from one sector to another, and this is clear from the definitions of the pioneers.

Deming (1982) defined TQM as *management methods* used to enhance quality and productivity in organizations, particularly businesses. Deming came up with a philosophy, which is applicable to all organizations without any constraint to the size and nature of the organization. TQM can also be defined as such an *effective system* used in integrating the quality development, quality maintenance and quality improvement efforts of a number of groups inside an organization, in order to achieve optimal production/service (Feigenbaum, 1983).

Worldwide researches to have abundant definitions of the TQM concept; for that reason, it is not easy to explain this concept. However, the following definitions may provide insights of what TQM is. Kanji (1990) defined TQM as the way of life of an organization committed to customer satisfaction through continuous improvement, which varies from one organization to another, but has certain principles, which can be implemented to protect market share. On the other hand, Berry (1991) defined TQM as a total corporate process focusing on meeting and exceeding customers' expectations and significantly reducing costs by adopting a new management system and coherent environment. Likewise, Kanji and Asher (1993) described TQM as continuously a performance improvement process of individuals, groups and organizations.

A further definition offered by Evans (1993) stated that TQM is an integral management concept of continuous improvement of the products quality and service delivery throughout the involvement of all organization components. Similarly, Dahlgaard, Kristensen and Kanji (1998) and Dale (1999) defined TQM as a management approach and reciprocal co-operation of everyone in an organization, centered on quality, based on the total participation of all its employees and aspiring at long-term success through customer satisfaction.

Some authors considered TQM as an approach of *competitive advantage*. For example, Oakland (2000) describes TQM as an approach to improve competitiveness, efficiency and flexibility for the whole organization. Similarly, Goetsch and Davis (1994) considered TQM as an approach for gaining competitive advantage by continuously improving every side of organizational features.

There are also different points of view about the content of TQM. According to Boaden (1997), TQM is viewed as an element of cultural change. Yeung and Chan (1999) revealed that TQM consists of three major components, namely, philosophies, systems and tools, and Hellsten and Klefsjo (2002) named the interdependent components of TQM as values, techniques and tools, which support each other in order to increase internal and external customer satisfaction at minimum possible cost.

From *a philosophical perspective*, William (2005) pointed out that TQM is a philosophy that involves everyone in an organization on the continual endeavor to improving quality. Similarly, Demirbag, Tatoglu, Tekinkus and Zaim (2006) which, defined TQM as a holistic management philosophy aspired at continual improvement in all organizational activities to deliver services in line with customer's requirements or needs under the leadership of top management.

Moreover, some authors have suggested *a system approach* to the concept of TQM. Shiba, Graham and Walden (1993) define TQM as a system, consisting of practices, tools, and training methods for managing organizations in a rapidly changing context. Similarly, Boon, Arumugam and Hwa (2005) viewed TQM as a programmed system, rather than considering it as a set of philosophies and methods used by an organization to lead it in continuous improvement. Yang (2005) asserted that TQM is an integrated management philosophy and a set of practices that emphasizes, among other objects, continuous improvement, meeting the expectations of customers, reducing to rework, long-range thinking, employee participation and teamwork, process redesign, competitive benchmarking, problem-solving team, constant measurement of outcomes, and strong relationships with suppliers.

Dale et al. (2001) describe TQM as a fusion of eastern and western ideas in diverse contexts connected to the quality field. Therefore, Hellsten and Klefsjo (2002) and Hansson and Klefsjo (2003) defined TQM as a management system in continuous change, which is composed of values, methodologies and tools, with the primary aim of improving customer satisfaction. Throughout a common depiction of the evolution of quality improvement, Bergman and Klefsjo (2003) presented the four-stage model that has led to the concept of the TQM; these stages are Quality Inspection, Statistical Quality Control, Quality Assurance, and Total Quality Management.

Besterfield et al. (1999) considered TQM as the art of managing the whole organization to accomplish excellence after they analyze the acronym (TQM). The authors defined the three words that it's made up of: *total* refers to be made up of the whole and involves everyone and all activities in the organization; *quality* refers to the degree of excellence of a product/service; and *management* refers to the ability or scheme of handling, controlling, leading and planning the organizational activities.

In the literature, TQM is often referred as a *social movement* (Vouzas & Psychogios, 2007). Therefore, it is not only a tool and technical system. In fact, TQM is connected with the organization itself, which is also a social system. Youssef and Zairi (1995); Pike and Barnes (1996) argued that organizations are not only technical systems, but also human systems. In addition, Evans and Dean (2003) stated that TQM is a people-focused management system, which includes methods, systems and tools that aspire continual increase in customer satisfaction at constant lower cost. Zhu and Scheuermann (1999) mentioned that TQM entails much more than statistical tools; it requires top management commitment, leadership, training and teamwork. These are the key elements in a successful constitution of TQM.

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. Whereas, Spanbauer (1995) proposed the following definition of TQM in education context: "TQM is a management philosophy which puts systems and processes in place to meet and exceed the expectations of customers".

A review of the literature suggested a blend of (soft) and (hard) quality element of TQM. Similarly, Vouzas and Psychogios (2007) revealed that all the definitions of TQM pointed 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) is linked to management concepts and principles (elements). This notwithstanding, this study is limited to the soft elements of TQM being the core elements.

Al Nofal, Al Omaim and Zairi (2005) also share this view; they considered the soft quality element as being intangible and not easy to measure, and that they are primarily associated with leadership and employee involvement. Hard quality elements, on the other hand, refer to the systems, tools and techniques, which affect internal efficiency (e.g., quality system, cost of quality and statistical control process) and external effectiveness (e.g., benchmarking and customer satisfaction appraisal).

Constructing a universal definition of TQM is approximately impossible (Eriksson & Hansson, 2003), and the available definitions vary extensively depending on the context where they are focused. All the views above indicate that although different researchers approach the issues of TQM from diverse perspectives, there is still a general agreement regarding the core elements, practices, and values of TQM (Kanji, 2000; Motwani, 2001; Hellsten & Klefsjo, 2002; Taylor & Wright, 2003; Lynne & Ross, 2007; Vouzas & Psychogios , 2007; Venkatraman, 2007).

It could be observed from the numerous definitions given by notable scholars in the area of TQM, one thing is common to all the definition, which is continuous improvement. Definitely, if the continuous improvement process can be certain, such an organization will be able to maintain the competitive advantage, which leads to the high organizational performance. In summary, the researcher then comes up with the following operational definition of TQM in HEI context, which captures the above-mentioned definitions.

Specifically, TQM can be defined as systematic approach of managing quality aimed at achieving high performance in terms of academic achievement, which requires commitment from the academic leadership by adopting effective core quality elements (leadership commitment; strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact) to develop a cohesive academic environment, which infuses and enhances the continuous improvement for all educational related processes and activities.

2.2.2 The Benefits of TQM

Generally, the benefits of TQM can be regarded as the consequences of its successful implementation. Such can be estimated using a number of approaches, the most common approach in estimating TQM benefits is measuring the cost of poor quality (Evans & Dean, 2003; Juran, 1989). It has been revealed by so many researchers that the most important goal of TQM is improving organizational performance (Hellsten & Klefsjo, 2002; Motwani, 2001; Vouzas & Psychogios, 2007). In this regard, one can consider organizational performance enhancement as the best nexus of evaluating

TQM benefits. Therefore, TQM is considered worthy if organizational performance is enhanced. Similarly, it is revealed that adopting TQM has a benefit of improving customer satisfaction, higher products and services quality and better market share (Hung & Lien, 2004; Pheng & Jasmine, 2004; Sharma & Kodali, 2008).

Continuous improvement, leadership and top management commitment to the aim of customer satisfaction, employee empowerment and customer focus have been identified as the goals of TQM (Ugboro & Obeng, 2000). All these are equally considered as the benefits of TQM since they are all achieved via TQM. Similarly, enhancing productivity, operations performance in terms of efficiency and effectiveness, financial performance and competitiveness are identified as benefits of TQM (Evans & Dean, 2003; Hellsten & Klefsjo, 2002; Mele & Colucio, 2006; Ojo, 2008; Pheng & Jasmine, 2004; Vouzas & Psychogios, 2007).

2.2.3 TQM in Higher Education

TQM is an evolving concept; it has been extensively adopted as a management paradigm by many organizations worldwide since the first establishment in 1980s. Quality movement in almost every country usually starts with quality improvement programs at industrial organizations since the quality at organizational levels accumulates with the overall global quality. TQM has recently been extended to the service organizations such as insurance companies and banks, and eventually to non-profit organizations such as hospitals, government, and educational institutions (Sirvanci, 2004). Higher education institutes are one significant service sector in the modern business realm (Ali & Zairi, 2005).

Higher education institutions are considered as the knowledge home where learning takes place through the research effort, only that it is unfortunate that they were lagging behind other non-education organizations in terms of TQM adoption and implementation (Sirvanci, 2004). This is because TQM applied first in the industry organizations, and then followed by the service-organizations in terms of TQM adoption (Venkatraman, 2007).

Although, TQM has its origins in the industrial sector, there has been a strong push for adopting TQM in educational organizations from the stakeholders (Bayraktar, Tatoglu & Zaim, 2008; Moreland & Clark, 1998; Owlia & Aspinwall, 1998; Srikanthan & Dalrymple, 2003; Telford & Masson, 2005).

Many researchers mentioned that TQM has been widely adopted by HEIs in both public and private (Ahmed, 2008; Heras, 2006; Kaynak, 2003; Lim et al., 2004; Powell, 1995; Sharma & Hoque, 2002; Turner, 1995). Kanji and Tambi (1999) pointed out that Higher Education should be guided throughout TQM principles and the definition of its core elements by the top management for excellent performance. Adopting TQM has witnessed diverse views globally resulting from different environments, which have precipitated varying TQM philosophy (Osseo-Asare et al., 2005; Srikanthan & Dalrymple, 2003). Motwani (1995) stated that educational institutions had started to realize the pressure to change and improve.

Regarding HEIs, TQM started witness a noticeable increase between the late 1980s and early 1990s. HEIs began to be anxious about the quality and implementing the TQM philosophy (Rosa, Saraiva & Diz, 2001), as a response to the demand for improving quality in HEIs.

Many researchers have established the elements of TQM into different aspects of the educational field, as a step to get better management of higher education (Bayraktar et al., 2008; Koch & Fisher, 1998; Lim et al., 2004; Peat, Taylor & Franklin, 2005). The authors believed that the elements of TQM could positively contribute to the improvement of higher-educational performance.

Unlike manufacturing, where statistical quality control methods could be adopted as they are related to tangible products. While, in higher education what is rendered in the classroom is an intangible service. These have posed many challenges dealing with the intangible processes in higher education among the diverse elements of TQM. Customer focus, process orientation and continual improvement are the mainly common philosophies that have direct inclusions for teaching and learning process in higher education (Venkatraman, 2007).

While applying TQM philosophy to their organizations, some leadership in HEIs believed that participative management programs drive educational quality, which may swerve from their core process and customer focus. Hence, it is important for HEIs to learn from the experiences and probations of these organizations and to concentrate on their core processes, especially teaching/learning process. There must be a regular appraisal of the performance, which is to be achieved by TQM (O'Neill & Palmer, 2004; Temponi, 2005).

Despite the fact that many educational institutes have been very successful in TQM adoption, there are some, which failed to obtain the benefits of TQM (Houston, 2007; Koch, 2003; Venkatraman, 2007). In the same way, there is a general belief that educational institutions that are slow in adopting and implementing TQM, are likely to forfeit their opportunity to drive change and expand, which affects their relationship to the business world. HEIs depend on public confidence and as a result should understand current and future societal needs, meet the students learning and teaching requirements, and go beyond the society's expectations (Johnson & Golomski, 1999; Venkatraman, 2007).

Unfortunately, the evidence in favor of the use of TQM in the educational context relates primarily to administrative tasks (Koch & Fisher, 1998; Koch, 2003; Venkatraman, 2007). The non-academic focus of TQM dramatically reduces its significance and impact in the world of higher education (Ahmed, 2008; Koch, 2003; Venkatraman, 2007). Hence, research is needed to test the position that TQM initiatives do, indeed, have a relationship with academic related improvements. In light of this, the present study will focus on the educational process as a core academic activity in HEIs. Moreover, the researcher aims to contribute in this direction by examining TQM effect on performance through KM to further enhance the fitness of TQM in the higher-education context.

From the principles of TQM, and other quality management theories; it is obvious that, there are all highly structured towards one philosophy, which is continuous improvement in order to achieve a common goal; customer satisfaction (Adair, 2004). Therefore, it is necessary to identify the customers of higher education. Kanji and Tambi (1999), classified the customers of higher education can be viewed from two perspectives; primary and secondary customers, based on their position, i.e., internal or external, and the occurrence of interactions the institution has with them. While the academic educator (as employee), is defined as the primary internal customer, the students (as educational partner), is the secondary internal customer.

Likewise, the student is also the primary external customer; and the government, business companies, and parents are the secondary external customers. More detail, Table 2.2 shows a comprehensive view for customers of higher education and their needs.

Table 2.2
The Customers of Higher Education

Customers	Needs
Internal customers – academic	
Students	Knowledge, skill, and abilities to pursue personal and professional goals, joy in learning
Faculty	Continuous personal growth, security, joy in work, information, and input
Programs /department	Continuous improvement, information exchange (input/output), cooperation, collaboration
Internal customers – administrative	
Students	Service provided when requested, questions answered when asked
Employees	Continuous personal growth, security, joy in work, information, and input
Units /department, division	Continuous improvement, information exchange (input/output), cooperation, collaboration
External customers – direct	
Employees	Competent employees, productive performance
Other colleges, universities	Students capable of advanced learning and research
External customers – indirect	
Legislature (state, federal)	Be elected or re-appointed compliance, make a contribution
Community	Competent workforce, leaders and followers, volunteers in community services, politically active citizens
Accrediting agencies	Compliance with established criteria and standards
Alumni	Pride in having attended, continuing education
Donors	Awareness of both the quality and needs of the college/ university, appropriate acknowledgment of a donation

Source: Lewis, R. & Smith, H. (1994) *Total quality in higher education*, Florida: St. Lucie Press.

In higher education, it is important to know that the success of continuous improvement approach requires people to know what mission to do at a specific time and how to do it (Lynne & Ross, 2007). TQM is considered as a process-oriented approach to increasing productivity, decreasing costs and improving quality of service (Moreland & Clark, 1998). From the theories of TQM, one can conclude that it stresses teamwork, finding better ways to accomplish missions, sharing responsibility and significantly improving educational environment, all these forms the basis for establishing high-quality value set of many modern universities and their colleges (Venkatraman, 2007).

Claims in favor of TQM within a higher-education context include improvement in students academic achievement (Marshall, Pritchard & Gunderson, 2004; Turner, 1995); quality of teaching (Ali & Zairi, 2005; Barnard, 1999; Venkatraman, 2007); program and course design (Van Zadelhoff et al., 1995; Winn & Green, 1998); institution-community relations (Ali & Shastri, 2010; Spanbauer, 1995); staffs' performance and development (Ahmad, 2008; Babbar, 1995); students enrollment process (Dimen & Ludusan, 2009; Nagy & Cotter, 1993). However, the unfortunate aspect of it is that, there is a lack of empirical evidence in this respect as most of the previous studies are anecdotal and surprisingly sparse (Koch & Fisher, 1998; Lim et al., 2004). Thus, there is a need for detailed empirical studies to examine the impact of TQM in higher education, especially those that relate to academic achievement (Koch, 2003).

TQM philosophy has been applied to universities and colleges in the USA, UK, and in Asian countries such as Malaysia (Kanji & Tambi, 1998; Kanji & Tambi, 1999; Lim et al., 2004), and also in Iraqi HEIs (Ahmed & Hamdoon, 2007; Yousif, 2007). However, in Iraqi HEIs, the public universities were faster than private universities in adopting TQM (Al-Fatlawy, 2006). For this reason, the researcher focuses on the Iraqi HEIs (public universities) as a scope of the current study.

According to Ahmed and Hamdoon (2007), applying TQM in HEIs became a necessity for any Arab country, if it likes to improve its performance effectively, and serve its society and attain the global level. Hence, quality in higher education became one of the public issues in Arab countries. Since Iraq is one of the Arab countries, this case is no different in the institutions of higher education in Iraq.

The Iraqi HEIs only considers implementation of TQM from the implementation of the national system of accreditation started in 1993, in order to achieve better educational quality by following the suitable total quality processes (Yousif, 2007). This is done without necessarily paying attention to the TQM core elements. The author emphasized that a lot of work is needed in TQM and quality assurance field regarding proper application of TQM in Iraqi universities with respect to education, research and performance development using the main TQM elements.

2.2.4 The Core Elements of TQM

Various studies have been carried out to identify those elements that can be used in constituting the TQM paradigm (Bayraktar et al., 2008; Karia & Asaari, 2006; Montes, Jover & Fernandez, 2003; 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 award models (Tari, 2005). This approach has attracted the attentions of later researches, in such a way that the literature on TQM has increasingly developed from TQM guru's contributions, identifying the various elements for effective quality management (Claver et al., 2003). Based on this approach, in the current study, the researcher will identify the core elements of TQM.

TQM studies revealed that the core elements were identified both conceptually and empirically. There are models of quality award and accreditation used by organizations, which can be considered as a guideline for TQM. The most important models are the Malcolm Baldrige National Quality Award (MBNQA), the European Foundation for Quality Management (EFQM), Association to Advance Collegiate Schools of Business (AACSB), European Quality Improvement System (EQUIS) and ISO 9000 standards.

The Baldrige Award of education has seven core evaluation criteria namely leadership; strategic planning; customer (student and stakeholder) focus; measurement, analysis, and knowledge management; workforce focus; operations focus; and organizational performance results. These seven criteria are supplementary defined by 17 sub-criteria, each focusing on a major requirement for excellent performance in the education context (MBNQA, 2011-2012).

Whereas, the EFQM model is based on nine criteria grouped into two components, five enablers criteria (how things are done in the organization) and four results criteria (what is achieved by the enablers). Enabler's criteria include (leadership, policy & strategy, people, partnership & resources, processes), and results criteria include (customer results, people results, society results, key performance results) (EFQM, 2012). The EFQM excellence model was established in 1992 as the framework for assessing organizations for the European quality award (Sadeh & Arumugam, 2010). The theoretical framework in this study reflects all these elements.

The Association to Advance Collegiate Schools of Business (AACSB) accreditation standards were first adopted in 1919. Throughout the years, the standards have continued to be revised to ensure quality and continuous improvement in collegiate business education. AACSB has a robust global strategy concerning accreditation recognizing that high-quality management education is occurring around the world. Thus, the AACSB accreditation standards are based on a mission-driven philosophy with a focus on overall high quality and continuous improvement. AACSB consists of 21 accreditation standards; 1-5 standards are related to the strategic management; 6-14 standards are related to participants (students and faculty); and 15-21 standards are related to assurance of learning (AACSB, 2012).

The European Quality Improvement System (EQUIS) is the quality assurance scheme run by the European Foundation for Management Development (EFMD) as a service to the management education profession worldwide. EQUIS is the leading international system of quality assessment, improvement, and accreditation of higher education institutions in management and business administration. Its fundamental objective, linked to the mission of the EFMD, is to raise the standard of management education worldwide. EQUIS standards involve meeting the mission, students and participants, executive education, personal development, program quality, resources and development, contributions to the community, faculty, physical resources, corporate connections, and international issues (EQUIS, 2012).

In addition to quality award models and accreditation standards, this study also focuses on ISO 9000 standards in identifying the core elements of TQM. Generally, ISO standards focus on ensuring that the organization can constantly deliver products/services, which meet the customer’s quality requirements. ISO 9000 is based on eight quality management principles. The principles include customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision-making, and mutually beneficial supplier relationships (ISO 9000: 2008). These principles can be used as a guideline to lead an organization towards improved performance.

According to Karuppusami and Gandhinathan (2006), over the past few decades, the quality gurus (such as Deming, 1986; Crosby, 1979; Feigenbaum, 1983; Juran, 1986 and others) have advocated and developed covenant prescriptions in the field of quality management. Their contributions to quality management concept and theory provide a good understanding of TQM core elements.

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, core values or essential factors. Whichever way it is addressed, it still refers to the identical object which is the determinants of a TQM and in this study, the term "core elements" is used, since it is a way to emphasize that these elements are basic and should work together to improve the performance of an organization.

Fenghueih and Yao-Tzung (2002) noted that the achievement of TQM is typically based on the philosophy derived from Deming, Juran and Crosby where the achievement is categorized into two parts as follows:

1. The soft part of TQM which forms the principles behind it and;
2. The hard side of TQM that represents the techniques involved.

However, TQM entails much more than technical or statistical tools. It requires top management commitment, leadership, training and teamwork as identified as core elements of TQM for its successful achievement (Zhu & Scheuermann, 1999). According to Goetsch and Davis (1994), in practically every definition of TQM, two major components are indispensable; these are the (what) and the (how) of TQM. As the component of *what* diverges in almost every single study and textbook, the *how* component distinguishes TQM from other quality management approaches and includes core elements that are generally accepted (Vouzas & Psychogios, 2007).

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 et al., 2003; Rungtusanatham et al., 2005). TQM as a holistic approach with a set of core elements has been widely believed as a powerful strategy to achieve higher organizational performance. Based on this fact, many studies have been conducted to assess the complementarity among TQM core elements (e.g., Escrig-Tena, 2004; Furlan, Vinelli, & Dal Pont, 2011; Lim et al., 2004). Their studies tend to support the holistic approach of TQM by revealing that applying the core elements simultaneously significantly affects performance rather than applying TQM core elements separately.

Nevertheless, as reported by previous studies (Ahire et al., 1996; Agus, 2000; Lim et al., 2004), the holistic approach of TQM may create a multicollinearity problem when tested with other variables using the regression model. This is because of the synergistic effect among TQM core elements (Choi, Poon, & Davis, 2008; Escrig-Tena, 2004; Furlan et al., 2011). Hence, in this study, the researcher will take into account all issues related to this problem seriously.

Based on comprehensive review and synthesis of TQM literatures, particularly, contributions from quality gurus, empirical studies, and models of quality award and accreditation standards (AACSB, 2012; Babbar, 1995; Crosby, 1979; Deming, 1986; EQUIS, 2012; EFQM, 2012; ISO 9000, 2008; Juran, 1988; Kanji & Tambi, 1999; Lim et al., 2004; MBNQA, 2011-2012; Oakland, 2000; Sallis, 1996 and others), the researcher has identified nine initial core elements of TQM. Table 2.3 summarizes the core elements as dimensions of TQM. A discussion of the nine core elements follows.

Table 2.3
Summary of TQM Core Elements Development Studies

Core elements	Author/s (year)
Leadership Commitment	Bayraktar et al., 2008; Crosby, 1979; Coetzee, 2001; Dale, 2003; Deming, 1986; Evans & Dean, 2003; ISO 9000, 2008; Kanji, 2002; Lim et al., 2004; MBNQA, 2011-2012; Osseo-Asare et al., 2005; Pun & Hui, 2002; Sirvanci, 2004; Steenkamp, 2001; Sureshchandar et al., 2002; Taylor & Wright, 2003.
Strategic Planning	AACSB, 2012; Cascella, 2002; Crosby, 1979; Deming, 1986; EFQM, 2012; EQUIS, 2012; Evans & Dean, 2003; George & Weimerskirch, 1998; Juran, 1988; Lim et al., 2004; London, 2002; MBNQA, 2011-2012; Sallis, 1996; Samson & Terziovski, 1999; Swift, Ross & Omachonu, 1998; Taylor & Wright, 2003.
Continuous Improvement	Adair, 2004; Anderson et al., 1994; Corbett & Rastrick, 2000; Crosby, 1979; Deming, 1986; EFQM, 2012; EQUIS, 2012; Garcia-Lorenzo & Prado, 2003; ISO 9000, 2008; Jabnoun & Khafaji, 2005; Juran, 1988; Lim et al., 2004; Lynne & Ross, 2007; MBNQA, 2011-2012; Pearce & Robinson, 2000.
Customer Focus	AACSB, 2012; Bayraktar et al., 2008; Deming, 1986; ISO 9000, 2008; EQUIS, 2012; Juran, 1988; Kanji, 2000; Lagrosen, 2001; Lim et al., 2004; Lynne & Ross, 2007; MBNQA, 2011-2012; Rampersad, 2001; Sallis, 1996; Samson & Terziovski, 1999; Taylor & Wright, 2003; Venkatraman, 2007; Zairi, 2000.
Process Focus	Ahmed, 2008; Bayraktar et al., 2008; Bergman & Klefsjo, 2003; EFQM, 2012; EQUIS, 2012; Harrington, 1995; ISO 9000, 2008; Juran, 1989; Lim et al., 2004; MBNQA, 2011-2012; Sallis, 1996; Samson & Terziovski, 1999; Venkatraman, 2007.
Employee Involvement	AACSB, 2012; Besterfield et al., 1999; Behara & Gundersen, 2001; Crosby, 1979; Deming, 1986; EFQM, 2012; Eng & Yusof, 2003; Geralis & Terziovski, 2003; Ishikawa, 1985; ISO 9000, 2008; Juran, 1988; Lim et al., 2004; MBNQA, 2011-2012; Morgan & Murgatroyd, 1997; Plsek, 2000; Pun et al., 2001; Sallis, 1996; Vouzas, 2004; Wilkinson, 1998.
Training & Learning	AACSB, 2012; Dale, 1999; Deming, 1982; EQUIS, 2012; George & Jones, 2005; Lim et al., 2004; Lynne & Ross, 2007; Mathews et al., 2001; MBNQ, 2004; Motwani, 2001; Oakland & Oakland, 1998; Oakland, 2000; Saraph et al., 1989.
Rewards & Recognition	Allen & Kilman, 2001; Bayraktar et al., 2008; Bin Abdullah et al., 2008; Crosby 1979; Dayton, 2001; Eng & Yusof, 2003; Everett, 2002; Li et al., 2001; Lim et al., 2004; Martinez-Lorente et al., 1998; Rao et al., 1999; Wilkinson, 1997.
Management by Fact	Bayraktar et al., 2008; Deming ,1986; Hsu & Shen, 2005; ISO 9000, 2008; Kanji, 2001; Kanji, 2002; Kanji & Tambi, 1998; Kanji & Tambi, 1999; Kanji & Sa, 2003; Lim et al., 2004; MBNQA, 2011-2012; Samson & Terziovski, 1999.

2.2.4.1 Leadership Commitment

Many quality scholars and researchers maintained that the TQM establishment requires a serious commitment on the part of the decision makers (leaders) of the organization for achieving its goals (e.g., Bayraktar et al., 2008; Coetzee, 2001; Crosby, 1979; Dale, 2003; Deming, 1986; Evans & Dean, 2003; Kanji, 2002; Lim et al., 2004; Michael, Sower, & Motwani, 1997; Osseo-Asare et al., 2005; Pun & Hui, 2002; Sirvanci, 2004; Steenkamp, 2001; Sureshchandar, Rajendran & Kamalanabhan, 2002; Taylor & Wright, 2003).

The above scholars and researchers stated in their studies that leadership commitment is the most crucial and vital prerequisite for organizational achievement when constituting TQM. These researchers agreed that a leadership commitment provides a focal point for the aspirations and wishes of employees in organizations where TQM is implemented. The two quality gurus' Deming (1986) and Crosby (1979) encouraged leadership or top management commitment and obviously pose that the TQM way of life begins and ends in the leadership of top management. George and Weimerskirch (1998) equally share this view, where it was added that “Quality isn’t just a pool for fording; it is an ocean. If you do not take the diver, if you do not totally plunge yourself, you cannot hope to persuade a whole organization to jump in. That’s why TQM constitution starts at the leadership commitment.

Motwani (2001) visualized TQM as constructing a house, he recommended putting a leadership commitment to TQM as the foundation or base, and other core elements of TQM can be viewed as pillars of a house, without a sturdy foundation, the house will never stand. The case cannot be different in this study.

Leadership rather than management is an essential element in challenging era, particularly, when an organization intends to adopt TQM (Coetzee, 2001). Meanwhile, the goal of leadership should be to improve performance and increase the organizational outputs (Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007). In stressing this further, Kanji (2000) pointed out that leadership is vigorously involved in creating a total quality culture and has a vision. Thus, leadership plays a major role in ensuring that the shared thinking and provide adequate internal communication throughout the organization (Graetz, 2000; Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007).

The word commitment attached to top management is just as necessary as leadership. Many quality experts argued that TQM practices must be a top-down process, integrated into the organization environment (Kanji & Moura 2001; Landon, 2003; Oakland 2000; Samsom & Terziovszi, 1999, Santos-Vijande & Alivarez-Gonzalez, 2007; Savolainen, 2000).

Townsend and Gebhardt (2002) also revealed that such leadership commitment is considered the main element for achieving TQM, without this commitment, no TQM process can be successful. Kanji and Moura (2001) argued in the same manner that leadership nowadays is a significant novel development and is taken to be a long-term partnership or relationship between top management, employees, customers and stakeholders. Furthermore, leadership is the first criteria and building block for many quality standards such as ISO 9000, MBNQA, EFQM and Kanji’s Excellence Model; these models single out leadership as the “key element” for successful total quality improvement. It becomes clear that in present time, leadership commitment is one of the most essential elements of TQM (Tari, 2006).

According to Venkatraman (2007), for an organization to sustain her competitive advantage in terms of customer focus, clear goal definition and high expectation, the leadership commitment should concentrate on the top management.

Concerning HEIs, the leadership element should examine top management's personal leadership traits and involved in constructing and maintaining a customer focus, clear objective, high expectations and a leadership system that would support performance excellence (Michael et al., 1997; Venkatraman, 2007). The detailed evidence from the literatures shows that there is enough justification for the inclusion of leadership commitment as one of the core elements (dimensions) of TQM in this study.

In short, *leadership commitment* is conceptualized in terms of sufficient internal communication facilities, ensures best teaching/learning methods, encourages a culture of accepting good innovations, sense of unity and barriers elimination, assumption of responsibilities, consideration of teaching quality as a top priority, encourage the information sharing, and adequate provision of resources (Antony et al., 2002; Bayraktar et al., 2008; Kanji & Moura, 2001; Landon, 2003; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007; Venkatraman, 2007).

2.2.4.2 Strategic Planning

The second core element that determines the successful TQM is strategic planning, which comes in order to play prior to the actual implementation of TQM to provide an enabling environment for the TQM execution and deployment through the organization (Cascella, 2002; Hung & Lien, 2004).

The criteria for the AACSB, EFQM, EQUIS and MBNQ show how significant strategic planning is as a core element in quality improvement activities. From the principles of TQM through the ideas of the three quality gurus, Crosby (1979), Deming (1986) and Juran (1988), it is clearly that strategic planning is another core element of TQM. Landon (2003), in studying the strategic planning concept, concludes the success of any organization nowadays is much attributed to its strategic planning. It is stressed further that organizational strategic planning has a positive direct relationship on the realization of the organizational objectives.

Strategic planning can be defined as the process, which involves the top management of an organization in planning its future by designing a number of required procedures and operations in achieving the organizational objective (Evans & Dean, 2003). For that reason, it can be deduced from such definition that strategic planning defines the course and direction which organization takes in realizing her long-term goals and objectives.

George and Weimerskirch (1998) further described strategic planning as the designed and comprehended module of organizational guidance and the development of structure and management practices that aimed at achieving total customer satisfaction. The authors mentioned that strategic planning defined who we are and where we are trying to go, and the quality is a strategic issue, rather than the technical aspects. Therefore, TQM as a strategic issue must be carefully integrated into the overall strategic planning practices of an organization (Santos-Vijande & Alivarez-Gonzalez, 2007). By integration, this implies that the decision-makers within the organization must institutionalize TQM within the organizational strategic plan.

Strategic planning should be considered as a key concern of top management in supporting organization to establish action plans that have to do with continual improvement of the consequences and customer satisfaction to gain competitive advantage (Swift, Ross & Omachonu, 1998; Hung & Lien, 2004; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007).

The learning-centered education and operational performance are main strategic issues that need to be integral as parts of organization's general planning in HEIs. Specifically, learner-centered education is considered as a strategic view of education. The focus is on the drivers of student learning like student determination, student and stakeholder satisfaction, new markets, and market share key features in educational success (AACSB, 2012; EQUIS, 2012; MBNQA, 2011-2012). This means that strategic planning in HEIs should be focused on the real needs of students, including those derived from market requirements and national responsibilities (AACSB, 2012; Hung & Lien, 2004; MBNQA, 2011-2012).

In short, *strategic planning* is conceptualized in terms of formulates a clear mission statement for educational objectives, clear description of the learning-centered process, giving priority to learning-process, emphasis on students requirements, tracking of staff performance, and clear quality goals (AACSB, 2012; Bayraktar et al., 2008; EQUIS, 2012; Evans & Dean, 2003; Hung & Lien, 2004; Lim et al., 2004; MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007; Swift et al., 1998).

2.2.4.3 Continuous Improvement

The third core element to be highlighted in TQM literature is associated with continuous improvement (Ahmad, 2008; Lim et al., 2004; Garcia-Lorenzo & Prado, 2003; Lynne & Rose, 2007). Continuous improvement has proven itself a powerful tool in organizations (Garcia-Lorenzo & Prado, 2003). From the core elements of TQM, all are highly structured towards one philosophy that is continuous improvement, in order to achieve better performance (Adair, 2004). It is very important to know that the success of continuous improvement; It requires everyone to know what to be done at a given time and how to do it.

Continuous improvement has become a fundamental part of TQM since the customer satisfaction is regarded as the objective of continuous improvement (Anderson, Rungtusanatham & Schroeder, 1994; Antony, Leung, Knowles & Gosh, 2002). It is argued that the values driving continuous improvement are primarily the values that confirm commitment to customer requirements (Jabnoun & Khafaji, 2005).

According to Pearce and Robinson (2000), continuous improvement dictates the way and manners the managers offer a form of strategic control that allows their organizations to respond more proactively and opportune to rapid developments in hundreds of parts that influence an organization’s success. Continuous improvement or incremental change is not a mere focal breakthrough; it is the aim of all who desire to move towards total quality (Lynne & Ross, 2007).

From the writings of the three quality gurus, Deming (1986), Juran (1988) and Crosby (1979), continuous improvement has been encouraged as a necessity in a worldwide competitiveness distinguished by rapidly changing technology and customer demand for higher level of value.

The term *continuous improvement* is derived from the Japanese term "*kaizen*", meaning to maintain and improve the working standards through small, gradual improvements. Kaizen means ongoing improvement involving everyone, including managers and employees. Therefore, team approach should be employed in maintaining continuous improvement (Baidoun, 2003). For this season, the process of continuous improvement should be based on fact and systematic analysis (Baidoun, 2003; OECD, 2007).

Many of the TQM literatures highlighted another concept related to a continuous improvement philosophy that is, quality assurance (Boaden & Cilliers, 2001; Jabnoun & Khafaji, 2005; QAA, 2004). In higher-education context, quality assurance is defined as one of the mechanisms that contribute to recognition of learning. This system includes the means of developing and improving national or local policy on qualifications, institutional measures, quality assurance processes, assessment and awarding process, skills recognition and other mechanism that link education and training to the labor market and civil society (EQUIS, 2012; OECD, 2007; QAA, 2004). The definition reveals that quality assurance is a continuous, dynamic and integrated process for maintaining and improving quality rather than simply a system of evaluation (Ahmed, 2008). Therefore, quality assurance mechanisms should be integrated into every part of the educational organization set up in order to integrate quality in all aspects of the educational process.

Corbett and Rastrick (2000) cited that, the best way to improve organizational output is to improved performance continually. In this belief, HEIs is tasked with the responsibility of demonstrating required quality in their courses and for such quality to be monitored through continuous improvement, in order to integrate the newly discovered knowledge and in turn improve the learning environment (Ahmed, 2008).

Prevention and control are central to quality assurance activities, and they are considered as important components of continuous quality improvement (Rao, Solis, & Ragunathan, 1999). These are captured in the conceptual framework in the form of feedback and evaluation.

It is clear that continuous improvement is one of the core elements of TQM and quality improvement process. Based on the evidence from various scholars in the quality area, the researcher is of the opinion to include continuous improvement as one of the main (core element) dimensions of TQM in this study.

Concisely, *continuous improvement* is conceptualized in terms of systematic improvement approach for educational process, continuously look for ways to improve the teaching process, effective feedback system, accurate documentation of quality assurance, continuous review of educational quality-related issues, continuous evaluation of quality-related strategies, and full integration of the quality assurance system (Ahmad, 2008; Anderson et al., 1994; Antony et al., 2002; EQUIS, 2012; Lim et al., 2004; Lynne & Rose, 2007; Pearce & Robinson, 2000; QAA, 2004; Rao et al., 1999).

2.2.4.4 Customer Focus

In TQM context, the concept of *customer focus* has another interpretation, sometimes in the literature referred to as *"delight the customer"*. According to Lynne and Ross (2007), delight the customer means being best at issues, which are considered the most important to customers and these changes continually. Customer focus is a core element of TQM that stresses the significance of knowing and understanding customers' needs and requirements, and such understanding will guarantee customer satisfaction and invariably enhances organizational performance (Lagrosen, 2001; Samson & Terziovski, 1999; Venkatraman, 2007; Zairi, 2000).

These were many reasons that the customer being the subject of any organization, cannot be treated with levity especially when effective organizational performance is desired. This is in line with the position of Taylor and Wright (2003) here the emphasis is pronounced on the need to understand customer need as an essential determinant of TQM success. Rampersad (2001) accentuated the need to understand customer requirement, that, everyone within the organization should consider customer focus as common issue, and support organizations to make a store of customer's database for benchmarking to obtain what the customer needs.

For other conventional industries, identifying customers is very easy. Regarding to HEIs, many researchers have pointed out that there is a diverse customer focuses (Lawrence & Robert, 1997; Owlia & Aspinwall, 1998; Venkatraman, 2007). Therefore, it is necessary to identify who is the customer of HEIs or, more accurately, who are its customers? According to Lewis and Smith (1994), four categories of customers are identified vis-à-vis the internal-academic (students, faculty, programs/departments), the internal-administrative (students, employees, units /departments), the external-direct (employees, other colleges), and the external-indirect (legislature, community, accrediting agencies, alumni, donors). All these categories having its specific needs (see Table 2.2). Consequently, the customer focus is essential in order to understand customer needs.

Since the TQM is adopted in HEIs, there is so much debate on who is the primary customer of HEIs (Sirvanci, 2004). Many researchers have clearly revealed that the primary customer in an education system is the student (Bayraktar et al., 2008; Kanji & Tambi, 1999; Lim et al., 2004; Sallis, 1993; Sakthivel et al., 2005; Sirvanci, 2004).

The question of whether the student is the primary customer depends on which aspect of the education process is being investigated. When focusing on the teaching process, the student is the primary customer for the delivery of the teaching process. In addition, MBNQA criteria for education, which were adopted from MBNQA criteria for business, replaced the term “customer” into “student”.

MBNQA (2011-2012) also revealed that the student focus in HEIs, explains the ways in which the universities perceive the current and future needs of their students and stakeholders. This is achieved with access to important information about necessary students’ requirements.

In this study, the focus is mainly on learning and teaching aspect of HEIs. Hence, the researcher focuses on the student as the primary customer of HEIs. In brief, *customer focus* is conceptualized in terms of attending to the demands of students, understanding students’ requirements, suggestions from students are taken into account, effective resolution of students' complaints, using student's complaints for improving the teaching/learning process, and regular assessment of students' satisfaction (AACSB, 2012; EQUIS, 2012; Bayraktar et al., 2008; ISO 9000, 2008; Lagrosen, 2001; Lim et al., 2004; MBNQA, 2011-2012; Samson & Terziovski, 1999; Venkatraman, 2007; Zairi, 2000).

2.2.4.5 Process Focus

In virtually all organizations, the activities follow a number of specific processes. The aim of a process retraces the past events for possible improvement. A good process will always lead to a better product or service (Bergman & Klefsjo, 2003). Organizations that adopt TQM philosophies are placing increasing responsibilities on those working within it to continually improve the process (Ahmed, 2008). Thus, process focus is considered as the core element of TQM.

A description of the process concept is essential in this work to explain the element "process focus". The definition of the process concept varies in TQM literature from one domain to another, but some basic similarities are found. This can be explained by the following definitions:

A process is any activity or set of activities that take an input, adds value to it, and makes available from an output to an internal or external customer. Processes employ an organization's resources to provide ultimate outcome (Harrington, 1995). A process is a chain of activities, which continually creates/adds value for the organization's customers (Rummler et al, 2009).

Similarly, Bergman and Klefsjo (2003) defined the process as a network of activities that are frequent in nature, whose purpose is to create value to external or internal customers. From these definitions, we can regard the process in an organization as a group of activities, with an accurate beginning and ending, which are repetitive in nature. It alters certain resources to consequence that should satisfy its customers.

Juran (1989) stated that, when talking about processes, there are three different associated roles, which include suppliers, processors, and customers. This is explained in what the author calls the “*Triprol Diagram*", and it is similar to the process views discussed earlier. Nevertheless, the author also pointed out that people working in an exact process, called “process team”.

Contrary to what is obtainable in the industry, where quality control techniques could be adopted as they deal with tangible processes, in higher education, educational process is considered an intangible process. That means the higher-education organization may be facing a main challenge of dealing with the intangibility of educational processes (Venkatraman, 2007). It is clearly that process focus is yet another core element in the TQM. Since higher institutions are established for three main purposes namely teaching and learning, research and community development, the researcher is concentrating on teaching/learning process of HEIs in order to be more focused, because it considers the core process in HEIs (MBNQA, 2011-2012; EQUIS, 2012; Venkatraman, 2007).

According to MBNQA (2011-2012), process focus is considered to be highly significant in educational processes. It is normally integrated into the main requirements of an efficient and effective process; effective education design, a focus on student learning, create value for all main stakeholders, continuous improvement, and organizational learning. Educational organization, which adopts the TQM philosophy, is placing increasing responsibilities on those working within it to improve the educational process continually (Ahmed, 2008; Bayraktar et al., 2008; MBNQA, 2011-2012). Therefore, process focus is considered as the core element of TQM.

In summary, the *process focus* is conceptualized in terms of designing educational process that add values to students, newly introduced teaching process critically examined prior to its actual implementation, emphasis on effective educational delivery, value creation through facilities, maintaining good lecturer-student relationship, and commitment towards review of the teaching technique (Ahmed, 2008; Bayraktar et al., 2008; Bergman & Klefsjo, 2003; Lim et al., 2004; MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007).

2.2.4.6 Employee Involvement

There is no way we can discuss about employee involvement without mentioning working together as a team within an organization. They work together in improving organizational performance. Crosby (1995) emphasizes that employees must be rigorously involved in achieving the highest performance level. This element can be explained in two ways as employee empowerment and employee participation.

Deming (1986) philosophized that the basis for inclusion of the element is to involve employees. Crosby (1979) considered employee’s empowerment as the basis of TQM philosophy. Ishikawa (1985) revealed that the top managers in the organization should make their subordinate to be fully involved by delegating responsibilities. Furthermore, Morgan and Murgatroyd (1997) noted that, all elements of TQM require every organizational member to be involved in the quality improvement.

Kanji and Tambi (1999) divided the employees in HEIs into two academic and non-academic (managerial) staffs. Since the current study is interested in the quality of teaching and learning process, thus, along with the student, the academic staff is the focus of attention in this study. Due to the academic staff is one of the fundamental pillars of the educational process, and a vital source of the quality in HEIs (Venkatraman, 2007).

The criteria for the AACSB, MBNQA, EFQM and ISO 9000 equally single out the importance of people empowerment in quality improvement activities. According to Geralis and Terziovski (2003), empowerment is a technique involving the transfer of authority and control from upper levels to lower levels in an organization by providing employees with the resources, discretion and suitable tools to further the benefits of the organization. On the other hand, the employee apprehensions of their organization’s TQM practices determine their level of participation (Santos-Vijande & Alivarez-Gonzalez, 2007).

Similarly, previous researchers emphasized that TQM practices lead to employee empowerment and support an organization’s endeavors towards quality improvement (Eng & Yusof, 2003; Hung & Lien, 2004; Santos-Vijande & Alivarez-Gonzalez, 2007). According to Pun, Chin and Gill (2001), empowerment means that each employee in an organization feels he/she has the authority and responsibility to participate in problem-solving and decision-making process at his/her or her appropriate operating level.

One of the most essential goals of involvement is to encourage creative thoughts and constructive opinions among all employees, so that management can acquire the whole benefit from the employee in order to establish TQM (Hung & Lien, 2004; Plsek, 2000). Within the context of TQM, teamwork is an essential and vital requirement of continuous improvement (Santos-Vijande & Alivarez-Gonzalez, 2007). Soltani (2003) argued that teams are required for all organizations to make them work more flexibly and to develop trust among each other.

Empowerment alone is not sufficient, as employees cannot always manage things on their own. Hence, educational organizations must encourage a team environment with active and flexible borders, where employees can overcome the liabilities deep-rooted in hierarchical, individual-focused management systems. Teams form a key part of any TQM process as teamwork enables diverse components of the organization to work mutually, in order to meet customer requirements in means that cannot be done by the manners of individual performance.

A high value was placed on teamwork to achieve better performance at organizations (Oschman, 2005; Santos-Vijande & Alivarez-Gonzalez, 2007). The author underpins 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 the knowledge sharing aspects of KM.

Behara and Gundersen (2001) revealed that TQM practices emphasize associated opportunities offered by teamwork and cross-functional relationships for social interaction and social reinforcement among the employees within an organization.

In summary, *employee involvement* is conceptualized in terms of academic staff autonomy in decision-making, involvement of academic staffs in planning of teaching/learning activities, teamwork, active involvement of academic staffs in college's policy of quality improvement, good interaction between academic staffs and other HEIs components, integration of academic staff's suggestions in the design of new educational services, and regular appraisal of academic staff' job satisfaction (AACSB, 2012; Bayraktar et al., 2008; Hung & Lien, 2004; ISO 9000, 2008; Pun et al, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

2.2.4.7 Training and Learning

The seventh core element of TQM involves the concept of training and learning. Many studies have included employee training and learning as one of the core elements of TQM (e.g., Bayraktar et al., 2008; Lim et al., 2004; Venkatraman, 2007). 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). This idea has been touched by previous quality studies. According to George and Jones (2005), training is considered an efficient and essential way to enhance the employees' ability to achieve better than the desired level.

Oakland and Oakland (1998) believed that training is one of the most important elements for continual improvement. Likewise, Oakland and Oakland (2001) argued that training is the most important element of quality improvement efforts. Conca et al. (2004) clearly stated that TQM needs technical and specific knowledge, in addition to detailed training to ensure employee understanding. Furthermore, constituting TQM effectively calls for training and learning program, which will be part of the overall quality strategy and planning at improving the required skills for quality improvement (Antony et al., 2002; Kanji & Sa, 2003; Lau & Idris, 2001; Lynne & Ross, 2007; Mathews et al., 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

Venkatraman (2007) revealed training and learning in HEIs should focus on how the academic staffs are better trained and developed for an involving responsibility of impacting knowledge with the students. According to Motwani (2001), the future of training on issues connected to total quality should be more emphasized most especially in this changing world.

Moreover, the criteria for AACSB, EQUIS, and MBNQA highlighted the importance of training and learning as a core element in quality improvement activities. Such resides in the power of knowledge (AACSB, 2012; EQUIS, 2012; MBNQA, 2011-2012). Training and learning help in facilitating knowledge sharing. It is expected of any system implementing knowledge management to include good training facility meaning that it is difficult to separate knowledge management from TQM in this regard. Such opportunity is essential in higher institutional organizations was nurturing knowledge is the main business.

In a few words, *training and learning* is conceptualized in terms of frequency of training, ability of academic staff to learn from one another, aligning training/learning programs with college objectives, sufficient training and learning resources, and provides training in quality principles (AACSB, 2012; Antony et al., 2002; Bayraktar et al., 2008; EQUIS, 2012; Kanji & Sa, 2003; Lim et al., 2004; Lau & Idris, 2001; Lynne & Ross, 2007; Mathews et al., 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

2.2.4.8 Rewards and Recognition

Organizations and managers always acknowledge reward and recognition as a critical element in motivating individual employees (Kerrin & Oliver, 2002). It is important to recognize that people who play progressive roles within the organization as a way of encouraging them to do more, the rewards are also referred to as communication and motivation devices (Sweins & Jussila, 2010). Several scholars and researchers have as well mentioned the significance of the reward and recognitions in the quality improvement activities (Crosby 1979; Dayton, 2001; Everett, 2002; Jimenez-Jimenez & Martinez-Costa, 2009; Li et al., 2001; Lim et al., 2004; Martinez-Lorente et al., 1998; Rao et al., 1999; Santos-Vijande & Alivarez-Gonzalez, 2007).

According to Townsend and Gebhardt (2002), certain behaviors are recommended for better organizational performance, which is designed by the organization. The author argued that for making people to follow the designed organizational behavior patterns, there should be rewards for compliance with such behavior for motivational purposes. Similarly, Oakland and Oakland (2001) defined recognition as remuneration in the form of an acknowledgement of gratitude perceived as a commendation by the recipient, while Eng and Yusof (2003) defined reward as a gift or prize considered to be of great value to the recipient. The effective balance between financial and non-financial motivation varies from organization to organization and often between different groups of people within an organization.

It is important for organizations to incorporate its reward management processes, which are used to determine when an employee meets the organizational requirements in terms of behavior. Thus, it is agreed that such an act will motivate the employee to work more effectively without forcing it to do so (Eng & Yusof, 2003).

The study conducted by Allen and Kilman (2001) stressed the significance of relating the reward system with the TQM support and sheds light on how management can employ the recognition and reward system to ensure that TQM is as effective as possible. The increased use of appropriate recognition and reward practices should be seriously considered to ensure that TQM influences the organizational performance. It then becomes necessary for organizations to integrate staff performance and recognition strategy capable of recognizing employee who has performed extraordinarily in order to encourage others.

Talavera (2004) revealed that there should be provisioned of awards and incentive for both internal and external customers for achieving higher organizational performance and to gain customer loyalty. In the same view, Wilkinson (1997) stated that TQM is an endless journey of continuous improvement; management must continually review and improve their reward system to guarantee that it focuses on quality of the learning-centered process in order to motivate academic staff to excellence, and support strategic objectives. This eventually becomes a habit of all employees within the organization.

Based on all the reviews and evidence from scholarly journals, it is agreed that rewards and recognition should be given adequate attention to attain the acceptable level of organizational performance. This led to the decision to include this variable as one of the core elements of TQM and the items under it are a product of the reviews.

In short, *rewards and recognition* is conceptualized in terms of recognition of quality improvement efforts, system of acknowledgements oriented by educational-quality objectives, system of promotion based on scholarly contributions, awards system focuses on quality of educational process, and incentives for academic staffs to share their knowledge (Bayraktar et al., 2008; Eng & Yusof, 2003; Hung & Lien, 2004; Lim et al., 2004; Oakland & Oakland, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007; Swift et al., 1998).

2.2.4.9 Management by Fact

This element is identified to be one of the core elements of TQM in Kanji's Pyramid Model (Kanji & Tambi, 1999). According to the model, achieving high organizational performance requires constant improvement of all aspects of organizational processes. This can be achieved through good and selfless leadership by making only goal-oriented decisions based on facts and figures (Kanji & Tambi, 1998; Kanji & Tambi, 1999 Kanji, 2001; Kanji, 2002; Antony et al., 2002; Kanji & Sa, 2003; Suryadi 2007). Thus, management by fact is considered as a core element of TQM.

Organizations depend on 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 data and information about key processes and results (MBNQA, 2011-2012; NIST, 2009; Suryadi, 2007). For this reason, many types of data and information are needed for performance measurement.

In TQM literature, knowing the current performance level of the products/services is the initial step of being able to improve. If we know where we are starting from, we can measure our improvement. It is argued that information to be disseminated to people needs to be based on facts (Hsu & Shen, 2005; Talavera, 2004; Al Nofal, Al Omaim, Zairi, 2005).

Quality as standards usually referred to as relatively strong, conservative and measurable performance objectives (Antony et al., 2002; Bayraktar et al., 2008). Different universities have been using several evaluation programs to access students, academic staffs, and the diverse courses offered (Ayoo, 2009; Welle-Strand, 2002). Universities' approaches to quality may be standard, to some extent, notwithstanding; it also needs additional processes for dealing with the consequences of applying standards, for learning from experience and for improving the systems, which means that 'quality' is not synonymous with 'standards'.

Similarly, Caruana (2004) noted virtually all academic students want quality educational services, and the reward for academic staffs of the universities that are found capable of providing the desired quality educational service is necessary as well. Such reward has to be based on facts and figures with clearly stated evaluation criteria.

According to MBNQA (2011-2012), performance measurement in HEIs should focus on student learning achievements, which requires a comprehensive and integrated fact-based system. In short, management by fact is conceptualized in terms of establishing appropriate quality standards, measurement and analysis of college performance, clear definition of quality indicators, using reliable data, information and knowledge, using systematic analysis for performance measurement, and lastly; the applications of database for educational-quality activities are well managed (AlNofal et al, 2005; Bayraktar et al., 2008; Hsu & Shen, 2004; ISO 9000, 2008; Lim et al., 2004; MBNQA, 2011-2012; Suryadi, 2007; Talavera, 2004; Venkatraman, 2007).

2.3 Knowledge Management (KM)

Knowledge management has been recognized as an important tool in achieving organizational performance to the extent that many organizations are now making its implementation mandatory although only few studies have been done to assess the rate at which knowledge management improves organizational performance (Crnkovic, Belardo & Asoh et al., 2005; Zack et al., 2009).

KM is relatively a new discipline, derived from other various disciplines, including management, information system, business theory, organizational behavior and social psychology (Sallis & Jones, 2002; Liao & Wu, 2009). Like other disciplines, a number of important theorists and academics are influencing the direction and development of KM.

Notwithstanding, there is no agreed list of "KM gurus" like TQM, but there are certain scholars (such as Peter Drucker, Chris Argyris, Peter Senge, Dorothy Leonder, Ikujiro Nonaka, Thomas H. Davenport, and others) who have been mainly influential.

Drucker (1993) and Argyris (1993) as management theorists have made significant contributions to the way of viewing management in this knowledge age. Senge (1990) disclosed the importance of the emerging learning organizations, and such benefits are attributed to the success of any knowledge-driven organization, while Drucker (1999) also revealed how information and knowledge have become the most essential organizational resource.

Leonder (1995) demonstrated how innovation is influential in the assurance that the core knowledge abilities do not turn into core rigidities. Nonaka and Takeuchi (1995) made a significant contribution to theories of the nature of knowledge, emphasizing the imperative of tacit knowledge to competitive advantage.

Similarly, Davenport (1993) argued that KM should be considered not just an information process management, but should be a central component of the organization. Thus, based on the aforementioned views, it is clearly that the philosophies and teachings of those thinkers have been notable contributed to our knowledge and understanding of KM today. For this reason could be considered those scholars as gurus of KM. Table 2.4 outlines the individual contributions of KM gurus.

Table 2.4

KM Gurus and their Main Contributions

KM guru	Main contribution
Chris Argyris	- He first used the phrase "*organizational learning*" (see Argyris, 1993). -Contributed to understanding of organizational learning using his famous theories (single and double loop learning models).
Thomas H. Davenport	- Famous for "*Davenport's 10 principles*" of knowledge management. - Drew an important difference between data, information and knowledge (see *Working Knowledge* 1998, written jointly with L. Prusak).
Peter Drucker	- Focused on the factors that determine the productivity of knowledge workers. - Developed four ways to motivate knowledge workers. (see *Management Challenges for the 21st Century* 1999)
Dorothy Leonder	- Best known as the author of "*Wellsprings of knowledge*". - Highlighted the core capabilities as a starting point for managing organizational knowledge (see Leonder, 1995).
Ikujiro Nonaka	- Introduced the idea of the social nature of knowledge creation. - Originated the four major processes of knowledge conversion (see *The Knowledge- Creating Company* 1995, written jointly with H. Takeuchi).
Peter Senge	- The idea of learning organization was his main concern. - Developed the five core disciplines for building a learning organization (see *The Fifth Discipline: The Art and Practice of the Learning Organization 1990*).

2.3.1 KM Definitions

Like TQM, KM has been defined in different ways and from different perspectives. In defining KM, there is a need to look at what knowledge itself is. Furthermore, in defining knowledge, there is a need for defining data and information, which transform into knowledge. Clarke and Rollo (2001) defined data as a set of discrete raw facts, which is presented without judgment or context while the information is considered as the result derived when data are categorized, analyzed, summarized and placed in a context in the form that makes meaning to the recipient. The authors went further to define knowledge as a kind of information that is associated with insights, experience, intuition, judgment and values. Similarly, Small and Sage (2006) defined knowledge as the intersection of information, experience and theory.

KM is a conscious strategy of getting the specific knowledge to the right people at the exact time, and encouraging people for knowledge sharing in order to exploit their knowledge in ways that will improve organizational performance (Van Ewyk, 2000). Crnkovioc, Belardo and Asoh (2005) equally defined knowledge as a combination of information with experience, context interpretation and reflection. This means that not all information is knowledge. There are two types of knowledge, which are tacit (knowledge in people such as expertise) and explicit knowledge (knowledge in forms of documentation).

Anantatmula (2007) revealed that the perspective of knowledge of the organization in the current knowledge economy is that knowledge is viewed as the main economic resource, and it is seen as a weapon that can be used in gaining competitive advantage. Thus, managing such vital economic resources is essential. Crnkovioc et al. (2005) defined KM as a formalized means of acquiring, organizing, communicating knowledge of the employees in a way specified by the organization to make such knowledge reusable by other employees in achieving effectiveness and productivity in the work. This definition is central to this study as it describes virtually all the important dimensions of KM that the researcher is interested in investigating. Since, tacit knowledge is difficult to circulate (Ngah & Jusoff, 2009); the focus of this study will be on expert knowledge.

Liao and Wu (2009) defined KM as the process of knowledge acquisition, knowledge conversion and knowledge application. This is in line with the KM processes, which are considered in this study.

According to Small and Sage (2006), knowledge can be differentiated from information in the following ways:

- Knowledge involves disciple (i.e., the person seeking the knowledge) while, information might not be learnt.
- Knowledge is more difficult to detach, transfer and share than information.
- Knowledge is more difficult to assimilate and understand than information.

According to Davenport et al. (1998), KM is defined as a tool that deals with exploiting and developing knowledge as organizational assets/properties with the central aim of furthering organization’s objectives. For this study, the researcher is interested in the enterprise or organizational form of knowledge.

Small and Sage (2006) defined organizational knowledge as a dynamic combination of personal, group, organizational and inter-organizational experiences, values, information and expert insights. The history of this type of knowledge can be traced to the mind of each knowledge worker, and it grows because of the interactions between the knowledge workers and their environment. It was further stressed that managing organizational knowledge is very crucial in ensuring optimum organizational performance. Thus, the extent at which it affects organizational performance needs to be examined.

O’Leary (1998) equally defined organizational knowledge management as a formal management of organizational resources in the form of knowledge in order to support access and reuse of knowledge with adequate information technology. 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 documentation.

Creating organizational knowledge involves transformation between tacit and explicit knowledge, which led to four phases of knowledge conversion such as socialization, externalization, combination, and internationalization (Nonaka & Takeuchi, 1995).

Clarke and Rollo (2001) revealed that individual knowledge on its own does not create economic value until when it is integrated within organizational routines (i.e., being converted into organizational knowledge). To substantiate this, Kamtsiou (2006) revealed that the key aspect of knowledge creation is defined by the four modes of knowledge conversion, which occur when tacit knowledge and explicit knowledge interact with each other (see Figure 2.2).

Safa, Shakir and Boon (2006) viewed KM as a current concept in management discipline that has gained popularity among organizations in developed countries as a tool for enhancing organizational performance. This is in line with the researcher's opinion about KM in determining organizational performance of higher-education institutes.

Similarly, Gupta, Iyer and Aronson (2000) defined KM as a process that assists organizations to discover, choose, organize, disseminate and transfer important information and expertise required for some vital organizational activities such as problem solving, dynamic learning, strategic planning and decision making. This definition captures all activities of any higher-education environment.

Alavi and Leidner (1999) equally defined KM as a specific process of acquiring, organizing and communicating both forms of knowledge (tacit and explicit) in a systematic and organized manner. This definition captures the KM processes that the researcher is interested to consider.

In this study, based on aforementioned definitions, KM can be defined as a dynamic combination of specific processes, which include knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application, by all organization's members in order to exploit the definite knowledge that leads to optimum organizational performance.

2.3.2 Benefits of KM

There is no doubt about the fact that virtually all organizations are becoming knowledge-driven in a plight to promote organizational efficiency in this information era. Several authors have identified KM as an important tool for enhancing organizational performance (Gupta et al., 2000; McKeen, Zack, Singh, 2006; Safa et al., 2006).

Safa et al. (2006) revealed that incorporating KM in an organization would enable such organization to achieve or maintain her competitive advantage in the e-economy business organizations of today. The organization's ability to maintain a competitive advantage will surely guarantee better organizational performance. The same thing is applicable to higher education since universities, and institutions are ranked based on their performances. In a similar view, Crnkovioc et al. (2005) equally identified KM as a means of achieving or maintaining an organizational competitive advantage in a highly competitive environment. Considering the fact that, organizational desire to achieve the competitive advantage has a positive impact on the overall organizational performance.

KM has been considered to be of significant benefits to organizations in the areas of serving as strategic resources, giving competitive advantage and as the main driver for the implementation of the organizational business strategy (Calurci & Schuima, 2006). Similarly, Crnkovioc et al. (2005) identified long-term total strategic performance of the organization as the main objective of KM. This supports previous authors that have considered KM of great benefits in organizational strategic planning.

Kidwell, Vander Linde and Johnson (2000) also identified KM of great benefits in a higher-education environment in research process, curriculum development process, student and alumni services, administrative services and business strategic planning. It can be found that the use of KM in higher education will have many direct benefits for academic achievements.

2.3.3 KM in Higher Education

In this information era, virtually all organizations are becoming knowledge-driven in order to achieve or maintain the competitive advantage. Choy (2006) revealed that KM has been practiced in 80 percent of the most prominent companies in the world. The author concluded that the power of KM in an organization could not be overestimated considering the fact that for an organization to maintain her growth and development; there must be regular update of the organizational knowledge.

Application of KM in education settings is clearly defined, which is equally reflected from the definition of KM in education given by Salis and Jones (2002) as follows:

KM in education can be defined as such a tool that gives clues to managers and staffs of educational organizations in the emerging world of KM to meet the challenge of the knowledge era. KM helps educational organizations to realize the merits and beauty of knowledge creation and sharing as means of enhancing teaching and learning process.

Several authors have worked on KM and its impact on organizational performance (Choy, 2006; Kiessling, Richey, Meng & Dabic, 2009; McKeen et al., 2006; Ngah & Jusoff, 2009; Safa et al., 2006). However, there are limited studies performed to determine the effect of KM in educational organizations (Daud & Abdul Hamid, 2006; Muhammad et al., 2011). Bose (2004) stated that organizational leaders play the key role in ensuring KM effectiveness. Therefore, it is very important for them to effectively understand the nature of knowledge and knowledge development activities ranging from managing, measuring and extending KM values to provide tangible additional value to their organizations.

It is equally revealed that effective implementation of reliable KM strategy and making organization to be knowledge-driven is necessary in the emerging knowledge economy (Bose, 2004). Similarly, Kiessling et al. (2009) argued that the success of a firm depends much on its ability to accumulate and process knowledge in a way to ensure organizational learning.

Ngah and Jusoff (2009) also revealed that knowledge sharing amounts to better organizational performance. The researcher considered knowledge sharing as one of the dimensions of KM in this study. Similarly, KM has been considered to have a positive effect on organizational performance, and that KM has assisted quite a number of organizations in gaining competitive advantage (Liao & Wu, 2009). The authors liken KM to the factors of production in any business. This show how relevant is KM to organizational performance. In line with the view of the researcher, KM processes (creation, conversion, and sharing) are identified as the necessary organization precondition of an effective KM (Liao & Wu, 2009).

Every organization has the tendency to embrace the idea of moving towards running a paperless office where activities and necessary workflow within a given organization can be achieved without any need to pass paper documents around. Such idea is aimed at improving the productivity of knowledge workers since virtually all organizations now are knowledge-driven (Martin, 2004). In such an attempt to improve the productivity of the knowledge workers, appropriate technology that is capable of supporting an efficient knowledge sharing among members of such knowledge-driven organization is highly essential. In higher-education context, educational professionals as knowledge workers require same thing to get the job done, within a robust sense of values.

In general, people refer to colleges and universities as knowledge environments. All their organizational activities (such as teaching, research and community service) revolve around knowledge. Such notion has been supported by many authors, for example, Kidwell, Linde and Johnson (2000) revealed that knowledge being the hub of any higher institution of learning, and hence, educational organizations should take the advantage of the emerging field of KM to enhance innovation, promoting good customer service and gaining competitive advantage over their competitors. The authors buttressed this by the following quotation: “colleges and universities have significant opportunities to apply KM processes to support every part of their mission”.

Moreover, Kidwell et al. (2000) revealed that KM is applicable to the research process, teaching/learning process, student and alumni services administrative activities and lastly strategic planning in any educational organization. The following benefits are identified by applying KM in higher-education environment: better result-oriented decision-making, shorter time required to deliver an educational product, more effective teaching/learning process, higher quality and volume of research, and better academic and administrative services at reasonable cost.

Similarly, Yeh and Ta (2005) observed that KM has been identified as the critical success factor in virtually all organizations. It is further stressed that the pressure being faced by higher-education institutions nowadays in order to maintain the competitive advantage is similar to what is experienced even in the private sector. KM and its related strategies are considered applicable to enhancing quality and performance in higher-education institutions.

Daud and Abdul Hamid (2006) also revealed that there is a strong relationship between effective knowledge sharing among different faculties of higher-education institutions and the overall performance of such an institution. Therefore, KM and its strategies are considered a strong determinant of organizational performance in higher education.

Suhaimee, Abu Bakar and Alias (2005) conducted a study to evaluate the current level of KM implementation in Malaysian public institutions of higher education (PIHE). The authors revealed that KM has gained acceptance not only in the business organization, but also in the academic world, which was the basis for Malaysian PIHE to support such a novel concept of KM in achieving the country's educational mission of the vision 2020.

According to Kebao and Juxun (2008), learning in most cases nowadays takes place within a knowledge environment. For the stakeholders in the higher educational environment (teachers and students) to get familiar with the new environment, there must be reorientation about the emerging KM concept and its processes. This implies that we cannot talk about performance at the educational organization level without referring to KM. The level of such a relationship will be examined in this study. Kebao and Juxun (2008) then concluded that more attention in terms of human resources and funds should be given to KM implementation for the success of the educational sector.

Knowledge has been considered a strategic resource in any organization used in sustaining competitive advantage (Amin, 2006). Thus, managing such knowledge is essential and needs to be carried out in a more effective manner. The same is applicable to the educational organization since the educational sector is becoming more competitive even than the conventional business settings. Such competitions have compelled it on universities and colleges to adopt the new IT-driven administrative approach that can support immediate response to likely changes resulted from the advancement in the technology. This is why the educational environment has changed drastically in this century in terms of teaching approaches and learning paradigms.

Chen and Burstein (2006) concluded that the existence of an organization depends on knowledge, and that KM makes the organization to be well organized. The authors equally identified people, policies and technology as the three factors to be considered in implementing KM.

Several authors have described Information Technology (IT) infrastructure as a critical factor for successful KM practices (Al-Mabrouk, 2006; Choi, 2000; Heising, 2001; Liebowitz, 1999; Slagter, 2007; Trussler, 1998; Williams, 2008; Wong & Aspinwall, 2005). According to Davenport et al. (1998), effective KM practices require a hybrid solution of people and technology.

In the same vein, Sallis and Jones (2002) revealed that IT solution is a central part in the higher-education context. According to the authors, such as technology provides collaborative processes capable of supporting the creation and sharing of knowledge, via virtual networking and in virtual-learning environments. Based on that fact, it is impossible for any educational organization to manage its knowledge successfully, without supportive technology systems.

Leen (2006) revealed that the importance of KM in educational organization is gaining more recognition for the past five years. It was equally argued in the paper that schools and business organizations are similar in the fact that they both tend to become learning organizations in the present knowledge economy. This means that KM is as important in higher-education institutions as in business organizations.

Throughout the world, higher-education organizations are driven by the technology that will facilitates to eliminate limitations, foster innovation, enable both students and academic staffs to live up to their full potential (Elameer & Idrus, 2010). Nowadays, Iraqi higher-education institutions are also with this global trend (UNESCO, 2011).

In Iraqi HEIs context, the efforts are continuing in order to remove obstacles and problems facing the development of the educational process (Elameer & Idrus, 2010). As a result of this status, and although KM practices in Iraqi higher education is still a new concept, the higher education sector responds positively to these practices in individual level and institutional level (Aljanabi, 2007).

According to Al-Shamary (2006) and Aljanabi (2007), KM processes had been recognized and implemented in Iraq HEIs. Despite the importance of KM in Iraq HEIs and its impact in improving the performance at the institutional level, empirical studies aiming to investigate the impact of KM processes on institutions' performance are very scant, and tend to be case study based on individual faculty's experiences. Therefore, the researcher is interested in investigating empirically the impact of KM on the organizational performance of the Iraqi higher-education institutions.

2.3.4 KM Processes

The concept of KM is generally described based on a number of practices or processes of KM. Such processes have several interpretations; the term of *processes* is sometimes referred to as activities, initiatives, practices or KM value chain. Whichever a way it is addressed, it still refers to the same object which is the dimensions of KM and in this study, the term "processes" is used, since it is a way to emphasize that these processes are basic and should work together to improve the performance of an organization.

Many studies have addressed KM processes with a view to identify the key processes (dimensions) of KM. These dimensions include identification, collection, organizing, storage, sharing, and evaluation (Kiessling et al., 2009); acquisition, innovation, protection, integration, and dissemination (Lee & Yang, 2000); acquisition, conversion, application, and protection (Gold, Malhotra & Segars, 2001); development, utilization, and capitalization (Kalling, 2003); creation, accumulation, sharing, utilization, and internalization (Lee, Lee & Kang, 2005); acquisition, sharing, utilization (Daud & Abdul Hamid, 2006); acquisition, dissemination, and application (Ooi, 2009). An examination of these diverse views enables the researcher to group them into five processes: knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. These five processes have received the most consensus attention in KM literature. The diagram in Figure 2.1 below, explains the processes of KM to be considered in this study.

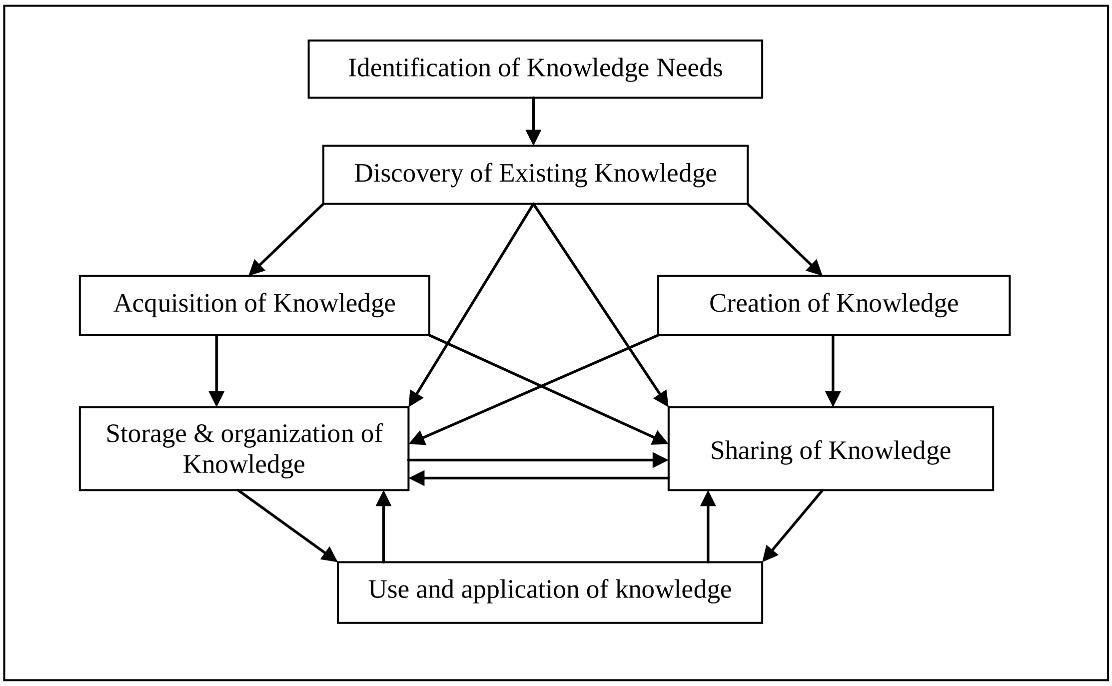

Figure 2.1
Knowledge Management Processes
Source: Bouthillier, F., & Shearer, K. (2002) Understanding knowledge management and information management: the need for an empirical perspective. *Information Research, 8*(1).

Based on many researchers (Lee &Yang, 2000; Gold et al., 2001; Daud & Abdul Hamid, 2006; Ooi, 2009; Kiessling et al., 2009; Liao & Wu, 2009; and Others), the researcher considers knowledge identification, knowledge discovery as a single dimension to be referred to as ***knowledge identification***. And other four main processes of KM, which are ***acquisition***, ***storage***, ***sharing*** and ***application*** to make a total of five processes (dimensions) of KM to be considered in this study. A discussion of the five dimensions of KM follows subsequent subsections.

2.3.4.1 Knowledge Identification

Knowledge identification is an action of discerning the location and value of knowledge, restraints to knowledge flow, and opportunities to leverage the value of knowledge. Looking at this perspective, knowledge can be identified by either individual employees or organization (Asoh, Belardo & Crnkovic, 2007; Darroch, 2005; Liao & Wu, 2009). Therefore, knowledge identification is well known as the initial stage of managing knowledge (Akhavan, Hosnavi & Sanjaghi, 2009).

Tripathy, Patra and Pani (2007) revealed that the knowledge identification is essential to know what knowledge the organization and its members are required in order meeting their goals and objectives. Thus, knowledge identification is significant in any organization for effective decision-making in order to gain competitive advantage.

This dimension also captures all that is related to determine core competencies, recognize strategic capabilities, and assess the expertise level for each knowledge domain. In short, determining the knowledge gaps between the existing and needed knowledge (Anderson, 2009; Hall & Andriani, 2002; Zack, 1999).

According to Sarawanawong et al. (2009), identify the knowledge gap is necessary to support staff daily work successful. Doing this requires identifying differences between what is known and what should be learned through benchmarking (Zack et al., 2009). Benchmarking is the best approach, which is used to identify gaps and opportunities for enhancing the organization's practices (Anderson, 2009).

Furthermore, many researchers mentioned that knowledge identification must occur followed by knowledge discovery (Bothillier & Shearer, 2002; Tripathy et al., 2007). Knowledge discovery is an activity that deals with locating and analyzing the organization knowledge status or environment internally and externally. This form of knowledge is always helpful since the organization makes conscious efforts to sense and discover relevant knowledge and its sources (Liao & Wu, 2009; McKeen et al., 2006; Peter, 2005; Stollberg, Zhdanova & Fensel, 2004; Tripathy et al., 2007). In order to identify the required knowledge, a list of knowledge sources has been accumulated. The list usually includes human experts and related documents (Tripathy et al., 2007). While in education context, the two major types of knowledge sources that are focused, those are academic staffs' experts and documents related to the educational process improvement. Moreover, many researchers emphasized technology solutions as a prerequisite to support knowledge identification (Aurum et al., 2007; Sarawanawong et al., 2009; Tripathy et al., 2007).

In short, *knowledge identification* is conceptualized in terms of benchmarking the performance continuously, determining the knowledge gap, discovering new professional knowledge, determining the knowledge sources, determining the best practices, and supporting the technological techniques for enabling knowledge identification (Anderson, 2009; Asoh et al., 2007; Bothillier & Shearer, 2002; Darroch, 2005; Sarawanawong et al., 2009; Liao & Wu, 2009; Tripathy et al., 2007).

2.3.4.2 Knowledge Acquisition

Once needed knowledge is identified, it has to be acquired for utilization. Thus, acquisition processes are those oriented to obtain the needed knowledge from both internal and external sources, and formalize and document the obtained knowledge (Bothillier & Shearer, 2002; Stollberg et al., 2004; Mohammad, Hamdeh & Sabri, 2010). This requires access to knowledge in knowledge-based resources to capturing the new knowledge, and exploiting the available knowledge.

According to Lee and Yang (2000), there are two activities through which organization acquires knowledge, which are; searching and organization learning. Knowledge acquisition through searching can be achieved through three means such as scanning, focused research, and performance monitoring. Meanwhile, organization learning takes a fundamental part in knowledge acquisition since there is a need for organizations to develop constantly. This viewpoint has been emphasized by many KM gurus and theorists (Argyris, 1993; Drucker, 1999; Senge, 1990). Therefore, these perspectives are considered in this study.

Drucker (1999) argued that acquiring knowledge involves continuous learning on the part of the knowledge workers (as academic staffs in HEIs), and continuous learning on the part of a knowledge worker organization. These two aspects of learning have been denoted as "*single-loop learning*" and "*double- loop learning*" (Argyris, 1993). Furthermore, Senge (1990) revealed that learning organization has the capability for both generating and adaptive learning as the sustainable resource of competitive advantage. This further stresses how significant it is for organizations to determine the best practices to be adopted in order to achieve excellent performance (Asoh et al., 2007; Liao & Wu, 2009; McKeen et al., 2006).

Many researchers have equally revealed that knowledge can be acquired from a variety of sources associated with a diversity of issues that are faced by organizations (Lee et al., 2005; Liao & Wu, 2009; Ooi, 2009; Stollberg et al., 2004). For instance, Darroch (2005) stated that knowledge can be obtained from the employees of an organization and therefore, will reveal the individuals' capabilities and experiences.

In the KM literature, many terms have been employed to explain the knowledge acquisition process (such as acquire, find, create, seek, catch, and obtain), but the common task that is involved is the accumulation of knowledge. Gold et al., (2001) revealed that the knowledge acquisition refers to a KM process oriented toward knowledge accumulation. Similarly, Mansur et al. (2008) stated that the knowledge acquisition is the process that captures knowledge by accumulating data via human observations and previous experiences.

In addition, a significant part of knowledge acquisition is innovation; whereby new knowledge is originated from the appliance of existing knowledge (Gold et al., 2001; Nonaka & Takeuchi, 1995). This requires an absorptive ability to distinguish, realize, and obtain knowledge from a variety of sources (Asoh et al., 2007; Darroch, 2005; Halawi et al., 2005; Hawamdeh, 2007; Liao & Wu, 2009; Ooi, 2009; Stollberg et al., 2004; Zack et al., 2009).

Notwithstanding, the acquisition process is a fundamental process of KM (Bothillier & Shearer, 2002; Gold et al., 2001; Liao & Wu, 2009; Mansur et al., 2008; Stollberg et al., 2004), many researchers have equally revealed that the knowledge acquisition process can be seen as the knowledge creation process (Lim et al., 1999; Lin & Kuo, 2007; Nonaka & Takeuchi, 1995).

To create value from acquiring knowledge, the knowledge acquisition process depends on an organization’s capability to integrate, structure, filter, and organize for sharing and application purposes (Davenport & Prusak, 1998; Frappaolo, 2006; Gold et al., 2001). It could be noted that creating knowledge is not considered useful until when it is shared as being observed by Ngah and Jusoff (2009), that sharing tacit knowledge enhances competency and organizational performance, which in turn makes such organization to maintain its competitive advantage. Therefore, knowledge sharing is considered a very crucial dimension of KM in this study.

Knowledge acquisition via the knowledge creation process can be viewed from the following two perspectives (Gunnlaugsdottir, 2003; Hawamdeh, 2007; Lee et al., 2005; Peter, 2005; Nonaka & Takeuchi, 1995; Sallis & Jones, 2002):

The ontological dimension: This view acquisition of the organizational knowledge as a process of improving the existing knowledge created by individuals, and this is crystallized in the virtual knowledge network.

The epistemological dimension: Here, it is believed that knowledge is created or derived from its distinction between tacit and explicit knowledge. This viewpoint has been widely accepted among the scholars, which is well known as the knowledge creation model of Nonaka and Takeuchi.

Nonaka and Takeuchi (1995) theorized that knowledge creation occurs through a spiral interaction between the epistemological and ontological dimensions of knowledge. This entails four diverse modes of interaction between tacit and explicit knowledge: socialization (tacit to tacit), externalization (tacit to explicit), combination (explicit to explicit), and internalization (explicit to tacit). These modes of interaction represent ways that existing knowledge is converted into new knowledge as described in Figure 2.2.

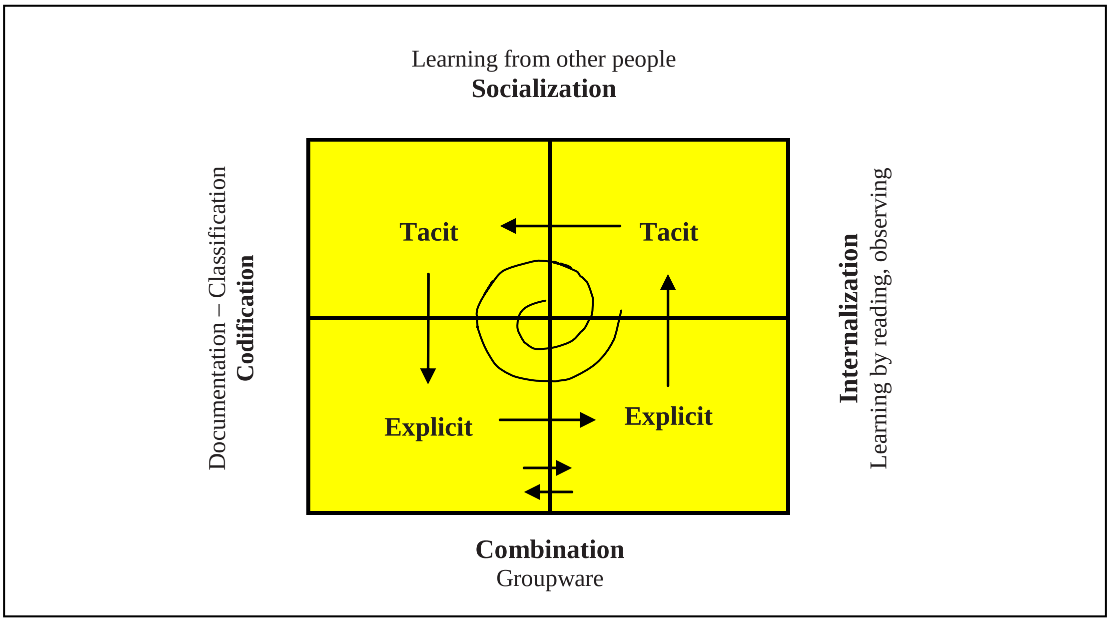

Figure 2.2
Knowledge Creation Process
Source: Gunnlaugsdottir (2003) adopted from [Nonaka, I., & Takeuchi, H. (1995). The knowledge creating company. New York: Oxford University Press].

Generally, knowledge is created through conversions; these conversions are of four categories (Gunnlaugsdottir, 2003; Small & Sage, 2006):

Internalization (*Explicit-to-Tacit*)**:** people learn by obtaining public knowledge from books, the Internet, and other public sources. This knowledge is internalized.

Socialization (*Tacit-to-Tacit*)**:** people learn by socializing with other people, sharing ideas and exchanging experiences.

Externalization (*Tacit- to-Explicit*)**:** personal (tacit) knowledge becomes public (explicit) knowledge throughout the documentation. Individuals' knowledge is accumulated, documented and classified to be available for reuse by others.

Combination (*Explicit-to-Explicit*)**:** the explicit knowledge from diverse sources is collective, joined or linked via groupware to create new knowledge.

In summary, *knowledge acquisition* is conceptualized in terms of obtaining knowledge, converting knowledge, absorbing knowledge, utilizing feedbacks from experiences, updating knowledge, and generating useful knowledge via virtual networking (Gold et al., 2001; Gunnlaugsdottir, 2003; Hawamdeh, 2007; Lee et al., 2005; Liao & Wu, 2009; Mansur et al., 2008; McKeen et al., 2006; Nonaka & Takeuchi, 1995; Peter, 2005; Sallis & Jones, 2002; Small & Sage, 2006).

2.3.4.3 Knowledge Storage

It is generally believed that if knowledge is valuable, then storing such valuable assets should be given an utmost concern. After acquiring knowledge, it is expected to be coded and recorded to enable easy access to such knowledge (Kiessling, Richey, Meng & Dabic, 2009). Typically, some group of experts within the organization is responsible for refreshing and refining the organization-evolving reservoir of knowledge. The organization only needed to store the explicit knowledge since is the product that is meant for sharing. Explicit knowledge is stored in the database similar to the conventional document database.

This special kind of database is called the *Knowledge Base*, which allows collection, organization and retrieval of knowledge to be carried out in a computerized manner. The knowledge base can be categorized into two major types: The machine-readable and the manual knowledge base (Asoh et al., 2007; Kiessling et al., 2009; Liao & Wu, 2009; McKeen et al., 2006). The machine-readable knowledge base enables the explicit knowledge to be stored in a computer-readable form. This form of knowledge based is applicable when there is a need to apply an automated deductive reasoning to the contained knowledge.

Manual knowledge base/ Human-readable knowledge base, on the other hand, is the original knowledge itself stored manually and used for a number of predetermined purpose, mainly for training and other academic activities. Good examples of these are user manuals, white papers and others used in capturing the organizational explicit knowledge (Kiessling et al., 2009; Liao & Wu, 2009).

The knowledge base is evaluated by the quality of information it contains. The success of any knowledge base depends on how robust the processes that support the system are. These processes determine the type of information to be captured and where that information resides in a knowledge base (Asoh et al., 2007; Liao & Wu, 2009; Safs et al., 2006).

The performance of the knowledge base system depends largely on the size of the employed knowledge base. It has an indirect relationship that is the performance of a knowledge base system slows down as the employed knowledge base increases while using primary memory. It gets worse when the size of the knowledge base grows much beyond the size of the available memory space, resulting in page faults when accessing the knowledge base (Asoh et al., 2007; Liao & Wu, 2009; Safa et al., 2006).

From a competitive advantage perspective, there is no way one can talk about knowledge storage without mentioning knowledge protection. This action is designed to protect the knowledge within an organization from an illegal or unauthorized use (Gold et al., 2001). In the emerging knowledge era where information is the key to organizational success, insecurity of organizational knowledge is detrimental to performance (Gold et al., 2001; Lin & Lee, 2005).

Moreover, Anderson (2009) revealed that protecting knowledge involves the use of effective technology and also appropriate policies and procedures. For the reason stated above among others, there is a need for effective information technology system with a storage policy that will allow the knowledge base to be stored on auxiliary storage, and linked with the primary memory for easy referencing and retrieval.

In simple words, *knowledge storage* is conceptualized in terms of coding and recording relevant knowledge, effective technology system for referencing and retrieval knowledge, replacing outdated knowledge base, robust technology for restrict knowledge access, and strong procedures and policies to protect the knowledge base (Anderson, 2009; Asoh et al., 2007; Gold et al., 2001; Kiessling et al., 2009; Liao & Wu, 2009; Lin & Lee, 2005; Safa et al., 2006; Sallis & Jones, 2002).

2.3.4.4 Knowledge Sharing

Knowledge sharing involves the exchange of information and knowledge from one source (person, group or organization) to another (Fugate, Theodore & Mentzer, 2009; Lee et al., 2005; Liao & Wu, 2009). Therefore, knowledge sharing as a vital pillar of KM is critical to organizational performance in this knowledge era, and its full value needs to be tapped (Abdullah et al., 2009).

According to Botthillier and Sheare (2002), the success of any KM processes in any organization relies on the effectiveness of the knowledge sharing. The general problem with KM is that most of the large organizations is not conscious of valuable knowledge they have (Kiessling et al., 2009).

With effective KM processes, hidden knowledge can easily discover, and such process mostly facilitated via sharing. It is equally revealed that the sharable knowledge could be categorized into any of the following three categories (Peter, 2005; Hawamdeh, 2007): the data, documents and employees.

Knowledge sharing plays an intermediate role to support knowledge exchange in the organization and aids the achievement and sustenance of their competitive advantage (Daud & Abdul Hamid, 2006; Liao & Wu, 2009). For this reason, employees need to understand how to access and work with information and sharable knowledge in order to get its values.

In order to maximize the knowledge sharing, many researchers revealed that the organization needs to consider several organizational components such as accessible technology, effective communication channels, organizational culture and reward system (Asoh et al., 2007; Daud & Abdul Hamid, 2006; Fugate et al., 2009; Liao & Wu, 2009; Safa et al., 2006; Sallis & Jones, 2002).

Similarly, Taylor and Wright (2004) stated that the factors such as an innovative culture, ability to learn from failure and information quality are considered as significant success factors for knowledge sharing in service-oriented public organizations. The same factors are applicable to higher-education institutions. Hence, for exploitation of such knowledge in the development of the educational process, academic staff should be involved fully in the knowledge sharing process in order to obtain its values.

In brief, *knowledge sharing* is conceptualized in terms of exchange of knowledge across academic departments, providing collaborative technologies, effective communication, knowledge sharing culture and incentive for sharing knowledge (Fugate et al., 2009; Hawamdeh, 2007; Lee at el., 2005; Liao & Wu, 2009; Peter, 2005; Safa et al., 2006; Sallis & Jones; Taylor & Wright, 2004).

2.3.4.5 Knowledge Application

Within KM context, the concept of "*application*" has another interpretation, sometimes in literature where it is referred to as "*utilization*". Many researchers stated that knowledge application process denotes actual utilization of the knowledge (Asoh et al., 2007; Davenport & Prusak, 1998; Gold et al., 2001; Lee et al., 2005; Liao & Wu, 2009; Zack, 1999).

Lee et al. (2005) mentioned that knowledge utilization is applicable at all levels of the organization's activities; one of the common forms of this process is to adopt the best practice from other leading organizations by discovering relevant knowledge and apply it. Moreover, several studies have indicated that ability to learn from experiences or from mistakes are considered as a significant component of knowledge application (Anderson, 2009; Asoh et al., 2007; Fugate et al., 2009; Liao & Wu, 2009; McKeen et al., 2006).

Zack (1999) revealed that knowledge as a process cannot be separated from its respective action-application. Meaning that knowledge without application process is considered as information, as supported by the definitions of knowledge as information in use (O’Dell et al., 1998), information applied to solve problems (Anderson, 2009; Hinds & Aronson, 2002).

Furthermore, Nonaka and Takeuchi (1995) argued that the process of applying knowledge happens when new knowledge is acquired and put to use. In order to support the knowledge application, many researchers stressed that the organization needs effective information technology system (Lee et al., 2005; Liao & Wu, 2009; Taylor & Wright, 2004).

Similarly, Lee et al. (2007) described knowledge application as the effective retrieval mechanisms that enable access to knowledge. The authors further revealed that while the conversion process organizes and constructs knowledge so that it can be stored, retrieved, and shared, the application process is the actual process of knowledge retrieval and knowledge sharing. This means knowledge application involves effective retrieval mechanisms that enable organization’s members to access relevant knowledge.

Notwithstanding, KM literature has paid little attention to the process of knowledge application (Anderson, 2009; Gold et al., 2001), many researchers highlighted another component related to knowledge application process that is, knowledge internalization (Gupta et al., 2000; Lee et al., 2005; Nonaka & Takeuchi, 1995; Ortiz Laverde, Baragano, & Sarriegui Dominguez, 2003). Internalization occurs when individuals discover new knowledge, get it and then apply it (Lee et al., 2005).

According to Ortiz Laverde et al., (2003), internalization is the process of understanding and absorbing (take in) explicit knowledge into tacit knowledge held by the individual. This means that internalization is a critical component of the effective knowledge application process. In other worlds, knowledge will be effectively applied after it is internalized.

In a nutshell, *knowledge application* is conceptualized in terms of developing information technology system, employing knowledge, exploiting knowledge through new educational services, using appropriate knowledge to solve problems, effective retrieval mechanisms, internalization (understanding and take in) of new knowledge before apply it, and applying the best practice (Anderson, 2009; Asoh et al., 2007; Fugate et al., 2009; Gold et al., 2001; Hinds & Aronson, 2002; Lee et al., 2005; Liao & Wu, 2009; McKeen et al., 2006; Nonaka & Takeuchi, 1995; Ortiz Laverde et al., 2003; Taylor & Wright, 2004).

2.3.5 Critical Success Factors of KM

Nowadays, KM is of increasing attention in business. With the significance of KM in achieving organizational competitive advantage being recognized, businesses are viewing KM as a critical success factor in today's knowledge economy society (Alazmi & Zairi, 2003).

From this perspective, several authors have identified some factors considered to be essential for successful KM initiative, such as Davenport et al. (1998); Trussler (1998); Liebowitz (1999); Bassi (1999); Choi (2000); Heising (2001); Wong &

Aspinwall (2005); Williams (2008), and those factors are called critical success factors (CSFs) of KM.

In general, Kanji and Tambi (1999) revealed that critical success factors are those factors that adequate attention has to be given in the course of achieving organizational goals and to equally survive in a competitive business environment.

In the same manner, CSFs of KM represent those managerial factors that must be given special attention to achieve high performance. For this reason, organizations must take into account these factors to be able to excel and to get the accrued KM benefit via its successful implementation (Alazmi & Zairi, 2003).

Similarly, Al-Mabrouk (2006) stated that organizations could definitely benefit from a more broad understanding of these factors, which are critical to the success of KM. Nevertheless, the adoption of factors, which are not appropriate, can hinder the desired performance achievement. One can then say that in using KM as a predictor of organizational performance, such factors need to be adequately considered.

Choy (2006) identified employee training, employee involvement, teamwork, employee empowerment, top management leadership and commitment, removal of organizational constraints, information systems infrastructure, and knowledge-based performance as the CSFs that may affect organization’s success in KM. However, CSFs for KM as identified by others are summarized in Table 2.5 below.

Table 2.5
Critical Success Factors of KM

	CSFs of KM	Author/s								
		1	2	3	4	5	6	7	8	9
1	Technology	√	√					√	√	
2	Leadership support/ leadership style			√		√	√	√		√
3	KM Culture		√	√		√	√	√	√	√
4	Resources							√	√	
5	Training and learning	√	√		√		√	√	√	√
6	Knowledge sharing	√	√	√	√	√				√
7	KM systems and tools			√						
8	KM strategy			√				√		
9	Store experiences			√		√				
10	Business process-oriented					√		√		
11	Issues of trust	√								√
12	Employee involvement						√			
13	Knowledge infrastructure	√	√				√	√	√	
14	Performance measurement						√	√		√
15	Strategy and purpose							√		
16	Transferring					√				
17	Creating motivation		√					√		√
18	Knowledge repositories	√		√						√
19	Teamwork						√			
20	Benchmarking									
21	Processes and activities					√		√		
22	Motivating Staff			√				√	√	√
23	Human resource management		√		√			√		√
24	Knowledge structure					√	√			√

Author(s): 1= Davenport et al. (1998); 2= Trussler (1998); 3= Liebowitz (1999); 4= Bassi (1999); 5= Heising (2001); 6= Hung et al. (2005); 7= Wong and Aspinwall (2005); 8= Williams (2008); 9= Choi (2000)

Choy (2006) clearly stated that the CSFs of KM should be treated as internal environmental factors, which can be controlled by the organization itself and not as external environment factors which organization had modest control over them.

In addition, Slagter (2007) mentioned that the success of KM practices depends on numerous factors; some within human manage while some are of less control by human. Therefore, there exist two groups of CSFs; technical/infrastructural factors and soft factors.

According to the CSFs of KM listed in Table 2.5, it is noted that some of the factors, especially soft factors are closely related to the core elements of TQM (see Table 2.6).

In line with this view, several authors (such as Hsu & Shen, 2005; Ribiere & Khorramshahgol, 2004) tend to support the notion that both TQM and KM can complement one another.

Table 2.6
The Similarity between TQM Core Elements and KM CSFs

TQM core elements		CSFs of KM
Leadership Commitment	⟷	Leadership support/ leadership style
Strategic Planning	⟷	Strategy and purpose/ KM strategy
Training and Learning	⟷	Training and learning; Knowledge sharing
Employee Involvement	⟷	Employee involvement; Teamwork
Process Focus	⟷	Processes and activities; Process-oriented
Rewards and Recognition	⟷	Motivating Staff; Creating motivation
Management by Fact	⟷	Performance measurement; Benchmarking

Based on displayed in Table 2.6, core elements of TQM can be considered as CSFs of KM implementation. In other words, KM will be enhanced if there is a sound management foundation like TQM (Zhao & Bryar, 2007).

Even though the application of TQM individually, as well as knowledge has a momentous impact on the organization's activities improvement, however, implementation of both TQM and KM together will lead to form a cycle of the improvement/development designed to achieve excellent performance (Ribiere & Khorramshahgol, 2004; Zhao & Bryar, 2007). Unfortunately, empirical evidence to explain the pattern of relationship between TQM and KM are surprisingly scant (Ju et al., 2006; Ooi, 2009). For this reason, the researcher is interested in investigating the relationship between TQM core elements and KM processes.

2.4 Organizational Performance (OP)

The growing challenges to the organization in either attaining or sustaining competitive advantage have made organizational performance to gain serious attention to survive in such a highly competitive environment. As a result, organizational performance is considered as an important construct in achieving the aim of the organization activities (Richard, Devinney, Yip & Johnson., 2009).

According to Poister (2003), high demand for accountability on the part of governing bodies, the media, including the public and the commitment on the part of managers and government agencies to focus on achievements and work more deliberately to improve performance are identified as the two forces that are forcing organizations to institutionalize the concept of organizational performance.

Organizational performance has been defined in different ways and from different perspectives. In defining OP, there is a need to look at what performance it is. According to Harbour (2009), performance refers to instigate and execute a set of actions. These actions represent as an actual result, outcomes, or achievements. Based on this description, several definitions have been given for OP; but the researcher is willing to agree with the position of Kirby (2005) where the author argued that a consistent definition of OP is important in order to remove any form of ambiguity and to have a clear operational definition of the concept without any confusion.

Conventionally, OP is narrowly viewed from the financial performance perspective, giving considerations to assets, budgets, sales volume, revenues growth or profitability results (Liao & Wu, 2009).

However, recent findings show that the nexus of OP goes beyond financial benefits such as competitive advantage, innovation, quality result, improvement trends, etc. (Kirby, 2005; Murphy & Cleveland, 1995). Accordingly, this will lead to the following definition where OP is defined as a broad construct, which captures what organizations are involved in, produce, and accomplish for the various constituencies with which they interact. In this study, OP is viewed at the level of institution performance in terms of improvement trends and academic achievement results (Kirby, 2005; Liao & Wu, 2009; Murphy & Cleveland, 1995; Richard et al., 2009).

2.4.1 Measurement of OP

OP is the most popularly used dependent variable in organizational research nowadays, but its measurement is yet to be clearly defined as research constructs (Theriou & Chatzoglou, 2007). Measuring OP is considered central to organizational decision-making and thus will enable both the researchers and managers to evaluate the overall organizational activities, for such an organization to sustain and maintain a competitive advantage over their rivals. The significance of OP as the best evaluative criteria is evidenced by its consistent usage as a dependent variable (Boyd, Gove & Hitt, 2005; Richard et al., 2009). OP is equally considered as the dependent variable in this study.

Chenhall and Lagfield-Smith (2007) demonstrated how many disciplines have contributed to the development of performance measures, throughout coordinating, communicating and unifying different approaches to the development of performance measures. Understanding how such discipline-specific measures load onto the dimensions of OP and the interrelationships between specialist measures is essential for understanding the relationships between organizational actions. This makes the valid measurement of an overarching performance construct (Richard et al., 2009).

Richard et al. (2009), clearly state that any study address OP must include strong theory that addresses two key issues: (a) the dimensionality of performance (i.e., establishing which measures are appropriate to the research context) and (b) the selection and combination of performance measures (i.e., establishing which measures can be usefully combined and the method of doing so). The first inquiry is about the nature of performance, and the second is about the nature of measurement. Literature on OP obviously showed that there is no sole universal measure that can be used to review overall OP (Monge et al., 2006). Table 2.7 below contains some of the previous studies on OP measures.

Table 2.7
Sample of Previous Studies on OP Measures

	OP measures	Author/s								
		1	2	3	4	5	6	7	8	9
1	Financial performance (ROA/ROE)	√		√				√		√
2	Sales growth	√							√	
3	Revenue growth	√								
4	Quality performance	√					√			√
5	Customer satisfaction/ Intimacy		√	√	√		√	√		√
6	Productivity		√	√	√	√				
7	Employee morale		√		√		√		√	
8	Delivery/Time dimension		√				√			
9	Demand for product/service			√						
10	Product/ service quality		√		√	√		√	√	
11	Profitability				√	√				√
12	Competitive position				√	√			√	
13	Cost/ Operating costs					√			√	√
14	Business result						√			
15	Operational excellence							√		
16	Product/ services life cycle			√					√	
17	Efficiency/ Effectiveness								√	
18	Innovation								√	√
19	Flexibility								√	
20	Employee satisfaction				√		√			
21	Decision making process								√	
22	Responsiveness								√	
23	Learning curve								√	
24	Customer retention									√

Author(s): 1= Powell (1995); 2= Samson and Terziovski (1999); 3= Kanji and Tambi (1999); 4= Sun (2000); 5= Hung and Lien (2004); 6= Shrivastava et al. (2006); 7= McKeen et al. (2006); 8= Wei et al. (2009); 9= Zack et al. (2009)

Based on OP measures, which are listed above, OP viewed from two main perspectives vis-à-vis the non-financial aspects and the financial aspect. The former could comprise operational performance measures which of more interest to the researcher and the latter corporate and market performance measures. The decision of the researcher is because higher-education institutions are in most cases not profit-oriented most especially the public universities. For this reason, this study will focus on the non-financial indicators.

2.4.2 OP Indictors in HEIs

Education today is subject to the same pressures of the marketplace. Profound changes in competition have made universities, and HEIs think like business to the extent that students are now being treated as customers. In addition, the stakeholder demands are getting more and more complex, which must be attended to whether the educational organization must maintain its competitive advantage. The HEIs then must ensure that the students receive high-quality service. HEIs have a responsibility to produce graduates that are able to accommodate challenges emerging in society, such as graduates producing high-quality profile and competence in their respective profession (Suryadi, 2007).

The higher-education industry worldwide is facing a dynamic and unstable environment due to tendencies such as changing demographics in students' population, decrease in public funding and greater importance of information and communication technology in learning and teaching process (Conway, 2003). HEIs are changing from a public service to a market-driven one (Kettunen, 2003), and HEIs now face pressing concerns such as international competition (Issa & Jamil, 2010;

Venkatraman, 2007). For that reason, HEIs are faced with the need for improvement many of their existing management practices and attitudes. One of the current issues of significance is the need for performance management, particularly the measurement of key performance indicators (Suryadi, 2007).

It is believed that knowing such performance indicators will enable the organizations to achieve an acceptable level of OP. In this part, more attention is paid to the diversity of performance indicators used in HEIs due to the varying educational objectives in the various educational institutions. Although the concepts of performance measurement have existed for many years, there is increasing demand that agencies began to transform their organizations to institutionalize these practices (Poister, 2003).

HEIs also have to adjust themselves and develop strategies to respond rapidly to the changes in organizational environment and increasing demands of stakeholders. Meanwhile, the criteria of key performance indicators (KPIs) in HEIs should be built upon the set of interrelated concepts and values (Suryadi, 2007):

- Learning-centered education
- Organizational / personal learning
- Valuing faculty and academic staff
- HEI agility
- Focus on the growth and sustainability
- Innovation managing
- Management by fact
- Focus on results and creating value

According to Kanji and Tambi (1999), the performance indicators in HEIs can be measured based on objective's achievement; this has to do with how well the core process (educational process) is operating.

Therefore, since the study focus on HEIs context (public universities), the OP measurement takes into account academic achievement. In addition, many researchers highlighted students' achievement indicators (such as CPA, classes of degrees, graduation rates, etc.) as key performance indicators for measuring the educational organization performance (Agha, 2007; Ball & Wilkinson, 1994; Higgins, 1989; Johnes, 1996; Lee & Buckthorpe, 2008; Miller, 2007; Palmer & Bray, 2003; Pinilla & Munoz, 2005; Sall, 2003).

Based on relevant literature, this study identified two categories of academic achievement, which include *students related academic achievement* and *non-students related academic achievement.* The former includes academic status (CPA), classes of degrees, undergraduates' wastage rates, and graduation rates. Non-students related academic achievements, on the other hand, involve competitive position, market share, innovation, organizational agility, and sustainability.

According to Murphy and Cleveland (1995), the performance measures can be categorized into two groups: judgmental or subjective measures and non-judgmental or objective measures. This study is interested in measuring OP subjectively, which is in line with many studies (Barnard, 1999; Bayraktar et al., 2008; Hung & Lien, 2004; McKeen et al., 2006; Muhammad et al., 2011; Pandi et al., 2009; Sabihaini et al., 2010; Santos-Vijande & Alvarez-Gonzalez, 2007; Suryadi, 2007; Zack et al., 2009).

However, the previous studies concentrate more on student related academic achievements without paying the required attention to non-student academic achievements (Agha, 2007; Lee & Buckthorpe, 2008; Lim et al., 2004; Miller, 2007; Palmer & Bray, 2003; Pinilla & Munoz, 2005; Sall, 2003). This study combined the two as a joint performance indicator to present a complete research environment. Table 2.8 provides the description of the indicators/dimensions of HEIs performance as employed in previous studies. These performance indicators/dimensions are adopted/adapted in this study.

Table 2.8
The Indicators of HEIs Performance

Performance dimension	Author/s (Year)	Description
Students related academic achievement		
Academic Status (CPA)	Higgins (1989); Ball & Wilkinson (1994); Miller (2007)	Cumulative point average (CPA) indicates the academic status of individual students in the college; it is the performance of the student throughout their duration of study thus far.
Undergraduates Wastage Rate	Johnes & Taylor (1990); Johnes (1996); Palmer & Bray (2003); Sall, (2003); Pinilla & Munoz (2005); Agha (2007); Lee & Buckthorpe (2008)	Undergraduates' wastage rate is an imperative measure of HEI performance; It measures the percentage of undergraduates who drop out because of not meeting the required academic standards.
Classes of Degrees	Higgins (1989); Johnes & Taylor (1990); Ball & Wilkinson (1994); Miller (2007)	A class of degrees is a vital measure of HEI performance; it focused on the level triumph of the learning process. The students' class of degree measures it.
Graduation Rates	Higgins (1989); Johnes & Taylor (1990); Ball & Wilkinson (1994); Pinilla & Munoz (2005); Miller (2007)	This dimension is defined as the rate of students who successfully complete their study.
Non-students related academic achievement		
Competitive Position	Sun (2000); Hung & Lien (2004); Wei et al (2009); Premananto (2008)	This is the position maintained by the institutions among the contemporaries. It is often presented in the form of ranking. It is a measure of competitive advantage.

Table 2.8 (continued)

Performance dimension	Author/s (Year)	Description
Market Share	Higgins (1989); Johnes & Taylor (1990); Ball & Wilkinson (1994); Deem (2008)	This dimension is defined as the percentage of applicants received by the institution from the prospective students on a yearly basis.
Innovation	MBNQA (2011-2012); McKeen et al (2006); Wei et al (2009); Zack et al (2009); Suryadi (2007); Deem (2008)	Innovation measures the ability of institution to use creative changes (such as new programs, new techniques, etc.) to improve institution's services and all educational processes.
Organizational Agility	Suryadi (2007); Rahman & Bullock (2002)	Agility is an important measure of organizational effectiveness. It requires a capacity for fast and flexible response to the changing needs of the educational partners and stakeholders.
Sustainability	Suryadi (2007); Ruskov & Todorova (2008)	This is the ability of an organization to sustain the performance and competitive advantage on a long-term basis.

2.5 The Relationship between TQM, KM & OP

There is no doubt; both TQM and KM have gained people attention both in academic and business environment (Ju et al., 2006; Molina et al., 2007). According to the sources, such popularity can be traced to the unprecedented high number of publications on both fields in an attempt of the professionals in the fields to substantiate its concepts and theories. Not only that, the implementation success recorded by KM so far also makes it to be more popular. This has brought about a pronouncement of KM as a business's critical success factor in today's knowledge-driven society. This has opened a number of opportunities for knowledge workers such as knowledge managers and knowledge creating teams in many organizations.

Thus, if KM can be considered as organization's critical success factors, one can then infer that KM can be best achieved via effective TQM, which in turn will lead to an acceptable organizational performance. For this reason, the researcher is interested in investigating how combining TQM and KM will improve OP.

2.5.1 TQM – KM Research

Since 1980s, TQM was first established in organizations as the way to improve overall organizational performance, the discipline did not accept an immediate sustain and worldwide approval. Correspondingly, twenty years later, organizations are facing exactly the same plight with KM (Adamson, 2005; Ribiere & Khorramshahgol, 2004).

Researchers have just recently begun to study the relationship between TQM and KM. The early studies have developed conceptual or theoretical studies that relate TQM with knowledge in order to understand the relationship between quality and learning. Sitkin, Sutcliffe and Schroeder (1994) conducted one of the first sets of studies that relate TQM and learning. The authors theorized that TQM consists of both *Total Quality Control* (TQC) and *Total Quality Learning* (TQL). It was equally hypothesized that under conditions of high uncertainty and task difficulty, TQL is considered a significant approach more than TQC in terms of continual improvement.

Wruck and Jensen (1994) highlighted the significance of the scientific method and the sharing of decision rights in TQM program. The authors argued that decision rights should be allocated based on specific knowledge of the organization's members. In the same vein, Pyzdek (1999) believed that there is a need for TQM experts to seek for ways of improving its knowledge and the techniques of achieving TQM. This suggests that the knowledge plays a key role in improving TQM activities. In contrast, this research focuses on the underlying processes of KM that lead to the enhancement of organizational performance, and how the core elements of TQM practices can support these processes.

Knowledge implications have also been supported by a number of TQM gurus (Deming, Crosby, Ishikawa, etc.) They illustrate some viable relationship between TQM and KM. Deming (1994) proposed the system of “profound knowledge” that consisted of four elements: appreciation for system, knowledge about the deviation, theory of knowledge, and psychology.

In improving an organizational performance, Deming believed that these four components were all interrelated with one another (Deming, 1994). Deming (1986) also advocated the PDCA (Plan, Do, Check, Act) cycle, which was described as a ‘‘learning cycle’’ and later changed the ‘‘Check’’ stage in the PDCA to ‘‘Study’’ to stress learning and reflection features of the ‘‘learning cycle’’.

Meanwhile, it is believed that the most human error is caused by lack of attention rather than lack of knowledge (Crosby, 1979). Ishikawa (1985) originated the quality circles to improve performance by solving organizational problems related to quality. The formation of quality circles is based on teamwork. Thus, working as a team involves a kind of collaboration. This can be best achieved through knowledge sharing. However, TQM gurus emphasized the importance of knowledge, but they did not identify knowledge in its actual sense. As a result, TQM gurus have dealt with concepts related to KM in a haphazard form. This suggests that, an integrative view of knowledge is required to effectively link TQM with KM.

Recently, several authors have established relationship between TQM and KM (Daud & Yusoff, 2011; Hsu & Shen, 2005; Ju et al., 2006; Lim, Ahmed & Zairi, 1999; Molina et al., 2007; Ooi, 2009; Ribiere & Khorramshahgol, 2004). According to Lim et al. (1999), the following four steps are suggested for implementing KM in such a way that it will form an integral part of an organization's quality strategy:

- Knowledge creation plan
- Knowledge sharing approach
- Measuring the effects of applying knowledge
- Learning and improving

Based on Kanji's Model, Hsu and Shen (2005) compared the similarities and dissimilarities between TQM and KM. The study argued that both can complement one another if appropriately planned, and the authors suggest investigating the synergies and relationships between TQM and KM in the future researches.

Since the core elements of TQM can be regarded as soft elements (Vouzas & Psychogios, 2007), and the CSFs of KM that affect the organization's success (see Table 2.6), it is believed that TQM core elements have a positive impact on KM success.

Ribiere and Khorramshahgol (2004) pointed out the relationship between TQM and KM, and recognized the commonalities between them and describe how these paradigms are integrated. The authors stated that KM could benefit seriously from TQM probations due to their significant similarities. Finally, the study showed clearly that TQM and KM have same path, and both paradigms can benefit from each other.

Otherwise, KM was consequently, added to various quality frameworks such as EFMQ Excellence Model, that means how important is KM in achieving business excellence.

In addition, Ju et al. (2006) mentioned that although both TQM and KM have great influence on an organization's strategic ability, most of the related studies lack empirical evidence to justify the relationship between them. Therefore, the researcher is interested in contributing in this regard.

As contained in the laid down element of TQM continuous improvement, the importance of educating and training the employees as internal members of the organization. Such practice ensures excellent performance. Certainly, this is an essential component of KM (Fernandez et al., 2006). Similarly, Daud and Yusoff (2011), revealed that the organizations interested in obtaining a competitive advantage must be focused on elements of TQM and KM processes together, without them, these organizations cannot move forward or achieve their objective even though they have very advanced technology or knowledge.

In higher education context, Sallis and Jones (2002) clearly mentioned that the integration of TQM with KM is a key driver behind the organizational success. Therefore, the relationship between TQM and KM is further justified in this regard.

Despite, the fact that the studies conducted to display the relationship between TQM and KM in the higher education context are limited; the researcher found through the reviewed literature that, there are some related studies (Ali & Shastri, 2010; Pandi et al., 2009; Ramanauskiene & Ramanauskas, 2006). To realize the nature of the relationship between these two variables, Table 2.9 summarizes the significant findings from these studies in the higher education sector.

Table 2.9
Sample of TQM – KM Research in Higher Education Sector

No.	TQM	KM	Nature of study	Study site	Finding
1	TQM principles: Management commitment; staff involvement, training, teamwork approach, etc.	KM Stages: Identification, obtaining, development, dissemination, application, preservation, knowledge distinguishing, assessment.	Conceptual	Higher Education	TQM principles can assist in better knowledge quality, educators' competence, students' activity and higher level of university service in terms of the teaching process.
2	TQM elements: Top- management commitment, system management, customer satisfaction, employee involvement, training, teamwork, continuous improvement	KM practices included with Integrated Total Quality Management (ITQM) model of TQM elements	Survey (Mean, SD, Correlation, Multiple Regression, t-test)	Higher Education (technical institutions in India)	TQM elements able to support knowledge dissemination process; and help to exploring new knowledge. The result also has clearly established significance (ITQM) model for improving the quality of educational outcomes.
3	TQM concepts: Leadership, Teamwork, customer focus, employee involvement, continuous improvement, etc.	KM processes: Production and dissemination	Conceptual	Higher Education	Application of TQM concepts in HEIs system able to improve institution's quality, and also leading to more innovative in knowledge creation and knowledge dissemination.

Author(s): 1 = Ramanauskiene and Ramanauskas (2006); 2 = Pandi et al. (2009); 3 = Ali and Shastri (2010).

Based on the findings presented in Table 2.9, most of these studies are anecdotal and surprisingly sparse. Ooi (2009) has supported this gap, when the author asserted that there is still insufficient systematic empirical evidence with regard to the degree of TQM practices and its effect on KM practices. However, empirical study conducted by Pandi et al., (2009), was lacking in terms of theory-building and rigorous methodology.

Although these studies contain valuable and insightful information that can help understand the relationship between TQM and KM, it is essential to advance these works using a more methodologically rigorous research to clarify the pattern of the interrelationship between TQM and KM empirically.

2.5.2 TQM – OP Research

According to EFQM (2012), performance can be considered as a set yardstick to evaluate achievement of an individual, a team, an organization or a process in any given environment. Samson and Terziovski (1999) revealed that there is a very strong relationship between TQM practice and OP and that such relationship is cross-sectional in nature. According to the authors, TQM practice intensity explains a significant proportion of variance in performance. Similarly, Allen and Kilmann (2001) also showed that there is a direct relationship between the level of OP and use of TQM based on the observed correlation, the more the use of TQM practice, the higher the level of organizational performance and vice-versa.

Boyne and Walker (2002) argued based on a number of empirical studies, that the impact of TQM on OP for public organizations cannot be denied. Such applicable to this study, since the organizations under the current study are HEIs (public organizations). This further justifies the how related are TQM and OP in higher-education institutes.

Montes et al. (2003) singled out a framework for tasting the relationship between TQM elements and OP through contingency approach, thus, the proposed model revealed these relations are mediated by the TQM-driven cultural change recognition.

From an industrial psychology perspective, the results of the study highlighted the relationship between the system and individual factors. The authors focused on these factors because it had technically been neglected in TQM literature, and otherwise, TQM elements have to be associated with behavioral and individual learning processes in the educational environment.

Several evidences have been established justifying the relationship between TQM and OP in the higher-education sector (Babbar, 1995; Barnard, 1999; Kanji & Tambi, 1999; Lim et al., 2004; Marshall et al., 2004; Najafabadi et al., 2008; Sabihaini et al., 2010; Sakthivel et al., 2005) as shows in Table 2.10. The findings of these studies had support to the view that TQM elements are strongly related to organizational performance.

Table 2.10
Sample of TQM - OP Research in Higher Education Sector

No.	TQM	Nature of study	Study site	Finding
1	TQM elements: Continuous improvement, employees involvement, leadership, corporate culture, and customer focus	Case study Survey Mean	Higher education (US public university)	TQM elements positively affect the performance of public education administrators, educators and students' achievement.
2	TQM principles: Continuous improvement, risk as opportunity, support and cooperation from other people, expectations for performance, etc.)	Survey factor analysis, ANOVA	Higher education (Schools of Business in USA)	TQM principles have a positive influence on the effectiveness of the lecturers and students' evaluation in business classrooms.
3	Kanji's Excellence Model: Delight the customer, management by fact, people-based management, continuous improvement	Survey Frequency dis.,cross-tabulation, correlation analysis	UK higher education institutions (universities)	TQM elements affect the performance of institution, and there is positive relationship between TQM elements and academic performance (such as students' achievement).

Author(s): 1 = Babbar (1995); 2= Barnard (1999); 3= Kanji & Tamb (1999); 4= Lim et al. (2004); 5 = Marshall et al. (2004); 6 = Sakthivel et al. (2005); 7 = Najafabadi et al. (2008); 8 = Sabihaini et al. (2010).

Table 2.10 (continued)

No.	TQM	Nature of study	Study site	Finding
4	TQM principles: Organizational commitment to quality, planning for quality, focus on customer, total staff involvement, training & development, rewards & recognition, management by fact, continuous improvement, and focus on processes	Survey Correlation, multiple regression	Malaysian Higher Education (public universities)	TQM principles have a significant positive relationship with OP in respect to students' academic achievement.
5	TQM elements: Deming's 14 principles	Survey Correlation, t-test, ANOVA	USA higher education	Strong relations between TQM, organizational healthy (in terms of optimize teaching), and students' achievement.
6	TQM constructs: Commitment of top management, course delivery, campus facilities, courtesy, customer feedback and improvement	Survey Mean, SD correlation, t-test, ANOVA	Academic Environment (universities)	Positive relationship between TQM and academic performance.
7	TQM elements: Customer focus, decisions based on facts, process focus, continuous improvement and commitment of everybody)	Case study Interviews, meeting, observation	Sweden higher education (University college of Boras)	Strong positive relationship between TQM elements and performance in terms of sustainability.
8	TQM elements: Involvement of all employees, managerial leadership, corporate culture, customer focus	Survey Mean, t-test	Indonesian higher education	The application of TQM elements' impact positively on the effectiveness of educational activities.

Author(s): 1 = Babbar (1995); 2= Barnard (1999); 3= Kanji & Tamb (1999); 4= Lim et al. (2004); 5 = Marshall et al. (2004); 6 = Sakthivel et al. (2005); 7 = Najafabadi et al. (2008); 8 = Sabihaini et al. (2010).

There are a substantial number of TQM-related empirical studies in the literature; notwithstanding, just a few of these were focused on the impact of TQM on OP. Koch and Fisher (1998) and Lim et al. (2004) have supported this standpoint, which suggest that such a gap still exist in TQM literature. In addition, none of these studies taken into accounts the whole picture of OP in terms of academic achievements as well as expected in this study.

2.5.3 KM – OP Research

Only a few researchers have studied the impact of KM on OP despite the global view that the rate of knowledge acquisition in an organization will determine its performance (Safa et al., 2006). The insinuation about the potential impact of KM on OP is derived from KM's ability to create competitive advantage (Schulz & Jobe, 2001). This among others has made KM to be identified as a strategic resource in the design and implementation of organizational strategy. Zack et al. (2009) equally posited that KM processes are directly related to OP. Thus, establishing all these impacts of KM on OP makes it incomplete to study OP through TQM without considering KM in this knowledge era.

Levett and Guenov (2000) also revealed that KM practices being an ingredient of organizational performance. In the same vein, Rubenstein-Montano et al. (2001) as well supported this view. According to Zack et al. (2009), there is a paucity of empirical studies, which investigate the relationship between KM and OP. This suggests there is a need for more empirical studies to clarify the relationship between these concepts, especially in the higher-education context (service sector).

The captured relationship between KM and OP evidenced from a number of previous studies in the higher-education sector are summarized in Table 2.11. The findings of all these studies tend to support a positive relationship between KM and OP despite the variation in the nature of the study. Even though KM was operationalized with a very limited subset of processes, the results offer the researcher a clear trend that KM affects OP in the higher-educational context.

Table 2.11
Sample of KM - OP Research in Higher Education Sector

No.	KM	Nature of study	Study Site	Finding
1	KM practices: knowledge sharing	Conceptual	Higher Education	Applying KM practices in the colleges and the universities support positively every part of their mission.
2	KM System: including KM process	Case study	Taiwan's Higher Education	The implementation of KM in educational organization helps to enhance their performance, and improve the core competence and innovation performance of their academic staff.
3	KM processes: (knowledge- Capture, knowledge-Store, knowledge- Learn, knowledge- Exploit and knowledge -Explore)	Conceptual	Higher Education	KM processes provide a good environment, which supports particular job performance in higher-education context, and lead to competitive advantages.
4	Knowledge Sharing	Survey Correlation, regression	Private higher education institutions in Malaysia	There is a significant relationship between knowledge sharing with all the factors for organizations (such as motivation and academic staff‟s attitudes).
5	KM technologies: Data mining, case-based reasoning , information retrieval, topic maps, weblogs and e-portfolio	Conceptual	Higher Education	Adoption KM practices in higher-education affect positively on students' achievement.
6	Knowledge Creation	Survey Multiple regression analysis	Malaysian Higher Education	Strong relationship between knowledge creation and academic performance (innovation), and the utilization of the knowledge creation process affects positively on classroom's innovation.
7	KM processes: Identification of knowledge, knowledge creation, knowledge storage, spread of knowledge	Conceptual	Higher Education Schools	KM becomes a significant part of higher-education attitude, because it is able to improve the learning process, innovational activities, and raise the competitiveness of educational organization.
8	KM practices: Knowledge generation Knowledge codification Knowledge sharing Knowledge utilization	Case study Survey Pearson Correlation	Malaysian Higher Education	KM practices have a positive and significant relationship with academic performance.

Author(s): 1 = Kidwell et al. (2000); 2 = Yeh and Ta (2005); 3 = Chen and Burstein (2006); 4 = Daud and Abdul Hamid (2006); 5 = Kebao and Junxun (2008); 6 = Daud et al. (2008); 7 = Sedziuviene and Veinhardt (2009); 8= Muhammad et al. (2011).

In line with the previous authors, as might be expected for KM application in higher-education context, little quantitative empirical research has been conducted (Sallis & Jones, 2002; Alzoubi & Alnajjar, 2010; Muhammad et al., 2011). Based on the findings presented in Table 2.11, the bulk of these studies comprised of conceptual frameworks and theoretical models (Chen & Burstein, 2006; Kebao & Junxun, 2008; Kidwell et al., 2000). Aside from the work of Daud and Abdul Hamid (2006) and Daud et al. (2008), empirical research relies primarily on a small number of descriptive exploratory and qualitative studies (Muhammad et al., 2011; Yeh & Ta, 2005). However, empirical research conducted by Daud and Abdul Hamid (2006) and Daud et al. (2008) were lacking in terms of theory-building and rigorous methodology. This justifies the research gaps in the recent study.

2.5.4 Analytical Issues

Complement to the previously mentioned, it is important to highlight at this point that even though literatures related to quality management (such as Agus, 2000; Escrig-Tena, 2004; Furlan et al., 2011; Lim et al., 2004), and knowledge management (such as Choi et al., 2008; Choy, 2006; Shankar & Gupta, 2005) tend to support the holistic approach for both TQM and KM to be effective. However, numerous studies (such as Daud & Yusoff, 2010; Gloet & Samson, 2012; Samat, Ramayah, & Saad, 2006; Islam, Mahtab, & Ahmad, 2010; Malik, Iqbal, Shaukat, & Yong, 2010; Ooi, Safa, & Arumugam, 2006; Sajjad & Amjad, 2011) have employed the multiple regression technique to determine whether the practice of TQM core elements, as well as KM processes, can help improve OP. Nevertheless, utilize this technique requires the researchers to make an assumption that the core elements of TQM or the processes of KM is independent and not related to each other, which is absolutely not that case among TQM core element and KM processes. In addition, dropping any of the independent variables (TQM core elements or KM processes) in the multiple regression models based solely on statistical reasoning is not proper, since all independent variables (IVs) together serve as building blocks of one concept.

In addition to the above, there are some analytical issues worth mentioning:

- Using the variance inflation factor (VIF > 10 or tolerance < .1) by prior researches (such as Daud & Yusoff, 2010; Samat, Ramayah, & Saad, 2006; Kontoghiorghes, Awbre, & Feurig, 2005; Islam et al., 2010; Ooi et al., 2006), allows for a substantial degree of association among the IVs (correlation coefficient, r > .95!) (Hair et al., 2006, p.230); the use of this threshold value may be problematic for social science studies, because rarely r > .9 due to many uncontrollable factors (Hair et al., 2010; Tabachnick & Fidell, 2007). Notwithstanding, multicollinearity refers to high linear correlation among the IVs (Hair et al., 2010), and when r > .6 should suspect for a multicollinearity problem in the regression model (MacDuffie, Sethuraman & Fisher, 1996).

- There is a criticism against VIF as a tool for discovering the multicollinearity problem, since there are several cutoffs (such as a VIF > 10.0, 7.0, 5.0, or 2.5) have been suggested as the signs of multicollinearity (Liao, 2010). Even, Hair et al. (2010, p.205) also argued that the multicollinearity problem might appear at low levels of VIF (e.g., VIF values of 3 to 5). Multicollinearity could lead to improper variable estimations and ultimately the unstable regression model formation (Agus, 2000; Hair et al., 2010). This situation can cause havoc in regression models since IVs that should be significant predictors of a dependent variable are insignificant. This is because when the IVs are correlated, the estimated standard errors for the coefficients will be large, and as a result; the t-statistics will be small (Wang, 1996).

- Despite the criticism against VIF as a tool for detecting multicollinearity, there is a need to perform other statistical methods to address the multicollinearity problem in the case of appearance (Agus, 2000; Alauddin & Nghiem, 2010; Hair et al., 2010; Qian, 2011).

In short, this analysis points to the need for examining and correcting the effect of the multicollinearity among the core elements of TQM and among the processes of KM in the TQM or KM relationship studies.

2.6 Summary

This chapter provides an extensive literature review on TQM, KM and OP. The first section reviews the definitions of TQM, core elements of TQM and application of TQM in higher-education environment. The second section contains the definitions of KM, benefits of KM, KM in HEIs, KM processes and the critical success factors of KM implementation were presented. Section three reviews the measurement of OP and OP indicators within HEIs context. This chapter also carried out some review in a way to justify the relationships between TQM, KM and OP from a number of relevant studies. Finally, some analytical issues related to TQM and KM studies have been highlighted in the last section. The review of the literature in this chapter provides a foundation for establishing the conceptual framework of the study, which is discussed in chapter three.

CHAPTER 3
RESEARCH FRAMEWORK

3.1 Introduction

After conducting the preliminary information gathering, defining the research problem, and completing the literature review about the concepts or variables under investigation, the next step is to develop a research framework to guide the study. Therefore, a research framework is essential to define the study's concepts, elaborate the relationships among variables, and describe the direction of the relationships. In brief, the research framework provides the logical foundation for developing the research hypotheses (Sekaran & Bougie, 2010). In this chapter, details of the research framework are discussed under three sections; theoretical framework, the related theories and the research proposition for the study.

3.2 Theoretical Framework

The rationales behind this section are proposing a theoretical framework along with a set of the hypotheses. The theoretical framework is that, which elucidates the relationship between the variables in this study (Cavana, Delahaye & Sekaran, 2001; Sekaran & Bougie, 2010). Based on the theoretical foundations which are reviewed in the literature, a framework has been developed to investigate the relationship among study's variables; TQM, KM and organizational performance for Iraqi HEIs context. Figure 3.1 shows these relationships.

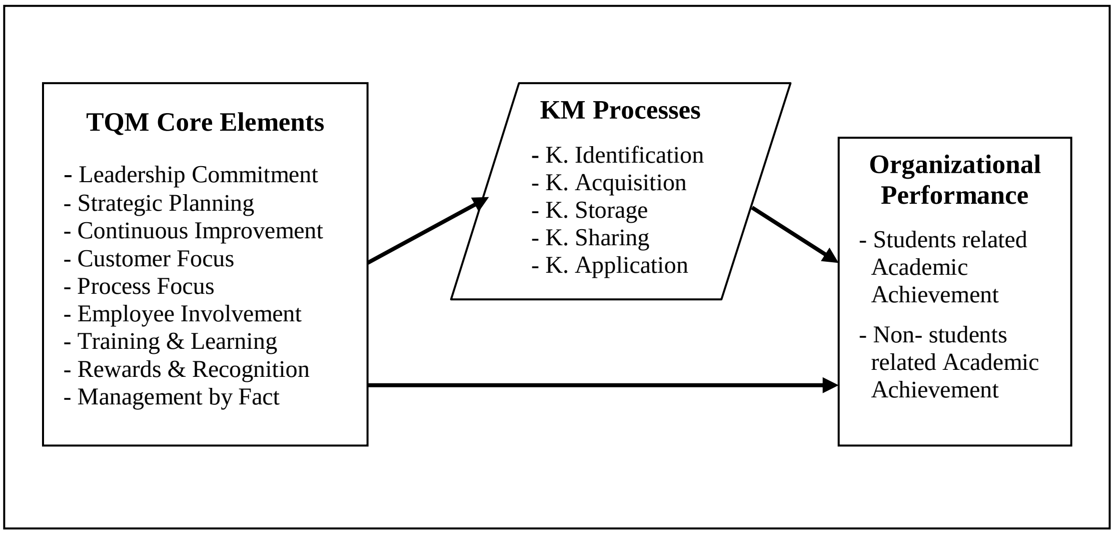

Figure 3.1
Theoretical Model of the Study

This model should be regarded as the overall framework for the analysis. The figure shows the relationship between TQM, KM and organizational performance. The independent variable in this framework is TQM, whereas the dependent variable is organizational performance. On the other hand, KM is intervening (mediating) variable between TQM and organizational performance.

Intervening variable equally means the mediating variable established when there are strong relations between the independent and dependent variables via another external variable (mediator) (Cavana et al., 2001; Sekaran & Bougie, 2010). According to the sources, the intervening variable always operates as a function of the independent variable, and helps in conceptualizing and clarifying the influence of the independent variable on the dependent variable. In this research framework, KM is introduced as intervening variable. In addition, this research is to investigate the direct relationships between TQM with organizational performance, and KM with organizational performance.

TQM is comprised of nine dimensions (core elements): leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact. Meanwhile, the five key processes of KM are knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. Organizational performance (OP) is viewed from two dimensions (students related academic achievement (SAA) and non-students related academic achievement (NSAA)). In order to explain the relationship between TQM, KM and OP, the following section discusses the related theories to this study.

3.3 Related Theories of the Study

Generally, a theory is specifically designed to assist in understanding what notion is behind the phenomenon under investigation. In fact, a theory provides a picture of the logical linkage between various concepts/constructs, allowing us to better understand the relationship among them, and how they affect one another (Zikmund et al, 2010). According to the source, in most scientific situations there are alternative theories to explain certain phenomena. In identifying the appropriate theory for this study, the researcher is engaged in a rigorous review within the domain of study.

Based on relevant literature, the researcher finds the contingency theory to be very related to this study having established the fact that contingency theory is considered applicable in any situation that demands measuring the condition under which things can occur (Betts, 2003; Joiner, 2007; Kalling, 2003; Psychogios & Priporas, 2007); this can be used to determine the factors that affect the organizational performance of HEIs. Contingency theory is a behavioral theory that has been used extensively for relating variables in management research, and has been found useful in analyzing situations and determining which variable really influence the target variable.

However, Lawrence and Lorsch (1967) were the first coined contingency approach to organizational environment, while, the roots of the contingency theory can be found in the writings of Burns and Stalker (1961) and Woodward (1965).

In literature, many of the existing researches on TQM were dominated by contingency theory (Joiner, 2007; Montes, Jover & Fernandez, 2003; Psychogios & Priporas, 2007; Silvestro, 2001), where the concept of 'fit' appears to be a central theme. The concept of 'fit' however, has been termed in various ways in the literature such as consistent with, contingent upon, matching, aligning, and congruence (Melan, 1998; Venkatraman & Camillus, 1984). In understanding the concept of 'fit' in contingency research, Venkatraman and Camillus (1984) proposed six schools of thought: strategy formulation school; strategy implementation school; integrated formulation-implementation school; interorganizational networks school; strategic choice school; and overarching 'gestalt' school. Therefore, this study is consistent with 'strategy implementation school'. Following Venkatraman and Camillus (1984), 'strategy implementation school' focuses on the 'fit' between strategy variable and internal organizational variables. The premise of this 'school' is the strategy needed to be aligned with internal variables. The essence of contingency theory is that an organization's practices must fit the organization's context; and that not all organizations have the same context (Psychogios & Priporas, 2007; Venkatraman & Camillus, 1984).

Specifically, contingency theory suggests that TQM practices, and its impact depend on the capability of organizations to adopt and apply TQM core elements (Joiner, 2007). This approach sees TQM from a more pragmatic point of view rather than arguing that TQM is either an ideal management model with universal application or a new and sophisticated method for work intensification/exploitation (Psychogios & Priporas, 2007). This view is supported by Davies, Douglas, and Douglas (2007) who stated that the TQM program should be tailored to suit the HEI context.

Contingency theory supports the applicability of TQM core elements for different sectors (Sitkin et al., 1994; Silvestro, 2001; Shrivastava, Mohanty & Lakhe, 2006). It states that an organization can adapt TQM elements, whether they are hard or soft aspects depending on the situational demands. Therefore, TQM core elements are applicable in HEIs. Conclusively, the following arguments provide theoretical justification based on contingency approach to understand how TQM core elements influence organizational performance in HEI context.

- Leadership Commitment: Leadership commitment is one of the most contingent elements in organizations. HEI with academic leadership not strongly committed in the long-run, employees can be losing the main driven motivation for TQM-driven improvement initiatives (Joiner, 2007; Psychogios & Priporas, 2007; Svensson, 2005; Michael et al., 1997; Montes et al., 2003). On the contrary, TQM implementation will affect positively on organizational performance, if the commitment of the top management at the highest level required.

- Strategic Planning: TQM as a management paradigm cannot be separated from the organizational strategy, since the strategic planning has an important function between an antecedent variable (i.e., strategy) and the consequent variable (i.e., performance) (Sitkin et al., 1994; Psychogios & Priporas, 2007; Venkatraman & Camillus, 1984). Accordingly, strategic planning is a significant contingent element in TQM implementation.

- Continuous Improvement: Continuous improvement consists in an explicit attempt to learn out of one's own experience (Miner & Mezias, 1996; Lynne & Ross, 2007). This way, HEI as learning organizations focus on the study of the errors made, seeking out of solutions, and preventing problems (Davies et al., 2007; Montes et al., 2003). Therefore, continuous improvement contains ways that most positively contributes to boosting organizational performance.

- Customer Focus: Factors related to the customer, comprising those aspects linked to the cognitive appraisal of the behavior of certain individuals (students), in the environment where the educational process takes place (Joiner, 2007; Montes et al., 2003). These organizational factors comprise a series of intangible factors of the academic environment that are liable to affect the overall performance (Venkatraman, 2007).

- Process Focus: TQM implementation creates ideal environments for educational process, which supporting the quality initiatives and providing educational partners with a series of mechanisms enabling them to enhance academic achievement (Davies et al., 2007; Montes et al., 2003).

- Employee Involvement: This element involves fully employees' participation in issues related to their work. In HEI context, if the educational organization is excessively hierarchical, the academic staffs can be reluctant to participate in any improvement initiatives; then, TQM implementation will not influence on performance effectively because of lower staffs' participation in making decisions related to their work (Joiner, 2007; Montes et al., 2003).

- Training and Learning: Through, training and learning process, the quality movement has been able to demonstrate the potential capability of the educational organizations to cope with the uncertain and changeable conditions of today's environments (Davies et al., 2007; Sitkin et al., 1994).

- Rewards and Recognition: In contingency view, the explanation of the employees' perception of the effectiveness and the level of educational quality can be found in the work motivation with the support from top-management commitment and effective rewards system (Joiner, 2007; Montes et al., 2003). Thus, employees with lack motivation, or less committed, will result in a poor performance level.

- Management by Fact: Through TQM implementation, educational organization can build a systematic procedure of benchmarking and performance appraisal based on reliable data to make sure educational-quality improvement (Joiner, 2007; Betts, 2003; Vouzas & Psychogios, 2007).

In brief, the contingency theory suggests that the influence of TQM on organizational outcomes is contingent upon; (1) a right alignment between the core elements of quality management and education context will ensure actions performed by the educational organization which are consistent with the academic environment; (2) implementing TQM core elements holistically rather than piecemeal, in such a way that the educational organization will accomplish the specific tasks, that is to say, it performance will be improved (Davies et al., 2007; Michael et al.,1997; Venkatraman, 2007).

In the most elaborate theories, the researcher verifies that resource-based view (RBV) and knowledge-based view (KBV) are also interested theories, which are able to explain the relationship between the research's variables. These theories were developed to understand how organizations achieve sustainable competitive advantages. RBV is defined as a kind of strategic economic tool that is commonly used in determining resource availability within a firm with the underlying principle that such resources serve as the basic organizational competitive advantage (Barney, 1991; Wernerfelt, 1984).

According to RBV, organizations perform well and create value when they implement strategies that exploit their internal resources and capabilities (Barney, 1991; Conner & Prahalad, 1996; Wernerfelt, 1984). Consistent with this view, TQM and KM become resources that are valuable, rare, inimitable, and non-substitutable (VRIN) for maintaining competitive advantage and better performance.

From RBV perspective, TQM is considered a valuable competitive factor, which is rare, inimitable and no substitutable (Escrig-Tena et al, 2001; Escrig-Tena, 2004; Grant, 1991). The valuable character of TQM can be implicit in many perspectives; customers' loyalty, the improvement in productivity, and greater motivation and commitment of employees derived from changes in the organizational culture (Escrig-Tena, 2004). Furthermore, in order to obtain a competitive advantage, TQM must be rare. The core values that distinguish TQM, and the practices derived from it are dependent on the organizational context (Sitkin et al., 1994; Psychogios & Priporas, 2007). Moreover, the benefits derived from TQM depend on the circumstances in which its introduction was carried out, on the culture of the organization. For this reason, the final configuration of TQM in each organization will be exclusive and non-substitutable paradigm. Therefore, a path-dependent process will make the TQM program unique for each organization (Escrig-Tena, 2004; Grant, 1991; Savolainen, 2000).

According to Grant (1991), imperfect transferability and the impossibility of replication are another way of arguing the inimitable character of TQM. More detail, TQM would be imperfectly transferable, since the practices of TQM are valid in one organizational context, and the universalistic application of the same practices in a different environment may not be effective. In addition, benefits obtained with TQM implementation are difficult for other organizations to replicate (Escrig-Tena, 2004; Grant, 1991).

The resource-based view of a firm (Barney, 1991; Conner & Prahalad, 1996; Wernerfelt. 1984) promotes a knowledge-based view (KBV) of the firm (Grant, 1996), which postulates that competitive advantage builds upon those privately developed resources, knowledge assets, inside the firm. Those assets tend to be created, gathered, shared, and applied among individuals more easily by implementing KM (Lee et al., 2004). In the resource-based view, knowledge is seen as a strategic asset with the potential to be a source of sustainable competitive advantage for an organization. Thus, the knowledge-based view of the firm (Grant, 1996) builds upon and extends RBV theory.

Nonaka and Takeuchi (1995), one of the leading voices in the KBV of the firm, they popularized the focus of knowledge in the firm. They view converting between tacit and explicit knowledge as one of the key challenges for organizations to remain competitive. In terms of KBV, both explicit and tacit knowledge can be considered as strategic resources for ensuring an organization's long-term success and survival, because it is unique and difficult to imitate (Grant, 1996). However, it is generally argued, that tacit knowledge is more strategically important as it is embedded in people and extremely hard for competitors to replicate. In KBV terminology, it is inimitable. The valuable knowledge of experts is also largely rare or scarce, non-movable, and strategically non-substitutable (Lee et al., 2004; Halawi et al, 2005), therefore, KM satisfies all the characteristics of VRIN in the resource-based view.

In line with Escrig-Tena et al. (2001), Powell (1995), and Savolainen (2000), the researcher believes that the RBV perspective provides a useful theoretical basis for explaining the effects of TQM on OP. The basic argument is that TQM can contribute to the improvement of OP by encouraging the development of elements that are particularly; create socially integrated elements, which are shared in the organizational environment to generate tacit knowledge, which is a core process of KM (knowledge creation). All these characteristics correspond to the conditions, which, along with the RBV, create a sustained competitive advantage (Escrig-Tena et al, 2001).

The KBV literature points out that competitive advantage can be created and sustained via knowledge use (Grant, 1996; Halawi et al, 2005; Lee et al., 2004). According to Van Ewyk (2000), KM is a cognitive strategy of obtaining the specific knowledge to the people right at the exact time and supporting knowledge sharing in order to improve OP. So then, all KM is about encouraging organization's members to communicate their knowledge (as intangible assets) by providing a supportive environment and technical systems for creating, organizing, and sharing knowledge across the organization. These activities will lead to the increase of the organization's ability to develop and leverage the value of these intangible assets, and as a result getting the competitive advantage. Therefore, the researcher believes that the KBV is an appropriate theory to explain the nature of the relationship between KM and OP.

In the same vein, Escrig-Tena (2004) revealed that the organization that follows a TQM strategy became learning organization, because it integrates models of continuous improvement and knowledge creation. This is made achievable by following a structured technique of problem-solving, because of the knowledge codification and other ways of knowledge sharing, or by copying on the lessons to be learned from the process of self-appraisal. In more details, the following arguments provide theoretical justification from many researchers in which will enable us to understand how the core elements of TQM influence on organizational performance through KM from RBV and KBV perspectives;

- Leadership Commitment: Leadership commitment to TQM can create an inimitable competitive advantage. This is because TQM is capable of generating a set of practices and some performance standards that make sure quality improvement through processes of creation and application knowledge about quality issues (Escrig-Tena, 2004; Grant, 1996; Rose & Ito, 1996).

- Strategic Planning: This element link up between quality planning and organization's strategy. Strategic planning provides a foundation for how an organization can manage its abilities and resources to achieve its objectives. Thus, all efforts to link KM practices to strategic planning have become an essential source of organization's competitiveness (Grant, 1996; Halawi et al, 2005).

- Continuous Improvement: The improvement process involves continuous implementation and evaluation standardized operations and utilizes different tools for improvement. In order to achieve this, specific information and knowledge must be gathered throughout benchmarking and self-assessment (Escrig-Tena et al, 2001; Escrig-Tena, 2004; Linderman et al, 2004).

- Customer Focus: This element involves efforts to identify the 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 order to push forward these practices, knowledge sharing is highly encouraged among employees (Escrig-Tena et al, 2001; Escrig-Tena, 2004; Linderman et al, 2004; Lee et al., 2004).

- Process Focus: this element stresses the value adding to the core process, increasing the productivity of every employee and improving the quality of the organization. The essential requirements of the core process are to lower down costs, reducing cycle-time and enhance efficiency, which all can be applied to KM processes (Escrig-Tena, 2004; Lee et al., 2004; Molina et al., 2007).

- Employee Involvement: This element involves employees' participation in making decisions related to their work, and working as teamwork in order to share their knowledge that will lead to improve the organization performance (Escrig-Tena et al, 2001; Escrig-Tena, 2004; Grant, 1996).

- Training and Learning: Effectiveness at work is assumed to increase if the individuals' knowledge about their job-skills is more increased. This involves improving the required skills through specific training and learning programs (Escrig-Tena et al, 2001; Escrig-Tena, 2004; Linderman et al, 2004; Rose & Ito, 1996).

- Rewards and Recognition: Efficiency at work involves that the individuals must enjoy helping others and at the same time, to increase self-knowledge efficacy. With the support from top management and suitable organizational rewards, it could further enhance the knowledge sharing, which would finally lead to improved OP (Halawi et al, 2005; Lin, 2007).

- Management by Fact: The most effective means of this element include following a systematic process of performance assessment. To carry these out, performance indicators must be established, and reliable data, information, and knowledge must be obtained (Escrig-Tena et al, 2001; Escrig-Tena, 2004).

The objectives of TQM and KM are somehow interrelated in the sense that while TQM helps organizations in doing the right things at exact time, KM's immediate goal is to manage knowledge resources in a way to benefit the organization (Escrig-Tena, 2004; Grant, 1996; Linderman et al, 2004). Also, the core elements of TQM can be considered as CSFs of KM (see Table 2.6). Numerous studies (such as Daud & Yusoff, 2011; Ju et al., 2006; Molina, 2007; Ooi, 2009) have provided empirical evidences that TQM influence KM. Moreover, Montes et al. (2003) provide a framework for testing the relationship between TQM elements and organizational performance from a contingency approach. The authors found the elements of TQM affect the performance on a dual basis. On the one hand, TQM affects the level of employees' learning, and therefore, it affects the knowledge acquisition and application for their job tasks. On the other hand, TQM has an effect on the way organization members apply their knowledge, and consequently; it affects OP. According to Neilson (1997), learning in an organization is a continuous process of knowledge creation, acquisition and sharing. Hence, KM mediates the relationship between TQM and OP. Based on the above argument, in this study, the researcher considered KM as mediating variable in the relationship between TQM and OP.

There is a concept that has been widely mentioned in management literature, that is, the concept of complementarity between practices. Therefore, it became essential to highlight it in this section of the study. According to Furlan, Vinelli, and Pont (2011), the perception of complementarity was originally proposed by Francis Ysidro Edgeworth, a mathematician, who defined activities as complementary "if doing (more of) any one of them increases the returns to doing (more of) the others". In other words, one practice enhances the contribution to others. Hence, it is suspected that the overall impact of ongoing improvement will be excellently greater than adopting as a separate practice.

Complementarity theory assumes that separate variables cannot be independently fine-tuned to reach better performance (Furlan et al., 2011). That is, this approach takes a holistic view of organizational variables and their interrelationships. Consequently, set or bundle of practices constantly emerges jointly and work synergistically. The concept of complementarity provides an explanation for this synergistic effect (Choi, Poon, & Davis, 2008; Escrig-Tena, 2004).

However, the complementarily is relevant to TQM as well as KM since a holistic approach is needed for each of them to be effective. According to Escrig-Tena, (2004), TQM effectiveness requires a commitment with all its core elements, and so it may be difficult to determine which of them are responsible for the success. This opinion consistent with the complementarily theory (Milgrom & Roberts, 1995), which suggests that quality management is hard to imitate, because it is an amalgam of a large number of interrelated, complementary, elements. While the approaches might be immediately imitated, a significant time lag will occur before their impact is realized, thus making it costly or difficult for competitors to imitate the value generated by the initiatives (Escrig-Tena, 2004; Spanbauer, 1995).

In particular, Joiner (2007) emphasizes the importance of implementing a comprehensive TQM program comprising the core elements of TQM, rather than implementing a few selected elements. Further, consistent with Powell's (1995) assertion that complementary TQM practices may enhance the TQM-performance relationship.

Similar to TQM, the complementary theory also rigorously explains how a combination of KM processes led to the best performance (Choi et al., 2008; Linderman et al., 2004), and how these processes can complement one another. In other words, one process enhances the contribution to others. Thus, the complementarity theory offers a useful perspective to understand the synergistic relationships among KM processes.

According to Choi et al. (2008), the impact of complementary KM processes is greater than any of the individual processes, because of the synergistic effects of bundling KM processes together. Undeniably, the notion of complementarity theory serves as guidelines to help in understanding the TQM core elements and KM processes that can boost organizational performance through their implementation.

In a few words, TQM and KM as holistic approaches would be incompletely transferable, since TQM and KM persuade the improvement of untraceable capabilities, developed by the organization and internalized into the collective activities. TQM is specific to each organization since TQM and its practices are valid in one organizational context, and the universalistic application or mere adoption of the same practices in a different context may not be effective. In addition, benefits achieved with KM are difficult for other organizations to replicate, whereas KM implementation depends on a series of interdependent processes, and it is not entirely possible to distinguish the actual process responsible for the KM effectiveness. Based on this standpoint, both TQM and KM become the keystone of the excellent performance. Without them, organizations will not fully benefit from their improvement initiative, whichever it is, and may not obtain the competitive advantage expected.

3.4 Statement of Hypotheses

This section discusses on hypotheses statement. In line with the research questions as well as the objectives of the study discussed in the first chapter, the following discussion deals with the hypotheses that will be tested in this study. All hypotheses are stated in the alternative forms.

The research propositions are provided in this section based on the relationship between study's variables. For the variables to be interconnected there is a need to show the interrelationship between them as the previous authors have revealed it.

3.4.1 The Relationship between TQM and KM

TQM and KM are related conceptually and practically (Ju et al., 2006; Ooi, 2009; Zetie, 2002). In addition, their practices are used for improving the organizational performance (Hung et al., 2010; Janpen et al., 2005). This drives the main interest in this study to examine the significance of the relationship between TQM and KM. Through reviewing the relevant literatures, it showed that only few empirical studies have been carried out to highlight the relationship between these concepts and not even in HEIs. Therefore, the researcher is interested in contributing in this regard.

An in-depth literature review was done (such as Cheah et al., 2009; Janpen et al., 2005; Ju et al., 2006; Molina et al., 2004; Ooi, 2009; Pandi et al., 2009), and the studies highlighted a positive relationship between TQM and KM. Consequently, the relationship between TQM and KM is hypothesized as follows:

H_1: TQM has a positive relationship with KM.

Quantitative research in TQM has increasingly focused on the impact of some core elements (individually) on organizational outcomes (e.g., Bayraktar et al., 2008; Daud & Yusoff, 2011; Hung et al., 2010). While some of these studies consider a single element or dimension (e.g., Svensson, 2005); others emphasize the holistic approach of TQM implementation, since TQM, as a management paradigm is an integral philosophy, a 'package' of fundamental elements (Ahire, Golhar & Walle, 1996; Lim et al., 2004; Samson & Terziovski, 1999). Consequently, bundle or set of core elements consistently appears together and work synergistically. The concept of complementarity provides an explanation for this synergistic effect (Furlan et al., 2011). Based on this argument, and in line with previous studies (Terziovski & Samson, 1999; Lim et al., 2004; Kristal et al., 2010), the researcher dealing with TQM core elements at the aggregate level for testing hypotheses. Hence, the main hypothesis (H_1) is broken down into the following five specific hypotheses:

H_{1a}: TQM core elements have a positive relationship with knowledge identification.

H_{1b}: TQM core elements have a positive relationship with knowledge acquisition.

H_{1c}: TQM core elements have a positive relationship with knowledge storage.

H_{1d}: TQM core elements have a positive relationship with knowledge sharing.

H_{1e}: TQM core elements have a positive relationship with knowledge application.

TQM core elements (collectively) are assumed to have a positive relationship with KM measures.

3.4.2 The Relationship between TQM and OP

Since TQM is established as a management philosophy, many studies have examined the relationship between TQM and OP. These studies were investigated the direct and indirect impacts of these elements (e.g., Allen & Kilmann, 2001; Babbar, 1995; Barnard, 1999; Boyne & Walker, 2002; Escrig-Tena et al., 2001; Hung & Lien, 2004; Joiner, 2007; Kanji & Tambi, 1999; Kaynak, 2003; Lim et al., 2004; Montes et al., 2003; Rahman & Bullock, 2002; Sabihaini et al., 2010; Sakthivel et al., 2005; Vijande & Gonzalez, 2007). All these studies recognized that there is positively significant relationship between TQM and OP. Consequently, the relationship between TQM and OP is hypothesized as follows:

H_2: TQM has a positive relationship with OP.

This study proposed that there is a positive relationship between TQM and organizational performance in terms of students related academic achievement, and non-students related academic achievement.

The main hypothesis (H_2) is therefore broken down into the following specific hypotheses:

H_{2a}: TQM core elements have a positive relationship with students related academic achievement.

H_{2b}: TQM core elements have a positive relationship with non-students related academic achievement.

The above hypotheses postulate the relationship between the TQM dimensions (collectively) and organizational performance measures. This indicates that the organizational performance improves when the degree of TQM core elements are enhanced.

3.4.3 The Relationship between KM and OP

Review of the literature showed that only a few empirical studies investigate the relationship between KM and OP (Zack et al., 2009). In order to identify the nature of the relationship between KM and OP, previous study tend to support positive significant relationship between the processes of KM and OP (Anantatmula, 2007; Asoh et al., 2007; Daud & Abdul Hamid, 2006; Daud et al., 2008; Fugate et al., 2009; Liao & Wu, 2009; McKeen et al., 2006; Muhammad et al., 2011; Safa et al., 2006). Consequently, the relationship between KM and OP is hypothesized as follows:

H_3: KM has a positive relationship with OP.

This study proposed that there is a positive relationship between KM and OP in terms of students related academic achievement, and non-students related academic achievement. Even though several empirical studies have examined the relationship between KM and OP, the style of hypothesis testing was mixed. Some researchers tested the KM processes separately (e.g., Daud et al., 2008; Ngah et al., 2009). Other studies argue that should follow an integrated approach to KM, which calls for the combining of KM processes holistically (e.g., Choi et al., 2008; Choy, 2006; Shankar & Gupta, 2005). According to Choi et al. (2008), KM processes within an organization tend to be adopted jointly because they are complementary supportive with each other. Complementarities among such processes are considered essential from the standpoint of their influence on OP (Choi et al., 2008; Linderman et al., 2004). For this reason, in this study, KM processes are treated as an aggregate level for testing hypotheses. Hence, the main hypothesis (H_3) is broken down into the following specific hypotheses:

H_{3a}: KM processes have a positive relationship with students related academic achievement.

H_{3b}: KM processes have a positive relationship with non-students related academic achievement.

The above hypotheses postulate the relationship between the KM processes (collectively) and organizational performance measures. This means that the organizational performance improves when the degree of KM processes are enhanced.

3.4.4 The Structural Relationship between TQM, KM and OP

The fourth research question of this study focused on investigating the structural relationship between TQM and OP mediated via the presence of KM. Here, this study presents a discussion that leads to the development of the hypothesis thus answering the fourth research question.

As mentioned earlier, many prior empirical studies (e.g., Terziovski & Samson, 1999; Lim et al., 2004; Kristal et al., 2010) have investigated the relationship between TQM and OP by combining every element of TQM into a single construct. This practice is due to the complementarity approach of TQM (Furlan et al., 2011). This assumption of core elements of TQM as interrelated implies that the TQM program, when implemented in package contributes synergistically to improve the organizational performance (Ahire et al., 1996).

Similarly, with the complementarity approach of TQM, several studies have provided empirical evidence indicating the importance of the holistic approach in the implementation of KM processes to obtain its potential benefits (e.g., Choy, 2006; Shankar & Gupta, 2005; Zivojinovic & Stanimirovic, 2009). Consequently, when more than one of the components is present simultaneously, they are expected to create a synergistic effect that influences performance more than any individual component (Choi et al., 2008; Linderman et al., 2004).

After completing an extensive review of TQM scholarly literature, Houston (2007) and Venkatraman (2007) concluded that not all TQM implementations are successful in higher education context. In response to these conclusive results, Bilen (2010) suggested that the future studies need to investigate variables that could influence the success of TQM implementation.

Among the key variables that have been recently discussed in the literature and able to shed a light in explaining the structural relationship between TQM and performance is KM (Hung et al., 2010).

However, the current study differs from the study conducted by Hung et al. (2010). They employed SEM to analyze the direct and indirect effects of KM on organizational innovation performance. The authors placed TQM (comprised of top management support, employee involvement, continuous improvement, and customer focus) as the mediator variable; KM (comprised of knowledge creation, knowledge storage, knowledge transfer, and knowledge application) as an exogenous variable. Meanwhile, innovation performance was placed as the endogenous variable. The authors concluded that the KM influence innovation performance through TQM.

Hung et al. (2010) also revealed that TQM is more strongly associated with KM and performance. The researcher in this study placed TQM as independent variable and KM as a mediator for TQM to improve OP, since TQM is a mature paradigm more than KM; and has established a reliable set of best practices for OP improvement (Linderman et al., 2004). Thus, it was suggested that KM could benefit greatly from TQM due to their significant commonalities (Ribiere & Khorramshahgol, 2004). Otherwise, core elements of TQM can be considered as CSFs of KM implementation (see Section 2.3.5). For this reason, KM mediates the relationship between TQM and OP.

Moreover, there is evidence that TQM core elements influence KM processes (Escrig-Tena et al., 2001; Escrig-Tena, 2004; Linderman et al., 2004; Molina et al 2007; Pandi et al., 2009; Ooi, 2009; Ooi et al., 2012); and the components of TQM and KM are expected to have a direct relationship to OP as measured in previous studies (Babbar, 1995; Daud et al., 2008; Joiner, 2007; Liao & Wu, 2009; Lim et al., 2004; Marshall et al., 2004; Muhammad et al., 2011; Sakthivel et al., 2005; Zack et al., 2009). Based on these evidences, hence, it is equally proposed that KM mediate the effect of TQM and OP.

Briefly, the relationship between TQM and OP is not restricted to the direct relationship; it could be indirect through the presence of KM. This is the justification for the formulation of the following hypothesis:

H_4: KM mediates the relationship between TQM and OP

It is worth mentioning that the above hypotheses, which postulate the relationship among TQM (comprised of leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact), KM (comprised of knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application), and OP (comprised of SAA and NSAA); were based on arguments derived from the related theories of this study, along with evidence from previous studies.

According to Zikmund, Babin, Carr, and Griffin (2010), the research hypotheses should be logically derived from reviewed of the relevant literature and linked to the research objectives. Therefore, Table 3.1 illustrates how research questions are linked to research objectives, which are linked to the research hypotheses.

Table 3.1
Research Questions, Research Objectives, and Research Hypotheses

Research Questions	Research Objectives	Research Hypotheses
What is the relationship between TQM and KM?	To investigate the relationship between TQM and KM	TQM has a positive relationship with KM
What is the relationship between TQM OP?	To determine the relationship between TQM and OP	TQM has a positive relationship with OP
What is the relationship between KM and OP?	To determine the relationship between KM and OP	KM has a positive relationship with OP
What is the interrelationship between TQM, KM and OP?	To ascertain the structural relationship between TQM and OP through the presence of KM	KM mediates the relationship between TQM and OP

3.5 Summary

Based on the theoretical foundations that are reviewed in the literature, this chapter provides the theoretical framework and a model for the study. The main aim of this study is the relationship between TQM and KM in relation to organizational performance. Thus, this chapter reviews the related theories to explain the relationship among study's variables. Then, to test the relationship among study's variables, four main hypotheses were formulated in line with the theoretical framework as well as problem statement, research questions, and objectives of the study. The research framework was generated based on the nine core elements of TQM, five processes of KM and two dimensions of organizational performance. The next chapter is research methodology.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the detail of research methodology employed in this study. Since the purpose of this study was to measure the impacts with a view to explaining and predicting the nature of relationship using statistical computations and hypotheses testing, a quantitative approach was appropriate for the study (Zikmund et al., 2010). The following chapter is divided into four main parts. The first part elucidates the research design of the study. The second part describes sampling design and data collection. The third part discusses the operational definitions and measurement instruments. The final part focuses on the data analysis approach and structural equation modeling.

4.2 Research Design

Research design can be defined as a master plan that specifies the methods and procedures for collecting and analyzing the required information (Zikmund et al., 2010). However, the research design involves a series of rational decision-making tasks. These tasks involve making decisions regarding the purpose of the study (i.e., exploratory, descriptive, hypothesis testing or case study), the extent of researcher interference, the study's setting, the time horizon and the unit of analysis (Cavana et al., 2001; Sekaran & Bougie, 2010). The clear definition of these tasks contributes to successful completion of any research.

An exploratory study is undertaken when little is known about the situation at hand, or when no information is available on how similar issues have been resolved in the past. In such case, extensive preliminary work needs to understand the phenomena of the situation before a model is developed and set up a rigorous design for investigation (Sekaran & Bougie, 2010).

Descriptive study is conducted to ascertain and be able to describe the characteristics of the population of interest in a situation (Cavana et al., 2001; Zikmund et al., 2010). On the other hand, the study that engaged in hypothesis testing typically explains the nature of certain relationships, or establishes the differences among groups or the independence of two or more factors in a situation (Sekaran & Bougie, 2010). This section discusses the guiding framework for collecting the pertinent data with a view to providing answers to the diverse research questions.

Since the purpose of this research was to investigate the relationship between TQM, KM and OP, this study focused on descriptive study and hypothesis testing. Descriptive study was undertaken in this study to identify the characteristics of the population such as respondents' characteristics. Hypothesis testing was undertaken to explain the relationship between the study's variables and the variance in the dependent variable.

The present study also employed a cross-sectional/one-shot study design as a temporal aspect (time horizon) of the study. Cross-sectional study design involves collecting data only once, perhaps over a period of days, weeks or months, to meet research objectives (Sekaran & Bougie, 2010). The reason for using a cross-sectional design in this study was that it required less time and at reduced cost and effort compared to a longitudinal design.

Moreover, the majority of previous studies on TQM and KM have also used this kind of research design (e.g., Asoh et al., 2007; Hung & Lien, 2004; Hung et al., 2010; Liao & Wu, 2009; Lim et al., 2004; Osseo-Asare et al., 2005; Rahman & Bullock, 2002; Safa et al., 2006; Santos-Vijande & Alivarez-Gonzalez, 2007).

4.3 Sampling Design and Data Collection

Sampling is defined as a process of selecting items from the population so that the sample characteristics can be generalized to the population (Sekaran & Bougie, 2010). The target population of this study was colleges of public universities in Iraq. The colleges in the Iraqi HEIs context were autonomous as an organizational unit (ILD, 2011), and therefore, TQM and KM practices differ and so do their performance. A total of 322 colleges (organizational level) within 24 universities were listed by Ministry of Higher Education and Scientific Research in Iraq (MHESR-I). According to Cavana et al. (2001), the required sample size for this study was about 175 colleges, which were determined based on the guideline provided by Krejcie and Morgan (1970) for sample size decisions.

The probability sampling method was used in this study due to its equal chance of selecting the elements in the population as the sample subject (Sekaran & Bougie, 2010; Zikmund et al., 2010). In addition, the probability sampling method offers more representative sample capable of supporting wider generalizability of the research findings (Sekaran & Bougie, 2010).

For this study, a stratified random type of probability sampling considered suitable to guarantee equivalent and independent representation of the research data (Cavana et al., 2001, Hair, Money, Samouel & Page, 2007).

This type of sampling method is being free of bias in the way respondents were selected, and the selection reflects the characteristics of the whole population (Zikmund et al., 2010). However, it consumes more time (Cavana et al., 2001; Sekaran & Bougie, 2010), its advantages worth the required time.

The sample members were drawn by using a stratified random sampling procedure. The individual strata were formed based on the MHESR-I directory (see Table 4.1). Since the researcher intended to use structural equation modeling (SEM) for data analysis, sample size plays a major role in the interpretation of SEM results. Using the Maximum Likelihood Estimation (MLE) in SEM model, a minimum sample of 100 is required. When the sample is increased to more than 100, the sensitivity of MLE will be improved. Once the sample becomes large (>400 to 500), MLE method will be too sensitive and almost any difference is detected, making goodness-of-fit (GOF) measures advocated poor fit. Thus, the sample size in the range of 100 to 200 was recommended for using MLE model appropriately (Hair et al., 2010).

For recording a reasonably acceptable response rate, as well as avoiding non-valid questionnaires, 250 colleges were selected based on proportionately stratified sampling as shows in Table 4.1.

Table 4.1
Sampling Frame and Stratification Process

No.	Iraqi Public Universities (Population)*	No. of Colleges (Stratum)	% of Colleges (Stratum)	Proportionate Sample Size (n=250)
1	Baghdad University	24	7.453	19
2	Al-Mustansiriyah University	14	4.434	11
3	Duhok University	18	5.590	14
4	Babylon University	21	6.521	16
5	Mousl University	23	7.142	18
6	DeQar University	11	3.416	9
7	Hawler Medical University	5	1.552	4
8	Al Nahrain University	8	2.484	6
9	Diyala University	12	3.726	9
10	Kufa University	17	5.279	13
11	Al-Qadisiya University	12	3.726	9
12	Salahaddin University	14	4.434	11
13	Tikrit University	15	4.658	12
14	Basrah University	16	4.968	12
15	Misan University	9	2.795	7
16	Kirkuk University	10	3.105	8
17	Al-Muthanna University	9	2.795	7
18	Koya University	7	2.173	5
19	Al-Anbar University	18	5.590	14
20	University of Technology	14	4.434	11
21	Sulaimaniah University	16	4.968	12
22	Wasit University	9	2.795	7
23	Kerbala University	11	3.416	9
24	Islamic University-Baghdad	9	2.795	7
	Total	322	100	250

*Source: The directory of Iraqi Public Universities, MHESR-I (2010)

Moreover, to increase the accuracy of the sample information, colleges under each individual stratum have been selected based on drawing simple random samples of the proportionate sample size (Hair et al., 2007).

Data collection involved sending out the final questionnaire to the top management of academic institutions (colleges), which were deans or assistant deans as key respondents. The chosen respondent was due to the likely validity of their perceptions of the academic performance indicators based on their knowledge and experience. Furthermore, the content of the questionnaire requires comprehensive or in-depth information about TQM and KM practices adopted by their colleges, which cannot be expected from other respondents.

There are several methods of data collection such as personally administered questionnaires, mail questionnaires, electronic questionnaires, personal or face-to-face interviews and telephone interviews (Sekaran & Bougie, 2010). The method of data collection for this study was the personally administered questionnaires. The advantage of this technique was that (a) it can develop relationship capable of motivating the respondents; (b) any doubts can be clarified; (c) satisfactory response rate guaranteed; (d) almost 100% response rate guaranteed; and (d) immediate assistance to respondents. On the negative side, using this technique is expensive and time consuming, particularly if the sample is geographically diffused (Cavana et al., 2001; Sekaran & Bougie, 2010).

To avoid misunderstandings and data bias, the questionnaire which was written in English language was translated to Arabic language, which is the first language of the respondents, and distributed in dual language. Thus, respondents were given the opportunity to choose from either of the languages.

4.4 Operational Definitions and Measurement Instrument

There are three key concepts that form the constructs of this study; TQM, KM and OP. All the constructs are multidimensional, and they include multiple items of measurement for each of the variables. The main questionnaire was divided into four sections (see *Appendix B*); the first section gives the background information about the respondent. The second section contained questions relevant to the degree of TQM core elements practices in Iraqi HEIs. Section three included questions related to the degree of KM processes practices of the Iraqi HEIs. In section four, the questionnaire was about the degree of perceived organizational performance over the past three years.

This section explains the operational definitions and measurement of the study's variables. The defining constructs involve explaining the reasons, antecedents, consequences or correlates of the variable. Relatively, it delineates its observable characteristics to be able to measure the variable. This is necessary because if we operationalize the variables incorrectly, it will affect the validity of their measures (Sekaran & Bougie, 2010).

The exogenous (independent) variable in this study is TQM. The endogenous (dependent) variable is organizational performance. KM is considered as a mediator (intervening) variable consistent with the theoretical framework. The measurements of the study's variables were performed by using the perceptual scale. Each question was answered through the Rensis Likert scale (Hair Black, Babin & Anderson, 2010; Zikmund et al., 2010). The scale consists of a set of the five-point scale descriptors from strongly disagree (1), disagree (2), neutral (3); agree (4); and strongly agree (5) (Sekaran & Bougie, 2010). The researcher preferred to use five-point Likert scale since it is revealed to enhance respondents' understanding (Olakunke, 2003).

4.4.1 Total Quality Management

A review of prior studies on TQM as presented in Chapter 2 indicates that there have been variations in the ways of measuring the construct of TQM. For the purpose of comprehensively capturing the core elements of TQM, this study built the construct for measuring TQM based on the core elements of TQM as conceptualized and tested by preceding TQM scholars (Hellsten & Klefsjo, 2002; Kanji, 2000; Lim et al., 2004; Lynne & Ross, 2007; Motwani, 2001; Taylor & Wright, 2003; Venkatraman, 2007 Vouzas & Psychogios , 2007; and others).

From the discussion in the literature review, the construct of TQM was generally described based on a number of core elements of TQM (see Table 2.3). The core elements of TQM consist of nine dimensions: (1) leadership commitment; (2) strategic planning; (3) continuous improvement; (4) customer focus; (5) process focus; (6) employee involvement; (7) training and learning; (8) rewards and recognition; and (9) management by fact. The specific dimensions of TQM are discussed in the following paragraphs.

(a) Leadership Commitment

Leadership commitment is an important aspect of organizational behavior exercised by the leadership of the organization towards long-term commitment aimed at integrating quality practices within the organization's activities to improving the teaching/learning process. This also requires the allocation of resources to support the quality practices (Bayraktar et al., 2008; Kanji & Moura, 2001; Landon, 2003; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007). Leadership commitment is operationalizes into (8) questions for its measurement:

1. In our college, the academic leadership provides sufficient internal communication facilities for effective deployment of quality teaching and learning (Graetz, 2000; Lim et al., 2004; Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007).

2. In our college, the academic leadership ensures using the best teaching and learning method for achieving educational quality (Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007; Venkatraman, 2007).

3. In our college, the academic leadership encourages innovative change and implements a culture of trust, involvement and commitment to achieve the best educational practice (Bayraktar et al., 2008; ISO 9000, 2008; Kanji & Sa, 2001; Samson & Terziovski, 1999).

4. In our college, the academic leadership has a sense of unity and eliminates any form of barrier between individuals/departments (Bayraktar et al., 2008; Kanji & Sa, 2001; Samson & Terziovski, 1999).

5. In our college, the academic leadership assumes responsibilities for quality performance (Antony et al., 2002; Lim et al., 2004; Venkatraman, 2007).

6. In our college, the academic leadership considers quality teaching a top priority in their regular meetings (Antony et al., 2002; Bayraktar et al., 2008; Jobnoun & Khafaji, 2005; Lim et al., 2004).

7. In our college, the academic leadership encourages information sharing across the college (Bayraktar et al., 2008; Hung & Lien, 2004; Lim et al., 2004; Swift et al., 1998).

8. In our college, the academic leadership provides adequate resources in order to support educational quality (Bayraktar et al., 2008; Lim et al., 2004; Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007; Venkatraman, 2007).

(b) Strategic Planning

Strategic planning is a process of planning, designing and coordinating organizational activities by the leadership of the organization. This core element focused on how the academic leadership strategically plans to achieve the organizational objective (educational process development) (AACSB, 2012; Evans & Dean, 2003; Hung & Lien, 2004; Lim et al., 2004; MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007; Swift et al., 1998). This dimension is measures using (6) questions:

1. In our college, the leadership formulates a clear mission statement capable of achieving the set educational objectives (Bayraktar et al., 2008; Kanji, 2000; Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007).

2. In our college, the strategic planning ensures proper identification of core learning-centered processes by academic leadership (AACSB, 2012; Bayraktar et al., 2008; Hung & Lien, 2004; MBNQA, 2011-2012).

3. In our college, the strategic planning considers the core learning-centered processes as central input (EQUIS, 2012; Hung & Lien, 2004; Landon, 2003; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007).

4. In our college, the strategic planning takes into account the students requirements (AACSB, 2012; Lim et al., 2004; MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007; Swift et al., 1998).

5. In our college, the strategic planning is able to provide clear tracking of staff performance (Bayraktar et al., 2008; Hung & Lien, 2004; MBNQA, 2011-2012).

6. Our college has clear quality goals.

(c) Continuous Improvement

Continuous improvement is an incremental change, and a series of system innovation designed and implemented to make sure that all educational activities have improved, and in order to add a high level of value to organization's outcomes (Anderson et al., 1994; Pearce & Robinson, 2000; Antony et al., 2002; QAA, 2004; Lim et al., 2004; Ahmad, 2008; Lynne & Rose, 2007; ISO 9000, 2008). Furthermore, many researchers identify quality assurance as an important element of continuous improvement (Boaden & Cilliers, 2001; QAA, 2004). Continuous improvement is measured using (7) questions, namely;

1. Continuous improvement of the educational process is based on a systematic approach (Baidoun, 2003; Bayraktar et al., 2008; OECD, 2007).

2. Our college continually looks for ways to improve the teaching/learning processes (Ahmad, 2008; EQUIS, 2012; Baidoun, 2003; Lim et al., 2004).

3. There is an effective feedback system for education quality improvement and quality assurance (AlNofal et al., 2005; Antony et al., 2002).

4. Quality assurance system of education is documented properly (AACSB, 2012; Ahmad, 2008; AlNofal et al., 2005; Lim et al., 2004; QAA, 2004).

5. There is a continuous review of educational quality-related issues at the academic leadership meetings (Antony et al., 2002; Bayraktar et al., 2008; Jabnoun & Khafaji, 2005).

6. There is a continuous evaluation of educational quality-related strategies (Antony et al., 2002; EQUIS, 2012; Lynne & Rose, 2007; Pearce & Robinson, 2000).

7. Quality assurance as a mechanism for continuous improvement is integrated in all aspects of the educational process (Ahmed, 2008; Lim et al., 2004; QAA, 2004).

(d) Customer Focus

Customer focus is one of the core elements of TQM that stresses the importance of knowing and understanding customers' needs. Since the focus in this study is mainly on learning and teaching aspect of HEIs, the researcher focuses on "students" as primary customers of HEIs (AACSB, 2012; Bayraktar et al., 2008; EQUIS, 2012; Kanji & Tambi, 1999; Lim et al., 2004; MBNQA, 2011-2012; Samson & Terziovski, 1999). It can then be noted that focusing on students leads to understanding students' needs. Thus, in this study, customer focus is operationalizes into (6) questions:

1. Our college actively seeking students' inputs to determine their requirement (survey, suggestion box, etc.) (Bayraktar et al., 2008; Kanji & Tambi 1999; Lim et al., 2004; Samson & Terziovski, 1999).

2. The students' requirements are well understood (AACSB, 2012; Bayraktar et al., 2008; MBNQA, 2011-2012; Samson & Terziovski, 1999).

3. The suggestions from the students are taken into account when designing new educational services (AACSB, 2012; MBNQA, 2011-2012; Venkatraman, 2007).

4. There is an effective process for resolving students' complaints (Bayraktar et al., 2008; MBNQA, 2011-2012; Samson & Terziovski, 1999; Venkatraman, 2007).

5. Students' complaints are used as a means of improving the current teaching/learning process (EQUIS, 2012; Bayraktar et al., 2008; Lim et al., 2004; MBNQA, 2011-2012; Venkatraman, 2007).

6. There is a regular assessment of students' satisfaction (EQUIS, 2012; Bayraktar et al., 2008; MBNQA, 2011-2012; Rampersad, 2001; Samson & Terziovski, 1999; Venkatraman, 2007).

(e) Process Focus

Process focus refers to the responsibility of the college in terms of emphasis placed on the educational process. Educational process as a set of activities that is a recurrent in nature, whose purpose is to create/add value to organization's stakeholders (Ahmed, 2008; Bergman & Klefsjo, 2003; Lim et al., 2004; MBNQA, 2011-2012). Therefore, process focus is considered as the core element of TQM and it is measures using (6) questions in the current study:

1. The educational process is designed in such a way that it adds value to students (Bayraktar et al., 2008; Bergman & Klefsjo, 2003; Lim et al., 2004).

2. Newly introduced teaching/learning process is critically examined prior to its actual implementation (MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007).

3. Emphasis is placed on effective educational delivery with regards to quality (MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007; Venkatraman, 2007).

4. The necessities of teaching/learning process are totally provided to guarantee value creation for students (Lim et al., 2004; MBNQA, 2011-2012; Santos-Vijande & Alivarez-Gonzalez, 2007).

5. Good relationship between academic staffs and students is maintained (Lim et al., 2004; MBNQA, 2011-2012; Venkatraman, 2007).

6. The college is committed to the review of the traditional teaching and learning technique to meet the current standard (EQUIS, 2012; Bayraktar et al., 2008; MBNQA, 2011-2012).

(f) Employee Involvement

Employee involvement in this study refers to involving academic staffs in the educational quality improvement process at operating level within the institution. Therefore, there is no way we talk about educators' involvement without mentioning teamwork. As a result, a high value is placed on teamwork to achieve high performance at institutions (Santos-Vijande & Alivarez-Gonzalez, 2007). On the other hand, TQM practices lead to educator empowerment to support an organization's activities by improving quality of the teaching process (Eng & Yusof, 2003; Hung & Lien, 2004; Lim et al., 2004). Employee Involvement is operationalizes into (7) questions:

1. The academic staffs are given required autonomy in making decisions related to their work (Pun et al., 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

2. The academic staffs are fully involved in planning their work (Bayraktar et al., 2008; Hung & Lien, 2004; Lim et al., 2004; Pun et al., 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

3. The academic staffs as a team are encouraged to fix the problems encountered in their work (Hung & Lien, 2004; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007).

4. The academic staffs are actively involved in the college's policy of quality improvement (Eng & Yuosf, 2003; Santos-Vijande & Alivarez-Gonzalez, 2007).

5. The academic staffs interact well with other components of the organization through effective communication links (Bayraktar et al., 2008; Behara & Gundersen, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

6. The suggestions of the academic staff are integrated in the design of new educational services (EQUIS, 2012; MBNQA, 2011-2012; Venkatraman, 2007).

7. There is a regular appraisal of academic staff's job satisfaction at work (EQUIS, 2012; Bayraktar et al., 2008; Rampersad, 2001; MBNQA, 2011-2012; Samson & Terziovski, 1999; Venkatraman, 2007).

(g) Training and Learning

Training and learning is one of the most important elements of TQM, which involves planning for improving the required skills that can guarantee successful achievement of educational quality improvement (AACSB, 2012; Antony et al., 2002; Bayraktar et al., 2008; Kanji & Sa, 2003; Lau & Idris, 2001; Lim et al., 2004; Lynne & Ross, 2007; Mathews et al., 2001; Santos-Vijande & Alivarez-Gonzalez, 2007). This dimension is operationalizes into (5) questions:

1. The academic staffs are frequently trained to ensure quality in job-specific skills (AACSB, 2012; Antony et al., 2002; Bayraktar et al., 2008; Lynne & Rose, 2007; Santos-Vijande & Alivarez-Gonzalez, 2007).

2. The academic staffs are able to learn from one another on how to improve the quality of educational services (Kanji & Sa, 2003; Lim et al., 2004; Venkatraman, 2007).

3. The training and learning programs look at how academic staffs are aligned with college objectives (AACSB, 2012; Bayraktar et al., 2008; Venkatraman, 2007).

4. The college provides sufficient resources to support training and learning activities (EQUIS, 2012; Bayraktar et al., 2008; Lau & Idris, 2001; Lim et al., 2004).

5. Our college provides training in Quality principles (Bayraktar et al., 2008; Lau & Idris, 2001; Lim et al., 2004).

(h) Rewards and Recognition

Reward and recognition refer to practices of the college in awarding and praising academic staffs who have demonstrated an unprecedented level of performance on their jobs (Bayraktar et al., 2008; Eng & Yusof, 2003; Lim et al., 2004; Oakland & Oakland, 2001). Reward and recognition policy in HEIs should be capable of recognizing academician who has performed extraordinarily in other to encourage others. In this study, reward and recognition is measures using (5) questions:

1. In our college, the top management is able to recognize quality improvement efforts (Bayraktar et al., 2008; Lim et al., 2004; Santos-Vijande & Alivarez-Gonzalez, 2007).

2. The acknowledgements system in our college is based on educational quality-oriented objectives (Oakland & Oakland, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

3. The promotion system for academic staffs in our college is based on scholarly contribution (Bayraktar et al., 2008; Oakland & Oakland, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

4. The awards system in our college focuses on the quality of the educational process in order to motivate academic staffs for superior quality performance (Lim et al., 2004; Oakland & Oakland, 2001; Santos-Vijande & Alivarez-Gonzalez, 2007).

5. The college offers incentives for academic staffs to share knowledge on educational quality-related issues (Bayraktar et al., 2008; Hung & Lien, 2004; Swift et al., 1998).

(i) Management by Fact

As revealed in the reviewed literature, this element refers to managing the educational level of performance based on facts and evidence; this can be achieved through good and selfless leadership (Antony et al., 2002; Kanji, 2001; Kanji, 2002; Kanji & Sa, 2003; Kanji & Tambi, 1999; Lim et al., 2004; Suryadi 2007). Therefore, managing and measuring higher-education institutes' performance should be derived from the educational objective and institute's strategy, which should provide necessary information about teaching process and students' achievements (MBNQA, 2011-2012; Suryadi 2007). Management by fact as a dimension of TQM is measures using (7) questions:

1. Our college provides appropriate quality standards, capable of dealing with the consequences of the educational process (Lim et al., 2004; Talavera, 2004; Venkatraman, 2007).

2. Measurement and analysis of college performance is based on the college's objective and strategy (Bayraktar et al., 2008; MBNQA, 2011-2012; Suryadi, 2007).

3. In our college, reliable measures of customer's satisfaction and quality indicators are established (AlNofal et al., 2005; Bayraktar et al., 2008; Hsu & Shen, 2004; MBNQA, 2011-2012).

4. Improving education quality is achieved with decisions of academic leadership based on facts and evidences (Antony et al., 2002; Bayraktar et al., 2008; Kanji & Sa, 2003; Lim et al., 2004).

5. In our college, the academic leadership ensures using reliable data, information, and knowledge for improving educational quality (Osseo-Asare et al., 2005; Santos-Vijande & Alivarez-Gonzalez, 2007; Venkatraman, 2007).

6. The measurement of college performance is based on actual data and systematic analysis (Baidoun, 2003; Lim et al., 2004; OECD, 2007; Venkatraman, 2007).

7. The application of database (such as data related to students satisfaction, academic performance, students' complaints) for planning and managing all aspects of work affecting educational quality are well managed (Juran & Gryna, 1988; Oackland, 2000).

4.4.2 Knowledge Management

Acknowledging the fact that the KM construct was defined in several and inconsistent ways in the prior reported empirical studies. In this study, based on positions of many authors, KM is referred as a dynamic combination of specific processes of identifying, acquiring, storing, sharing, and applying knowledge by the organization’s members in order to exploit the definite knowledge that leads to optimum organizational performance (Abdallah, Hassim & Chik, 2009; Asoh et al., 2007; Bouthillier & Shearer, 2002; Hawamdeh, 2007; Kiessling et al., 2009; McKeen et al., 2006; Ngah & Jusoff, 2009; Peter, 2005).

Therefore, the main dimensions from the previous definition are: (1) knowledge identification; (2) knowledge acquisition; (3) knowledge storage; (4) knowledge sharing; and (5) knowledge application. The following sections discussed the specific dimensions of KM.

(a) Knowledge Identification

Knowledge identification is a process of determining and evaluating explicit knowledge or discovering new knowledge based on current experience in a specific field (educational process) (Asoh et al., 2007; Darroch, 2005; Liao & Wu, 2009). This dimension captures all that is related to knowledge discovery as discussed in the previous chapter. Knowledge identification as a key dimension of KM is operationalizes into (6) questions:

Knowledge identification for the education process improvement inside our college involves;

1. benchmarking performance for educational process outcomes continuously (Anderson, 2009; Lee & Yang, 2000; Zack et al., 2009).

2. determining the knowledge gaps between the existing and needed knowledge about the education process (Sarawanawong et al., 2009; Anderson, 2009; Zack, 1999).

3. discovering professional knowledge about new educational services (such as curriculum, available courses, requirements and so on) from different sources (Darroch, 2005; Lee et al., 2005; Liao & Wu, 2009; Stollberg et al., 2004).

4. discovering and locating new knowledge sources (Bothillier & Shearer, 2002; Peter, 2005; Stollberg et al., 2004; Tripathy et al., 2007).

5. determining the best practices to achieve an excellent educational level (Asoh et al., 2007; Liao & Wu, 2009).

6. supporting the technological architecture for enabling knowledge identification (Aurum et al., 2007; Sarawanawong et al., 2009; Tripathy et al., 2007).

(b) Knowledge Acquisition

Knowledge acquisition process is an input-knowledge process. In other words, knowledge acquisition is a process oriented to obtain the needed knowledge from both internal and external. Where the needed knowledge can be acquired from a variety of different sources through appropriate technology (Anderson, 2009; Gold et al., 2001; Halawi et al., 2005; Hawamdeh, 2007; Lee et al., 2005; Liao & Wu, 2009; McKeen et al., 2006; Sallis & Jones, 2002; Stollberg et al., 2004). As discussed in the previous chapter, this dimension also captures all that is related to knowledge creation. Hence, knowledge acquisition as KM dimension is operationalizes into (6) questions:

Knowledge acquisition for the education process improvement inside our college involves;

1. obtaining needed knowledge from best external sources (leading universities) (Gunnlaugsdottir, 2003; Liao & Wu, 2009).

2. converting existed knowledge into a useful form for developing new educational service (Gold et al., 2001; Liao & Wu, 2009; McKeen et al., 2006).

3. absorbing academic staff's knowledge into college's database (Gunnlaugsdottir, 2003; Liao & Wu, 2009; Sallis & Jones, 2002).

4. utilizing feedback from previous experiences (Darroch, 2005; Liao & Wu, 2009; Mansur et al., 2008).

5. updating particular knowledge possessed by all academic staffs on a regular basis (Gunnlaugsdottir, 2003; Hawamdeh, 2007; Liao & Wu, 2009; Peter, 2005).

6. generating useful knowledge via virtual networking in a virtual learning environment (Lee et al., 2005; Nonaka & Takeuchi, 1995; Sallis & Jones, 2002).

(c) Knowledge Storage

Knowledge storage is a process of coding, recording, and protecting diverse types of knowledge related to the educational process in the specific knowledge database. This is an important aspect of KM as it will have a resultant effect on the efficiency of knowledge sharing and application (Asoh et al., 2007; Kiessling et al., 2009; Liao & Wu, 2009; McKeen et al., 2006; Safa et al., 2006; Sallis & Jones, 2002). This dimension of KM is operationalizes into (5) questions:

Knowledge storage for the education process improvement inside our college involves;

1. coding and recording different types of relevant knowledge (machine-readable and manual) from various sources (Asoh et al., 2007; Kiessling et al., 2009; Liao & Wu, 2009).

2. supporting knowledge storage process with an effective technological system for easy referencing and retrieval (Asoh et al., 2007; Liao & Wu, 2009; Safa et al., 2006; Sallis & Jones, 2002).

3. constantly replacing outdated knowledge from the information resides in college database. (Asoh et al., 2007; Liao & Wu, 2009; Safa et al., 2006).

4. robust technology that restricts access to some sources of knowledge (Anderson, 2009; Gold et al.; 2001; Lin & Lee, 2005).

5. strong procedures and policies to protect organizational knowledge from inappropriate utilize (Anderson, 2009; Gold et al.; 2001; Lin & Lee, 2005).

(d) Knowledge Sharing

Knowledge sharing is a fundamental process of KM. It refers to the exchange of explicit knowledge about the educational process from one source to another (person, group or organization) through collaborative technology, effective communication channels, knowledge sharing culture and well-organized reward system in order to make necessary information and knowledge sharable (Abdullah et al., 2009; Daud & Abdul Hamid, 2006; Lee et al., 2005; Liao & Wu, 2009; Safa et al., 2006; Sallis & Jones, 2002). Knowledge sharing in the current study is operationalizes into (5) questions:

Knowledge sharing for the education process improvement inside our college involves;

1. exchanging knowledge from one department to another (Fugate et al., 2009; Lee et al., 2005; Liao & Wu, 2009).

2. providing collaborative technologies (such as the internet) that allows knowledge sharing (Lee et al., 2005; Liao & Wu, 2009; Sallis & Jones, 2002).

3. guaranteeing effective communication among academic staff about new ideas, programs and activities useful to the college (Lee et al., 2005; Liao & Wu, 2009; Peter, 2005).

4. incorporating a reliable knowledge sharing culture (Lee et al., 2005; Safa et al., 2006; Taylor & Wright, 2004).

5. rewards and incentives system for making necessary knowledge sharable (Fugate et al., 2009; Hawamdeh, 2007; Lee et al., 2005; Taylor & Wright, 2004).

(e) Knowledge Application

Knowledge application is a process involving actual utilization of the knowledge. Thus, this process comprises of knowledge internalization, knowledge explosion and information technology system to apply the best practice (Asoh et al., 2007; Davenport & Prusak, 1998; Gold et al., 2001; Lee et al., 2005; Liao & Wu, 2009; Zack, 1999). This dimension of KM is operationalizes into (7) questions:

Knowledge application for the education process improvement inside our college involves;

1. developing an information technology system to support the process of knowledge application (Lee et al., 2005; Liao & Wu, 2009; Taylor & Wright, 2004).

2. employing knowledge learnt from the experiences of academic staffs to sustain competitive advantage (Anderson, 2009; Asoh et al., 2007; Fugate et al., 2009; Liao & Wu, 2009; McKeen et al., 2006).

3. exploiting knowledge in the development of new educational services (Fugate et al., 2009; Liao & Wu, 2009).

4. using appropriate knowledge to solve problems (Anderson, 2009; Hinds & Aronson, 2002).

5. effective retrieval mechanisms that make knowledge accessible to those who need it (Lee et al., 2007; Liao & Wu, 2009).

6. internalization (understand and take in) of new knowledge by academic staff before they are applied (Hinds & Aronson, 2002; Lee et al., 2005; Nonaka & Takeuchi, 1995).

7. applying the best practice that adopted from leading organizations (Gold et al., 2001; Lee et al., 2005; Liao & Wu, 2009).

4.4.3 Organizational Performance

The items for measuring organizational performance were derived from a scholarly literature review as tabulated in Table 2.8, which displays the list of sources taken for OP indicators. In the conceptualization of the term organizational performance, the performance indicator is viewed from two main perspectives of achievement namely students related academic achievement (SAA) and non-students related academic achievement (NSAA).

It is widely reported in the literature that managers are reluctant to share objective data with researchers (Carr & Kaynak, 2007). Therefore, in the present study, perceptual measures were used rather than objective measures. Performance measures of the degree of the perspective leaderships' perception of the performance of the educational organization measured by non-financial indicators. The respondents are required to answer the questions regarding their organizations perceived performance over the past three years in order to reduce the influence of temporary fluctuations in those OP measurements.

In this study, the indicators for students related academic achievements of HEIs context are: (1) Academic Status (CPA), (2) Undergraduates Wastage Rate, (3) Classes of Degrees, (4) Graduation Rates, and. The indicators for non- students related academic achievement are: (1) Competitive Position, (2) Market Share (3) Innovation, (4) Organizational Agility, and (5) Sustainability. In total, ten items were used to measure organizational performance of the HEIs understudy.

The measurement of OP for Iraqi HEIs was based on the aforementioned indicators. Each indicator is represented by one question. According to Zikmund (2000), one question for each indicator is adequate to measure the perception of the respondents. For this reason, the instrument of OP measurement for Iraqi HEIs in this study seems to be suitable. The specific dimensions of OP are measured by the following questions:

(a) Students related Academic Achievement (SAA)

SAA is referred as a quality and quantity of the students' academic performance; it is multidimensional; it related to academic status (CPA), undergraduates wastage rate, classes of degrees, graduation rates, and overall students academic achievement.

1. *Academic Status (CPA):* Students' cumulative point average has indicated an excellent academic performance over the past three years (Ball & Wilkinson, 1994; Higgins, 1989; Miller, 2007).

2. *Undergraduates Wastage Rate:* The percentage of undergraduates who drop out because of not meeting the required academic standards over the past three years is decreasing (Agha, 2007; Johnes, 1996; Lee & Buckthorpe, 2008; Palmer & Bray, 2003; Pinilla & Munoz, 2005; Sall, 2003).

3. *Classes of Degrees*: The percentage of graduates with a first-class and second-class upper division honors degree is increasing (Ball & Wilkinson, 1994; Higgins, 1989; Miller, 2007).

4. *Graduation Rates*: The percentage of undergraduates who successfully completed their studies in our college over the past three years is increasing (Ball & Wilkinson, 1994; Higgins, 1989; Miller, 2007).

5. Our college's students overall academic achievement over the past three years is encouraging.

(b) Non- students related Academic Achievement (NSAA)

NSAA is defined as a multidimensional construct composed of the overall academic performance of college; it encompasses competitive position, market share Innovation, organizational agility, and sustainability.

1. *Competitive Position*: Our College is highly ranked over the past three years (Deem, 2008; Hung & Lien, 2004; Premananto, 2008; Sun, 2000; Wei et al., 2009).

2. *Market Share*: The percentage of undergraduates applicants received in our college is significantly higher compared to other colleges over the past three years (Ball & Wilkinson, 1994; Sun, 2000).

3. *Innovation*: Our College is innovative in improving the educational process over the past three years (Deem, 2008; Hung & Lien, 2004; MBNQA, 2011-2012; McKeen et al., 2006; Suryadi, 2007; Zack et al., 2009).

4. *Organizational Agility*: Our College adapts to changes effectively with respect to the educational partners and stakeholders' needs in the past three years (Rahman & Bullock, 2002; Suryadi, 2007).

5. *Sustainability*: Our College puts in place strategies to sustain and enhance the educational performance level over the past three years (Ruskov & Todorova, 2008; Suryadi, 2007).

4.5 Pre-test

In order to ensure that high degree of content validity, readability, and clarity, the instrument was pre-tested and reviewed in two stages. As the requirements for validating the contents of a quantitative research instrument, the items were selected based on an extensive review of the literature and evaluated by several academicians.

Thus, in the first stage, five academic staffs were involved in the pre-test, who were specialists in the field of TQM and KM.

The second stage was aimed at ensuring equivalence and consistency between the two languages (English and Arabic). The original questionnaire was translated to Arabic and back to English. This stage involved specialist in the translation from the TOEFL Institute of Kufa-Iraq, and two academic staffs in business management from the University of Kufa- Iraq. Finally, suggestions and comments given after reviewing the instrument were critically observed to improve the quality of the instrument.

4.6 Data Analysis

Analyzing the research data in this study involves descriptive analysis of the phenomena of interest; Pearson correlation, canonical correlation, and regression analysis to assess hypotheses H_1, H_2, and H_3; and Structural Equation Modeling (SEM) to assess the last hypothesis, H_4. Package of SSPS version 19.0 software and Analysis Moment of Structures (AMOS) version 18.0 have been used to this aspect of the research. Each of these analytical methods describes as follows:

4.6.1 Descriptive Analysis

Descriptive analysis is mainly used to describe the phenomena of interest (Sekaran & Bougie, 2010). In such analysis, descriptive information is analyzed statistically in terms of how frequently certain phenomena occur (frequency), the average score or central tendency (mean), and the extent of variability (standard deviation). In this study, descriptive analysis was conducted to all sections of the research instrument.

4.6.2 Correlation Analyses

Correlation analysis is primarily designed for measuring the association between two variables. In other words, correlation analysis measures how a variable relates to another variable (Hair et al., 2007; Sekaran & Bougie, 2010). Correlation analyses in this study consist of Pearson's correlation and canonical correlation.

The number representing the Pearson correlation is referred to as a correlation coefficient[1]. By using Pearson's correlation analysis, the researcher was able to understand the nature, direction, and significance of the bivariate relationship of the variables used in the study (Sekaran & Bougie, 2010). In addition, canonical correlation[2] was also employed to examine the relationship between two sets of variables (Hair et al., 2010). In this study, canonical correlation analysis was employed to predict the relationships between the set of TQM core elements and the set of KM processes, and also between the set of TQM core elements and the set of OP measures, and between the set of KM processes and the set of OP measures.

4.6.3 Multiple Regression Analysis

There is always a deficiency in the result of the correlation coefficient as it only gives the degree of relationships between the variables under test without necessarily giving an idea of how much the variance in the dependent variables or criterion variable will

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[1]The correlation coefficient ranges from −1.00 to +1.00. Whereby, a value of +1.00 implies that a linear equation describes the positive relationship between the two variables perfectly. A value of −1.00 implies a perfect negative relationship. A value of zero implies that there is no linear correlation between the variables (Hair et al., 2007).

[2]Canonical correlation refers to how the two sets of multiple variables correlate. The first set of multivariate variables contains some dependent variables while the second set contains some independent variables (Hair et al., 2010).

be explained when several independent variables are theorized to simultaneously influence it (Sekaran & Bougie, 2010). For the mere fact, the correlation may exist not only in the relationship between independent variable and dependent variable, but also among themselves or inter-correlations. Thus, multiple regression analysis was used to measure the concurrent effects of several independent variables on a dependent variable (Cavana et al., 2001; Sekaran & Bougie, 2010).

Adjusted R^2 is the statistic that can be used to measure how well the dependent variable can be predicted by the independent variables. Sample size has a direct impact on the statistical power of multiple regression. It is suggested that the minimum ratio is (5 to 1), meaning that, there must be five observations for each independent variable (Hair, et al., 2010). Four assumptions that must be met under regression analysis are linearity, heteroscedasticity, normality and no serious multicollinearity problem (Coakes & Steed, 2007; Hair et al., 2010).

In the present study, regression analysis was applied to measure the significance of the relationship between TQM core elements and KM processes, between TQM core elements and organizational performance, and between KM processes and organizational performance. This analysis also provided information regarding the linear relationship between TQM core elements with both KM processes and organizational performance, and the linear relationship between KM processes with organizational performance.

To investigate the linear relationship between TQM core elements with KM processes and organizational performance, separate regression models were developed for each dependent variable, so that two general models were posited. The first model was aimed to measure the linear relationship between TQM core elements and KM processes, while the second model was developed to find out the linear relationship between TQM core elements and organizational performance measures.

Model 1: The relationships between TQM core elements and KM processes

$$KM_j = a + \beta_1 LC + \beta 2 SP + \beta 3 CI + \beta_4 CF + \beta_5 PF + \beta_6 EI + \beta_7 TL + \beta_8 RR + \beta_9 MF + e$$

Where,

KM_j = KM processes; j = 1, 2, 3, 4, 5 (KM processes); α = Intercept; $\beta_{1\ldots 9}$ = Regression coefficient; LC = Leadership commitment; SP = Strategic planning; CI = Continuous improvement; SF = Customer focus; PF = Process focus; EI = Employee involvement; TL = Training and learning; RR = Reward and recognition; MF = Management by fact; e = Random error.

Model 2: The relationships between TQM core elements and OP measures

$$OPi = a + \beta_1 LC + \beta 2 SP + \beta 3 CI + \beta_4 CF + \beta_5 PF + \beta_6 EI + \beta_7 TL + \beta_8 RR + \beta_9 MF + e$$

Where,

OP_i = Organizational performance; i = 1, 2 (OP measures); α = Intercept; $\beta_{1\ldots 9}$ = Regression coefficient; LC = Leadership commitment; SP = Strategic planning; CI = Continuous improvement; SF = Customer focus; PF = Process focus; EI = Employee involvement; TL = Training and learning; RR = Reward and recognition; MF = Management by fact; e = Random error.

Furthermore, a multiple regression model was also developed to determine the linear relationship between KM processes and organizational performance measures.

Model 3: The relationships between KM processes and OP measures

$$OP_k = a + \beta_1 KID + \beta 2 KAC + \beta 3 KST + \beta_4 KSH + \beta 5 KAP + e$$

Where,

OP_k = Organizational performance; k = 1, 2 (OP measures); α = Intercept; $\beta_1 \ldots 5$ = Regression coefficient; KID = Knowledge identification; KAC = Knowledge acquisition; KST = Knowledge storage; KSH = Knowledge sharing; KAP = Knowledge application; e = Random error.

4.6.4 Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical methodology used by behavioral, social, and educational scientists (Raykov & Marcoulides, 2006; Byrne, 2010). SEM is also a family of statistical models and multivariate technique, with mixing characteristics of factor analysis and multiple regressions that enables the researcher to test simultaneously a series of interrelated dependence relationships among the measured variables and latent constructs (Hair et al., 2010). In this study, SEM was applied for assessing the role of KM in mediating the relationship between TQM and organizational performance (H_4).

Many researchers and statisticians (e.g., Bollen, 1989; Hair et al., 2010; Iacobucci, Saldanha, & Deng, 2007; James, Mulaik, & Brett, 2006; Kline, 2011) have revealed that SEM performed better than regression while assessing the mediating role of a research variable. Hence, suggesting that SEM was a superior statistical technique over the regression. According to Hair et al. (2010), the standard errors in the SEM model are minimized due to the simultaneous estimation of all parameters in the SEM model.

Generally, structural equation modeling consists of three major components:

Variables: SEM has two types of variables, which are; latent/unobserved variables and observed/measured variables. Latent/unobserved construct is a key variable (TQM, KM and OP in this study), and can only be measured by the effect of observed variables. However, with latent constructs, a different terminology is used. *Exogenous constructs* are the latent, multi-item equal to independent variables (TQM in this study). They are determined by factors outside of the model (i.e., they are not explained by any other construct/variable in the model), as a result, the term independent.

Endogenous constructs are the latent, multi-item similar to the dependent variables (OP in this study). This construct is theoretically determined by factors within the model, thus, its dependent on other constructs, and this represented visually by a path to an endogenous construct from an exogenous construct (Byrne, 2010; Hair et al., 2010).

Models: SEM is associated with two kinds of models, which are; measurement and structural model (Anderson & Gerbing, 1988; Hair et al., 2010). *Measurement model* specifies the role of correspondence between latent and measured/observed variables, which deals with the indicators/items/scales for each construct. In this model, through confirmatory factor analysis (CFA), the researcher tests multidimensionality, reliability, convergent validity, discriminate validity and criterion-related validity. Once the measurement model is validated, the researcher conducts the structural model. *Structural model* deals with a set of one or more dependent relationships linking the hypothesized model's constructs. The structural model is most useful in representing the interrelationships of variables between constructs (Hair et al., 2010; Kline, 2011).

Measurement error: Degree to which the data values do not truly measure the characteristic being represented by the construct(s) of interest. There are quite a number of sources of getting measurement error like simple data entry errors that are not perfectly defined by any set of measured variables. For all practical purposes, all constructs have some measurement error, even with best indicator variables. However, the researcher's aim was to minimize the amount of measurement error in this study. SEM can handle measurement error and provide the most accurate estimate of the relationship between constructs (Hair et al., 2010; Kline, 2011).

4.7 Summary

This chapter describes the research methodology to be employed in this study. As explained in section 4.2 of this chapter, this study can be categorized as a descriptive study and hypothesis testing. This chapter also elaborated the sampling design and the justification of the sample size of the study. For the sampling procedure and data collection, a stratified random sampling was used. This chapter discussed the operational definitions and measurement instrument which was developed from an extensive literature review. In addition, this chapter also explained the data analysis techniques employed to test the hypotheses of the study. The result of the data analyses and the findings of the study will be discussed in the next chapter.

CHAPTER 5
RESEARCH FINDINGS

5.1 Introduction

This chapter reports the results of data analyses and hypotheses testing, which is the main part of this study. The first section describes the overview of data collection, which contains the information regarding response rate. The second section explains the process of data screening. The third section provides details of the respondents' profile. The subsequent sections provide a detailed explanation of descriptive statistics and hypotheses testing. Hypotheses' testing is conducted by applying Pearson's correlation analysis, regression analysis, principal component analysis, canonical correlation analysis, and structural equation modeling. Finally, a summary of the research findings is presented.

5.2 Overview of Data Description

As mentioned in Section 4.2, 322 colleges within 24 Iraqi public universities are listed as the population of the study. For data collection purpose, 250 questionnaires were distributed personally by hand to the respondents, starting on 28 November 2010. After four months, a total of 183 questionnaires were returned. This led to a response rate of 73.20 percent. Out of this, six questionnaires were abandoned from analysis because they were not completed, and inappropriate respondent answered the questionnaire. Subsequently, 177 questionnaires were usable and used for further analysis; this led to a valid response rate of 70.80 percent.

The high response rate was achieved due to the questionnaires being personally distributed by the researcher to each academic college (faculty). Moreover, this response rate is considered excellent considering that, according to Sekaran and Bougie (2010), the response rate of 30 percent is adequate for the survey. Table 5.1 shows the response rate of the questionnaires.

Table 5.1
Response Rate

Response	Frequency/Rate
Number of distributed questionnaires	250
Returned questionnaires	183
Returned and usable questionnaires	177
Returned and excluded questionnaires	6
Not returned questionnaires	67
Response rate	73.20%
Usable response rate	70.80%

5.3 Data Screening

The following section discusses the assumption tests before further multivariate analyses were carried out. The assumptions are outliers, normality, and linearity as suggested by several statisticians (e.g., Coakes & Steed, 2007; Hair et al., 2010; Tabachnick & Fidell, 2007). According to Tabachnick and Fidell (2007), outliers refer to extreme cases in the data. The test of normality assurances that the scores for each variable are normally distributed. Moreover, linearity test is to ensure linear association between two variables. Thus, these three assumptions should be achieved before applying any of the multivariate data analysis techniques. When these assumptions are not met the results may not be trustworthy, or risk a biased and flawed analysis (Hair et al., 2006).

5.3.1 Test of Outliers

Outlier is an observation that lies an abnormal distance from other observations in a random sample from a population (Barnett & Lewis, 1994). Generally, outliers have a large impact on the statistical results; i.e., the outlier case can possibly change the value or score that the researcher would predict for every other case in the study (Tabachnick & Fidell, 2007). Thus, outliers must be identified.

According to Hair et al. (2010), outliers can be identified from three perspectives: univariate, bivariate, and multivariate based on the number of variables/constructs measured. Consequently, this section details the techniques used in detecting outliers for all study's constructs from the three perspectives.

5.3.1.1 Univariate Outlier

The univariate identification of outliers examines the distribution of each variable and selects as outliers those cases falling at the outer ranges (high or low) of the distribution as outliers (Tabachnick & Fidell, 2007). Univariate outliers of all the constructs have been recognized independently by using box plots[3]. Table 5.2 shows a summary of outlier cases from univariate aspect.

[3]A boxplot is a graphical display of the data that shows; (1) median, which is the middle line, (2) middle 50% of scores, which is the shaded region, (3) high and low 25% of scores, which are the lines extending out of the shaded region, (4) the smallest and largest (non-outlier) scores, which are the horizontal lines at the high/low of the boxplot, and (5) outliers, which those observations falling at the outer ranges (high or low).

Table 5.2
Summary of Univariate Outliers (n = 177)

No.	Variable	Outlier cases
	TQM Core Elements	
1	Leadership Commitment	55, 80*, 99*, 117, 132, 162*
2	Strategic Planning	80, 149, 162
3	Continuous Improvement	80, 162
4	Customer Focus	99, 142, 162*, 166
5	Process Focus	80, 149, 162*
6	Employees Involvement	99, 162
7	Training & Learning	41, 80, 99, 151, 162*, 175
8	Rewards & Recognition	99, 117, 162
9	Management by Fact	80, 149
	Knowledge Management Processes	
1	Knowledge Identification	80, 149
2	Knowledge Acquisition	50, 80*, 149, 162*
3	Knowledge Storage	80, 99, 130, 149, 162
4	Knowledge Sharing	149
5	Knowledge Application	99, 162*
	Organizational Performance Measures	
1	Students related Academic Achievement	80*, 99, 162
2	Non-students related Academic Achievement	55, 80, 99*, 135, 162

Note. * Case with very extreme value (highest or lowest) for each construct.

Based on Table 5.2, case number 80, 99, 117, 149, and 162 appear in more than a single construct. Furthermore, case number 80, 99, and 162 have very extreme value, which might affect the overall measures of the constructs. Additional detections in both bivariate and multivariate aspect are required to decide whether to remain or not these cases in the subsequent analyses.

5.3.1.2 Bivariate Outlier

Bivariate outliers are cases that have an atypical score for pairs of variables. Scatter plots are useful for "*eyeballing*" bivariate outliers[4]. According to Hair et al. (2010), Scatter plot is appropriate to demonstrate the straight line that fits the data between two variables; TQM core elements against KM processes, TQM core elements against

[4]Scatter plot is graphical plot, which can show the linear relationship between two variables and determine whether outliers exist.

organizational performance measures, and KM processes against organizational performance measures. Table 5.3 summarizes the results of visual identification of bivariate outliers from 73 scatter plots.

Table 5.3
Summary of Bivariate Outliers (n = 177)

Independent Variable vs. Dependent Variable*	Case Number
Leadership Commitment vs. Knowledge Identification	80, 150, 149, 162
Leadership Commitment vs. Knowledge Acquisition	80, 162
Leadership Commitment vs. Knowledge Storage	28, 32, 80, 99, 130, 134, 162
Leadership Commitment vs. Knowledge Sharing	80, 99, 136,150, 149, 162
Leadership Commitment vs. Knowledge Application	80, 93, 99, 149, 162
Leadership Commitment vs. SAA	80, 90, 162
Leadership Commitment vs. NSAA	80, 90, 99, 162
Strategic Planning vs. Knowledge Identification	80, 99, 150, 149
Strategic Planning vs. Knowledge Acquisition	80, 162
Strategic Planning vs. Knowledge Storage	80, 99, 149, 162
Strategic Planning vs. Knowledge Sharing	80, 149, 162
Strategic Planning vs. Knowledge Application	80, 93, 149, 162
Strategic Planning vs. SAA	80, 93, 99, 149, 162
Strategic Planning vs. NSAA	64, 92, 98
Continuous Improvement vs. Knowledge Identification	92
Continuous Improvement vs. Knowledge Acquisition	50, 56, 92
Continuous Improvement vs. Knowledge Storage	54, 92, 98, 149
Continuous Improvement vs. Knowledge Sharing	92, 98, 149
Continuous Improvement vs. Knowledge Application	92, 98
Continuous Improvement vs. SAA	92, 98
Continuous Improvement vs. NSAA	64, 92, 98
Customer Focus vs. Knowledge Identification	67, 92, 98, 146
Customer Focus vs. Knowledge Acquisition	50, 67, 98, 152, 163
Customer Focus vs. Knowledge Storage	98, 134, 129, 163
Customer Focus vs. Knowledge Sharing	67, 92, 134, 163
Customer Focus vs. Knowledge Application	40, 98, 134, 163
Customer Focus vs. SAA	40, 98 107, 163
Customer Focus vs. NSAA	67, 92, 134, 163
Process Focus vs. SAA	98, 144
Process Focus vs. NSAA	118, 127
Employees Involvement vs. Knowledge Identification	92, 98, 149
Employees Involvement vs. Knowledge Acquisition	50, 51, 98, 149
Employees Involvement vs. Knowledge Storage	98, 149
Employees Involvement vs. Knowledge Sharing	13, 98, 149
Employees Involvement vs. Knowledge Application	51, 92, 98, 149
Employees Involvement vs. SAA	21, 51, 92, 98, 149, 172
Employees Involvement vs. NSAA	51, 149, 172
Training & Learning vs. Knowledge Identification	41, 119, 124, 149
Training & Learning vs. Knowledge Acquisition	41, 92,149, 172
Training & Learning vs. Knowledge Storage	41, 87, 92, 108, 149, 172
Training & Learning vs. Knowledge Sharing	92, 98, 149, 172
Training & Learning vs. Knowledge Application	41, 92, 149, 172
Training & Learning vs. SAA	98, 149, 172
Training & Learning vs. NSAA	45, 98, 149, 172
Rewards & Recognition vs. Knowledge Identification	13, 92, 116, 144

Table 5.3 (continued)

Independent variable vs. dependent variable*	Case number
Rewards & Recognition vs. Knowledge Acquisition	50, 89, 116, 144, 149
Rewards & Recognition vs. Knowledge Storage	47, 92, 98, 116, 144, 149
Rewards & Recognition vs. Knowledge Application	47, 92, 98, 116, 144, 149
Rewards & Recognition vs. SAA	98, 116, 144
Rewards & Recognition vs. NSAA	64, 98, 116, 144
Management by Fact vs. Knowledge Identification	9, 23, 87, 92, 149
Management by Fact vs. Knowledge Acquisition	7, 50, 87, 92, 149, 169
Management by Fact vs. Knowledge Storage	7,9, 23, 87, 92, 121, 129
Management by Fact vs. Knowledge Sharing	7, 87, 92, 149, 169
Management by Fact vs. Knowledge Application	9, 87, 92, 141, 149
Management by Fact vs. SAA	23, 87, 149
Management by Fact vs. NSAA	7, 24, 87 98, 123
Knowledge Identification vs. SAA	92, 98, 149
Knowledge Identification vs. NSAA	17, 92, 129, 148, 149
Knowledge Acquisition vs. SAA	50, 98, 107, 149
Knowledge Acquisition vs. NSAA	6, 50, 98, 107, 149
Knowledge Storage vs. SAA	28, 50, 54, 98
Knowledge Storage vs. NSAA	54, 98, 129
Knowledge Sharing vs. SAA	50, 53, 46, 135
Knowledge Sharing vs. NSAA	50, 46, 83, 135
Knowledge Application vs. SAA	92, 98, 120, 149, 156
Knowledge Application vs. NSAA	18, 98, 126

Note. *Scatter plots containing no outliers are not included in this table.

The resulting scatter plots indicated that the case number 80, 92, 99, 149 and 162 emerge rather frequently. Consequently, these cases may become outliers. According to Hair et al. (2010), the diagnostic method of bivariate outlier is inadequate to ensure whether or not the cases are outliers. Thus, the analytic method in multivariate perspective is essential, since the multivariate analyses involve more than two variables.

5.3.1.3 Multivariate Outlier

In order to discover multivariate outliers, many researchers proposed using Mahalanobis distance (Mahalanobis D^2) to identify the extreme score on two or more constructs (e.g., Byrne, 2010; Hair et al., 2010; Tabachnick & Fidell, 2007). The Mahalanobis distance assesses each case's distance in multidimensional space for the mean centre from all cases across a set of constructs.

According to Hair et al. (2010), the cases having D^2/df value (the D^2 measure divided by the number of variables involved) exceeding 2.5 can be designated as possible outliers. Table 5.4 summarizes results of multivariate outliers.

Table 5.4
Summary of Multivariate Outliers

Case Number	Mahalanobis D^2	D^2/df
80	53.394	3.559
149	44.181	2.945
162	42.441	2.829

Note. Smaller D^2/df values (< 2.5) are not included in this table.

Based on the results in Table 5.4, cases number 80, 149, and 162 are designated potential multivariate outliers due to D^2/df values exceed 2.5. In brief, outliers' detection results in the perspective of univariate, bivariate, and multivariate are revealed in Table 5.5.

Table 5.5
Results of Univariate, Bivariate, and Multivariate Outlier Detection

Case Number*	Multivariate outliers		Frequency**	
	Mahalanobis D^2	D^2/df	Univariate outliers	Bivariate outliers
80	53.394	3.559	11	12
149	44.181	2.945	7	36
162	42.441	2.829	12	12
13	32.576	2.171	-	2
99	25.790	1.719	9	7
172	20.131	1.342	-	8
117	19.721	1.314	2	-
50	9.699	.646	1	9
92	2.981	.198	-	27

Note. * Sorted based on value of Mahalanobis D^2/df
** Frequency of certain cases considered as outliers.

In this study, due to the analyses proposed assume the normality, problematic outliers should be excluded from the analyses. Thus, based on outliers detection, three cases (80, 149, and 162) of total 177 cases are considered outliers, because these three cases appear with a value of D^2/df greater than 2.5 as recommended by (Hair et al., 2010), and frequently noted as an outliers in the univariate and bivariate detection (see

Tables 5.2 and 5.3). Moreover, based on Table 5.5, six cases (13, 99, 172, 117, 50, and 92) are not considered outliers, because there is no multivariate outlier identified in these cases (D^2/df value < 2.5). Therefore, the three cases (80, 149, and 162) are discarded in the subsequent analyses; consequently, the analyses that follow and all reported statistics are based on 174 cases.

5.3.2 Test of Normality

Normality is a degree to which the distribution of the sample data corresponds to a normal distribution. Accordingly, normality test is employed to determine whether a data set is well-modeled by a normal distribution. If the variation of the data is sufficiently large, all resulting statistical tests are invalid, because normality is required to use the F and t-statistics (Hair, et al., 2010; Tabachnick & Fidell, 2007). Generally, there are two main methods of assessing normality namely, graphical method and statistical method.

Normality test is conducted by using SPSS software for all the 174 cases graphically and statistically. Graphical interpretation has been carried out by using the *normal probability plot*[5], while the statistical interpretation assesses via skewness and kurtosis statistics. In the normal probability plot, each observed value matches with its expected value from the normal distribution. In detail, to support normality test, normal probability plot matches the cumulative distribution of actual data values with the cumulative distribution of a normal distribution (Hair et al., 2010).

[5] A graphical tool for assessing normality is the normal probability plot, a quantile-quantile plot (QQ plot) of the standardized data against the standard normal distribution. Here, the correlation between the sample data and normal quantiles (a measure of the goodness of fit) measures how well the data is modeled by a normal distribution. For normal data the points plotted in the QQ plot should fall approximately on a straight line, indicating a high positive correlation. These plots are easy to interpret and also have the benefit that outliers are easily identified.

In terms of the statistical interpretation[6], Hair et al. (2010) and Kline (2005) revealed that the distribution is not normal if $Z_{skewness}$ and $Z_{kurtosis}$ exceed a critical value ± 2.58 at the .01 level, and ± 1.96 at the .05 level. Positive values of skewness point to a positive skew (most of the scores are below the mean), while positive values of kurtosis point to a distribution that is pointed. Negative values of skewness point to a negative skew (most of the scores are above the mean), while negative values for kurtosis indicate a distribution that is flatter.

Moreover, Byrne (2010) clearly stated that even though univariate normality is achieved, multivariate distribution could still be multivariate non-normal. Nevertheless, the essential assumption for using SEM in general, and particularly for AMOS, is that the data are multivariate normal (Arbuckle, 2008; Byrne, 2010). Thus, it is essential to assess the normality distribution of each construct based on the multivariate aspect.

All the 174 cases are tested by using graphically and statistically methods. In some normal probability plots, several observed values are not matching with its expected value from the normal distribution. It leads to the conclusion that in some construct, the data is not distributed normally.

To ensure the conclusion acquired from the normal probability plots, skewness and kurtosis statistics are tested for each construct independently (univariate) and collectively (multivariate) as revealed in Table 5.6.

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[6] Statistically, all normal distributions look like a symmetric, bell-shaped curve.

Table 5.6
Univariate and Multivariate Normality

No.	Variable	Skewness	$Z_{skewness}$ (Critical Ratio)	Kurtosis	$Z_{kurtosis}$ (Critical Ratio)
	TQM Core Elements				
1	Leadership Commitment	-.241	-1.310	.330	.902
2	Strategic Planning	-.329	-1.788	1.003	2.740
3	Continuous Improvement	-.317	-1.723	-.423	-1.156
4	Customer Focus	-.049	-.266	-.056	-.153
5	Process Focus	-.213	-1.158	-.418	-1.142
6	Employees Involvement	-.597	-3.245	.793	2.167
7	Training & Learning	-.222	-1.207	.384	1.049
8	Rewards & Recognition	-.364	-1.978	.143	.391
9	Management by Fact	.023	.125	-.423	-1.156
	Multivariate			40.425	3.251
	KM Processes				
1	Knowledge Identification	.086	.467	.197	.538
2	Knowledge Acquisition	.076	.413	.160	.437
3	Knowledge Storage	.028	.152	-.399	-1.090
4	Knowledge Sharing	-.398	-2.163	.345	.943
5	Knowledge Application	-.348	-1.891	.316	.863
	Multivariate			15.954	2.481
	OP Measures				
1	SAA	-.229	-1.245	.215	.587
2	NSAA	.118	.641	.325	.888
	Multivariate			3.059	1.302

Note.
- Standard errors for skewness and kurtosis of TQM core elements are respectively .208 and .438
- Standard errors for skewness and kurtosis of KM processes are respectively .206 and .416
- Standard errors for skewness and kurtosis of OP measures are respectively .203 and .416

Regarding univariate normality, Table 5.6 points out that only one $Z_{skewness}$ of employees' involvement exceeding the critical value of ± 2.58. $Z_{skewness}$ value of employees' involvement is -3.245. Although the $Z_{skewness}$ value exceeds the critical value, its $Z_{kurtosis}$ is 2.167. This value is smaller than 2.58 and much greater than -2.58. Similarly, despite the $Z_{kurtosis}$ value of strategic planning exceeding the critical value 2.58, its $Z_{skewness}$ value is -1.788. Thus, the data for the two constructs can be assumed normally distributed (Byrne, 2010). In brief, the assumption of univariate normality is achieved for all constructs.

As mentioned early, multivariate normality test is a critical assumption for SEM analyses. The values of multivariate kurtosis and multivariate $Z_{kurtosis}$ of each construct are shown at the bottom of the kurtosis and $Z_{kurtosis}$ columns in Table 5.6. Several researchers revealed that the most important value is the multivariate $Z_{kurtosis}$. The value of smaller than 5.00 is indicative of data that are normally distributed (Bentler, 2007; Byrne, 2010). Table 5.6 also provides the information that all values of multivariate $Z_{kurtosis}$ are within the acceptable limits. Thus, multivariate normality is achieved. In a nutshell, normality test provides the evidence that data are normal distributed for all the constructs.

5.3.3 Test of Linearity

Test of linearity is part of bivariate testing that has been illustrated in section 5.3.1.2**.** Bivariate analysis was carried out to see if one construct is related to another construct (Coakes & Steed, 2007). In this study, bivariate analysis was tested by using scatter plots that represent the relationships between TQM core elements and KM processes, TQM core elements and OP measures, and between KM processes and OP measures. Based on outlier detection, the cases with the most frequently outliers in bivariate aspect have been dropped. Thus, the linear relationships between the constructs were achieved. In addition, Pearson's correlation provides the information that the correlations among all constructs are significant at the level .05. As a result, this evidence supports that assumption of linearity is achieved.

5.4 Respondents Profile

As described in the earlier section, the next analyses are based on 174 cases that have achieved the required assumptions. The sample size of 174 cases is practically sufficient to be analyzed in this study. According to Sekaran and Bougie (2010), sample sizes larger than 30 and smaller than 500 are fitting for all research.

In the same vein, Hair et al. (2010) revealed that minimum sample size for using correlation and multiple regression analysis is 50 and preferably 100. Moreover, SEM requires 100-150 samples size (Byrne, 2010; Hair et al., 2010). Based on the directory of Iraqi HEIs (MHESR-I, 2011), Table 5.7 shows the distribution of population (Iraqi HEIs-public universities) and the sample which involved in this study. The sample provides fairly representative public higher education institutional coverage.

Table 5.7
Distribution of Population and Sample

No.	Iraqi Public Universities	No. of Colleges (Population)*		Sample	
		N	%	n	%
1	Baghdad University	24	7.453	11	6.322
2	Al-Mustansiriyah University	14	4.434	7	4.023
3	Duhok University	18	5.590	9	5.172
4	Babylon University	21	6.521	12	6.897
5	Mousl University	23	7.142	10	5.747
6	DeQar University	11	3.416	7	4.023
7	Hawler Medical University	5	1.552	3	1.724
8	Al Nahrain University	8	2.484	2	1.149
9	Diyala University	12	3.726	8	4.598
10	Kufa University	17	5.279	13	7.471
11	Al-Qadisiya University	12	3.726	9	5.172
12	Salahaddin University	14	4.434	11	6.322
13	Tikrit University	15	4.658	6	3.448
14	Basrah University	16	4.968	9	5.172
15	Misan University	9	2.795	5	2.874
16	Kirkuk University	10	3.105	6	3.448
17	Al-Muthanna University	9	2.795	5	2.874
18	Koya University	7	2.173	3	1.724
19	Al-Anbar University	18	5.590	11	6.322
20	University of Technology	14	4.434	6	3.448
21	Sulaimaniah University	16	4.968	7	4.023
22	Wasit University	9	2.795	5	2.874
23	Kerbala University	11	3.416	6	3.448
24	Islamic University-Baghdad	9	2.795	3	1.724
	Total	322	100%	174	100%

Note. *****The directory of Iraqi Public Universities**,** MHESR-I (2011)

The profile of the respondents is described in Table 5.8. The majority of the respondents 167 (95.97%) are experienced members of the academic colleges, only five respondents (2.87%) have been serving the college less than three years. Moreover, the majority of the respondents 148 (85.06%) have been working in the current position more than three years. Notwithstanding, nine of the respondents (5.17%) are working at their current position (dean or assistant dean) a period of less than a year, but these respondents have worked as professors in the same college for many years. Therefore, they have such knowledge and sufficient experience enabling them to answer the questionnaire. As a result, these respondents are considered sufficiently knowledgeable to participate in this study.

Table 5.8
Profile of the Respondents

Demographics	Frequency	Percentage
Designation of respondent (job title)		
Dean	112	64.37%
Assistant Dean	62	35.63%
Respondent gender		
Male	142	81.61%
Female	32	18.39%
Respondent age		
Less than 30 years	--	.00%
30 - 39 years	12	6.90%
40 - 49 years	38	21.84%
40 - 59 years	97	55.75%
60 years and over	27	15.52%
Academic rank		
Professor	58	33.33%
Associate Professor	93	53.45%
Senior Lecturer	23	13.22%
Number of years serving in the college		
Less than 1 year	2	1.14%
1 - 3 years	5	2.87%
More than 3 years	167	95.97%
Number of years serving in the current position		
Less than 1 year	9	5.17%
1 - 3 years	17	9.77%
More than 3 years	148	85.06%

5.5 Construct Validity and Reliability

In the social science studies, there are always errors in the measurement of attitudinal variables (Sekaran & Bougie, 2010). Therefore, it is important to ensure that the instrument that develops to measure particular concepts is indeed accurately measuring the variables they are supposed to measure (Cavana et al, 2001; Sekaran & Bougie, 2010). According to Brunner and Martin Sub (2005), the reliability test assumes unidimensionality. Thus, construct validity must be achieved first.

Validity is a hierarchy procedure to ensure that whatever which is concluded from a research can be shared confidently (Garver & Mentzer, 1999). The purpose of having validity is to make sure that the instrument measures what it is supposed to measure (Zikmund et al, 2010). Construct validity in terms of construct unidimensionality was subsequently tested. Construct unidimensionality is defined as the survival of one construct underlying a set of items (Anderson & Gerbing, 1988; Brunner & Martin Sub, 2005), in other words, construct unidimensionality refers to the underlying factors that reflect what the variable share in common (Hair et al., 2010). The construct validity was evaluated by factor analyzing the measurement items of each construct (Hair et al., 2010; Shah & Goldstein, 2006).

Factor analysis (FA) was carried out to reduce/retain the scale of TQM core elements, KM processes, and organizational performance to a slighter number of underlying factors. For stable factor analysis results, FA was performed separately[7] on each construct to confirm its scale dimensionality. Principal components method was employed to identify factors with eigenvalues of at least 1.0. In examining factor loading, the minimum benchmark of .40 was applied to the analysis (Hair, et al., 2010). This means that the items with the factor loading of higher than or at least .40

[7] As widely practiced by several researchers and statisticians (e.g., Ahire et al., 1996; Lim et al., 2004; Lee & Lee, 2007), if the sample size is small, researchers should examine factor analysis on each construct separately. Hence, in order to examine whether items are tapping into the same construct or not, factor analysis was carried out separately for each construct. However, the suggested sample size for stable factor analysis results is roughly 5-10 observations per item (Hair et al., 2010).

were critical to the represented construct. In contrast, the lower factor loading was considered as less meaningful and thus, statistically insignificant. The results of factor analysis are shown in Table 2.9.

Table 5.9
Statistical Summary of Factor Analysis

No.	Variable	No. of Items	Factor Loading for Retained Items	KMO	Eigen Value	% of Variance
	TQM Core Elements					
1	Leadership commitment	8	.727, .742,.769, .676, .799, .622, .770, .704	.890	4.249	63.405
2	Strategic planning	6	.695, .705, .767, .748, .712, .750	.838	3.586	59.766
3	Continuous improvement	7	.767, .785, .832, .759, .726, .714, .737	.875	4.309	61.553
4	Customer focus	6	.715, .810, .795, .774, .754, .646	.863	3.942	65.696
5	Process focus	6	.742, .796, .798, .824, .717, .700	.852	4.158	69.306
6	Employee involvement	7	.733, .734, .716, .726, .732, .744, .678	.844	3.667	62.673
7	Training & learning	5	.763, .834, .777, .722, .723	.823	3.514	72.272
8	Rewards & recognition	5	.771, .876, .670, .774, .711	.756	3.018	71.352
9	Management by fact	7	.897, .806, .706, .746, .777, .807, .725	.885	4.218	61.216
	KM Processes					
1	Knowledge identification	6	.685, .757, .809, .742, .807, .711	.825	4.615	65.929
2	Knowledge acquisition	6	.781, .811, .738, .780, .696, .634	.818	3.306	55.105
3	Knowledge storage	5	.799, .816, .796, .747, .746	.797	3.051	61.024
4	Knowledge sharing	5	.743, .734, .680, .853, .814	.817	4.325	68.868
5	Knowledge application	7	.796, .810, .780, .742, .851, .617, .673	.874	4.006	65.890
	OP Measures					
1	SAA	5	.715, .753, .817, .837, .759	.835	3.380	67.606
2	NSAA	5	.791, .717, .827, .701, .795	.843	3.202	65.034

Based on Table 5.9, the results indicate that factor loadings for all constructs were within the range from .622 to .897. Therefore, all items recommended to be retained. Moreover, all constructs explain more than 50% of total variance, the percent of variances ranging from 55.105 to 72.272.

According to Leech, Barrett, and Morgan (2005), the Kaiser-Meyer-Olkin (KMO) is a test of an assumption whether items are adequate for each factor. In other words, KMO measure of sampling adequacy. Furthermore, the Bartlett's test of sphericity tests, whether the variables are correlated highly enough to provide a reasonable basis for factor analysis (Leech, et al., 2005).

According to Pallant (2007), KMO value should be greater than .60; and Bartlett's test of sphericity should be large and significant (less than .05). Table 5.9 indicates that the KMO values are greater than .60. Other than that, the Bartlett's test of sphericity is significant at $\alpha = .05$ for all constructs. Thus, it can be concluded that all constructs are eligible.

After achieving construct validity, reliability was tested. Accordingly, there are two types of reliability; stability of measures and internal consistency of measures. Stability refers to the ability of a measure to maintain stability over time, and two tests described for evaluating stability, which includes test-retest reliability and parallel-form reliability. Internal consistency of measures indicates the homogeneity of the scales/items in the measure. Consistency can be examined throughout an inter-item consistency reliability and split-half reliability test (Cavana et al., 2001; Hair et al., 2010).

Although there are various types of instrument reliability methods, the most popular technique used in the survey researches is internal consistency reliability. Meanwhile, the Cronbach’s coefficient alpha is the most widely used test of internal consistency employed in quantitative research (Sekaran & Bougie, 2010). In line with several authorities in quantitative research, that the reliability of research constructs is considered acceptable with Cronbach's alpha value of .70 and above (Cavana et al., 2001; Hair et al., 2010; Sekaran & Bougie, 2010). The result of reliability analysis for each construct is revealed in Table 5.10.

Table 5.10
Statistical Summary of Reliability Analysis

No.	Construct	No. of items	Construct code	Cronbach's alpha
	TQM core elements			
1	Leadership Commitment	8	LC	.873
2	Strategic Planning	6	SP	.823
3	Continuous Improvement	7	CI	.878
4	Customer Focus	6	CF	.844
5	Process Focus	6	PF	.848
6	Employee Involvement	7	EI	.847
7	Training & Learning	5	TL	.817
8	Rewards & Recognition	5	RR	.820
9	Management by Fact	7	MF	.889
	KM Processes			
1	Knowledge Identification	6	KID	.845
2	Knowledge Acquisition	6	KAC	.834
3	Knowledge Storage	5	KST	.839
4	Knowledge Sharing	5	KSH	.821
5	Knowledge Application	7	KAP	.873
	OP Measures			
1	Students related Academic Achievement	5	SAA	.833
2	Non-students related Academic Achievement	5	NSAA	.822

Based on the displayed in Table 5.10, the results indicate that all the values of Cronbach's Alpha are greater than .70. Thus, reliability of measures was achieved. As a result, the instrument measures used in this study is valid and reliable.

5.6 Descriptive Statistics of Constructs

This section explains the descriptive statistics of all constructs, which involved in this study. Table 5.11 provides the information in terms of minimum value, maximum value, mean, and standard deviation of the data.

Table 5.11
Descriptive Statistics of Constructs

No.	Variable	Minimum	Maximum	Mean	Std. Deviation
	TQM core elements				
1	Leadership Commitment	2.625	4.885	4.014	.443
2	Strategic Planning	2.429	4.857	3.812	.491
3	Continuous Improvement	2.430	4.859	3.812	.490
4	Customer Focus	2.333	5.000	3.826	.494
5	Process Focus	2.667	4.833	3.788	.499
6	Employees Involvement	2.143	4.860	3.744	.429
7	Training & Learning	2.000	5.000	3.703	.511
8	Rewards & Recognition	2.200	5.000	3.758	.513
9	Management by Fact	2.571	5.000	3.846	.524
	KM processes				
1	Knowledge Identification	2.500	5.000	3.926	.463
2	Knowledge Acquisition	2.833	5.000	3.940	.433
3	Knowledge Storage	2.400	5.000	3.810	.517
4	Knowledge Sharing	2.800	5.000	3.908	.443
5	Knowledge Application	2.570	4.856	3.881	.440
	OP measures				
1	SAA	2.220	5.000	3.911	.512
2	NSAA	2.200	5.000	3.842	.495

Based on the results presented in Table 5.11, the descriptive statistics explain that the mean of TQM core elements ranges from 3.703 to 4.014, with a small standard deviation ranging between .429 and .524. This indicates that the Iraqi HEIs have been applying TQM core elements. Generally, leadership commitment, and training and learning are the two elements with the highest and the lowest extent of implementation, respectively.

In relation to the KM processes, the mean values range from 3.810 to 3.940, with a small standard deviation ranging between .433 and .517. This shows that the processes of KM have been implemented in Iraqi HEIs context. In general, the knowledge acquisition process has the largest mean value of all the KM processes, while the knowledge storage process is the slightest.

Finally, in terms of students related academic achievement (SAA) and non-students related academic achievement (NSAA); the mean values of OP measures indicate to the need for further improvement. The mean values are 3.911 (SAA) and 3.842 (NSAA), with standard deviation .512 (SAA) and .495 (NSAA), respectively. The following sections will present the result of Pearson correlation analysis, multiple regression analysis, canonical correlation, and structural equation modeling in attempting to test the hypotheses developed in this study.

5.7 Linear Correlation between Variables: Pearson Correlation Analysis

Pearson's correlation analysis is conducted to measure the relationship between two variables in the study. The extent of the correlation coefficient (r) can change from -1.00 to +1.00, with -1.00 reveals an ideal negative linear correlation. +1.00 reveals an ideal positive linear correlation, and .00 indicates no linear correlation between two variables. Cohen (1988) has explained the meaning of the correlation coefficients. As a rule of thumb, Cohen revealed that the common set of the correlation coefficient interpretation, which used for social science as follows: (a) absolute value of (.00 - .09) equals no correlation, (b) absolute value of (.10 - .29) equals a low correlation,

(c) absolute value of (.30 - .49) equals a medium correlation, and (d) absolute value of (.50 - 1.00) equals a high correlation (Cohen, 1988).

5.7.1 Correlation among TQM Core Elements

Regarding the core elements of TQM, the results in Table 5.12 indicates that all elements are positively associated with one another, and significant at $\alpha = .01$, while coefficients (r) values ranging from .342 to .694. Even though there are several (r) values in the level of medium and high correlation, high correlation values are more frequently discerned among TQM core elements. These positive associations tend to support the previous agreement that TQM core elements should be implemented holistically, not individually (Kristal et al., 2010; Lim et al., 2004; Samson & Terziovski, 1999).

Table 5.12
Pearson Correlation Coefficients among TQM Core Elements

No.	TQM Core Elements	1	2	3	4	5	6	7	8	9
1	Leadership commitment	1.000								
2	Strategic planning	.694**	1.000							
3	Continuous improvement	.508**	.612**	1.000						
4	Customer focus	.505**	.572**	.542**	1.000					
5	Process focus	.486**	.506**	.672**	.671**	1.000				
6	Employees involvement	.467**	.507**	.570**	.481**	.592**	1.000			
7	Training & learning	.342**	.400**	.588**	.447**	.475**	.632**	1.000		
8	Rewards & recognition	.450**	.486**	.461**	.439**	.441**	.484**	.463**	1.000	
9	Management by fact	.470**	.486**	.599**	.382**	.420**	.545**	.529**	.560**	1.000

Note. ** $p < .01$.

5.7.2 Correlation between TQM Core Elements and KM Processes

A Pearson correlation matrix of TQM core elements and KM processes are given in Table 5.13. The table indicates that TQM core elements are positive and significantly associated with all processes of KM at .01 levels with correlation coefficients (r) values ranging between .239 and .686. The results indicate that each of the TQM core elements is related to each of the KM processes.

In addition, better implementation of TQM core elements is associated with a better implementation of KM processes. This result agreed with several previous studies such as Ali and Shastri (2010), Ju et al. (2006), Lim et al. (1999), Ribiere and Khorramshahgol (2004), Molina et al. (2007), Ooi (2009), and Pandi et al. (2009).

Table 5.13
Pearson Correlation between TQM Core Elements and KM Processes

No.	TQM core elements	Knowledge management processes				
		Knowledge Identification	Knowledge Acquisition	Knowledge Storage	Knowledge Sharing	Knowledge Application
1	Leadership commitment	.338**	.581**	.244**	.365**	.396**
2	Strategic planning	.363**	.584**	.239**	.459**	.395**
3	Continuous improvement	.497**	.523**	.424**	.483**	.562**
4	Customer focus	.498**	.490**	.348**	.392**	.398**
5	Process focus	.686**	.453**	.379**	.415**	.523**
6	Employees involvement	.479**	.416**	.363**	.503**	.494**
7	Training & learning	.366**	.412**	.412**	.470**	.476**
8	Rewards & recognition	.420**	.505**	.257**	.396**	.391**
9	Management by fact	.312**	.491**	.342**	.454**	.434**

Note. ** $p < .01$.

According to Pandi et al. (2009) and Ali and Shastri (2010), application of TQM elements in HEIs context is able to improve the institution's quality, and as well leading to more innovative KM processes. Sallis and Jones (2002) equally revealed that the KM processes supported by TQM practices is a key driver behind an organizational success in educational organizations.

5.7.3 Correlation between TQM Core Elements and OP Measures

Table 5.14 exhibits the significant relationships between TQM core elements and OP measures. It demonstrates that TQM core elements are positive and significantly associated with all OP measures at .01 level with medium correlation coefficients (r) values ranging between .300 and .502. The results tend to support the previous studies conducted by Samson and Terziovski, (1999), Lim et al. (2004), Marshall et al., (2004), Sakthivel et al. (2005), Najafabadi et al. (2008), and Sabihaini et al. (2010).

Table 5.14
Pearson Correlation between TQM Core Elements and OP Measures

No.	TQM core elements	OP measures	
		Students related academic achievement	Non-students related academic achievement
1	Leadership Commitment	.370**	.351**
2	Strategic Planning	.344**	.380**
3	Continuous Improvement	.494**	.471**
4	Customer Focus	.449**	.369**
5	Process Focus	.476**	.470**
6	Employees Involvement	.502**	.499**
7	Training & Learning	.439**	.417**
8	Rewards & Recognition	.388**	.385**
9	Management by Fact	.337**	.300**

Note. ** $p < .01$.

5.7.4 Correlation among KM Processes

Pearson's correlation coefficients as shown in Table 5.15 demonstrates that the processes of KM are significantly correlated with one another at α = .01. The correlations among them are positive in the range between .430 and .682. It suggests that KM processes are interdependent. This result is consistent with several previous studies such as Safa et al. (2006), McKeen et al. (2006), and Zack et al. (2009).

Table 5.15
Pearson Correlation among KM Processes

No.	KM Processes	1	2	3	4	5
1	Knowledge Identification	1.000				
2	Knowledge Acquisition	.537**	1.000			
3	Knowledge Storage	.479**	.430**	1.000		
4	Knowledge Sharing	.470**	.636**	.464**	1.000	
5	Knowledge Application	.527**	.659**	.519**	.682**	1.000

Note. ** $p < .01$.

5.7.5 Correlation between KM Processes and OP Measures

The relationships between KM processes and OP measures are exhibited in Table 5.16. All processes of KM and OP measures are positive and significantly related to each other at α = .01 levels with medium coefficient's values ranging between .322 and .489. This finding agrees with several studies that have been conducted to explain such relationships. The study conducted by Daud et al. (2008), Safa et al. (2006), McKeen et al. (2006), and Zack et al. (2009) supported the argument that KM processes were significantly associated with organizational performance.

Table 5.16
Pearson Correlation between KM Processes and OP Measures

No.	KM processes	OP measures	
		Students related academic achievement	Non-students related academic achievement
1	Knowledge Identification	.322**	.354**
2	Knowledge Acquisition	.430**	.352**
3	Knowledge Storage	.357**	.334**
4	Knowledge Sharing	.489**	.433**
5	Knowledge Application	.489**	.479**

Note. ** $p < .01$.

Based on the Pearson correlation analyses, TQM core elements are interrelated among themselves and TQM core elements are positive and significantly associated with both KM processes and OP measures. Furthermore, the positive and significant relationships are also seen between KM processes and OP measures.

5.8 Initial Analyses of the Relationships between TQM Core Elements, KM Processes, and OP Measures: Multiple Regression Analysis

Many researchers have developed predicting models of the relationships of TQM practices and operating performance using regression analysis (Qian, 2011). However, the analytical issues as discussed in section 2.5.4 suggest for the need to examine and correct the multicollinearity problems among the TQM core elements and KM processes.

In this section, the effects of multicollinearity are explored and tries to find out the relationships between the nine TQM core elements and the five processes of KM, between the nine core elements of TQM and two OP measures, and between five processes of KM and two OP measures.

The results of the initial analyses are useful in terms of (a) providing insights into those core elements of TQM, as well as those critical processes of KM, thought to be the most important to improve organizational performance; (b) submitting additional evidence to support the validity of the TQM and KM measures developed for the current study; (c) submitting evidence to support the relationships between the (exogenous and endogenous) indicator variables and their (exogenous and endogenous) associated constructs are linear for the subsequent SEM analysis (Mueller, 1996).

5.8.1 The Relationships between TQM Core Elements and KM Processes

This section focuses on regression analysis to measure the relationships between TQM core elements and KM processes. The analysis measures the linear relationship between TQM core elements and KM processes.

Regression model 1:

$$KM_j = a + \beta_1\ LC + \beta_2\ SP + \beta_3\ CI + \beta_4\ CF + \beta_5\ PF + \beta_6\ EI + \beta_7\ TL + \beta_8\ RR + \beta_9 MF + e$$

Where,

KM_j = KM processes; j = 1, 2, 3, 4, 5 (KM processes); α = Intercept; $\beta_{1,\ldots,9}$ = Regression coefficient; LC = Leadership commitment; SP = Strategic planning; CI = Continuous improvement; CF = Customer focus; PF = Process focus; EI = Employee involvement; TL = Training and learning; RR = Reward and recognition; MF = Management by fact; e = Random error.

The results of regression analysis of each process of KM as dependent variables are given in Table 5.17. Regression analysis indicates the significant relationships between TQM core elements (independent variables) and each process of KM (dependent variable). The adjusted R^2 values range between .207 and .472. The adjusted R^2 value of knowledge identification is the highest of all processes of KM with 47.20% variance explained by variances in TQM core elements. The F-statistic which tests H_0: $R^2 = 0$ is significant at $\alpha = .05$ for all regression models.

The t-statistic which tests H_0: $\beta_i = 0$ points out that the majority of regression coefficients are insignificant at $\alpha = .05$ level. For instance, regression model of knowledge identification indicates that there are only two TQM core elements with the significant t-value; they are process focus ($p = .00$), and rewards and recognition ($p = .023$). Regression model of knowledge acquisition demonstrates a similar result, with two significant TQM core elements; they are leadership commitment ($p = .003$), and rewards and recognition ($p = .028$).

Equally, in the regression model of knowledge application, there is only one TQM core element (continuous improvement) with the significant t-value at $\alpha = .05$. Even, there are no TQM core elements with the significant t-value at $\alpha = .05$ as revealed by regression models of knowledge storage and knowledge sharing while, F-statistic is statistically significant in all regression models.

Table 5.17

Results of Multiple Regression Analysis between TQM Core Elements and KM Processes (Model 1)

TQM core elements (IV)	Knowledge Identification (DV)					Knowledge Acquisition (DV)					Knowledge Storage (DV)				
	Beta	Std. Error	Std. Beta	t	Sig.	Beta	Std. Error	Std. Beta	t	Sig.	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	1.261	.280		4.501	.000	.842	.267		3.156	.002	1.581	.383		4.129	.000
Leadership Commitment	-.041	.084	-.039	-.483	.630	.240	.080	.246	2.989	.003	.025	.115	.021	.214	.831
Strategic Planning	-.054	.093	-.052	-.587	.558	.168	.088	.172	1.900	.059	-.165	.127	-.141	-1.299	.196
Continuous Improvement	.069	.087	.073	.785	.434	.085	.083	.097	1.022	.308	.211	.119	.200	1.764	.080
Customer Focus	.049	.076	.052	.645	.520	.091	.073	.105	1.260	.210	.136	.104	.130	1.306	.193
Process Focus	.518	.084	.558	6.182	.000	.006	.080	.007	.080	.936	.078	.114	.075	.678	.499
Employee Involvement	.122	.090	.113	1.360	.176	-.075	.086	-.074	-.875	.383	.064	.123	.053	.522	.603
Training and Learning	-.035	.072	-.039	-.493	.622	.058	.068	.068	.844	.400	.182	.098	.180	1.862	.064
Rewards and Recognition	.150	.065	.167	2.296	.023	.138	.062	.164	2.219	.028	-.026	.090	-.026	-.295	.769
Management by Fact	-.068	.070	-.080	-.971	.333	.085	.067	.103	1.281	.202	.089	.096	.090	.927	.356
R^2			.499					.479					.248		
Adjusted R^2			.472					.451					.207		
Significance of F			.000					.000					.000		

Table 5.17 (continued)

TQM core elements (IV)	Knowledge Sharing (DV)					Knowledge Application (DV)				
	Beta	Std. Error	Std. Beta	t	Sig.	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	1.211	.303		3.995	.000	1.205	.292		4.126	.000
Leadership Commitment	-.034	.091	-.034	-.370	.712	.088	.088	.089	1.002	.318
Strategic Planning	.174	.100	.175	1.740	.084	-.052	.097	-.053	-.541	.589
Continuous Improvement	.078	.095	.086	.821	.413	.223	.091	.249	2.452	.015
Customer Focus	.032	.083	.036	.394	.694	-.026	.080	-.030	-.331	.741
Process Focus	.017	.091	.020	.192	.848	.171	.087	.194	1.956	.052
Employee Involvement	.185	.097	.179	1.907	.058	.110	.094	.107	1.176	.241
Training and Learning	.121	.078	.140	1.565	.120	.107	.075	.124	1.430	.155
Rewards and Recognition	.040	.071	.047	.567	.572	.048	.068	.056	.703	.483
Management by Fact	.096	.076	.114	1.271	.206	.036	.073	.043	.498	.619
R^2			.358					.397		
Adjusted R^2			.323					.364		
Significance of F			.000					.000		

Moreover, some regression coefficients have a theory contradict signs. For example, the relationships between strategic planning and knowledge identification, the relationships between leadership commitment and knowledge sharing, and the relationships between customer focus and knowledge application. Otherwise, these relationships are insignificant; the coefficients obtain a negative sign while, theory and common sense propose positive relationships. In addition, Pearson's correlation analysis showed positive relationships. These findings suggest the possibility for multicollinearity in the first regression model (Mueller, 1996; Wang, 1996). The effects of multicollinearity and how to handle this problem are interpreted thoroughly in Section 5.9.

5.8.2 The Relationships between TQM Core Elements and OP Measures

In order to assess the relationships between TQM core elements and organizational performance, this section focuses on regression analysis to measure the contribution of TQM core elements to OP measures.

Regression model 2:

$$OP_i = a + \beta_1 LC + \beta_2 SP + \beta_3 CI + \beta_4 CF + \beta_5 PF + \beta_6 EI + \beta_7 TL + \beta_8 RR + \beta_9 MF + e$$

Where,
OP_i = Organizational performance; i = 1, 2 (OP measures); α = Intercept; $\beta_{1,\ldots,9}$ = Regression coefficient; LC = Leadership commitment; SP = Strategic planning; CI = Continuous improvement; CF = Customer focus; PF = Process focus; EI = Employee involvement; TL = Training and learning; RR = Reward and recognition; MF = Management by fact; e = Random error.

Table 5.18 exhibits the results of regression analysis for both organizational performance measures as the dependent variable. The significant relationships are also found between TQM core elements (independent variable) and organizational performance (dependent variable). Regression analysis indicates that students-academic achievement has the highest adjusted R^2 value with 33.0% variances explained by variances in TQM core elements, while 30.2% of the variances in non-students related academic achievement can be explained by TQM core elements.

Table 5.18
Results of Multiple Regression Analysis between TQM Core Elements and OP Measures (Model 2)

TQM core elements (Independent variables)	Students related academic achievement (Dependent variable)				
	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	.923	.349		2.647	.009
Leadership Commitment	.124	.105	.107	1.183	.238
Strategic Planning	-.175	.115	-.152	-1.520	.130
Continuous Improvement	.252	.109	.242	2.320	.022
Customer Focus	.164	.095	.158	1.728	.086
Process Focus	.045	.104	.044	.431	.667
Employee Involvement	.283	.112	.237	2.533	.012
Training and Learning	.076	.089	.076	.856	.393
Rewards and Recognition	.119	.082	.119	1.454	.148
Management by Fact	-.097	.087	-.099	-1.115	.266
R^2		.364			
Adjusted R^2		.330			
Significance of F		.000			

Table 5.18 (continued)

TQM core elements (Independent variables)	Non-students related academic achievement (Dependent variable)				
	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	1.047	.344		3.044	.003
Leadership Commitment	.054	.103	.049	.524	.601
Strategic Planning	.023	.114	.020	.199	.842
Continuous Improvement	.189	.107	.188	1.765	.079
Customer Focus	-.024	.094	-.024	-.253	.801
Process Focus	.139	.103	.140	1.348	.180
Employee Involvement	.288	.110	.249	2.610	.010
Training and Learning	.081	.088	.084	.924	.357
Rewards and Recognition	.138	.080	.143	1.711	.089
Management by Fact	-.147	.086	-.155	-1.706	.090
R^2		.338			
Adjusted R^2		.302			
Significance of F		.000			

Alike to the first model, F-statistic at the second model is also significant at $\alpha = .05$ for both OP measures. F-statistic testing H_0: $R^2 = 0$ is significant in all regression models. Although the F-statistic shows the significant relationships between TQM core elements and each OP measure, t-statistic testing H_0: $\beta_i = 0$ indicates that only few TQM core elements have a significant linear relationships with the OP. Regression model provides the information that students related academic achievement is only supported by continuous improvement (p = .022), and employee involvement (p = .012). Table 5.18 also describes that non-students related academic achievement is only significantly related to one TQM core element; employee involvement (p = .010).

In addition, some regression coefficients have negative signs. For example; the relationships between management by fact and OP measures, also the relationships are insignificant at $\alpha = .05$, but one relationship (with non-students related academic achievement) is significant at $\alpha = .10$; while the theory and common sense suggest that implementing management by fact as a TQM core element commonly improved the organizational performance. Once more, the above findings highlight the possibility of the multicollinearity problem in the second regression model.

5.8.3 The Relationship between KM processes and OP Measures

This section focuses on regression analysis to measure the relationships between KM processes and organizational performance. The regression analysis assesses the linear relationship between KM processes and organizational performance measures.

Regression model 3:

$$OP_k = a + \beta_1 KID + \beta_2 KAC + \beta_3 KST + \beta_4 KSH + \beta_5 KAP + e$$

Where,
OP_k = Organizational performance; k = 1, 2 (OP measures); α = Intercept; $\beta_{1,\ldots,5}$ = Regression coefficient; KID = Knowledge identification; KAC = Knowledge acquisition; KST = Knowledge storage; KSH = Knowledge sharing; KAP = Knowledge application; e = Random error.

Table 5.19 exhibits the results of multiple regression analysis. The analysis was employed to find out the linear relationship between KM processes and OP. Similar to the prior regression models, the significant relationship is also exposed in the third regression model. The highest value of adjusted R^2 is .275. It means that 27.50% of variance in students related academic achievement (dependent variable) is explained by variances in KM processes; whereas 24.1% of the variances in non-students related academic achievement can be explained by KM processes. In the same vein with prior models, F-statistic for the third regression model is significant at α = .05 for both OP measures. However, the t-statistic shows that only few KM processes have a significant linear relationships with the OP. Based on the regression model, students related academic achievement is supported by knowledge sharing (p = .013), and knowledge application (p = .036) at α = .05. Non-students related academic achievement is only supported by one process of KM; knowledge application (p = .005).

Table 5.19
Results of Multiple Regression Analysis between KM Processes and OP Measures (Model 3)

KM processes (Independent variables)	Students related academic achievement (Dependent variable)				
	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	1.062	.358		2.964	.003
Knowledge Identification	.000	.091	.000	.003	.998
Knowledge Acquisition	.115	.112	.098	1.030	.305
Knowledge Storage	.092	.079	.093	1.168	.245
Knowledge Sharing	.275	.110	.238	2.500	.013
Knowledge Application	.249	.118	.214	2.117	.036
R^2		.296			
Adjusted R^2		.275			
Significance of F		.000			

Table 5.19 (continued)

KM processes (Independent variables)	Non- students related academic achievement (Dependent variable)				
	Beta	Std. Error	Std. Beta	t	Sig.
(Constant)	1.280	.354		3.612	.000
Knowledge Identification	.113	.090	.106	1.254	.212
Knowledge Acquisition	-.045	.111	-.040	-.408	.684
Knowledge Storage	.062	.078	.065	.799	.425
Knowledge Sharing	.198	.109	.177	1.821	.070
Knowledge Application	.331	.116	.294	2.846	.005
R^2		.263			
Adjusted R^2		.241			
Significance of F		.000			

Notwithstanding, a theory or common sense and correlation analysis indicates a positive relationship between independent and dependent variables (see Table 5.16), Table 5.19 shows, there is one standardized regression coefficient take on a negative value (-.040), the relationship between knowledge acquisition and non-students related academic achievement. This empirical evidence once again suggests the existence of a multicollinearity problem.

As a whole, the findings in subsections 5.8.1, 5.8.2, and 5.8.3 are consistent with several previous studies that proclaimed complementarities and interdependency among the set of TQM core elements (Ahire et al., 1996; Escrig-Tena, 2004; Furlan et al., 2011; Kristal et al., 2010; Lim et al., 2004; Terziovski & Samson, 1999), and among the set of KM processes (Choi et al., 2008; Choy, 2006; Shankar & Gupta, 2005); that is these elements/processes must bundle together for greater effect. Thus, this offers evidence of convergent validity of the newly developed measures of TQM core elements and KM processes used in the current study. The following section will discuss in detail about the multicollinearity problem, and how to reduce its effect in regression analysis.

5.9 Reducing the Effects of Multicollinearity Problem

Multicollinearity refers to the high linear correlation among the independent variables. Thus, a variable can be explained by the other variables in the analysis (Agus, 2000; Coakes & Steed, 2007; Hair, et al., 2010). The perfect condition in regression analysis would be to have a number of independent variables highly correlate with the dependent variable, but with a little association among them. Hair et al. (2010) declared that as multicollinearity increases, it confuses the explanation of relationships because it is more difficult to clarify the effect of any single construct due to other interrelationships. More detail, multicollinearity can affect the subsequent conditions (Wang, 1996):

1. The estimated standard errors for the coefficient will be large and produce small value of a t-statistic.
2. The estimated coefficients may become insignificant or have wrong signs (positive or negative).
3. It will be difficult to assess the relative significance of independent variables, because of the large estimated standard errors.

Similarly, Grapentine (1997) and Mueller (1996) clearly stated that the multicollinearity might be appeared if any of the familiar conditions below occurs:

- Correlation coefficients among independent variables are quite high, say .70.
- Regression coefficients have a theory contradicting signs.
- Some values of standardized regression weights are very large.
- The standard errors of regression coefficients are extraordinarily large.

- The regression equation has a large R^2 or adjusted R^2 and high F-statistics with numerous insignificant independent variables.

In the current study, the multicollinearity problems seem to emerge in all the three regression models. In model 1 and 2, Pearson's correlation coefficients among TQM core elements are statistically high and significant at $\alpha = .01$ with the highest value .694 (between leadership commitment and strategic planning (see Table 5.12)). According to MacDuffie et al. (1996), correlation coefficient of above .60 is adequate to suggest risk of the multicollinearity problem in the multiple regression model. Nevertheless, all the regression models developed in this study indicated moderately high adjusted R^2 values; between .241 and .472 (see Table 5.17, Table 5.18, and Table 5.19).

Moreover, F-statistics for all multiple regression models are statistically significant at $\alpha = .05$. Nevertheless, t-statistics show only few independent variables, which significantly related to the dependent variable. Even, for certain case of the regression models, there is no independent variable, which related significantly to the dependent variable, while the F-statistic is significant.

In the first model, even though F-values are statistically significant at $\alpha = .05$, and adjusted R^2-values range between .248 and .472; the insignificant contribution of independent variables is shown by t-statistics (see Table 5.17). In the second model, although the F-statistics are significant, there are very few or no significant independent variables as indicated by t-statistics (see Table 5.18).

In the third model, conversely the regression equation has a significant F as shown in Table 5.19, only knowledge application indicates a significant t-value at $\alpha = .05$, while the other KM processes do not show any significant linear relationships toward the overall regression model of organizational performance.

According to Hair, et al. (2010), Tolerance value and Variance Inflation Factor (VIF) are the two direct measures of multicollinearity in multiple regression analysis. Tolerance is defined as the amount of variability of the selected independent variable not interpreted by the other independent variables.

Tolerance value should be high, which means a small degree of multicollinearity. Tolerance is calculated as (1- R^2), while VIF is the reverse of tolerance value. Hence, cases of higher degrees of multicollinearity are reflected in lower tolerance values and higher VIF values. In this regard, Allison (1999), Miles and Shevlin (2001), and Alauddin and Nghiem (2010) equally stated that the tolerance value of less than .40 and a VIF value of greater than 2.50 is enough to indicate a serious multicollinearity problem in multiple regression analysis. Even though Hair et al. (2010) have suggested cutoff for the VIF value is 10.0 (or corresponding tolerance value of .10), the authors also argued that the multicollinearity problem is likely at much lower levels of VIF (e.g., VIF values of 3 to 5). It means that the lower value of VIF (i.e., less than 5.0) may indicate the multicollinearity problem. In detail, the result of multicollinearity diagnostics for all TQM core elements and KM processes are revealed in Table 5.20 and Table 5.21, respectively, whereas the SPSS outputs are given in *Appendix C* and *E*.

Table 5.20

Multicollinearity Diagnostic: Tolerance and VIF of TQM Core Elements

No.	TQM core elements	Tolerance	VIF
1	Leadership Commitment	.470	2.126
2	Strategic Planning	.389	2.570
3	Continuous Improvement	.356	2.812
4	Customer Focus	.461	2.168
5	Process Focus	.375	2.667
6	Employees Involvement	.442	2.264
7	Training & Learning	.488	2.047
8	Rewards & Recognition	.580	1.723
9	Management by Fact	.488	2.048

Table 5.21

Multicollinearity Diagnostic: Tolerance and VIF for KM Processes

No.	KM processes	Tolerance	VIF
1	Knowledge Identification	.614	1.629
2	Knowledge Acquisition	.467	2.139
3	Knowledge Storage	.660	1.516
4	Knowledge Sharing	.463	2.160
5	Knowledge Application	.410	2.438

Table 5.20 indicates that the multicollinearity problem presents in the regression model, particularly for strategic planning (Tolerance = .389, VIF = 2.570), continuous improvement (tolerance = .356, VIF = 2.812), and process focus (Tolerance = .375, VIF = 2.667). While there are no tolerance values that are less than .40, and there are no VIF values that greater than 2.50 as shown in Table 5.21. Conversely, there is one process of KM; knowledge application, which relatively close to the suggested threshold values (Tolerance = .410, VIF = 2.438).

In addition, some correlation coefficients among KM processes are large enough to cause the multicollinearity problem (above .60) as recommended by MacDuffie et al. (1996) (e.g., the association between knowledge sharing and knowledge application (see Table 5.15)).

Notwithstanding, several cutoffs have been suggested as the signs of severe multicollinearity (such as a VIF greater than 10.0, 7.0, 5.0, or 2.5 and tolerance less than .10, .14, .20 or .40), the suggestions are ad hoc (Liao, 2010). The author also suggested that checking VIF and tolerance alone to postulate the multicollinearity problem is insufficient. Thus, other measures of multicollinearity diagnostic are required.

In this regard, Liao (2010) clearly revealed that the tolerance, VIF and condition index should be combined with assessing the multicollinearity problem. In other words, multicollinearity problem in multiple regression analysis can be examined with the help of a condition index as well (Lani, 2009; Liao, 2010).

According to Liao (2010), *conditional index* is mathematically defined as the square root of the largest eigenvalue being divided by the square root of the smallest eigenvalue. In general, if the condition index is one, then there is no multicollinearity. Other than that, the multicollinearity will be present if the eigenvalues were greater or smaller than one. If the eigenvalue becomes close to zero, then there is a serious multicollinearity problem. More detail, if the condition index is greater than 15 and less than 30, then multicollinearity is a concern; and if the condition index is greater than 30, then multicollinearity is a very serious problem (Lani, 2009; Liao, 2010).

Furthermore, as explained by Liao (2010), variance proportion values larger than .30, are considered problematic. The calculation results of eigenvalue, condition index and variance proportion of TQM core elements and KM processes are shown in Table 5.22 and Table 5.23, respectively.

Table 5.22

Multicollinearity Diagnostic: Eigenvalue, Condition Index and Variance Proportions for TQM Core Elements

Dimension	Eigen value	Condition index	Variance proportions									
			Constant	LC	SP	CI	CF	PF	EI	TL	RR	MF
1	9.930	1.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
2	.014	26.346	.008	.025	.019	.000	.104	.051	.006	.126	.073	.151
3	.013	28.155	.045	.063	.029	.031	.020	.077	.013	.175	.134	.025
4	.009	32.353	.217	.027	.008	.000	.070	.056	.024	.050	.477	.000
5	.009	33.442	.142	.010	.018	.157	.020	.004	.020	.098	.159	.269
6	.007	39.064	.266	.052	.130	.000	.074	.204	.042	.273	.000	.058
7	.006	40.750	.039	.025	.033	.093	.516	.040	.042	.000	.104	.383
8	.005	42.710	.277	.069	.000	.271	.000	.011	.455	.024	.033	.035
9	.004	49.373	.003	.519	.210	.060	.052	.179	.261	.164	.001	.009
10	.003	57.967	.003	.210	.552	.387	.143	.378	.136	.089	.018	.069

Note. LC = Leadership commitment, SP = Strategic planning, CI = Continuous improvement, CF = Customer focus, PF = Process focus, EI = Employee involvement, TL = Training and learning, RR = Reward and recognition, MF = Management by fact

Table 5.22 shows that the nine TQM dimensions with the condition index greater than 15, while seven dimensions have the condition index that is greater than 30. For instance, condition index of the last dimension (57.967) is highly related with strategic planning (variance proportions = .552), continuous improvement (variance proportions = .387), and process focus (variance proportions = .378); meaning that, the β weights for these variables are possibly not well-estimated (Liao, 2010). Moreover, the eigenvalues of most dimensions were close to zero, thereby indicating the presence of the multicollinearity problem.

Table 5.23

Multicollinearity Diagnostic: Eigenvalue, Condition Index and Variance Proportions for KM Processes

Dimension	Eigenvalue	Condition index	Variance proportions					
			(Constant)	KID	KAC	KST	KSH	KAP
1	5.967	1.000	.000	.000	.000	.000	.000	.000
2	.010	24.016	.036	.000	.049	.902	.034	.010
3	.008	27.837	.237	.447	.018	.027	.152	.090
4	.007	29.581	.709	.469	.017	.025	.000	.013
5	.004	37.350	.002	.082	.579	.023	.474	.002
6	.004	39.209	.016	.001	.138	.023	.340	.886

Note. KID = Knowledge identification, KAC = Knowledge acquisition, KST = Knowledge storage, KSH = Knowledge sharing, KAP = Knowledge application

Similarly, for KM processes, as displayed in Table 5.23, the five KM processes dimensions have the condition index greater than 15 and two dimensions have the condition index greater than 30. Although the fifth dimension is highly associated with knowledge acquisition (variance proportions = .579) and knowledge sharing (variance proportions = .474); then the β weight for knowledge acquisition and knowledge sharing are most likely not so well estimated. Furthermore, the eigenvalues of most dimensions were close to zero, meaning that, there is a serious multicollinearity problem.

Based on the aforementioned discussion, the researcher is intended in applying the essential remedies to decrease the effects of multicollinearity. Hair et al. (2010) proposed a number of remedies for multicollinearity problems in the multiple regression analysis as follows:

- Take out one or more highly correlated independent variables.
- Use the simple correlations between the independent variables and the dependent variables to interpret the relationships.
- Use the model with the highly correlated independent variables for prediction only and no attempt to interpret the regression coefficients, while recognizing the lowered level of overall predictive ability.
- Use simple regression on principal component of independent variables to obtain a model that more clearly reflects independent variable effects on the dependent variable.

Due to associations among TQM core elements, and among KM processes are positive and statistically significant as indicated by Pearson's correlation coefficients (see Table 5.12 and Table 5.15). These results tend to support the studies that stated that TQM core elements and KM processes should be implemented collectively and comprehensively, not piecemeal (Ahire et al., 1996; Lim et al., 2004; Shankar & Gupta, 2005; Sila, 2007; Zivojinovic & Stanimirovic, 2009). For this reason, in this study, the last option (*principal component analysis*) as proposed by Hair et al. (2010) is selected as the technique to decrease the effect of multicollinearity. Principal component analysis (PCA) has also been employed by prior studies in order to account for the combined (synergy) effect (e.g., Adnan, Ahmad & Adnan, 2006; Agus, 2000; De Toni & Tonchia, 2001; Kontoghiorghes et al., 2005; Lim et al., 2004).

PCA method is designed to summarize most of the original information (variance) in the lowest number of factors for prediction purposes (Hair, et al., 2010). For this purpose, the principal component score is first computed by using the linear combination of the explanatory variable (Adnan et al., 2006). Simple regression analysis is then applied between each dependent variable with the first principal component score which explains the largest variances of the set of independent variables by following the regression model: $Y = \alpha + \beta_1 X_1$ (Hamilton, 1992; Adnan et al., 2006). F-test is used to decide whether regression models can significantly explain variances of dependent variables. Simple regression is appropriate if the aim is to investigate the relationship between the variables, not to develop/generate a statistical model for prediction purpose.

5.9.1 The Relationship between TQM Core Elements and KM Processes: Simple Regression Analysis

This section is aimed to find out the relationships between TQM core elements (collectively) and each process of KM. Hence, the following five hypotheses are tested in this section.

H_{1a}: TQM core elements have a positive relationship with knowledge identification.
H_{1b}: TQM core elements have a positive relationship with knowledge acquisition.
H_{1c}: TQM core elements have a positive relationship with knowledge storage.
H_{1d}: TQM core elements have a positive relationship with knowledge sharing.
H_{1e}: TQM core elements have a positive relationship with knowledge application.

Due to the presence of multicollinearity problems in multiple regression analysis, TQM core elements were analyzed collectively and principal component scores of TQM core elements were retrieved. A simple linear regression analysis was later carried out between each process of KM and the first saved principal component score of TQM core elements. The complete result of PCA is exhibited in *Appendix F*.

The first principal component or linear combination of TQM core elements is: .320 (leadership commitment) +.344 (strategic planning) + .364 (continuous improvement) + .329 (customer focus) + .345 (process focus) + .345 (employees' involvement) + .317 (training & learning) + .308 (rewards & recognition) + .324 (management by fact). The first principal component explains 56.90% of the total variance in TQM core elements. The results of simple regression analysis between the first principal component scores of TQM core elements and each process of KM are shown in Table 5.24.

Table 5.24

Results of Simple Linear Regression Analysis between Principal Component Scores of TQM Core Elements and KM Processes

Model	Beta	Std. Error	Std. Beta	t	Sig.	R^2
(Constant)	1.132	.288		3.925	.000	
Regression IV = Principal component scores of TQM DV = Knowledge identification	.245	.025	.596	9.738	.000	.355*
(Constant)	1.169	.260		4.502	.000	
Regression IV = Principal component scores of TQM DV =Knowledge acquisition	.243	.023	.633	10.727	.000	.401*
(Constant)	1.365	.354		3.856	.000	
Regression IV = Principal component scores of TQM DV = Knowledge storage	.215	.031	.468	6.940	.000	.219*
(Constant)	1.334	.281		4.748	.000	
Regression IV = Principal component scores of TQM DV = Knowledge sharing	.226	.025	.575	9.208	.000	.330*
(Constant)	1.127	.268		4.200	.000	
Regression IV = Principal component scores of TQM DV = Knowledge application	.242	.023	.618	10.315	.000	.382*

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

As revealed in Table 5.24, KM processes are supported by TQM core elements collectively. Regression coefficients of all regression models are statistically positive and significant at $\alpha = .05$, while R^2 values range from 21.9% to 40.1%. It means that the TQM core elements have a significant linear relationships with KM, in terms of knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. Therefore, hypotheses H_{1a}, H_{1b}, H_{1c}, H_{1d}, and H_{1e} are supported.

There are three assumptions, which should be accomplished in regression analysis. They are linearity, homoscedasticity, and normality. These assumptions have been achieved as shown in *Appendix G*. From the scatter plots of residuals against predicted values, it can be concluded that there is no obvious relationship between the residuals and the predicted values, consistent with the assumption of linearity and homoscedasticity. The normal P-P plots of regression standardized residuals for each dependent variable also show a normal distribution.

5.9.2 The Relationship between TQM Core Elements and OP Measures: Simple Regression Analysis

To find out the relationships between TQM core elements (collectively) and organizational performance, two hypotheses below are tested in this section:

H_{2a}: TQM core elements have a positive relationship with students related academic achievement.

H_{2b}: TQM core elements have a positive relationship with non-students related academic achievement.

The existence of the multicollinearity problems in multiple regression analysis has suggested that the analyses are limited to describing the impact of interrelated TQM core elements as a set, rather than as individual dimensions (Agus, 2000; Escrig-Tena, 2004; Kristal et al., 2010; Lim et al., 2004). As illustrated in *Appendix F.1*, PCA has produced the first principal component equation of TQM core elements. The results of simple regression analysis are shown in Table 5.25.

Table 5.25

Results of Simple Linear Regression Analysis between Principal Component Scores of TQM Core Elements and OP Measures

Model	Beta	Std. Error	Std. Beta	t	Sig.	R^2
(Constant)	.940	.325		2.890	.004	
Regression	.261	.028	.573	9.174	.000	
IV = Principal component scores of TQM						.329*
DV = SAA						
(Constant)	1.131	.323		3.506	.001	
Regression	.238	.028	.541	8.447	.000	
IV = Principal component scores of TQM						.293*
DV = NSAA						

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

For both regression models presented in Table 5.25, the regression coefficients are statistically positive and significant at α = .05. Thus, all the core elements of TQM collectively have a significant linear relationship with the OP, while R^2 values were 32.9% and 29.3%. Particularly; the establishment of TQM significantly improves OP in terms of students related academic achievement and non-students related academic achievement. Consequently, hypotheses H_{2a} and H_{2b} are supported.

For the above regression models, the assumptions of linearity and homoscedasticity have been investigated by using scatter plots; while normality has been tested by using normal P-P plots. The scatter plots indicate that there is no obvious relationship between the regressions standardized predicted values and the regression standardized residuals. It means the assumptions of linearity and homoscedasticity are achieved. The normal P-P plots of the regression standardized residuals for dependent variable also indicate a relatively normal distribution (see *Appendix H*).

5.9.3 The Relationship between KM Processes and OP Measures: Simple Regression Analysis

This section is aimed to test whether there is a significant relationship between KM processes (collectively) and organizational performance. The following two hypotheses are tested in this section:

H_{3a}: KM processes have a positive relationship with students related academic achievement.
H_{3b}: KM processes have a positive relationship with non-students related academic achievement.

Owing to the multicollinearity, KM processes have been analyzed collectively by applying PCA, which generates the first principal component and a linear combination of KM processes as explained in *Appendix F.2.*

The principal component analysis has produced the first principal component equation of KM processes; .420 (knowledge identification) + .465 (knowledge acquisition) + .399 (knowledge storage) + .464 (knowledge sharing) + .483 (knowledge application). This first principal component explains 63.50% of the total variance in the KM processes. The linear relationship between KM processes (collectively) and both OP measures are tested in this section by using simple linear regression analysis between principal component scores of KM processes and organizational performance as exhibited in Table 5.26.

Table 5.26

Results of Simple Linear Regression Analysis between Principal Component Scores of KM Processes and OP Measures

Model	Beta	Std. Error	Std. Beta	t	Sig.	R^2
(Constant)	1.027	.357		2.876	.005	
Regression IV = Principal component scores of KM processes DV = SAA	.332	.041	.526	8.113	.000	.247
(Constant)	1.236	.353		3.500	.001	
Regression IV = Principal component scores of KM processes DV = NSAA	.300	.040	.492	7.413	.000	.242

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

Table 5.26 indicates that the processes of KM collectively have a significant positive linear relationship with the organizational performance at $\alpha = .05$ with R^2 values 24.7% and 24.2%. Consequently, hypotheses H_{3a} and H_{3b} are supported. All fundamental assumptions of linear regression; normality, linearity, and homoscedasticity for both the regression models between principal component scores of KM processes and both OP measures have been accomplished (see *Appendix I* for more details).

As a whole, the findings in the subsections 5.9.1, 5.9.2, and 5.9.3 offer evidence of (a) criterion-related relationship; and (b) interrelated dependence relationships that are assumed to be linear for the subsequent SEM analysis (Hair et al., 2010).

5.10 The Relationship between Two Sets of Multivariate Variables: Canonical Correlation Analysis

The canonical correlation as multivariate analysis used to predict simultaneously the associations between several independent variables and several dependent variables (Hair, et al., 2010; Tabachnick & Fidell, 2007). In this study, additional analysis is conducted to predict the linear relationship between the set of TQM core elements and the set of KM processes, between the set of TQM core elements and the set of organizational performance measures, and between the set of KM processes and the set of organizational performance measures.

Moreover, this study is also aimed to measure the role of KM in mediating the relationship between TQM and organizational performance by applying the approach of structural equation modeling (SEM). SEM assumes the linear relationship among the tested variables. Hair et al. (2010) explained that canonical correlation between the pair of variates is based on the linear relationship. Hence, the results of canonical correlation analysis could be used to support the assumption of linearity between the exogenous and endogenous latent variables in applying SEM (Mueller, 1996). Table 5.27 summarizes the results of canonical correlation analysis.

Table 5.27
Results of Canonical Correlation Analysis

Multivariate Variables	Canonical Correlation	*Wilk's lambda*	χ^2	*df*	Sig.
Between the set of TQM core elements and the set of KM processes	.753	.222	247.722	45	.000*
Between the set of TQM core elements and the set of OP	.631	.471	93.133	18	.000*
Between the set of KM processes and the set of OP	.664	.461	70.080	10	.000*

Note. * p < .05.

5.10.1 The Relationship between the Set of TQM Core Elements and the Set of KM Processes

This section evaluates the relationship between the set of TQM core elements and the set of KM processes. The first set of multivariate variables is KM processes, which consists of knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. TQM core elements in terms of leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employees' involvement, training and learning, rewards and recognition, and management by fact are assigned as the second set of multivariate variables (see *Appendix J.1*).

The null hypothesis for assessing the statistical significance of the canonical correlations is H_0: $C_1 = 0$. This statistic tests the null hypothesis that the canonical correlation coefficient is zero. Thus, rejection of the null hypothesis means at least the first canonical correlation coefficient (the highest value among the five coefficients calculated) is statistically significant. In other words, the two sets of variables are interdependent. The first pair of linear combination (canonical variates) is shown by the following canonical equations:

Dependent variate:

.563 (knowledge identification) + .238 (knowledge acquisition) + .024 (knowledge storage) + .109 (knowledge sharing) + .267 (knowledge application)

Independent variate:

.074 (leadership commitment) + .019 (strategic planning) + .187 (continuous improvement) + .070 (customer focus) + .496 (process focus) + .124 (employees involvement) + .067 (training & learning) + .200 (rewards & recognition) + .016 (management by fact)

Based on Table 5.27, the coefficient of canonical correlation between the set of TQM core elements and the set of KM processes is .753 while, the value of Wilk's lambda indicating the number of variance unexplained by the model states is .222. It means that 77.80% (1- .222) variance can be explained by the model. χ^2-statistic of Bartlett test is 247.722, which means the relationship is statistically significant at $\alpha = .05$. Hence, the null hypothesis (H_0: $C_1=0$) is rejected. The rejection leads to the conclusion that TQM core elements and KM processes are interdependent.

5.10.2 The Relationship between the Set of TQM Core Elements and the Set of OP Measures

In this section, the two categories of OP measures are assigned as the first set of multivariate variables, whereas leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact are assigned as the second set of multivariate variables. The following equations exhibit the first pair of linear combination (canonical variates):

Dependent variate:

.596 (students related academic achievement) + .472 (non-students related academic achievement)

Independent variate:

.145 (leadership commitment) - .134 (strategic planning) + .398 (continuous improvement) + .140 (customer focus) + .134 (process focus) + .426 (employees involvement) + .106 (training & learning) + .230 (rewards & recognition) - .239 (management by fact)

Based on Table 5.27, the coefficient of canonical correlation is .63 between the set of TQM core elements and the set of OP. The value of Wilk's lambda is .471, which means that 52.90% variance can be explained by the model. The χ^2-statistic of Bartlett's test is 93.133, which means the relationship between the set of TQM core elements and the set of OP measures is statistically significant at $\alpha = .05$. The results lead the researcher to reject the null hypothesis (H_0: $C_1 = 0$). Consequently, it can be concluded that the TQM core elements and OP measures are interdependent (see *Appendix J.2*).

5.10.3 The Relationship between the Set of KM Processes and the Set of OP Measures

In this section, canonical correlation analysis also has been employed to evaluate the interrelationship between KM processes and OP measures. As shown in Table 5.27, the first set of multivariate variables represented by OP measures, while KM processes are the second set of multivariate variables. The relationship between KM processes and OP measures is concluded with the first pair of linear combination (canonical variate) as below:

Dependent variate:

.655 (students related academic achievement) + .412 (non-students related academic achievement)

Independent variate:

.078 (knowledge identification) + .084 (knowledge acquisition) + .156 (knowledge storage) + .406 (knowledge sharing) + .464 (knowledge application)

Based on Table 5.27, the Wilk's lambda is .661, and the interrelationships between KM processes and OP is statistically significant at $\alpha = .05$. The χ^2-statistic of Bartlett's test is 70.080, while the coefficient of canonical correlation is .664. Since the value of Wilk's lambda is .461, the percentage of variance can be explained by the model is 53.90%. As a result, the canonical correlation analysis indicates that the null hypothesis (H_0: $C_1 = 0$) is not supported. It means that the set of KM processes is significantly related to the set of OP measures. Overall, based on all the aforementioned results of canonical correlation analyses, the significant linear relationships between all pairs of the set of variables; TQM core elements and KM processes, TQM core elements and OP measures, and KM processes and OP measures, are supported (see *Appendix J.3* for more details).

5.11 Structural Equation Modeling

The results of correlation analysis, regression analysis and canonical analysis in this study are consistent with many prior empirical studies (such as Choy, 2006; Kristal et al., 2010; Lim et al., 2004; Shankar & Gupta, 2005; Terziovski & Samson, 1999; Zivojinovic & Stanimirovic, 2009) suggesting the creation of a synergistic effect amongst the core elements of TQM as well as among the processes of KM. Moreover, there is evidence that TQM (combination of core elements) influence KM; and both TQM (combination of core elements) and KM (combination of processes) influence organizational performance. Therefore, the following hypothesis is also proposed for testing.

H_4: KM mediates the relationship between TQM and OP

In this section, the researcher is interested in examining the direct and indirect impact of TQM on organizational performance. The indirect relationship is evaluated by placing KM as a mediator variable. For this purpose, the technique of structural equation modeling (SEM) is applied. By applying SEM, a series of dependence relationships can be examined simultaneously.

Based on the information provided in chapter three, the relationships among variables have been developed as a theoretical framework (see Figure 3.1 in Chapter 3). The structural equation model shows how latent variables are associated with each other. Figure 3.1 suggested that there are three latent variables in this study, which are TQM, KM, and OP. TQM has a direct impact on KM and OP, and as well indirect impact on OP via KM as a mediator variable.

In this study, throughout assessing SEM model, the researcher will be focusing on goodness-of-fit indices that are most widely used, since some of them are considered to have fulfilled the model fitness (Hair et al., 2010). The goodness-of-fit is intended to examine how closely the data fit the model. However, the following section discusses the considerations of SEM in terms of goodness-of-fit indices.

5.11.1 Goodness-of-Fit of the SEM Model

The SEM model fitness is assessed by using χ^2 goodness-of-fit test and GOF (goodness of fit) indices. In SEM, χ^2 goodness-of-fit test is used to find out how the observed value of the sample is significantly different from the expected value (Arbuckle, 2008; Byrne, 2010; Hair, et al., 2010; Kline, 2011). In other words, the purpose of χ^2 test is to evaluate the difference in the observed and estimated covariance matrix. In this test, the observed sample distribution and the expected probability distribution are compared. The null hypothesis (H_0) assumes that the sample covariance matrix is not significantly different from the estimated covariance matrix. Hair et al. (2010) recommended that insignificant value (p > .05), and low value of χ^2 indicates the model fit.

Due to the sensitivity of χ^2 test with sample size, this test was often not used as the sole goodness-of-fit measure. Literature review noted that there are several indices, which can be used to assess goodness-of-fit. Generally, there are three groups of GOF indices: (1) absolute fit indices; (2) incremental fit indices; (3) parsimonious fit indices (Arbuckle, 2008; Byrne, 2010; Hair et al., 2010; Raykov & Marcoulides, 2006). The absolute fit indices are direct measures of the overall model fit, while the incremental fit indices (similar to R^2) assess how the estimated model fits compared to some alternative baseline model (null model). Finally, the third group of indices is designed particularly to provide information about, which model is the best among a set of models, considering its fit compared to its complexity. This study will focus only on absolute fit indices and incremental fit indices, while not focusing on the third group of GOF (parsimony fit indices) because it is useful only in comparison of competing models.

According to Hair et al. (2010), using three or four fit indices provides adequate evidence of model fit, because they are often redundant. Table 5.28 provides a summary of some commonly used GOF indices and acceptable fit level for SEM model. According to Byrne (2010) and Hair et al. (2010), GOF indices such as GFI, CFI, NNFI or TLI, and RMSEA are not sensitive with sample size. Hence, these GOF indices provide sufficient unique information to estimate the model fit.

Table 5.28
Summary of Goodness-of-Fit Indices (GOFIs) of the SEM Model

Group of indices	GOF indices	Code	Acceptable level of fitness	Explanation
Absolute fit indices	Goodness of Fit Index	GFI	Value ≥ .90 Range of value (0 to 1.00)	GFI indicates the amount of variance and covariance explained by the model. Its underlying logic is similar to (R^2) index in regression analysis.
	Root Mean Square Error of Approximation	RMSEA	Value ≤ .08 Range of value (.03 - .08)	RMSEA indicates the amount of unexplained variance or residual in the model; the smaller RMSEA value indicating better model fit.
Incremental fit indices	Non-Normed Fit Index	NNFI or (TLI)	Value ≥ .90 Range of value (0 to 1.00)	NNFI indicates the percentage of observed-measure covariation explained by a given measurement of the structural model. The value close to 1.00 indicates the good fit; the higher value suggests a better fit. This index also known as Tucker-Lewis index (TLI).
	Comparative Fit Index	CFI	Value ≥ .90 Range of value (0 to 1.00)	CFI evaluates the relative improvement in a fit of the study's model compared with a baseline model (independence model or null model) which covariance is assumed to be zero in the model. The higher value indicates a better fit.

Source: (Arbuckle, 2008; Byrne, 2010; Hair, et al., 2010; Hu & Bentler, 1999; Kline, 2011)

In order to obtain a SEM solution, maximum likelihood estimation (MLE) is used in the current study as estimation technique. According to Hair et al. (2010), MLE provides a valid and stable result with sample size as small as 50. In addition, MLE is more efficient and unbiased when the assumption of multivariate normality is met (see Section 5.3.2). Furthermore, MLE is a flexible approach to parameter estimation in which the most likely parameter values to achieve the best model fit is found (Hair et al., 2010).

SEM combines a two-step approach, which are the measurement model and structural model into a simultaneous statistical test (Anderson & Gerbing, 1988; Hair et al., 2010). For the measurement model, the researcher validates the measurement model through confirmatory factor analysis. In this step, the researcher also tests for construct unidimensionality, reliability, convergent validity, discriminate validity and criterion-related validity. Once the measurement model is validated, the researcher conducts the second step, estimating the structural relationship between latent variables.

In terms of structural model estimation, SEM model demands a high ratio of the number of observations to number of parameters estimated (N:q) (Benter & Chou, 1987; Marsh et al., 1988; Kline, 2011). The (N:q) ratio or sample size ratio is required to obtain trustworthy estimates[8]. In fact**,** a strict guideline for minimum sample size in SEM does not exist (Hair et al., 2010; Kline, 2011). Therefore, a useful rule of thumb concerning the relation between sample size and model complexity is required. However, the rule of (N:q) ratio is appropriate when the method of MLE is used (Kline, 2011).

As recommended by Hair et al. (2010) and Kline (2011), in order to get trustworthy estimates in the structural model, the minimum required ratio of (N:q) is 5. According to Hair et al. (2010), sample size as well affects the generalizability of the results by the ratio of (N:q). A general rule is that the ratio should never fall below (5:1). In other words, as this ratio falls below 5:1, the researcher encounters the risk of over-fitting the variate to the sample, making the results to be specific to the sample and thus lacking generalizability. Simply, if the number of estimated parameters (q) equals the sample size (N), perfect prediction will arise, even if all the variable values are random numbers. This scenario would be very unacceptable and considered extreme over-fitting, because the estimated parameters have no generalizability (Hair et al., 2010).

[8]The (N:q) ratio needs to be larger enough to obtain trustworthy z-test on the significance of parameters, and still large to yield correct model assessment chi-square probability (Bentler, 2007).

In this study, if the researcher estimates the structural model by representing the manifest variables (i.e., the 9 TQM measures, 5 KM measures and 2 OP measures) as first-order factors and act as indicators of the second-order factors (TQM, KM, and organizational performance); the N: q ratio would be less than 5:1; which is considered very low by many of the researchers in this area (Benter & Chou, 1987; Hair et al., 2010; Kline, 2011; Marsh et al., 1988). Accordingly, there is a need to look for a way to overcome the problem associated with the complexity of the second-order model. In this regard, many researchers suggest the use of *items parceling technique* as a way to overcome this problem (e.g., Bagozzi & Edwards, 1998; Hair et al., 2006; Kline, 2011; Marcoulides & Schumacker, 2009).

In the area of organizational research, Bagozzi and Edwards (1998) have recommended that the use of parcels products in the estimation of fewer model parameters, because factor loadings and measurement error variances need only be estimated for each parcel rather than for each item. Because of this, it is revealed that the use of parcels can be beneficial in studies involving small samples because it will result in a more optimal sample size ratio (N:q) and thus more stable parameter estimates (Kline, 2011; Marcoulides & Schumacker, 2009). For this reason, in order to reduce the complexity of the second-order structural model (i.e., reduce the number of parameters to be estimated), the 16 constructs of this study were introduced into the first-order structural model as observable variables, which measured by a single-surrogate variable resulting from structuring the parcels for each construct.

Recall the technique of parceling items, which is forming by combining several observable variables (indicators) into a single *composite measure* to act as a surrogate variable for use in the subsequent analysis (Coffman & MacCallum, 2005; Hair et al., 2006). However, given the above consideration, this study incorporates the item-parceling technique in SEM model. For more details, the following section discussed the considerations of this technique.

5.11.2 Parcels and SEM Model

A parcel is a technique of mathematical combination summarizing multiple variables into one (Hair et al. 2006). In other words, parcel is a total score across a set of homogeneous items each with a Likert-type scale. The score reliability of parcels (total scores) tends to be greater than that for the individual items (Coffman & MacCallum, 2005; Kline, 2011).

Based on many research positions (e.g., Huang, Kristal & Schroeder, 2008; Kristal et al., 2010; Sila, 2007), this study employed the item parceling technique after examining the ratio of the number of observations to number of parameters estimated (N:q). Due to the large number of estimated parameters (218) and a limited number of observations (174), the ratio (N: q = 174:218) is .798. Thus, based on the second-order model, the ratio of (N:q) is not adequate to support fitting a model that included item-level data. In contrast, after applying the parcels technique, the ratio will become 5.11 (i.e., 174:34), suggesting that the sample size requirement for SEM model is achieved.

Various justifications are associated with the parcel. Recently, many researches in the area of TQM (e.g., Bou-Llusar et al., 2008; Kristal et al., 2010; Sila, 2007); KM (e.g., Chen & Mohamed, 2010; Lee & Lee, 2007); and OP (e.g., Lee & Lee, 2007; Sila,

2007) also utilized item parceling to solve the problem related to the complexity of the SEM model.

According to Hair et al. (2006), parcels have the potential to improve a model fit simply because it reduces the complexity of the SEM model, and models with fewer variables have the potential for better fit. However, achieving a good fit in the SEM model should not be the foremost reason to apply parcels. The main reason should be to construct a model, which represents the best data (Hair et al., 2006; Marcoulides & Schumacker, 2009).

Based on a review of SEM literature, Bandalos and Finney (2001) reported three key reasons for the increased application of parcels namely; to increase the stability of the parameter estimates, improve the sample size ratio, and to remedy small sample sizes. In brief, empirical justifications for employing item parcel include increasing reliability, adapting to small sample sizes, reducing the idiosyncratic influence of individual items, simplifying interpretation, and obtaining a better model fit (Bandalos & Finney, 2001; Hall, Snell & Foust, 1999; Marcoulides & Schumacker, 2009).

Many researchers have reported that parcels technique used to estimate the structural model; and this technique is appropriate when all the items for a construct are psychometrically unidimensional (Coffman & MacCallum, 2005; Hair et al., 2006; Kim & Hagtvet, 2003; Kishton & Widaman, 1994; Kline, 2011; Little et al., 2002), meaning that, the parcel is conceptually analogous to a theoretical construct, if the theoretical observed construct is one-dimensional (Alhija & Wisenbaker, 2006). Hence, it is very essential to highlight that the technique is appropriate when the information is not lost by using the parcels instead of individual items.

Nevertheless, there are some disadvantages to parcels; it can sometimes hide problems with item measures[9] and provide a better fit than actually exist in the data. In addition, it ignores the effects of measurement error, which result in inconsistent structural estimates of the relationships between the construct that is presented by parcel and other latent constructs (Bandalos 1999; Jarvis, MacKenzie & Podsakoff, 2003). Otherwise, parceling should not be considered with formative models (Hair et al., 2006). The reason is that all causes of a formative factor are very important to determine the structural relationship among constructs. In this study, the parcels technique is appropriate because all factors (indicators) of SEM model are reflective.

Marcoulides and Schumacker (2009) provided the following guidelines for parceling items: (a) items must be valid individual measures of the construct of interest, (b) items must be at the same level of specificity both within and across parcels (i.e., items and indicators should not be parceled together), and (c) items within a parcel must be strictly unidimensional. In addition, many researchers recommend using parcels technique only structural relationships between latent variables are the focus of investigation, not the measurement model itself (Bandalos & Finney, 2001; Bou-Llusar et al., 2008; Coffman & MacCallum, 2005; Hair et al., 2006; Meade & Kroustalis, 2006). All these considerations will be taken into account when doing the formation of parcels. Furthermore, through measurement model, and before applying parcels, all items were screened by conducting a confirmatory factor analysis (CFA) as recommended by Hair et al. (2006) and Kline (2011), to determine whether they indeed measured their assigned construct.

[9] parcels may increase the risk of potentially misleading results by selecting only a single variable to represent a perhaps more complex result (Hair et al. 2006).

Admittedly, the use of item parcels in SEM has become quite common in recent years (Kline, 2011). Since the current study is conducted, there has been a growing interest in the issue of item parceling. Research has focused on such issues as the method of parceling (Hagtvet & Nasser, 2004; Hall et al., 1999); number of items to include in a parcel (Marsh, Balla, & Grayson, 1998); extent to which item parcels affect a model fit (Bandalos, 2002); and more generally, whether or not researchers should even engage in item parceling at all (Little et al., 2002). Aside from the work of Hall et al. (1999), few recent researchers have considered the issue of how the items might best be formed into parcels (Marcoulides & Schumacker, 2009).

Traditionally, there are diverse methods to parcel items. These methods, including method of random assignment of items within a dimension, groupings of items based on theoretical grounds (e.g., the items share similar content), and combining items with the highest correlations or with similar factor loadings (Hair et al., 2006; Kline, 2011; Marcoulides & Schumacker, 2009).

At the reviewing of the SEM literature, however, there are two most commonly used techniques of forming parcels namely, summated scale score and parcel based-factor score. *Summated scale* refers to an observed variable constructed by taking the simple mean of several items assumed to reflect that theoretical construct (Bou-Llusar et al., 2008; Chen & Mohamed, 2010; Hair et al., 2010; Lee & Lee, 2007). Meanwhile, *factor score* is a composite variable that reflects the relative contributions of all variables to the factor (Albright & Park, 2009; DiStefano et al., 2009; Fox, 2011; Green & Yang, 2009; Rowe, 2006).

In this study, the researcher employed *factor score* technique for forming parcels, because of the factor score is a linear composite of the optimal-weighted observed variables (Albright & Park, 2009), meaning that, every variable contributes to the factor score based on the size of its loading (rather than calculating the score of summated scale based on the mean of selected variables) (DiStefano et al., 2009). For this reason, parcel based-factor score is the best technique to represent original data (DiStefano et al., 2009).

Another reason to employ this technique lies in the emergence of the multicollinearity problem in the preceding analysis. According to Grewal, Cote, and Baumgartner (2004), using factor scores for forming parcels will enable the researcher to avoid problems caused by the multicollinearity in subsequent analyses.

Based on the above discussions, the following four considerations are fundamental to the construction of the parcels: theoretical basis, unidimensionality, reliability, and validity (Hair et al., 2006; Hall et al., 1999; Kline, 2011; Marcoulides & Schumacker, 2009).

Theoretical basis

Constantly, the structure of parcels is guided by the theoretical basis (Hall et al., 1999; Marcoulides & Schumacker, 2009). The theoretical bases specify the conceptual definitions for the parcel, and define the constructs that are relevant to the research context. In academic research, conceptual definitions are based on previous research that defines operationally the nature and character of a construct (Hair et al., 2007; Sekaran & Bougie, 2010). In this regard, the detailed operational definitions are presented in chapter four (see Section 4.4). Through the process of operational definitions, this study converted the constructs of the theoretical framework into observable and measurable components, which were consequently, selected as measurement variables (Sekaran & Bougie, 2010). Based on these measurement variables, parcels were constructed to measure the constructs within the theoretical framework.

Unidimensionality

A fundamental assumption and essential requirement for constructing a parcel is that the items are unidimensional, meaning that, they are strongly linked with each other and represent a single variable. Unidimensionality was established when the parcel consists of a variety of high loading on a single factor. When parcels were proposed to have multiple dimensions, the dimensions were reflected by separate factors (Byrne, 2010; Hair et al., 2006).

For the unidimensionality test, this study incorporates CFA under measurement model to confirm the structures of the parcels. In the SEM literature, χ^2/df or CMIN value of less than 3.00 (Gefen, 2000); a *comparative fit index* (CFI) cutoff value of .90 (Bagozzi & Phileps, 1991; Kline, 2011) or ‘close to’ .95 (Hu & Bentler, 1999; Kline, 2011); a *standardized root mean square residual* (SRMR) value of less than .08 (Hu & Bentler, 1999; Kline, 2011); and a *root mean square error of approximation* (RMSEA) value of less .08 (Browne & Cudeck, 1993; Kline, 2011) have been suggested for adequate measurement model fit. Table 5.29 shows that all the χ^2/df values were less than 3.00, while the CFI values were above .90, and both SRMR and

RMSEA values were less than .08, indicating that all the constructs were unidimensional.

Table 5.29
Summary of Unidimensionality Test and Reliability Coefficients

Constructs	Unidimensionality						Reliability
	χ^2	*df*	χ^2/df	CFI	SRMR	RMSEA	Cronbach's Alpha
TQM core elements	2716.7	1514	1.794	.905	.033	.078	.910
Leadership Commitment	49.260	20	2.463	.946	.018	.072	.873
Strategic Planning	26.117	9	2.902	.945	.017	.065	.823
Continuous Improvement	40.870	14	2.919	.949	.018	.051	.878
Customer Focus	18.751	9	2.083	.973	.016	.078	.844
Process Focus	24.420	9	2.713	.959	.018	.077	.848
Employee Involvement	47.651	14	2.404	.919	.020	.071	.847
Training & Learning	10.652	5	2.130	.980	.016	.061	.817
Rewards & Recognition	13.685	5	2.737	.922	.036	.067	.820
Management by Fact	36.862	14	2.633	.931	.023	.069	.889
KM processes	578.13	352	1.642	.914	.030	.071	.881
Knowledge Identification	24.124	9	2.680	.908	.025	.063	.845
Knowledge Acquisition	23.456	9	2.606	.907	.021	.049	.834
Knowledge Storage	13.646	5	2.729	.908	.029	.070	.839
Knowledge Sharing	9.219	5	1.844	.986	.011	.044	.821
Knowledge Application	33.138	14	2.367	.938	.017	.065	.873
OP Measures	40.30	30	1.344	.986	.016	.077	.853
SAA	9.089	5	1.818	.987	.987	.069	.833
NSAA	8.677	5	1.735	.992	.009	.051	.822

Reliability

In this study, coefficient of Cronbach's Alpha was employed to assess the consistency of the scales. Reliability around .90 can be considered "excellent"; a value around .80 as "very good"; and values around .70 as "adequate" (Kline, 2011). The Cronbach's Alpha values for the nine TQM core elements ranged from .817 to .889 (see Table 5.29). The alpha values for KM processes ranged from .821 to .873, and the alpha values of OP measures were .833 and .822. These results suggested that all constructs were highly reliable.

Validity

Validity is the extent to which a scale or set of measures accurately represents the concept of interest (Hair et al., 2010). Measurement validity refers to how well the conceptual and operational definitions' mesh with each other (Neuman, 2010). For addressing the scale validity, Neuman (2010) and Hair et al., (2010) recommend four types of validity that must be considered namely, *face validity*, *convergent validity*, *discriminant validity,* and *criterion-related validity*.

Face validity is a judgment of the scientific community that the measurement variables really measure the construct (Hair et al., 2010; Neuman, 2010). In this study, the theoretical framework was developed based on an extensive literature review. Previous empirical studies based on TQM, KM and OP, as well as the empirical studies in the higher-education context. Whereas, the items of each construct, which adopted from relevant empirical studies were pre-tested and evaluated by several academicians in the field of TQM and KM (see Section 4.4). The objective of these approaches was to ensure the face validity (Neuman, 2010).

Convergent validity is a type of validity that employed to assess the overlap between two or more tests that presumably measure the same construct. In other words, convergent validity is used to evaluate the degree to which two or more measures that theoretically should be related to each other (Hair et al., 2010). CFA can be used to test convergent validity (Hair et al., 2010; Kline, 2011). The authors suggested a factor loading, composite reliability (CR), and average variance extracted (AVE) to assess convergent validity. Table 5.30 shows the results of convergent validity test.

Table 5.30

Result of Convergent Validity Test

Latent Variable	Manifest Variable	Factor loading	Loadings squared	EV*	AVE**	CR***
TQM	Leadership Commitment	.797	.635	.365	.777	.932
	Strategic Planning	.848	.719	.281		
	Continuous Improvement	.861	.741	.259		
	Customer Focus	.746	.557	.443		
	Process Focus	.756	.572	.428		
	Employee Involvement	.739	.546	.454		
	Training & Learning	.770	.593	.407		
	Rewards & Recognition	.732	.536	.464		
	Management by Fact	.735	.540	.460		
KM	Knowledge Identification	.676	.602	.398	.647	.902
	Knowledge Acquisition	.843	.711	.289		
	Knowledge Storage	.758	.575	.425		
	Knowledge Sharing	.783	.613	.387		
	Knowledge Application	.858	.736	.264		
OP	SAA	.995	.990	.010	.916	.956
	NSAA	.918	.843	.157		

Note.

* (EV) Error variance = 1- square of the factor loadings

** (AVE) Average variance extracted = (summation of the square of the factor loadings) / {(summation of the square of the factor loadings) + (summation of the error variances)}

*** (CR) Composite reliability = (square of the summation of the factor loading) / {(square of the summation of the factor loadings) + (summation of the error variances)}

Based on Table 5.30, the factor loadings of indicators on their constructs exceeded the recommended value of .6 (Chin, Gopal & Salisbury, 1997). The AVE, which reflects the overall amount of variance in the indicators accounted for by the latent construct, which exceeded the recommended value of .5 (Hair et al., 2010). CR values, which depict the degree to which the construct indicators indicate as the latent. All CR values exceeded the recommended value of .70 (Hair et al., 2010).

Discriminant validity measures the degree to which a construct and its indicators are different from another construct and its indicators (Kline, 2011). Discriminant validity, also called *divergent validity*, can be assessed by comparing the correlations between constructs and square root of the average variance extracted from a construct. The square root of variance-extracted estimates should be greater than the correlation estimate (Hair et al., 2010). As shows in Table 5.31, the correlation estimate between the constructs is less than the square root of the average variance extracted, which indicates the adequate discriminant validity. Overall, the reliability and validity of all scales were established.

Table 5.31
Discriminant Validity of Constructs

Constructs	TQM	KM	OP
TQM	**.881**		
KM	.801	**.804**	
OP	.633	.635	**.957**

Note. Diagonal represent the square root of the average variance extracted, while the other entries represent the correlations estimate as in Amos output.

Criterion-related validity is the degree of correspondence between a measure and criterion variable, typically measured by their correlation (Bollen, 1989; Sekaran & Bougie, 2010). In this study, TQM, KM, and OP are the relevant criteria. As shown in Table 5.31, the bivariate correlations between (TQM & KM), (TQM & OP), and (KM & OP) were .801, .633, and .635, respectively. These correlations were statistically significant at .05 level, indicating strong criterion-related validity.

After given the empirical evidence of unidimensionality, reliability, and validity, the researcher estimates the structural model by using the parcel based-factor scores as recommended by many researchers (e.g., Bollen, 1989; Bou-Llusar et al., 2008; DiStefano et al., 2009; Fox, 2011; Green & Yang, 2009; Rowe, 2006). Consequently, by computing factor score coefficients[10], the parcels of each observed (manifest) variable are constructed and saved for use in the subsequent analysis.

[10] Factor-score coefficients are computed by the "*regression method*" as $B = C^{-1} C^*$, where C is the model-implied covariance or moment matrix among the observed variables and C* is the matrix of model-implied covariances or moments between the observed and latent variables (Bollen, 1989; Fox, 2011). However, Amos software provides this score.

As mentioned earlier, this study employed parcels technique based on the consideration of N:q ratio (174:218) = .798, in order to reduce corresponding items to a manageable level and to meet sample size requirements for SEM model (Bentler, 2007; Hall et al., 1999; Huang et al., 2008; Kristal et al., 2010; Little et al., 2002; Sila, 2007). In short, through employing item parcels the researcher can still assess the structurall relationships among study's constructs (Alhaja & Wisenbaker, 2006; Sila, 2007), while increasing the N:q ratio considerably (174:34) = 5.11.

5.11.3 Estimation of the Initial Structural Model

The result of the initial structural equation model is presented in Figure 5.1. In this SEM model, factor loadings are adequate ranging from .664 to .884 for the indicators of TQM, ranging from .743 to .810 for the indicators of KM, and for the indicators of OP were .884 and .846, respectively.

Generally, the values of the factor loading of all observed variables exceeded the recommended value of .50 as suggested by Byrne (2010) and Hair et al. (2010). On the other hand, the values of GFI, NNFI, CFI, RMSEA, and CMIN are .871, .888, .906, .101, and 2.779 respectively. Meanwhile, the *p*-value associated with this result is .000. Hence, this result leads to the conclusion that the null hypothesis must be rejected. In brief, except the *p*-value and RMSEA, it can be concluded that the initial model closely fits sample data.

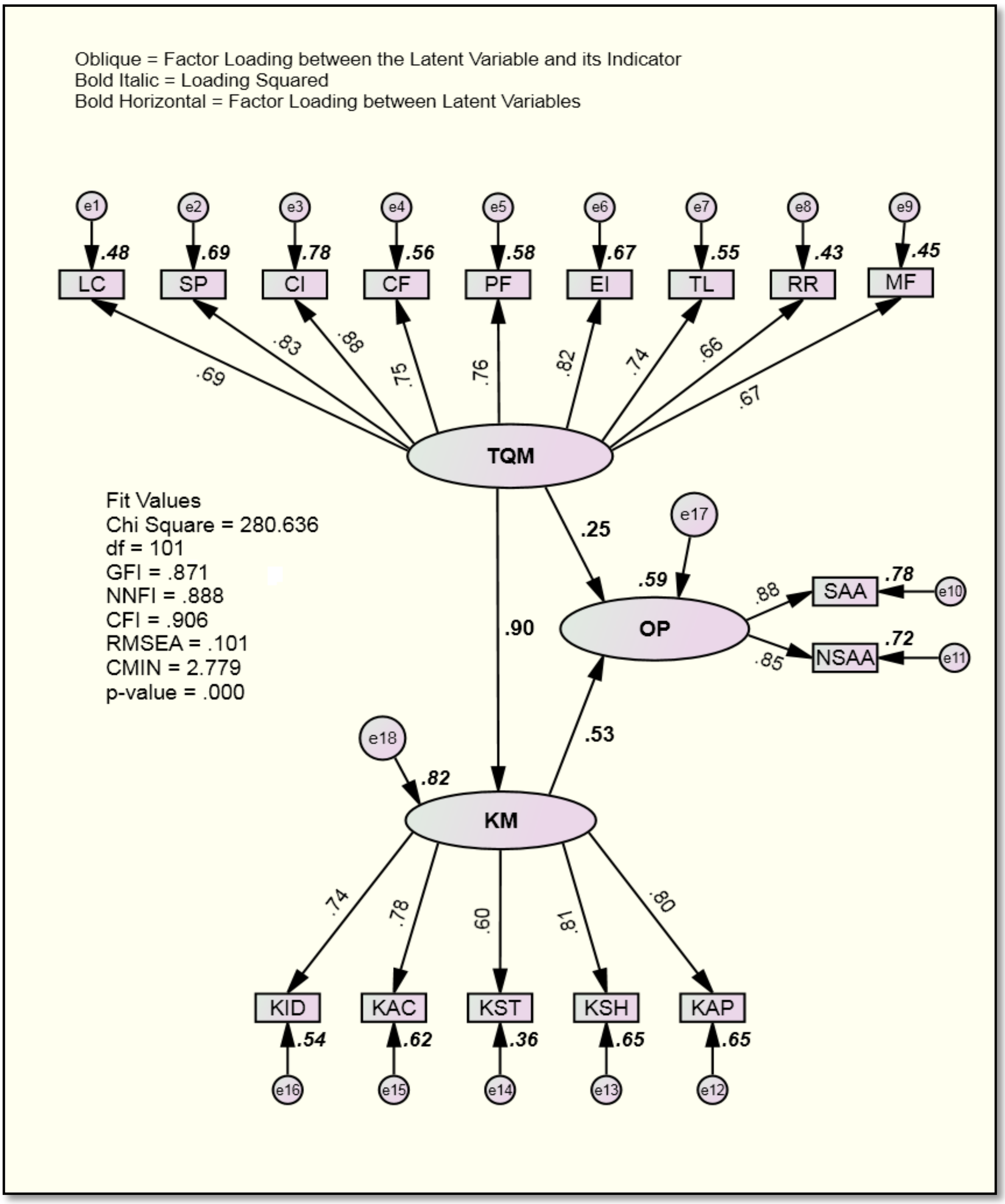

Figure 5.1
Standardized Estimates of the Initial Structural Equation Model

In detail, Table 5.32 indicates that the relationship between TQM and KM, and the relationship between KM and OP are positive and significant at α = .05. It means TQM contributed positively and significantly to KM, and KM as well contributed positively and significantly to OP.

Table 5.32
Relationships among Latent Variables (the Initial Structural Equation Model)

Structural relation	Regression weights	Standard error (S.E.)	Critical ratio (C.R.)*	Standardized regression weights (factor loading)	p
TQM → KM	1.015	.110	9.228	.904	.000
TQM → OP	.327	.263	1.243	.253	.214
KM → OP	.612	.241	2.535	.532	.011

Note. ***** The C.R. value of 1.96 or higher indicates statistical significance at the customary .05 level (Byrne, 2010).

However, there is an insignificant relationship between TQM and OP at $\alpha = .05$. Focusing on the relationship between these two Constructs, Table 5.32 also demonstrates that the probability of getting a critical ratio as large as 1.243 in absolute value is .214. In other words, the standardized regression weight (factor loading) for TQM in the prediction of OP is not significantly different from zero at .05 level (as indicated by C.R. value < 1.96). Thus, this may become the sign of indirect relationship between TQM and OP; the relationship might present via KM as a full mediator variable.

In order to eliminate the consequence of insignificant impact of TQM on OP, a preliminary modification is carried out on the initial SEM model by using *Wald method*. According to Kline (2011), the Wald method used for the structural model trimming. The Wald method indicates how much the proposed model’s chi-square would increase, if the particular parameter were fixed in 0 (i.e., if the parameter was dropped from the model under consideration). Thus, the researcher drops the arrow connecting TQM and OP. Figure 5.2 exhibits the outcomes of standardized estimates for the first modified structural equation model.

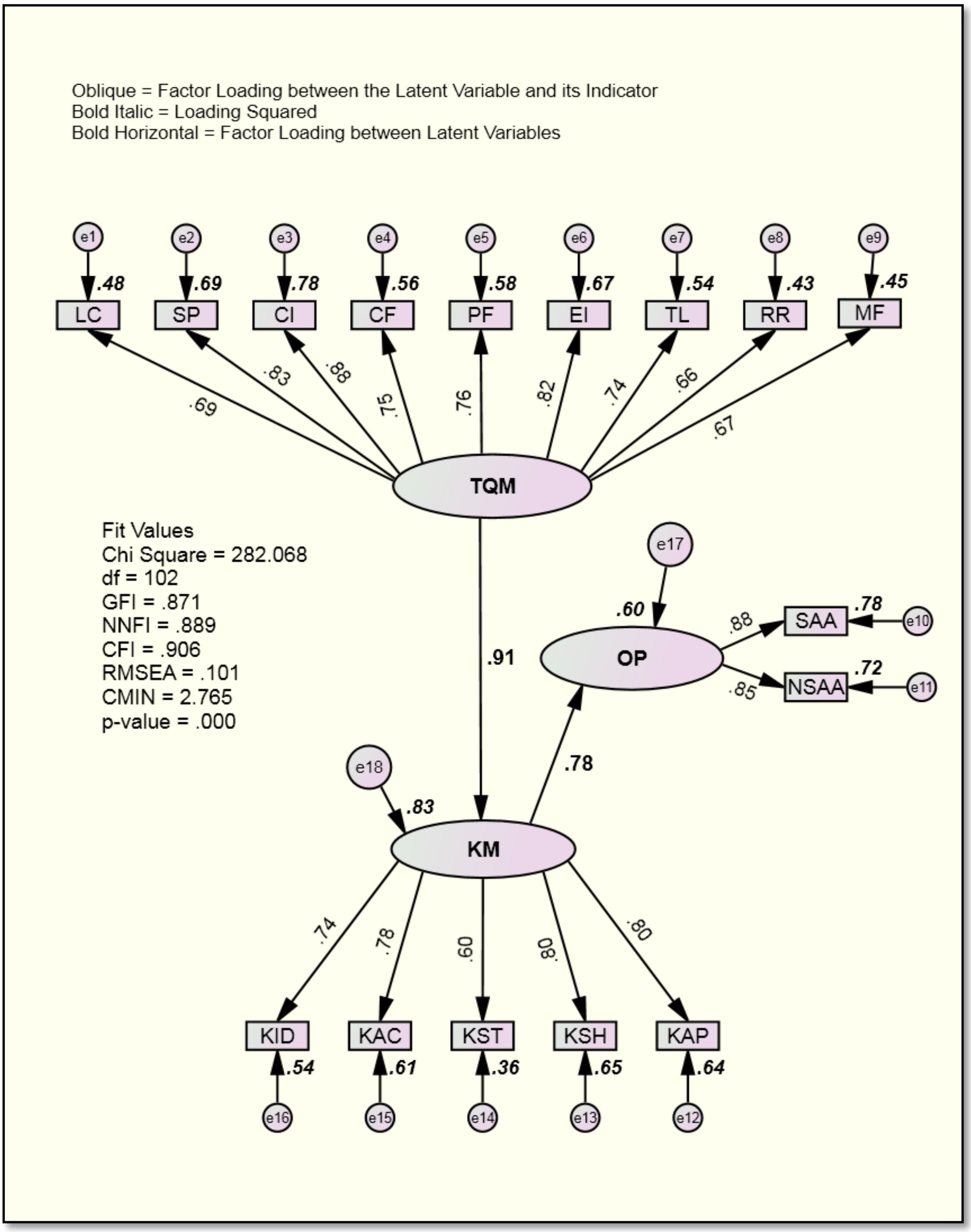

Figure 5.2

Standardized Estimates of the First Modified Structural Equation Model

Based on the result of the first modified SEM model as displays in Figure 5.2, the overall model χ^2 is 282.068 with 102 degrees of freedom. Regarding to the goodness-of-fit indexes, the values of GFI, NNFI, CFI, and RMSEA are .871, .889, .906, and .101 respectively, which considered marginally accepted. Then again, the *p*-value associated with this result is .000. Accordingly, this result leads to the conclusion that the null hypothesis stated that the model fit the data must be rejected; the χ^2 goodness-of-fit statistic does not indicate that the observed covariance matrix matches the estimated covariance matrix within sampling variance. As a result, it can be concluded that the first modified SEM model is still considered marginally fit the data. However, SEM model that displays a poor fit can be improved (decrease the χ^2 values) by using modification indices (Byrne, 2010; Kline, 2011). The next section will discuss the improvement of the SEM model by using modification indices.

5.11.4 Model Improvement

In the previous section, the goodness-of-fit (GOF) has been assessed. The values of GOF indices were marginally accepted but the model still did not fit the data well regarding to the *p*-value. Hence, it cannot be justified that the first modified SEM model is the accepted model from several possible alternatives. Nevertheless, given the problems associated with the model fitness, Byrne (2010) and Hair et al. (2010) noted that the χ^2 value is sensitive to sample size, multivariate normality, and number of measures or indicators. In this regard, several modifications can be done to reduce the χ^2 value. As known, the lowest χ^2 value indicates the better fit of the model and the data (Byrne, 2010; Hair, et al., 2010; Kline, 2011).

Model modification identifies a set of new relationships that best improve the overall model fit. To modify the SEM model, modification indices has recommended the new relationship that can reduce the χ^2 value. Certainly, any modification should be supported by theoretical grounds (Byrne, 2010; Kline, 2011). Thus, model modification will improve the model fit that is theoretically justified.

In the SEM literature, the modification indices (MIs) are utilized to determine which direct effect, if included in the model, is likely to contribute to the explanation of the data. The larger the MIs value, the greater the contribution of that direct effect to model improvement (Byrne, 2010; Kline, 2011). Even though no strict rules-of-thumb exist, concerning how large these indexes must be to warrant a meaningful model modification, based on purely statistical considerations one might simply consider making changes to parameters associated with the highest MIs (Byrne, 2010; Raykov & Marcoulides, 2006). According to Raykov and Marcoulides (2006), if there are several parameters with high MIs, the researcher can consider freeing them one at a time, start with the largest, because like in the general linear modeling framework a single change in a SEM model can affect other parts of the result. Thus, based on these considerations, the researcher focus on the path associated with the largest modification index.

Therefore, after reviewing Amos output (i.e., MIs-Covariances), the researcher adds the linear covariance between several measurement errors of TQM core elements. They are between leadership commitment and strategic planning; between leadership commitment and training/learning; and between process focus and customer focus (see *Appendix K*).

Typically, structural equation modeling considers all errors as independent. However, Bollen and Curran (2006) suggested that the measurement errors can be correlated if the measures are influenced by a common factor. The common factor is commonly involved together in the construction of the measures (Bollen & Grandjean, 1981; Bollen, 1989). In addition, according to Hair et al. (2010) and Byrne (2010), the measurement errors can be related to each other as long as supported by theoretical arguments. Thus, the following justifications support the model modification conducted in this study:

1. Allowing the measurement errors of leadership commitment and strategic planning to be correlated.

According to Venkatraman (2007), TQM should be embraced as a strategy via the top management, and they should get visibly and explicitly committed to its philosophy. However, the claim that the leadership commitment makes the difference between success and failure in the TQM adoption is supported by empirical evidence (e.g., Oakland, 2003; Osseo-Asare et al, 2005; Santos-Vijande & Alivarez-Gonzalez, 2007). According to Oakland (2003), leadership provided the framework for successful strategic planning. In other words, leadership enabled successful strategic plans through resource allocation and capacity to achieve its objectives. Similarly, Venkatraman (2007) revealed that the leaders should be able to set practical corporate vision and be willing to initiate change and provide the resources needed for team efforts directed towards achieving the vision. In short, providing sufficient resources can be a common factor of leadership commitment and strategic planning.

2. Allowing the measurement errors of leadership commitment and training and learning to be correlated.

Several quality scholars and researchers declared that TQM establishment needs a serious commitment on the part of the decision makers of the organization for achieving a common goal; quality improvement (e.g., Bayraktar et al., 2008 Crosby, 1979; Dale, 2003; Deming, 1986; Osseo-Asare et al., 2005; Sirvanci, 2004).

In the same vein, Townsend and Gebhardt (2002) revealed that such leadership commitment is considered the critical element for achieving TQM, without this commitment; no TQM program for quality improvement can be successful. On the other hand, establishing TQM effectively calls for training and learning program, which is an essential part of the overall quality strategy for quality improvement (Conca et al., 2004; Lynne & Ross, 2007; Santos-Vijande & Alivarez-Gonzalez, 2007). As a result, it has been seen that achieving quality improvement can be a common factor of leadership commitment and training/learning programs.

3. Allowing the measurement errors of process focus and customer focus to be correlated.

TQM is considered as a process-oriented approach to increasing efficiency, decreasing costs and improving quality of service. In higher education, TQM requires establishing a strong feedback loop with continuous assessment of the core process namely, teaching/learning process (MBNQA, 2011-2012; Sirvanci, 2004; Venkatraman, 2007). In simplistic fact, focusing on teaching/learning process cannot be achieved without focusing on students' needs and requirements. On the other hand, MBNQA (2011-2012) revealed that customer focus in HEIs explains the ways in which the universities perceive the current and future needs of their students and to understand related issues. This is achieved with access to important information about necessary students' requirements (Bayraktar et al., 2008; Venkatraman, 2007). It can then be noted that focusing on students leads to a proper understanding of students' requirements. Therefore, students' requirements can be a common factor between process focus and customer focus.

Based on the justifications given above, the SEM model is modified. The next section will discuss the estimation and GOF of the second modified SEM model.

5.11.5 Estimation and GOF of the Second Modified SEM Model

The results of standardized estimates of the second modified structural equation model are demonstrated in Table 5.33 and Figure 5.3.

Table 5.33

Standardized Estimates for all Manifest Variables (Second Modified SEM Model)

Latent Variable	Manifest Variable	Code	Standardized Regression Weights (Factor Loading)	(Loadings squared)*	p
TQM	Leadership Commitment	LC	.687	.472	.000
	Strategic Planning	SP	.814	.663	.000
	Continuous Improvement	CI	.884	.781	.000
	Customer Focus	CF	.729	.532	.000
	Process Focus	PF	.743	.552	.000
	Employee Involvement	EI	.820	.672	.000
	Training & Learning	TL	.759	.576	.000
	Rewards & Recognition	RR	.664	.441	.000
	Management by Fact	MF	.678	.459	.000
KM	Knowledge Identification	KID	.734	.538	.000
	Knowledge Acquisition	KAC	.780	.609	.000
	Knowledge Storage	KST	.600	.361	.000
	Knowledge Sharing	KSH	.806	.650	.000
	Knowledge Application	KAP	.803	.645	.000
OP	Students related Academic Achievement	SAA	.884	.781	.000
	Non-students related Academic Achievement	NSAA	.846	.716	.000

Note. ***** The percentage of the manifest variable explained by the predictor (latent variable)

As shown in Table 5.33, the values of the factor loading of all observed variables exceeded the recommended value of .500 as suggested by Hair et al. (2010) and Byrne (2010). In addition, Figure 5.3 also shows that all structural path loadings are positive and significant at $\alpha = .05$. It means TQM contributed positively and significantly to KM; and KM as well contributed positively and significantly to OP.

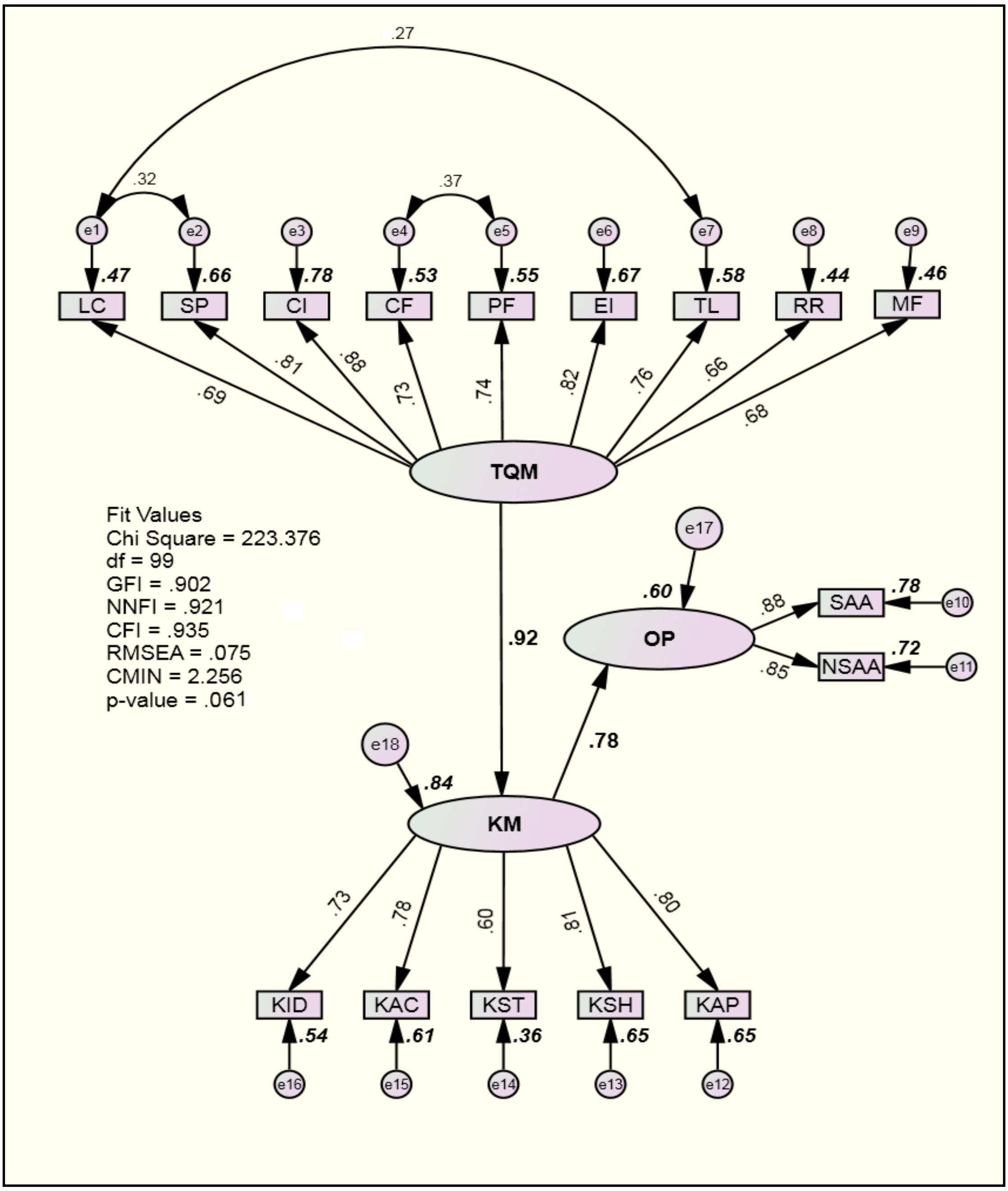

Figure 5.3
Standardized Estimates of the Second Modified SEM Model

In detail, as shown in Figure 5.3, the test of the overall fit model yielded in a χ^2 = 223.376 with 99 degree of freedom and *p*-value is insignificant (p = .061) at α = .05. Thus, assuming that sample covariance matrix insignificantly different from the estimated covariance matrix. Based on the *p*-value consideration, the null hypothesis is not rejected. Furthermore, all the fit indices were above the recommended values.

The values of GFI, NNFI, CFI, RMSEA and CMIN are .902, .921, .935, .075, and 2.256 respectively. Hence, the results of goodness-of-fit test together with goodness-of-fit indices provide evidence of model fit.

5.11.6 The Mediating Role of KM in the Relationship between TQM and OP

Table 5.34 summarizes the results of standardized estimates of the SEM model as revealed in Figure 5.3. The standardized regression weights of .916 and .776 provide the information that the relationship between TQM and KM, and the relationship between KM and OP are significant at $\alpha = .05$. Table 5.34 as well illustrates that the 84.0% of the variance of KM can be explained by TQM. Similarly, KM can also explain 60.3% of the variance of OP.

Table 5.34
Results of Standardized Estimates for the Second Modified SEM Model

Structural relation	Regression weights	Standard error S.E.	Critical ratio C.R.	Standardized regression weights (factor loading)	Loadings squared	*p*
TQM → KM	1.045	.114	9.150	.916	.840	.000
KM → OP	.895	.093	9.630	.776	.603	.000

Undeniably, this study has provided empirical evidence that TQM affects OP indirectly via KM as a mediator variable. The direct relationship between TQM and OP is insignificant due to the existence of KM as a mediator variable. In the mass, Table 5.35 exhibits, the standardized total effects among study's constructs**.** The table also shows the direct effect of TQM on KM, the direct effect of KM on OP, and the indirect effect of TQM on OP via KM as a mediator variable.

Table 5.35
Standardized Effects between Latent Variables

Path	Direct effect	Indirect effect	Standardized total effects
TQM → KM	.916	---	.916
KM → OP	.776	---	.776
TQM → OP	---	.711	.711

Based on Table 5.35, the direct effect of TQM on KM is very high (.916). Similarly, direct effect of KM on OP is also high (.776). Thus, the total effect of TQM on OP is .711 (i.e., .916 × .776). This value is high as well. In summary, when TQM go up by 1 standard deviation, OP goes up by .711 standard deviations. Based on the above empirical evidence, the findings suggested that KM fully mediates the relationship between TQM and OP. Therefore, the last hypothesis (H_4) is supported.

5.12 Summary

In this chapter, the relationships between the research's variables were assessed via descriptive analyses, Pearson correlation, multiple regression, principal component analysis, simple regression, canonical correlation, and structural equation modeling. The four hypotheses were examined to achieve the research objectives. Pearson's correlation analysis indicated positive and significant relationships between TQM core elements and KM processes, between TQM core elements and organizational performance measures, and between KM processes and organizational performance measures.

Multiple regression analysis was conducted to examine the relationship between the independent variables and the dependent variables by employing three general models. Notwithstanding, the multicollinearity problems were detected in all multiple regression models. Principal component analysis and simple regression analysis were applied to deal with multicollinearity problems. In other words, these analyses are limited to describe the effect of interrelated independent variables as a set, rather than as an individual.

In attempting to predict the relationship between sets of multiple dependent and multiple independent variables, canonical correlation analysis was carried out. The result provides empirical evidence that linear relationships between the set of TQM core elements and the set of KM processes, between the set of TQM core elements and the set of OP measures, and between the set of KM processes and the set of OP measures are positive and significant. In conclusion, H_1, H_2, and H_3 are supported. The last analysis, structural equation modeling analysis provided empirical evidence supporting KM fully mediate the relationship between TQM and OP. As a result, the last hypothesis (H_4) is also supported.

The next chapter will discuss the findings, followed by implication and limitations of the study. Possible recommendation for future research and conclusions also will be discussing.

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1 Introduction

This final chapter is devoted to summarizing the study, discuss the findings, highlight the implications of the study of the existing literature as well as to practitioners, detail the limitations of the study, suggest the potential path for future study and conclude this study.

6.2 Recapitulation of the Research Finding

This study sets out to examine empirically and systematically the impact of TQM on KM and organizational performance. In the context of higher education in Iraq, this study had four specific objectives as discussed in Chapter 1. The objectives are represented here as a guidance for the discussion in this section. Given that, the objectives of the study were:

1. To investigate the relationship between TQM and KM.
2. To examine the relationship between TQM and OP.
3. To determine the relationship between KM and OP.
4. To ascertain the structural relationship between TQM and OP through the presence of KM.

In order to achieve the objectives of this study, an extensive literature review was performed and reported in Chapter 2. In addition, previous studies on the relationship between TQM, KM and organizational performance have revealed the needs to investigate the relationships amongst them, especially in the service context. In attempting to fill the gap in the literature indicating the limited studies conducted in the area of TQM and KM, Iraqi-HEIs (public universities) have been selected as the object of the study. 174 colleges within 24 universities were employed as the sample of this study.

Respondents of the study consisted of the top management, which were familiar with quality activities, KM processes and organizational performance indicators. The respondents were the deans of the colleges (64.37%) and assistant deans (35.63%). The respondents fall within three academic ranks, (33.33%) professors, (53.45%) assistant professors, and (13.22%) senior lecturers. In addition, the majority of the respondents (83.06%) have been working in the college for more than three years. Hence, the respondents were considered suitably knowledgeable to participate in this study.

In achieving the study objectives, TQM was examined by using nine core elements, which were most frequently used in several previous studies namely; leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact. Meanwhile, five key processes were assigned to examine KM i.e., knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application.

In addition, organizational performance was measured in terms of students related academic achievement (SAA) and non-students related academic achievement (NSAA). This study placed TQM as the independent variable, KM as the mediator variable, and organizational performance as the dependent variable.

Based on descriptive analysis, means of all independent variables ranging from 3.703 to 4.014 indicated that the extent of TQM implementation among Iraqi HEIs was moderately high. In addition, the results of Pearson correlation analysis highlighted the positive and significant association among TQM core elements ($0.342 \leq r \leq 0.649$). This result is in agreement with Lim et al. (2004) findings, which found that all the correlations among the TQM elements were positive and significant with each other.

Descriptive analysis also indicated that the implementation of KM processes in Iraqi HEIs was moderately high as well. The mean values ranged from 3.810 to 3.940. The Pearson correlation analysis provided the evidence that there were positive and significant associations among KM processes ($0.430 \leq r \leq 0.682$). This finding seems to be consistent with other prior researches, which are Safa et al. (2006), McKeen et al. (2006), and Zack et al. (2009). Moreover, organizational performance measures indicated to the need for further improvement. The mean values were 3.911 (SAA) and 3.842 (NSAA).

6.2.1 Relationship between TQM Core Elements and KM Processes

In achieving the first objective, five testable specific hypotheses were developed to explore the relationship between TQM core elements and KM processes. The results of Pearson correlation analysis indicated that all the nine core elements of TQM are positive and significantly associated with all the five processes of KM ($0.239 \leq r \leq 0.686$). According to the Cohen (1988) guidelines, the strength of this relationship is moderately high. Specifically, each TQM core element is associated with each KM process. Furthermore, interdependency between two sets of variables was examined using canonical correlation. The results provided the evidence that there is positive and significant relationship between the set of TQM core elements and the set of KM processes ($C_1 = 0.753$, $p = 0.000$). On the other hand, multiple regression analysis was carried out to examine the linear relationship between TQM core elements and each of the KM processes. However, the multicollinearity problem was detected in the model developed (see Sections 5.8 and 5.9).

Based on evidence of the multicollinearity problem amongst the TQM core elements, the researcher concludes that the measure of the TQM core element passes the convergent validity test. Convergent validity, as adapted from Hair et al. (2010) for present purposes, reflects the degree to which the versions of TOM promulgated by their founders and observed in organizational practice share a common set of assumptions and prescriptions.

To reduce the effects of multicollinearity in the independent variables (TQM core elements), PCA was applied to summarize most of the original information (variance) in a minimum number of factors in the set of variables. Therefore, the independent variables were viewed holistically, rather than individually. The first principal component of TQM core elements explained 56.90 percent of the overall variance of TQM core elements. Consequently, simple linear regression was conducted between the first principal component score of TQM core elements and each process of KM to investigate the relationship between TQM core elements (collectively) and the processes of KM. The results of the simple regression are shown in Table 6.1.

Table 6.1
Summary of Simple Regression Analysis of the First Principal Component Score of TQM Core Elements and KM Processes

Model	% Variance Explained	Conclusion*
IV = Principal Component Score of TQM Core Elements DV = Knowledge Identification	35.5%	Significant relationship
IV = Principal Component Score of TQM Core Elements DV = Knowledge Acquisition	40.1%	Significant relationship
IV = Principal Component Score of TQM Core Elements DV = Knowledge Storage	21.9%	Significant relationship
IV = Principal Component Score of TQM Core Elements DV = Knowledge Sharing	33.0%	Significant relationship
IV = Principal Component Score of TQM Core Elements DV = Knowledge Application	38.2%	Significant relationship

Note. IV = Independent variable; DV = Dependent variable; Principal component score is obtained from PCA; * F-statistics are significant at the 0.05 level.

To answer the first objective, summary of hypothesis testing is displayed in Table 6.2. As demonstrated in Table 6.2, all the specific hypotheses are supported, which indicating that TQM has a positive relationship with KM processes.

Table 6.2
Summary of Hypothesis Testing for the Relationship between TQM Core Elements and KM Processes

Hypotheses	Result
H_{1a}: TQM core elements have a positive relationship with knowledge identification	Supported
H_{1b}: TQM core elements have a positive relationship with knowledge acquisition	Supported
H_{1c}: TQM core elements have a positive relationship with knowledge storage	Supported
H_{1d}: TQM core elements have a positive relationship with knowledge sharing	Supported
H_{1e}: TQM core elements have a positive relationship with knowledge application	Supported

6.2.2 Relationship between TQM Core Elements and Organizational Performance

To achieve the second objective, two specific testable hypotheses were developed to investigate the relationship between TQM core elements and organizational performance. Overall, the result of Pearson's correlation analysis shows that all the core elements of TQM are positive and significantly correlated to the two measures of organizational performance ($0.300 \leq r \leq 0.502$). Hence, the researcher is justified in concluding that the TQM core elements are highly associated with organizational performance.

In addition, linear relationship between the set of TQM core elements and the set of OP measures was examined using canonical correlation analysis. The result provided the evidence that there is a positive and significant relationship between the two sets of variables ($C_1 = 0.631$, $p = 0.000$). However, due to the presence of multicollinearity in the multiple regression model with nine TQM core elements as independent variables, PCA and simple regression analysis were applied. The results of simple regression analysis are summarized in Table 6.3.

Table 6.3
Summary of Simple Regression Analysis of the First Principal Component Score of TQM Core Elements and OP Measures

Model	% Variance Explained	Conclusion*
IV = Principal Component Score of TQM Core Elements DV = SAA	32.9%	Significant relationship
IV = Principal Component Score TQM Core Elements DV = NSAA	29.3%	Significant relationship

Note. IV = Independent variable; DV = Dependent variable; Principal component score is obtained from PCA; *F-statistics are significant at the 0.05 level.

Based on Table 6.3, the results of the variance explained (R^2) are much better as reported by Lim et al. (2004). Overall, the result of simple regression leads to the conclusion that TQM core elements (collectively) have a positive relationship with organizational performance measures. Summary of hypothesis testing is shown in Table 6.4.

Table 6.4
Summary of Hypothesis Testing for the Relationship between TQM Core Elements and OP Measures

Hypotheses	Result
H_{2a}: TQM core elements have a positive relationship with students related academic achievement	Supported
H_{2b}: TQM core elements have a positive relationship with non-student related academic achievement	Supported

6.2.3 Relationship between KM Processes and Organizational Performance

To confirm the relationship between KM processes and organizational performance, two specific hypotheses were posited. Overall, the result of Pearson's correlation analysis supported a positive and significant association between the processes of KM and measures of organizational performance ($0.322 \leq r \leq 0.489$), which is considered slightly high regarding to the strength of the relationship. Furthermore, based on canonical correlation analysis, interdependency between the set of KM processes and the set of OP measures was not violated ($C_1 = 0.664$, $p = 0.000$). Multiple regression analysis was conducted to measure the linear relationship of KM processes with OP measures. However, due to the presence of multicollinearity in the model, PCA was applied to reduce the effect of multicollinearity. KM processes are positive and significantly correlated with each other. This is consistent with a priori expectation. The results of PCA indicated that the first principal component of KM processes explained 63.50 percent of the overall variance of the KM processes.

To investigate the relationship of collective KM processes with the both measures of OP, the first principal score of KM processes obtained from PCA was regressed to each of OP measures. The results of the simple regression analysis are exhibited in Table 6.5.

Table 6.5
Summary of Simple Regression Analysis between the First Principal Component Score of KM Processes and OP Measures

Model	% Variance Explained	Conclusion*
IV = Principal Component Score of KM processes DV = SAA	24.7%	Significant relationship
IV = Principal Component Score of KM processes DV = NSAA	24.2%	Significant relationship

Note. IV = Independent variable; DV = Dependent variable; Principal component score is obtained from PCA; * F-statistics are significant at the 0.05 level.

Based on Table 6.5, KM processes (collectively) have a significant relationship with the both measures of OP. Table 6.6 shown that both hypotheses regarding the relationship between KM processes and OP measures are supported, which indicates that KM processes have a positive relationship with organizational performance.

Table 6.6
Summary of Hypothesis Testing for the Relationship between KM Processes and OP Measures

Hypotheses	Result
H_{3a}: KM processes have a positive relationship with students related academic achievement	Supported
H_{3b}: KM processes have a positive relationship with non-student related academic achievement	Supported

6.2.4 Mediating Effect of KM Processes

The final objective of this study was to investigate possible mediating effect of KM on the relationship between TQM and organizational performance. In this regard, structural equation modeling was applied to achieve this objective (see Table 5.34 in previous chapter). The structural effect of TQM on KM is high (0.916). The standardized structural coefficient of TQM on KM is associated with the low standard error (0.114) and a significant critical ratio (9.150), which indicates that the structural effect between these two constructs is positive, and the relationship is statistically significant.

In addition, KM also exhibits a strong and positive structural effect on organizational performance (0.776), with low standard error (0.093) and a significant critical ratio (9.630). Notes from these findings that the structural effect of TQM on KM is the highest compared to the structural effect of KM on organizational performance.

Overall, the analysis led to the conclusion that KM fully mediates the relationship between TQM and organizational performance. TQM explained 84.00 percent of the overall variance of KM. Moreover, KM also explained 60.30 percent of the overall variance of organizational performance. Therefore, the last hypothesis (H_4) is supported. As such, it is essential to reaffirm that TQM can enhance KM and ultimately improve the organizational performance of the higher educational institutions in Iraq. The contribution of TQM to KM, and the contribution of KM to organizational performance are summarized in Table 6.7.

Table 6.7
Summary of Regression Results of Structural Equation Model

Structural Equation	Exogenous Construct	Endogenous Construct	% Variance Explained	Conclusion*
1	TQM	KM	84.00%	Significant contribution
2	KM	OP	60.30%	Significant contribution

Note. ** $p < 0.05$.

Specifically, the results of data analyses can be summarized as follows:

1. TQM core elements constituting a leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact have been implemented by a number of Iraqi HEIs.

2. The positive and significant association among TQM core elements suggests that TQM core elements should be implemented collectively, integrally and comprehensively, due to the elements are interdependent with one another. In other words, implementation of one element depends on implementation of other elements.

3. The positive and significant association among KM processes suggests that the processes of KM should be implemented totally, integrally and comprehensively, because of these processes are interdependent with one another. In a few words, implementation of one process depends on implementation of other processes.

4. The canonical correlations between the set of TQM core elements and the set of KM processes, between the set of TQM core elements and the set of OP measures,

and the set of KM processes and the set of OP measures are significant. Meaning that, the set of TQM core elements and the set of KM processes, the set of TQM core elements and the set of OP measures, and the set of KM processes and the set of OP measures are related.

5. The collective TQM core elements (collectively) can explain a significant percentage of the total variance in each of the processes of KM (knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application). Hence, this supports the notion that TQM core elements can positively and significantly enhance KM processes.

6. KM processes (collectively) can explain a significant percentage of the total variance in both measures of organizational performance. In other words, the better the processes of KM, the better the students-academic achievement and non-students-academic achievement.

7. TQM core elements (collectively) have strong correlation with OP measures, and the significant relationship can be explained by the TQM – KM – OP sequence of relationships.

8. The results of SEM analysis highlight the role of KM in mediating the relationship between TQM and organizational performance. The analysis has concluded that KM fully mediates the relationship between TQM and organizational performance. Thus, implementation of TQM will only affect organizational performance, if KM is in place as well.

6.3 Discussion of the Study Findings

This section presents the overall discussion of the study findings. The discussion of the findings is based upon the four objectives of the study. Generally, this study was aimed to investigate empirically the impact of TQM on KM and organizational performance. The research findings successfully achieved research objectives: (1) the relationship between TQM core elements and KM processes; (2) the relationship between TQM core elements and organizational performance; (3) the relationship between KM processes and organizational performance; and (4) whether KM mediate the relationship between TQM and organizational performance.

The study objectives have been achieved by applying several statistical techniques, i.e., Pearson correlation analysis, multiple regression analysis, PCA, simple linear regression analysis, canonical correlation analysis and SEM.

In this section, the relationship between TQM, KM and organizational performance will be discussed. Finally, an in-depth discussion pertaining to the mediation role of KM in bridging the relationship between TQM and organizational performance is explained. However, the results of the descriptive analysis also have a share of the discussion in this section.

6.3.1 Descriptive Analysis of the Constructs

Since this study is also a descriptive study, along with hypotheses testing, therefore, the results obtained from the descriptive analysis are worth discussing.

A descriptive analysis was done in order to judge the general state of the Iraqi HEIs understudied concerning TQM core elements, KM processes and organizational performance. According to the mean score, the implementation of each TQM core element and process of KM are expressed as a higher or lower degree of TQM or KM. Furthermore, the level of organizational performance is articulated as higher or lower performance.

Regarding TQM implementation, the mean scores of TQM core elements ranging from 3.703 to 4.014 indicates that the level of TQM implementation among Iraqi HEIs was moderately high. In detail, the mean value of leadership commitment is the highest among the TQM core elements. This indicated that the commitment of academic leadership of HEIs understudied towards the TQM program was in a good situation.

On the other hand, the mean value of training and learning is the lowest among the TQM core elements with the value of 3.703. This mean value provided evidence that, more work needs to be done to improve the programs of training and learning of Iraqi HEIs. The possible explanation for this situation is that some public universities still follow the traditional training/learning programs, while training/learning programs must be continuously updated in order to keep pace with scientific progress. However, this case may be present in some academic colleges but not at all Iraqi HEIs.

For KM processes, on the same line with TQM, the mean values ranged from 3.810 to 3.940, which indicate that the implementation of KM processes in Iraqi HEIs was moderately high. In particular, knowledge acquisition has recorded the highest mean value among KM processes; followed by knowledge identification and knowledge sharing. In contrast, the mean value of knowledge storage is the lowest among the KM processes. One plausible reason is that possibly not all colleges have an effective database to support the process of knowledge storage.

Finally, the mean values of performance-related constructs were 3.911 and 3.842. Generally, as expected, these values indicate that the level of performance of Iraqi HEIs was not at a high level. Hence, there is a need to enhance the current performance of Iraqi HEIs to the high-required level. As asserted by Santisteban (2005) and UNSCO reports in 2006, 2008, and 2009; there is an urgent necessity to improve the performance of Iraq's higher-education institutions.

6.3.2 The Relationship between TQM Core Elements and KM Processes

Firstly, Pearson's correlation coefficients among TQM core elements suggest that TQM core elements should be implemented collectively and comprehensively, because they are interdependent. This is theoretically appropriate in terms of the holistic approach of TQM; TQM core elements should not be implemented as individual practice or in a limited subset. Several authors, such as Samson and Terziovski (1999); Lim et al. (2004); Sila (2007); Prajogo and Hong (2008) and Kristal et al., (2010) support substantially this conclusion.

Ahire et al (1996) have explained the concept of holistic approach of TQM core elements. He stated that the concept of holistic approach of implementing TQM is meant to imply the dependence among the core elements of TQM. Each core element is vital and critical to the success in TQM program. In higher-education context, Lim et al. (2004) also highlighted the holistic approach of TQM implementation. The authors revealed that no single TQM element can stand alone and be expected to achieve a better performance level of all TQM elements combined. In other words, when all TQM core elements work collectively, all would contribute significantly and positively to the organizational performance in terms of the educational outcome.

Moreover, the result of PCA for the nine TQM core elements supports the evidence that TQM core elements must be implemented holistically. The first principal component score or linear combination of the nine TQM core elements; 0.320 (leadership commitment) + 0.344 (strategic planning) + 0.364 (continuous improvement) + 0.329 (customer focus) + 0.345 (process focus) + 0.345 (employee involvement) + 0.317 (training & learning) + 0.308 (rewards & recognition) + 0.324 (management by fact) has the closest resemblance and positive loading values. The weights (factor loadings) that are about equal indicate that each component is about equally represented in the linear composite (Agus, 2000; Furlan et al., 2011; Lim et al., 2004). In other words, these indicate the same importance of all TQM core elements on the first principal component. The first principal component obtained from PCA can explain about 56.90 percent of the variance in TQM core elements.

The result of Pearson's correlation analysis has provided empirical evidence that TQM core elements are positive and significantly associated with all the KM processes. Canonical correlation analysis applied to measure the relationship between two sets of variables provided the evidence that the collective TQM core elements have significant linear correlation with the collective KM processes. The results of the correlation (Pearson and canonical) analyses support the opinion that there is a strong association between TQM and KM. The strength of the relationship between TQM and KM has been noted in previous literature (such as Hsu & Shen, 2005; Hung et al., 2010; Ju et al., 2006; Molina et al., 2007). However, the correlation between TQM core elements and KM processes offers evidence of criterion-related relationship.

In addition, simple regression analyses asserted that the first principal component of TQM core elements significantly related to each of the processes of KM. All the nine TQM core elements statistically explained a significant percentage of the total variance of KM processes. Hence, the higher the extent of TQM core elements implementation would lead to the better KM processes. In this regard, several earlier findings in literature such as Lim et al. (1999), Ju et al. (2006), Molina et al. (2007), Ooi (2009), Singh et al. (2010) also concluded somewhat similar results.

In addition, the current study has supported the result of Daud and Yusoff (2011) in the context of a developing country that the KM processes can be best achieved via effective TQM core (soft) elements, which in turn will lead to enhancement of collective learning ability in the organization. Hence, TQM implications to the KM in the developing countries are consistent with the findings from previous studies conducted in the developed countries. In HEIs context, the empirical studies that were conducted to highlight the relationship between TQM and KM were very scant. However, the available related studies (such as Ali & Shastri, 2010; Pandi et al., 2009; Ramanauskiene & Ramanauskas, 2006) also support the same results.

6.3.3 The Relationship between TQM Core Elements and Organizational Performance

In investigating the relationship between TQM core elements and organizational performance, correlation analyses (Pearson and canonical) have also provided evidence that TQM core elements positively and significantly associated with organizational performance measures; and this provides evidence of criterion-related relationship. On the other hand, the result of simple regression analysis between the first principal component score of TQM core elements and both measures of organizational performance offers evidence that TQM implementation will ensure better organizational performance.

In the context of developing country, Lim et al. (2004) have conducted the study in the Malaysian higher education (public universities). The result supported the conclusion that TQM core elements significantly improve organizational performance (in terms of students-academic achievement). Thus, this current study has confirmed earlier studies of the relationship between TQM core elements and organizational performance by postulating that TQM is applicable not only in the developed countries but also in the developing countries.

Without doubt, an educational organization with a high degree of effective TQM implementation would lead to better organizational performance. Furthermore, the significant relationship between TQM core elements and organizational performance in the Iraqi HEIs context are consistent with and confirm previous studies on similar relationships, including Babbar (1995), Kanji and Tambi (1999), Lim et al. (2004), Marshall et al. (2004), Najafabadi et al. (2008), Sabihaini et al. (2010), and Sakthivel et al. (2005). These findings suggest that TQM elements are critical for HEIs to accomplish its goals and achieve better organizational performance. Therefore, the higher extent of TQM core element's implementation, the better the organizational performance.

Briefly, this study provides a useful perspective for educational organizations throughout the world to corroborate and understand the potential benefits that TQM can bring if adopted successfully.

6.3.4 The Relationship between KM Processes and Organizational Performance

Similarly, with TQM core elements, the Pearson correlation coefficients among KM processes suggest that KM processes should be implemented holistically and comprehensively, since each process was interdependent one another. In other words, one process influences some other processes. Many researchers (such as Choi et al., 2008; Choy, 2006; Shankar & Gupta, 2005; Zivojinovic & Stanimirovic, 2009) have supported the concept of holistic approach of KM processes. In addition, the correlation between KM processes and OP measures offers evidence of criterion-related relationship.

To aggregate the five processes of KM, principal component analysis has generated the first principal component equation of KM processes; 0.420 (knowledge identification) + 0.465 (knowledge acquisition) + 0.399 (knowledge storage) + 0.464 (knowledge sharing) + 0.483 (knowledge application). The weights are about equal, so that all KM processes (knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application) are about equally represented in the linear composite.

Therefore, the first principal component of KM processes could be interpreted as a measure of KM. Meaning that, the close resemblance and positive loading values of KM processes indicated that all processes are about equally represented in the first principal component of KM. Equally important; the first principal component explains 63.50 percent of the total variance in KM processes.

The consensus regarding the influence of KM processes on organizational performance is undeniable. In this regard, the statistically significant results on the impact of KM processes on organizational performance in Iraqi HEIs is consistent with several previous studies (such as Daud & Abdul Hamid, 2006; Daud et al., 2008; Safa et al., 2006; McKeen et al., 2006; Zack et al., 2009). These studies suggested that KM processes could drive broader organizational performance measures; the better the KM processes, the better the organizational performance.

In a few words, the current study provides a practical standpoint for educational organizations throughout the world to realize and support the prospective advantages that KM processes can obtain if implemented effectively.

6.3.5 The Mediation Role of KM

The primary findings from correlation and regression analyses indicate TQM core elements to be significantly related to organizational performance. However, the inclusion of KM as mediator in the SEM model diminishes the relationship observed between TQM and organizational performance. Thus, the SEM analysis provided evidence supporting the role of KM in mediating the relationship between TQM and organizational performance. The most obvious finding to emerge from this study is that TQM does not affect organizational performance directly. It does so through KM.

In other words, TQM contributes positively and significantly to KM, and KM subsequently contributes to organizational performance. This finding implies that the higher extent of TQM implementation in educational organizations leads to significant increase in KM, and subsequently, the increasing in KM will increase organizational performance.

This resulted in a full mediation model that explains the relationship between TQM and organizational performance. Meaning that, there is no direct relationship between TQM and organizational performance, only through KM. In other words, the effect of TQM on organizational performance can be explained by the state of KM. As far as the researcher knowledge, no study has investigated the impact of TQM on KM with organizational performance in Iraqi HEIs context.

Through this study, the message that could be given to organizations implementing TQM, which can be summarized as follows: TQM will affect organizational performance through KM. Therefore, KM is an important mediator between TQM and organizational performance. This finding is completely new to previous research. Since TQM is an essential input, HEIs will implement KM well in order to enhance organizational performance. If HEIs cannot effectively implement TQM, it is uncertain that their performance will be improved.

This study proposes and tests a structural model that clearly articulates the role of various key variables (i.e., TQM, KM and OP) that in previous research received only partial and independent consideration. The major findings are discussed as follows. Indisputable, TQM as a management paradigm has been acknowledged for many years. However, the effectiveness of TQM depends on many factors. This study attempted to affirm the importance between TQM core elements and KM processes. From empirical evidence, the researcher found that HEIs require implementation of TQM core elements comprehensively, and accompany with KM processes; then organizational performance (in terms of academic achievement) will be improved. If one educational organization ignores the processes of KM, TQM will not effectively promote the organizational performance directly. Therefore, KM plays a bridge role to bond TQM and organizational performance in Iraqi HEIs context.

It should be noted that the findings of the simple regression and canonical correlation analyses indicated that TQM has strong correlation with OP; and the results of SEM exhibited structural contributions of TQM. Each of these findings has supported, in different ways, the interrelationship between TQM, KM and OP, and point to the need for further delineation. For this purpose, the work by Baron and Kenny (1986) is consulted where the authors have proposed the procedure for testing mediation using regression technique. The Baron and Kenny (1986) paper has been enormously influential in shaping how researchers think about mediation (Iacobucci et al., 2007).

According to Baron and Kenny (1986, p.1177), a variable is confirmed as a mediator if (1) there is evidence of a linear relationship between the IV (i.e., TQM) and the DV (i.e., OP); (2) there is a linear relationship between the IV (TQM) and the mediator (i.e., KM); and (3) the relationship between the IV (TQM) and the DV(OP) is reduced when the mediator (KM) is in the equation. If the relationship between the IV (TQM) and the DV (OP) goes to zero when the mediator (KM) is in the equation, mediation is said to be perfect (or full); if the relationship is diminished, but not to zero, mediation is said to be partial.

However, it is claimed that SEM is the more powerful technique than regression for testing mediation (Iacobucci et al., 2007; Hair et al., 2010; Kline, 2011). In particular, a variable in the SEM model can act as both independent and dependent variable. As in regression, the dependent variable (DV) regresses on the independent variable (IV), meaning that the DV is being predicted by the IV. In addition, the ability to analyze complex models (such as shown in Figure 5.1) in a single, unified process is a major advantage of SEM over regression model. Meanwhile, in regression, item loadings on the latent variables must be analyzed in a separate step (Iacobucci et al., 2007). Moreover, SEM analysis also generally results in a more rigorous variance analysis (Bollen, 1989; Kline, 2011), and enables the researcher to include not only the common variance but also specific and error variance explicitly in the research model (Hair et al., 2010). Hence, this study has employed a SEM technique to test the mediation role of KM in the relationship between TQM and OP.

It is important to note that the linear relationship between TQM and OP is not represented in the SEM approach, but it is generally implicit (James, Mulaik, & Brett, 2006). The linear relationship between TQM and OP is about the total effect of TQM on OP (Iacobucci et al., 2007; Schumacker & Lomax, 1996; Zhao, Lynch, & Chen, 2010). That is, it exactly equals the sum of the “indirect path” and the “direct path” in the SEM model. Specifically, the significant correlation between TQM and OP would be explained by the TQM – KM – OP sequence of relationships (Hair et al., 2006).

The result of SEM analysis suggested that KM fully mediate the relationship between TQM and OP, that is the relationship (direct path) between TQM and OP goes to zero when the three variables (TQM, KM, and OP) are hypothesized to occur in a causal sequence.

Based on the mediation analysis, it should be concluded that for TOM to affect OP, KM practices must present. Alternatively, KM practices must be implemented concurrently with TOM projects to ensure impact on OP. It means KM is a vital mechanism that leverages TQM influences on organizational performance. In fact, KM as a full mediator is not a surprising result, since the knowledge considered a hub of any higher-education institutions (Kidwell et al., 2000; Muhammad et al., 2011). In addition, KM is essential for facilitating the TQM program in the higher-education context, since TQM implementation involves making adjustments in the educational environment for the improvement of organizational performance (Davies et al., 2007; Venkatraman, 2007). Moreover, the mediation role of KM suggests that how well knowledge is managed is critically associated with how properly TQM values are translated into value to the educational organization, this because TQM enables KM practices effectively regarding the knowledge deployment in an organization (Colurcio, 2009), especially in knowledge-driven organizations like HEIs (Daud & Yusoff, 2011).

From another point, fundamental inputs for TQM are a combination of information and people; and to obtain the competitive advantage, the desired outcomes are involved to apply relevant knowledge as an intangible asset among the knowledge workers (academic staffs in HEIs). Thus, TQM as a knowledge-based approach will enlarge the capabilities of the educational organization to attain excellence achievement if KM implementation is in place.

6.4 Implications of the Study

The results of the current study have provided several implications for practitioners and academicians. These implications also serve as a recommendation to top management and contribution to the body knowledge to academia. The implications of this study can be divided into three aspects: theoretical contributions, robustness of research methodology, and practical contributions.

6.4.1 Theoretical Implication

The theoretical relationship postulated in the theoretical framework was empirically supported. The present study made a contribution to the existing theoretical knowledge from at least five diverse aspects. Firstly, this study provides a detailed and original analysis of TQM core elements and KM processes in the higher-education sector of Iraq (public universities). In the literature for public organizations, this study represents one of very few empirical researches investigating TQM and KM in service organizations. As mostly reported in the literature, past studies have essentially focused on manufacturing sector organizations (Ju et al., 2006; Molina et al., 2007; Ooi, 2009); and a lesser amount of focus was given to service organizations, especially academic organizations (Daud & Yusoff, 2011), thus, raising the issues of generalizability and applicability of the findings to educational sector organizations (Iraqi public universities). However, to the researcher's knowledge, this may be the first local empirical study, which examines the relationship between TQM and KM. This study has confirmed the relationship between TQM core elements and KM processes in Iraqi HEIs context.

Secondly, the findings from this study contribute to the empirical research on the relationship between TQM and organizational performance of higher-educational organizations in Iraq. The study support that TQM core elements (collectively) are positively associated with organizational performance. However, for TQM to affect organizational performance, KM practices must be present. It is also imperative to note that this study attempts to enrich the literature review and contribute in quality-related studies, especially in developing countries.

Within Iraqi HEIs context, the current findings add substantially to our understanding of the role of TQM implementation in enhancing organizational performance. In addition, this study also contributes to the management literature by combining various measures that capture the multi-dimensionality of organizational performance in terms of academic achievements. As widely reported, literature has limitedly focused on academic achievements (Koch & Fisher, 1998; Koh, 2003; Lim et al., 2004; Venkatraman, 2007).

Thirdly, the findings of this study contribute to the empirical studies on the relationship between KM and organizational performance of higher-educational organizations in Iraq. The results of this study also offer support on the relationship between KM and organizational performance. The findings demonstrate that KM is a holistic approach similar with TQM. The holistic approach of KM refers to the dependence among the processes of KM. This means that each process of KM is fundamental and crucial for successful KM implementation in Iraqi HEIs.

Fourthly, this study, to the researcher's knowledge, is the first piece of empirical research to investigate the mediating effect of KM on the relationship between TQM and organizational performance in the higher-education context.

Typically, prior studies examined TQM and KM individually. Meanwhile, this study is to investigate how TQM influence organizational performance through the presence of KM. In other words, the present study provides an important understanding for how organizations can enhance the possibilities for achieving better organizational performance if there is a sound management foundation like TQM and KM.

Finally, to provide a theoretical basis, the present study combined several theories namely, contingency theory, RBV, KBV, and complementarity theory. As explained in Chapter 3, in order to explain the relationship between TQM, KM, and organizational performance, the interrelationships between these latent variables are developed accordingly with these theories. The contingency theory assumes that a close linkage exists between TQM and organizational performance, if TQM core elements strategically fitting in the education context, and implemented holistically rather than piecemeal. The findings of the present study offer evidence to support the premise of contingency theory.

Other than that, as widely reported in literature, the RBV theory focuses on selecting the resources that can be strategically very essential in improving organization's performance and competitive advantage. According to RBV approach, TQM becomes a fundamental resource for maintaining competitive advantage and better performance in an organization. Therefore, the core elements of TQM are all resource-based, since they are tools for gaining competitive advantage. The philosophy of RBV-TQM strategy serves as guidelines to help in understanding the core elements that can maximize organization's performance through its holistic implementation. This explains better, the relationship between the RBV and TQM. In the same manner, according to KBV theory, KM is the equally tool of gaining competitive advantage, since all processes of KM are valuable, rare, inimitable, and non-substitutable, especially in HEIs, which considered knowledge-driven organizations.

Based on RBV literature, KM approach has focused on selecting a fundamental strategy, which including the specific practices that are intended to underpin organization's performance. Thus, the practices of both TQM and KM, were arranged by using the RBV and KBV perspectives, and those practices have been proven to be the powerful activities to enhance the organization's performance.

Regarding to the complementarity theory, this study strongly suggests that TQM core elements should be implemented collectively and comprehensively, because they are interdependent. In other words, each core element is essential and critical to the success in TQM implementation. In line with complimentarily perspective, this same interpretation could be applicable to the implementation of KM processes, since a holistic approach is needed for it to be effective. Its success requires a commitment with all its key processes, and so it may be difficult to determine which of them are responsible for the success. Thus, the complementarity theory offers a valuable standpoint to understand the synergistic relationships among TQM core element, and among KM processes.

For obtaining an overview, it should bring the compatibility between the theories used in this study, which can be summarized as follows:

- TQM would be imperfectly transferable, since TQM encourages the development of untradeable capabilities, developed by the organization and implemented holistically into the cooperative environment. TQM is specific to each organization since the core elements of TQM are valid in one organizational context, and the universalistic application of the same elements in a different context may not be effective.

- Benefits obtained with KM are difficult for other organizations to replicate, since the KM implementation depends on a series of mutually related processes developed by the organization and assigned into the holistic approach. Hence, it is not completely possible to discern the real process responsible for the KM success.

In summary, since the association between TQM core elements and KM processes are significant. The researcher strongly believes that TQM and KM are the keystones of the door to excellent performance. Therefore, in order to “pass this door”; TQM should put into practice holistically and KM as well. That is to say, the collaboration between TQM, KM and the integrated approach of the theories namely, contingency, RBV, KBV, and complimentarily, will boost up the organization to achieve an extraordinary performance.

6.4.2 Implication for Research Methodology

In terms of robustness of research methodology, the present study combined various past measurement studies in measuring the variables of TQM, KM and organizational performance. In addition, this study reported a rigorous analysis on the instrument validation. As discussed in Chapter 3 and Chapter 4 of this thesis, TQM, KM and organizational performance were among the regularly investigated constructs in the management literature.

Undeniably, there is a growing number of literature reviews on TQM in education. Most of the previous TQM-performance studies had limitedly relied on traditional testing procedures like Cronbach alpha coefficient and factor analysis. Meanwhile, KM and organizational performance construct has been almost anecdotal and less rigorously tested. Therefore, by extending the validation analysis to the confirmatory factor analysis (CFA), this study was able to contribute to management literature. The findings also contribute by using HEIs, which proves to be valuable as an example of a methodology that might be used to track the extent of TQM and KM effects on organizational performance.

This study also contributes to the literature by employing a SEM technique to investigate the structural relationships between TQM, KM and organizational performance. Even though SEM has become the preeminent statistical analysis in many social sciences research such as marketing and psychology research studies

(Marcoulides & Schumacker, 2009), this is not a case in management research studies. The present study extends the scope of SEM technique's usage.

In addition, there are a number of studies on sample size required by SEM techniques. This study was based on a relatively small sample size but has succeeded in gaining meaningful results using *parcels* technique with SEM model. Therefore, based on the work done in this study, for future research this should increase the confidence of researchers in using parcels technique in SEM studies, especially in small data studies.

A more general implication for management researchers concerns the investigation of highly correlated event. Multiple regression analyses as used by many of the past studies are inadequate when the independent variables are highly correlated, and may lead to erroneous conclusions. Therefore, future researchers are advised to pay attention to the collective impact of quality management core elements or knowledge management processes when doing analysis of the contribution of TQM or KM.

6.4.3 Practical Implication

From the practical implication, the results of this study should also be able to raise awareness among the academic leadership of the higher educational organizations on the importance of institutionalizing TQM in their colleges. This awareness should further be followed by increasing their commitment towards the implementation of TQM. The holistic approach of TQM has been widely discussed in the literature, particularly in TQM literature (e.g., Ahire et al., 1996; Kristal et al., Lim et al., 2004; 2010; Samson & Terziovski, 1999; Sila, 2007). In order to succeed in implementing this approach, the core elements should be implemented holistically because all the nine TQM core elements are interdependent, and they are equally imperative in enhancing organizational performance.

Broadly speaking, if HEIs want to reinforce their TQM program, they must focus on nine core elements: (1) leadership commitment; (2) strategic planning; (3) continuous improvement; (4) customer focus; (5) process focus; (6) employee involvement; (7) training and learning; (8) rewards and recognition; (9) management by fact.

In the aspect of the leadership commitment, this study suggests that academic leadership should focus on the following: prepares a clear mission statement; provides sufficient internal communication facilities; ensures using best teaching/learning methods; encourages a culture of accepting good innovations; eliminates any form of barrier between individuals/departments; and provides adequate resources to support educational quality.

In terms of the strategic planning, the present study suggests that academic leadership should focus on the following: encourages the information dissemination; clear description of learning process; giving priority to learning-process; emphasis on academic staff requirements; and tracking of staff performance. As part of the continuous improvement, this study suggests that academic leadership should focus on the following: institutes effective feedback system; proper documentation of quality assurance; continuous review of educational-quality issues; continuous evaluation of educational-quality strategies; and full integration of the quality assurance system in all aspects of the educational process.

In the aspect of customer focus, this study suggests that what academic leadership had to do are as follows: understanding students' requirements; the effective resolution of students' complaints; using students' complaints for improving the teaching process; and regular assessment of perceived students' satisfaction. While, in terms of the process focus, academic leadership should focus on the following: adding knowledge values to students; emphasis on effective educational delivery; guarantees value creation through educational facilities; maintaining a good lecturer-student relationship; and commitment towards the review of the teaching technique to meet the current standard.

For employee involvement, academic leadership should focus on the following: given required autonomy of job academic staffs; full involvement of academic staffs in planning of teaching/learning activities; encourages teamwork; using academic staffs' suggestions in the design a new educational services; good interaction between academic staffs and other HEIs components; and regularly assess of job satisfaction.

In the aspect of the training and learning, academic leadership must be taken into consideration the following points: frequently training to ensure quality in job-specific skills; focus on learning capabilities; training programs are aligned with college objectives; and provides sufficient training and learning resources. On the other hand, regarding the rewards and recognition, academic leadership must take care of the following: recognition of quality improvement efforts; a promotion system based on scholar's contributions; awards system focuses on quality of the educational process; and incentives for academic staffs to share their knowledge.

After all, in the aspect of the management by fact, this study suggests that the decision-makers should bear in mind the following: provides appropriate quality standards; measurement and analysis of the performance based on actual data; establishing reliable measures of customer’s satisfaction; clear definition of the quality indicators; and lastly, make sure that the database of the college well managed.

In addition, this study confirms that when TQM core elements are implemented integrally, higher level of KM processes can be achieved. Similarly, with TQM, several authors have supported the findings of this study regarding the importance of holistic implementation of KM such as Choy (2006) and Shankar & Gupta (2005). Academic leadership and academic partners can use these significant KM variables to obtain a better understanding of the existing KM processes and to assign responsibilities within the educational organization for achieving organization-wide improvements in KM implementation.

In more details, if higher-education organizations want to strengthen their KM, they must concentrate on five processes: (1) knowledge identification; (2) knowledge acquisition; (3) knowledge storage; (4) knowledge sharing; (5) knowledge application. In the aspect of knowledge identification, this study suggests that what academic leadership had to do are as follows: determining the knowledge gap between the existing and needed knowledge; discovering new professional knowledge; determining the knowledge sources; determining the best practices to achieve an excellent educational level; and supporting the technological techniques for enabling knowledge identification.

Either in connection with the knowledge acquisition, academic leadership should focus on the following: obtaining needed knowledge from best sources; converting existing knowledge into a valuable form for developing new educational service; utilizing feedbacks from experiences; updating particular knowledge possessed by all academic staffs; and generating helpful knowledge via virtual networking.

In the aspect of the knowledge storage, academic leadership must be taken into consideration the following: providing different types of knowledge (machine-readable and manual); supporting effective technology system for retrieval knowledge; replacing the outdated knowledge base; provide robust technology for restricting knowledge access; and creates strong procedures to protect the knowledge base.

In the aspect of the knowledge sharing, academic leadership must be mindful of the following: provide collaborative technologies for knowledge sharing; assurance of effective communication among academic staffs; creating a knowledge sharing culture; and supporting incentive system for sharing knowledge.

Lastly, in the aspect of knowledge application, the current study suggests that what academic leadership had to do are as follows: developing information technology systems; exploiting knowledge through innovative educational services; using appropriate knowledge to solve problems; the internalization of new knowledge before applying, establishing effective retrieval mechanisms; and applying the best practice.

From the practical implication, this study offers numerous suggestions to practitioners and academic leadership of educational organizations. This study allows practitioners and top management to gain deeper knowledge about the impact of TQM on KM and organizational performance.

In general, HEIs should be encouraged to implement TQM because the empirical evidence provided support of its ability to enhance KM and organizational performance. The message for academic leadership is that, TQM contributions toward KM and eventually organizational performance are remarkable. Hence, those educational organizations implementing TQM will benefit in the long-term period. In line with this argument, Sallis and Jones (2002) revealed that the key driver behind the organizational success in the higher-education context is integrated system of TQM and KM.

In addition, to measure the extent of TQM core elements and KM processes in an organization, questionnaire provided through this study can be used to assess and justify the managerial activities that should be improved in order to enhance the better organizational performance. Lastly, this study provides a useful perspective for educational organizations throughout the world to understand and corroborate the potential benefits that TQM and KM can bring if adopted.

The researcher hopes that any suggestions and ideas give will help academic leadership steer their organizations towards being more valuable and successful. In addition, constituting and supporting both TQM and KM as management paradigms in higher-education organizations are actually a very brilliant choice in order to enhance their performance and obtains the competitive advantage. It is hoped, that the academic leadership and other educational partners can drive the organization with actively supporting into the integrating approach of TQM and KM simultaneous; and searching for ways to eliminate obstacles to continuously improving the educational process.

6.5 Limitation of the Study

As another reported scientific research, this study is not without limitations, and it is essential to identify these limitations clearly. For the greatest benefit, limitations of this study should be considered when interpreting its results or before drawing any implications from its results. However, three important limitations of the present study need to be addressed in terms of generalizability, methodology and causality.

In terms of generalizability, the findings of this study cannot be generalized in a wider context across cultures of other countries since the data collected for this study was limited to Iraqi HEIs. Different cultures and different educational environments may furnish different impact of TQM and KM on organizational performance. In addition, the population size of the study is limited to only those colleges within public universities, which are listed in the MHESR-I directory. Therefore, other educational organizations not listed in the directory could not be selected for the sample of this study. However, the researcher believes the findings as well as the instruments developed for this study can also benefit them, as there are many similarities in the work processes among the educational organizations.

In terms of methodology, this study selected the top management of the college as a single key respondent from each college understudied. As with all survey research, an assumption in data collection was that the respondents had sufficient knowledge to answer the questionnaire, and that, respondents answered the measurement items carefully and truthfully. Even though the key respondent who can present the best information, the accuracy of self-perception might be influenced by the respondent's experience in the management of the organizations. Therefore, although the questionnaire pre-tested and passed the validity and reliability test, respondents' interpretations may have differed from that intended.

In addition, this study also used subjective self-reported perceptual measures to measure theoretical constructs of organizational performance. Although extra care was taken to ensure validity as well as the reliability of the construct of assessing their construct validity and reliability, future research could benefit from the use of more objective data. Future research can also use the combination of perceptual and objective measures to provide a convincing conclusion regarding the organizational performance construct.

In terms of causality, this survey study used a cross-sectional sample made at one particular point in time. Accordingly, while the causal relationship can be inferred, they cannot be rigorously confirmed. As broadly discussed in the literature, both TQM and KM are long-term initiatives. Thus, the implementation of these paradigms needs long-term commitment, and their benefits sometime cannot be realized in a short term. Given that, the relationship between TQM, KM and organizational performance can be analyzed relative to the time of their implementations. In other words, a longitudinal study would be essential to accurately test the effects of TQM and KM on organizational performance of HEIs.

6.6 Suggestions for Future Research

To overcome the limitations of the study, this study has thrown up several questions in need of further investigation. In this study, the data were collected using a cross-sectional approach using a set of the questionnaire as a study instrument. Thus, further work needs to be done to establish the effects of changes over a longer period of time in the aspects of TQM core elements and KM processes.

In addition, this study provides some insights in the resource-based view. It reveals that the resources in an organization may be hierarchical. KM may be one-step closer to organizational performance in the paths leading from TQM to organizational performance. Further investigation is needed to examine this suggestion by conducting a longitudinal study. Longitudinal study enables researchers to investigate the composite relationship between various variables. As for the issue of the relationship between TQM, KM and organizational performance, the longitudinal study can also explain the practices by which a process of KM develops and changes in response to TQM core elements, and how they impact influences organizational performance.

Since the current study employed quantitative approach in the design and analysis, the information gathered is limited to the questionnaire responses. The application of qualitative technique should be included in future research. A case study is one potential approach of qualitative techniques that can be applied by future studies.

Thus, as a case study research provides the potential for a deeper investigation of the procedure involved in the relationship between TQM, KM, and organizational performance.

Moreover, the results of this study would be more meaningful if both quantitative and qualitative methods are employed since both can complement each other. Another limitation of this study is that a single respondent was used for both dependent and independent items in this thesis.

This study relies on self-reported data from single informants, which introduces the potential for common method variance (CMV). To address the issue of CMV, as recommended by Podsakoff et al. (2003), the researcher conducted *Harman's single-factor test*, a widely used test for CMV.

The procedure requires entering simultaneously all study variables into an exploratory factor analysis; and examines the unrotated factor solution to determine the number of factors that are necessary to account for the variance in the variables. The results of the unrotated factor analysis on 16 variables (i.e. 9 core elements of TQM, 5 KM processes, and 2 OP measures) indicated the presence of three factors, the same number of the factors included in the model of this study. In addition, the first factor explained 28% of the variance, and there was no general factor in the unrotated factor structure, indicating that common methods bias may not be a serious problem in the data. Briefly, the results of Harman's single-factor test indicate the sample lacked a significant presence of CMV. However, although the CMV is not a serious problem in this study, future studies can consider collecting multiple sources of data to ensure the most precise results.

The sample of the study is limited to Iraqi HEIs. Further research should consider replicating this study in other cultures or countries, especially on the mediating effects of KM. In addition, future research is also needed to be carried out in other service sectors (such as banking sector) or manufacturing sector.

Finally, it is hoped that this study would encourage or at least inspire interest towards future research in the similar domain, as more research in this matter is required. It is also hoped; the current study can contribute to the higher-educational organizations throughout the world, not only the developing countries but also developed countries.

6.7 Conclusion

As a conclusion, issues of the organizational performance of HEIs will remain a vital agenda for academic leaderships, academicians, researchers, local governments, and society. The findings of this study strongly suggest that TQM and KM are significant practices for enhancing the organizational performance of HEIs.

This study contributes to the understanding of the relationship between TQM, KM and organizational performance. The results of the study indicate that both TQM core elements and KM processes must be implemented holistically, not individually. TQM core elements related to leadership commitment, strategic planning, continuous improvement, customer focus, process focus, employee involvement, training and learning, rewards and recognition, and management by fact contributes significantly to KM processes and organizational performance. Most importantly, the evidence suggests that KM fully mediates the effects of TQM on organizational performance.

The findings of this study have the theoretical and practical contribution. From the theoretical standpoint, the results acquired from this study were consisting with theories and earlier literature, which advocated these theories. The empirical evidence from this study contributes to the body of knowledge in the fields of TQM and KM as well.

From a practical perspective, the results of this study strongly suggest the establishment of TQM core elements as a solid strategy for OP improvement. On the other hand, TQM has a significant impact on KM, which in turn significantly affect organizational performance. Given this important role of KM, the findings of this study also suggest that HEIs implement TQM must be willing to make improvements in KM processes if they wish to improve the performance of their organizations effectively. In other words, the empirical findings of this study provided evidence that the significant success of implementing TQM core elements comprehensively could be yielded by having a holistic approach of KM processes.

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APPENDICES

Appendix A: Letter for Conducting Data Collection/Survey

UNIVERSITI UTARA MALAYSIA

06010 UUM Sintok, Kedah Darul Aman, Malaysia. Tel: 604 - 928 4000

College of Business

"KEDAH SEJAHTERA"

UUM/COB/A-3 (91854)

October 27, 2010

TO WHOM IT MAY CONCERN

Dear Sir/Madam

DATA COLLECTION

PROGRAMME : DOCTOR OF PHILOSOPHY (MANAGEMENT)
1ST SUPERVISOR : ASSOC. PROF. DR. LIM KONG TEONG
2nd SUPERVISOR : DR. SITI NOREZAM OTHMAN

This is to certify that the following is a postgraduate student from the College of Business, Universiti Utara Malaysia. He is pursuing the above mentioned course which requires him to undertake an academic study at any organization. The details are as follows:

NO.	NAME	MATRIC NO.	THESIS TITLE
1.	Ammar Abdulameer Ali	91854	The Impact of TQM on KM and Organizational Performance: An Empirical Study of HEIs in Iraq

In this regard, I hope that you could kindly provide assistance and cooperation for him to successfully complete the assignment given. All the information gathered will be strictly used for academic purposes only.

Your cooperation and assistance is very much appreciated.

Thank you.

"ILMU BUDI BAKTI"

Yours faithfully,

ROSLEE BIN MARDAN
Assistant Registrar
College of Business

c.c - Student's File (91854)

MSC MALAYSIA Status Institution

Appendix B: Questionnaire

Appendix B.1: Questionnaire (English)

UNIVERSITI UTARA MALAYSIA
COLLEGE OF BUSINESS (COB)

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S U R V E Y

SURVEY QUESTIONNAIRE TO DETERMINE THE IMPACT OF TOTAL QUALITY MANAGEMENT ON KNOWLEDGE MANAGEMENT AND ORGANIZATIONAL PERFORMANCE IN IRAQI HIGHER EDUCATION INSTITUTIONS

General Information

This study is a PhD research to determine Total Quality Management (TQM) impact on Organizational Performance (OP) through Knowledge Management (KM) in Iraqi Higher Education Institutions (HEIs). The researcher believed that the outcome of the study will be of immense benefit to improve the performance in the Iraqi higher educational system as a whole. Your effort in filling the questionnaire is highly appreciated in order to produce quality of research.

Instruction

You are expected to choose the answer that represents your opinion. Your answer plays a significant role in the success of this study and you are assured that such information will be treated with **utmost confidentiality**. (Please tick (✓) in the appropriate box).

Thanks for participating in this survey.

Researcher
Ammar Abdulameer Ali Zwain
College of Business (COB)
University of Utara Malaysia

Supervisors
Assoc. Prof. Dr. Lim Kong Teong
& Dr. Siti Norezam Othman
COB, University of Utara Malaysia

Part (A): Respondent Background

Please, Tick (√) as appropriate as follow:

1- Designation of Respondent (Job Title):

Dean ☐ Assistant Dean ☐ Others ☐ please specify…………........

2- Respondent Gender:

Male ☐ Female ☐

3- Respondent Age:

Less than 30 years ☐ 30- 39 ☐ 40 – 49 ☐ 50 – 59 ☐ 60 and over ☐

4- Academic Rank:

Professor ☐ Assistant Professor ☐ Senior Lecturer ☐

Others ☐ please specify……………………………………………………………

5- Number of Years Serving in the College:

Less than 1 year ☐ Between 1 to 3 years ☐ More than 3 years ☐

6- Number of Years Serving in the Current Position:

Less than 1 year ☐ Between 1 to 3 years ☐ More than 3 years ☐

Please supply the following information:

Name of University: …………………………………………………………

College Name: ……………………………………………………………….

Part (B): *The Core Elements of TQM*

This section focuses on quality practices of the educational process in the college. It addresses the core elements of Total Quality Managements (TQM) representing each of the dimensions.

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

1. **Leadership Commitment:** leadership commitment is an important aspect of organizational behavior exercised by the leadership of the organization towards long-term commitment aimed at integrating quality practices within the organization's activities to improve the teaching and learning process. The organization under study is an academic college.

No.	Items/Questions	Scale				
		1	2	3	4	5
1	In our college, the academic leadership provides sufficient internal communication facilities for effective deployment of quality teaching and learning.	1	2	3	4	5
2	In our college, the academic leadership ensures using the best teaching and learning method for achieving educational quality.	1	2	3	4	5
3	In our college, the academic leadership encourages innovative change and implements a culture of trust, involvement and commitment to achieve the best educational practice.	1	2	3	4	5
4	In our college, the academic leadership has a sense of unity and eliminates any form of barrier between individuals/departments.	1	2	3	4	5
5	In our college, the academic leadership assumes responsibilities for quality performance.	1	2	3	4	5
6	In our college, the academic leadership considers quality teaching a top priority in their regular meetings.	1	2	3	4	5
7	In our college, the academic leadership encourages information sharing across the college.	1	2	3	4	5
8	In our college, the academic leadership provides adequate resources in order to support educational quality.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

2. **Strategic Planning:** strategic planning is a process of planning, designing and coordinating organizational activities by the leadership of the organization. This core element focused on how the academic leadership strategically plans to achieve the organizational objective (educational process development).

No.	Items/Questions	Scale				
1	In our college, the leadership formulates a clear mission statement capable of achieving the set educational objectives.	1	2	3	4	5
2	In our college, the strategic planning ensures proper identification of core learning-centered processes by academic leadership.	1	2	3	4	5
3	In our college, the strategic planning considers the core learning-centered processes as central input.	1	2	3	4	5
4	In our college, the strategic planning takes into account the students requirements.	1	2	3	4	5
5	In our college, the strategic planning is able to provide clear tracking of staff performance.	1	2	3	4	5
6	Our college has clear quality goals.	1	2	3	4	5

3. **Continuous Improvement:** continuous improvement is an incremental change and series of system innovation designed and implemented to make sure that all educational activities have improved.

No.	Items/Questions	Scale				
1	Continuous improvement of the educational process is based on a systematic approach.	1	2	3	4	5
2	Our college continually looks for ways to improve the teaching/learning processes.	1	2	3	4	5
3	There are an effective feedback system for education quality improvement and quality assurance.	1	2	3	4	5
4	Quality assurance system of education is documented properly.	1	2	3	4	5
5	There is a continuous review of educational quality-related issues at the academic leadership meetings.	1	2	3	4	5
6	There is a continuous evaluation of educational quality-related strategies.	1	2	3	4	5
7	Quality assurance as a mechanism for continuous improvement is integrated in all aspects of the educational process.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

4. <u>Customer Focus:</u> customer focus is one of the core elements of TQM that stresses the importance of knowing and understanding customers' wants and needs. This study focuses on "students" as primary customers of HEIs.

No.	Items/Questions	Scale				
1	Our college, actively seeking students' inputs to determine their requirement (survey, suggestion, box, etc.).	1	2	3	4	5
2	The students' requirements are well understood.	1	2	3	4	5
3	The suggestions of the students are taken into account when designing new educational services.	1	2	3	4	5
4	There is an effective procedure for resolving students' problems.	1	2	3	4	5
5	Students' complaints are used as a means of improving the current teaching/learning process.	1	2	3	4	5
6	There is a regular assessment of students' satisfaction.	1	2	3	4	5

5. <u>Process Focus</u>: this element refers to the responsibility of the college in terms of emphasis placed on the educational process.

No.	Items/Questions	Scale				
1	The educational process is designed in such a way that it adds value to students.	1	2	3	4	5
2	Newly introduced teaching/learning process is critically examined prior to its actual implementation.	1	2	3	4	5
3	Emphasis is placed on effective educational delivery concerning quality.	1	2	3	4	5
4	The necessities of the teaching/learning process are totally provided to guarantee value creation for students.	1	2	3	4	5
5	Good relationship between academic staffs and students is maintained.	1	2	3	4	5
6	The college is committed to the review of the traditional teaching and learning technique to meet the current standard.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

6. <u>Employee Involvement</u>: employee involvement in this study refers to involving academic staff in the educational quality improvement process.

No.	Items/Questions	Scale				
1	The academic staffs are given required autonomy in making decisions related to their work.	1	2	3	4	5
2	The academic staffs are fully involved in planning their work.	1	2	3	4	5
3	The academic staffs as a team are encouraged to fix the problems encountered in their work.	1	2	3	4	5
4	The academic staffs are actively involved in the college's policy of quality improvement.	1	2	3	4	5
5	The academic staffs interact well with other components of the organization through effective communication links.	1	2	3	4	5
6	The suggestions of the academic staff are integrated in the design of new educational services.	1	2	3	4	5
7	There is a regular appraisal of academic staff' job satisfaction at work.	1	2	3	4	5

7. <u>Training and Learning</u>: training and learning is one of the most important elements of TQM, which involves planning and combining the efforts in improving the required skills that guarantee successful achievement of educational quality improvement.

No.	Items/Questions	Scale				
1	The academic staffs are frequently trained to ensure quality in job-specific skills.	1	2	3	4	5
2	The academic staffs are able to learn from one another on how to improve the quality of educational services.	1	2	3	4	5
3	The training and learning programs look at how academic staffs are aligned with college objectives.	1	2	3	4	5
4	The college provides sufficient resources to support training and learning activities.	1	2	3	4	5
5	Our college provides training in Quality principles.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

8. <u>Rewards and Recognition</u>: this element refers to practices of the college in awarding and praising academic staffs who have demonstrated unprecedented level of performance on their jobs.

No.	Items/Questions	Scale				
1	In our college, the top management is able to recognize quality improvement efforts.	1	2	3	4	5
2	The acknowledgements system in our college is based on educational quality-oriented objectives.	1	2	3	4	5
3	In our college, the promotion system for academic staffs is based on scholarly contribution.	1	2	3	4	5
4	The awards system in our college focuses on the quality of the educational process in order to motivate academic staffs for superior quality performance.	1	2	3	4	5
5	The college offers incentives for academic staffs to share knowledge on educational quality-related issues.	1	2	3	4	5

9. <u>Management by fact</u>: this element refers to managing the educational level of performance based on facts and evidences.

No.	Items/Questions	Scale				
1	Our college provides appropriate quality standards, capable of dealing with the consequences of the educational process.	1	2	3	4	5
2	Measurement and analysis of college performance is based on the college's objective and strategy.	1	2	3	4	5
3	In our college, reliable measures of customer's satisfaction and quality indicators are established.	1	2	3	4	5
4	Improving education quality is achieved with decisions of academic leadership based on facts and evidences.	1	2	3	4	5
5	In our college, the academic leadership ensures using reliable data, information, and knowledge for improving educational quality.	1	2	3	4	5
6	The measurement of college performance is based on actual data and systematic analysis.	1	2	3	4	5
7	The application of database (such as data related to students' satisfaction, academic performance, students' complaints) for planning and managing all aspects of work affecting educational quality are well managed.	1	2	3	4	5

Part (C): *Knowledge Management Processes*

This section focuses on the five knowledge management processes to be considered in this study, which includes knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. It addresses how these processes contribute to the performance of the educational organization in terms of teaching and learning process.

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

1. **Knowledge Identification**: knowledge identification is a process of determining and evaluating explicit knowledge or discovering new knowledge based on current experience in a specific field (educational process).

Knowledge identification for the education process improvement inside our college involves;

No.	Items/Questions	Scale				
1	benchmarking performance for educational process outcomes continuously.	1	2	3	4	5
2	determining the knowledge gaps between the existing and needed knowledge about the education process.	1	2	3	4	5
3	discovering professional knowledge about new educational services (such as curriculum, available courses, requirements and so on) from different sources.	1	2	3	4	5
4	discovering and locating new knowledge sources.	1	2	3	4	5
5	determining the best practices to achieve excellent educational level.	1	2	3	4	5
6	supporting the technological architecture for enabling knowledge identification.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

2. **<u>Knowledge Acquisition</u>**: knowledge acquisition is a process oriented to obtain the needed knowledge from both internal and external sources to improve the educational process.

Knowledge acquisition for the education process improvement inside our college involves;

No.	Items/Questions	Scale				
1	obtaining needed knowledge from best external sources (leading universities).	1	2	3	4	5
2	converting existed knowledge into a useful form for developing new educational service.	1	2	3	4	5
3	absorbing academic staff's knowledge into college's database	1	2	3	4	5
4	utilizing feedback from previous experiences.	1	2	3	4	5
5	updating particular knowledge possessed by all academic staffs on a regular basis.	1	2	3	4	5
6	generating useful knowledge via virtual networking in a virtual learning environment.	1	2	3	4	5

3. **<u>Knowledge Storage</u>:** this process includes coding, recording, maintaining, and protecting diverse types of explicit knowledge related to the educational process in the specific knowledge database.

Knowledge storage for the education process improvement inside our college involves;

No.	Items/Questions	Scale				
1	coding and recording different types of relevant knowledge (machine-readable and manual) from various sources.	1	2	3	4	5
2	supporting knowledge storage process with an effective technological system for easy referencing and retrieval.	1	2	3	4	5
3	constantly replacing outdated knowledge from the information resides in college database.	1	2	3	4	5
4	robust technology that restricts access to some sources of knowledge.	1	2	3	4	5
5	strong procedures and policies to protect organizational knowledge from inappropriate utilize.	1	2	3	4	5

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

4. **Knowledge Sharing:** knowledge sharing is a fundamental process of KM; it refers to exchange of explicit knowledge about the educational process from one source to another.

Knowledge sharing for the education process improvement inside our college involves;

No.	Items/Questions	Scale				
1	exchanging knowledge from one department to another.	1	2	3	4	5
2	providing collaborative technologies (such as internet & intranet) that allows knowledge sharing.	1	2	3	4	5
3	guaranteeing effective communication among academic staff about new ideas, programs and activities useful to the college.	1	2	3	4	5
4	incorporating a reliable knowledge sharing culture.	1	2	3	4	5
5	rewards and incentives system for making necessary knowledge sharable.	1	2	3	4	5

5. **Knowledge Application:** knowledge application is a process that indicates actual utilization of the relevant knowledge about the educational process.

Knowledge application for the education process improvement inside our college involves;

No.	Items/Questions	Scale				
1	developing an information technology system to support the process of knowledge application.	1	2	3	4	5
2	employing knowledge learnt from the experiences of academic staffs to sustain competitive advantage.	1	2	3	4	5
3	exploiting knowledge in the development of new educational services.	1	2	3	4	5
4	using appropriate knowledge to solve problems.	1	2	3	4	5
5	effective retrieval mechanisms that make knowledge accessible to those who need it.	1	2	3	4	5
6	internalization (understand and take in) of new knowledge by academic staff before they are applied.	1	2	3	4	5
7	applying the best practice that adopted from leading organizations.	1	2	3	4	5

Part (D): *Organizational Performance*

This section examines the level of performance of the academic college through two main perspectives of achievements namely students related academic achievement and non- students related academic achievements.

On the following scale, please circle the appropriate number which best reflect your perception.

(1) Strongly Disagree	(2) Disagree	(3) Neutral	(4) Agree	(5) Strongly Agree

1. Students related Academic Achievements

No.	Items/Questions	Scale				
1	***Academic Status* (CPA):** Students' cumulative point average has indicated an excellent academic performance over the past three years.	1	2	3	4	5
2	***Undergraduates Wastage Rate:*** The percentage of undergraduates who drop out because of not meeting the required academic standards over the past three years is decreasing.	1	2	3	4	5
3	***Classes of Degrees*:** The percentage of graduates with a first-class and second-class upper division honors degree is increasing.	1	2	3	4	5
4	***Graduation Rates*:** The percentage of undergraduates who successfully completed their studies in our college over the past three years is increasing.	1	2	3	4	5
5	Our college's students overall academic achievements over the past three years are encouraging.	1	2	3	4	5

2. Non- students related Academic Achievements

No.	Items/Questions	Scale				
1	***Competitive Position*:** Our College is highly ranked over the past three years.	1	2	3	4	5
2	***Market Share*:** The percentage of undergraduates applicants received in our college is significantly higher compared to other colleges over the past three years.	1	2	3	4	5
3	***Innovation*:** Our College is innovative in improving the educational process over the past three years.	1	2	3	4	5
4	***Organizational Agility*:** Our College adapts to changes effectively with respect to the educational partners and stakeholders' needs in the past three years.	1	2	3	4	5
5	***Sustainability*:** Our College puts in place strategies to sustain and enhance the educational performance level over the past three years.	1	2	3	4	5

Thanks for your patience in filling the questionnaire

Appendix B.2: Questionnaire (Arabic)

جامعة الشمال (أوتارا) الماليزية
كلية الاعمال
سنتوك – ماليزيا
البريد الالكتروني: amalizw@yahoo.com
الهاتف: 009647811364212
0060149055214

استبانـة

استبيان لتحديد أثر إدارة الجودة الشاملة على ادارة المعرفة والأداء التنظيمي في مؤسسات التعليم العالي العراقية

معلومات عامة:
هذه الدراسة هي بحث دكتوراه لتحديد أثر أدارة الجودة الشاملة على الاداء التنظيمي من خلال أدارة المعرفة في مؤسسات التعليم العالي العراقية . ومن المؤمل ان تكون نتائج الدراسة ذات فائدة كبيرة في تحسين اداء نظام التعليم العالي ككل في العراق. جهودكم في ملئ الاستمارة هي موضع تقدير عالٍ لدى الباحث من أجل تحقيق جودة للبحث.

تعليمات :
من المتوقع أن تختار الإجابة التي تمثل رأيك. جوابك يلعب دورا هاما في نجاح هذه الدراسة، علماً أن هذه المعلومات سيتم التعامل معها **بسرية تامة**. (يرجى وضع علامة (✓) في المربع الذي يمثل اجابتك).

شكرا لمشاركتكم في هذا الاستبيان

الباحث
عمار عبد الاميرعلي زوين
كلية الاعمال
جامعة الشمال (اوتارا) الماليزية

المشرفين
أ م د. ليم كونك تيونك
د. سيتي نوريزام عثمان
كلية الاعمال
جامعة الشمال (اوتارا) الماليزية

القسم الاول: خلفية المستجيب

يرجى وضع علامة (✓) في المربع الملائم

1) تعيين المستجيب (المنصب الوظيفي):

عميد ☐ مساعد العميد ☐ منصب آخر ☐ يرجى التحديد ....

2) جنس المستجيب:

ذكر ☐ أنثى ☐

3) عمـر المستجيب:

أقل من 30 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60 فأكثر ☐

4) اللقب الاكاديمي:

أستاذ ☐ أستاذ مساعد ☐ مدرس ☐ مدرس مساعد ☐

منصب آخر ☐ يرجى التحديد ....

5) عدد سنوات الخدمة في الكلية:

أقل من سنة ☐ أكثر من سنة ☐ أكثر من ثلاث سنوات ☐

6) عدد سنوات الخدمة في المنصب الحالي:

أقل من سنة ☐ أكثر من سنة ☐ أكثر من ثلاث سنوات ☐

يرجى توفير المعلومات التالية:

إسم الجامعة: ....

إسم الكلية: ....

القسم الثاني: العناصر الجوهرية للادارة الجودة الشاملة
The Core Elements of TQM

هذا القسم من الاستبيان يركز على ممارسات اداره الجودة في الكلية و المتعلقة بالعملية التعليميه. وتلك الممارسات موجه بالعناصر الجوهرية للادارة الجودة الشاملة.

على المقياس التالي، يرجى وضع دائرة على الرقم المناسب الذي يمثل اجابتك

(1) غير متفق بشدة	(2) غير متفق	(3) محايد	(4) متفق	(5) متفق بشدة

1. التزام القيادة العليا (tnemtimmoC pihsredaeL): وهو شكل او مظهر من السلوك التنظيمي يمارس من قبل القيادة العليا في المنظمة من اجل التزام طويل الامد يهدف الى دمج وتعزيز ممارسات الجودة داخل انشطة المنظمة من اجل تحسين العملية التعليمية. كما ان المنظمة المعنية بالدراسة ه ي الكلية.

في كليتنا،

ت	الاسئلة	المقياس				
1	القيادة الاكاديمية تهئ تسهيلات كافية للاتصال الداخلي لضمان نشر فاعل لجودة التعليم.	1	2	3	4	5
2	القيادة الاكاديمية تؤكد على استخدام أفضل الطرق التدريسية من اجل تحقيق جودة التعليم.	1	2	3	4	5
3	القيادة الاكاديمية تشجع التغيير الابداعي وتطبق ثقافة المشاركة والثقة والالتزام لتحقيق أفضل الممارسات التعليمية.	1	2	3	4	5
4	القيادة الاكاديمية لديها دراك بالوحدة والقدرة على ازالة العوائق بين الافراد والاقسام العلمية.	1	2	3	4	5
5	القيادة الاكاديمية تضطلع بمسؤلياتها في اداء الجودة.	1	2	3	4	5
6	القيادة الاكاديمية تضع جودة التدريس في قمة الاولويات في اجتماعاتها الدورية.	1	2	3	4	5
7	القيادة الاكاديمية تشجع تشارك المعلومات عبر الكلية.	1	2	3	4	5
8	القيادة الاكاديمية تهيئ موارد كافية من أجل دعم جودة العملية التعليمية.	1	2	3	4	5

2. التخطيط الاستراتيجي (gninnalP cigetartS): التخطيط الاستراتيجي هي عملية تخطيط ، تصميم وتنسيق انشطة المنظمة بـواسطة القيادة العليا في المنظمة ، وهي تركز على كيفية قيام القيادة العليا بالتخطيط ستراتيجياً لتحقيق الاهداف التعليمية.

في كليتنا،

ت	الاسئلة	المقياس				
1	القيادة العليا لديها صياغة واضحة لمهمة الكلية قادرة على احتواء مجموعة الاهداف التعليمية.	1	2	3	4	5
2	التخطيط الاستراتيجي يضمن تحديد ملائم لجوهر العمليات المرتكزة على جودة التعليم بواسطة القيادة الاكاديمية.	1	2	3	4	5
3	التخطيط الاستراتيجي يعد متطلبات جودة التعليم هي مدخلات اساسية.	1	2	3	4	5
4	التخطيط الاستراتيجي يأخذ بالحسبان احتياجات الطلبة.	1	2	3	4	5
5	التخطيط الاستراتيجي قادر على توفير متابعة واضحة الاداء العاملين.	1	2	3	4	5
6	كليتنا لديها أهداف جودة واضحة.	1	2	3	4	5

على المقياس التالي، يرجى وضع دائرة على الرقم المناسب الذي يمثل اجابتك

(1) غير متفق بشدة	(2) غير متفق	(3) محايد	(4) متفق	(5) متفق بشدة

3. التحسين المستمر (tnemevorpmI suounitnoC): التحسين المستمر هي عملية التغير المتزايد وسلسلة من نظام ابداعي مصممة ومنفذة للتأكد من إن العملية التعليمية قد تم تحسينها.

في كليتنا،

ت	الاسئلة	المقياس				
1	التحسين المستمر للعملية لتعليمية يستند على مدخل نظمية.	1	2	3	4	5
2	يتم البحث باستمرار عن أفضل الطرق لتحسين العملية التعليمية.	1	2	3	4	5
3	هنالك نظام تغذية عكسية فاعل لضمان جودة التعليم.	1	2	3	4	5
4	نظام ضمان الجودة للعملية التعليمية موثق بشكل دقيق.	1	2	3	4	5
5	هنالك مراجعة مستمرة للقضايا المرتبطة بجودة التعليم في اجتماعات القيادة الاكاديمية.	1	2	3	4	5
6	هنالك تقييم مستمر للاستراتيجيات المرتبطة بجودة التعليم.	1	2	3	4	5
7	ضمان الجودة كآلية للتحسين المستمر هي مدمجة في كل مكونات العملية التعليمية.	1	2	3	4	5

4. التركيز على الزبون (Customer Focus): وهو أحد العناصر الجوهرية لادارة الجودة الشاملة التي تركز على معرفة و فهم احتياجات ومتطلبات الزبون. وفي هذه الدراسة تم التركيز على الطالب باعتباره الزبون الاساسي في اي مؤسسة تعليمية.

في كليتنا،

ت	الاسئلة	المقياس				
1	يجري بشكل فاعل تحديد لاحتياجات الطلبة (الاستبيانات، صندوق الاقتراحات،..الخ).	1	2	3	4	5
2	متطلبات الطلبة مفهومة بشكل جيد.	1	2	3	4	5
3	اقتراحات الطلبة تؤخذ بالحسبان عند تصميم خدمات تعليمية جديدة.	1	2	3	4	5
4	هناك إجراءات فعلية لحل مشاكل الطلبة.	1	2	3	4	5
5	شكاوي الطلبة تستخدم كوسيلة لتحسين العملية التعليمية.	1	2	3	4	5
6	هناك تقييم دوري لرضى الطلبة.	1	2	3	4	5

5. **التركيز على العملية (Process Focus):** هذا العنصر يشير الى مسؤلية الكلية من حيث التركيز على العملية التعليمية باعتبارها العملية الاساسية في الكلية.

في كليتنا،

ت	الاسئلة	المقياس				
1	العملية التعليمية مصممة بطريقة تضيف قيمة للطلبة.	1	2	3	4	5
2	برامج التدريس الحديثة يجري اختبارها مسبقاً قبل تنفيذها فعلياً.	1	2	3	4	5
3	التأكيد على التوصيل التعليمي الفاعل ذو الصلة بالجودة.	1	2	3	4	5
4	الضروريات المصاحبة لعملية التدريس يتم تهيئتها بالكامل من اجل توليد قيمة للطلبة .	1	2	3	4	5
5	العلاقات الجيدة بين الكادر التدريسي والطلبة مصانة .	1	2	3	4	5
6	يجري تقييم ومراجعة لتقنيات التدريس المستخدمة حاليا لتأكد من مطابقتها للمعايير المستجدة حديثاً.	1	2	3	4	5

6. **مشاركة الموظف (Employee Involvement):** يركز هذا العنصر الى مشاركة الكادر التدريسي بشكل فاعل في تحسين العملية التعليمية.

في كليتنا،

ت	الاسئلة	المقياس				
1	يعطى الكادر التدريسي الاستقلالية المطلوبة في اتخاذ القرارات المتعلقة بعملهم.	1	2	3	4	5
2	الكادر التدريسي مشتركين بشكل كامل في تخطيط أعمالهم.	1	2	3	4	5
3	يتم تشجيع الكادر التدريسي على حل المشاكل المتعلقة بعملهم كفريق عمل.	1	2	3	4	5
4	الكادر التدريسي مشترك بشكل فعلي في سياسة الكلية لتحسين الجودة.	1	2	3	4	5
5	الكادر التدريسي يتفاعلون بشكل جيد مع بقية الاعضاء من خلال قنوات اتصال فاعلة.	1	2	3	4	5
6	اقتراحات التدريسيين مدمجة في تصميم خدمات تعليمية جديدة	1	2	3	4	5
7	هنالك تقييم دوري لرضى الكادر التدريسي (الرضى الوظيفي).	1	2	3	4	5

7. **التدريب والتعليم (Tgniniar & gninraeL):** التدريب والتعليم هي واحدة من اهم العوامل الجوهرية لادارة الجودة الشاملة , وهي عملية تستلزم التخطيط وتكثيف الجهود في تحسين المهارات المطلوبة التي تضمن تحسين ناجح لجودة التعليم.

في كليتنا،

ت	الاسئلة	المقياس				
1	الكادر التدريسي يتدرب بأستمرار لضمان الجودة في المهارات المهنية التخصصية.	1	2	3	4	5
2	التدريسيون قادرون على التعلم من بعضهم البعض حول كيفية تحسين جودة الخدمة التعليمية.	1	2	3	4	5
3	برامج التدريب والتعليم للتدريسسين موجهه نحو تحقيق اهداف الجودة.	1	2	3	4	5
4	يتم تهيئ موارد كافية لدعم انشطة التدريب والتعليم.	1	2	3	4	5
5	برامج التدريب مهيئة على مبادئ الجودة.	1	2	3	4	5

على المقياس التالي، يرجى وضع دائرة على الرقم المناسب الذي يمثل اجابتك

(1) غير متفق بشدة	(2) غير متفق	(3) محايد	(4) متفق	(5) متفق بشدة

8. <u>المكافئات و التمييز (sdraweR & noitingoceR)</u>: هذا العنصر يشير إلى ممارسات الكلية في منح من الموظفين الأكاديميين الذين أظهروا مستوى استثنائي من الأداء في وظائفهم.

في كليتنا،

ت	الاسئلة	المقياس				
1	الادارة العليا قادرة على تمييز الجهود المبذولة لتحسين الجودة.	1	2	3	4	5
2	نظام التشكرو التقدير يستند على الاهداف الموجهة نحو جودة التعليم.	1	2	3	4	5
3	نظام الترقية للكادر التدريسي يرتكز على المساهمات العلمية والجهود البحثية.	1	2	3	4	5
4	نظام المكافئات يركز على جودة التعليم من اجل حث الكادر التدريسي على تقديم اداء متميز.	1	2	3	4	5
5	يتم تقديم حوافز للكادر التدريسي من اجل المشاركة المعرفية بالقضايا المتعلقة بجودة التعليم.	1	2	3	4	5

.9 **<u>الإدارة بالحقيقة (Management by Fact)</u>:** يشيرهذا العنصر الى ادارة اداء المستوى التعليمي استناداً على حقائق وادلة واقعية.

في كليتنا،

ت	الاسئلة	المقياس				
1	تتوفر معايير جودة ملائمة تتوافق مع محتوى العملية التعليمية.	1	2	3	4	5
2	قياس وتحليل الاداء يستند على استراتيجية واهداف الكلية.	1	2	3	4	5
3	يقاس رضى الزبون و مؤشرات الجودة بمقياس موثوق به.	1	2	3	4	5
4	تحسين جودة التعليم يتحقق مع قرارات القيادة الأكاديمية المستندة إلى وقائع وأدلة.	1	2	3	4	5
5	القيادة الاكاديمية تؤكد على استخدام البيانت و المعلومات الموثوق بها لتحسين جودة التعليم.	1	2	3	4	5
6	قياس الاداء الاكاديمي للكلية يستند على بيانات واقعية وتحليل نظمي.	1	2	3	4	5
7	تطبيقات قواعد بيانات (مثل البيانات المتعلقة برضى الطلبة، الاداء الاكاديمي، شكاوي الطلبة) منظمة ومدارة بشكل يخدم جودة العملية التعليمة.	1	2	3	4	5

القسم الثالث: عمليات ادارة المعرفة
Knowledge tnemeganaM Processes

هذا القسم من الاستبيان يركز على عمليات ادارة المعرفة، وهي خمس عمليات تضمنتها الدراسة (تحديد المعرفة، اكتساب المعرفة، خزن المعرفة، نشر المعرفة و تطبيق المعرفة). وكيف تسهم تلك العمليات في تحسين اداء المنظمة التعليمية من حيث عملية التعلم والتعليم.

على المقياس التالي، يرجى وضع دائرة على الرقم المناسب الذي يمثل اجابتك.

(1) غير متفق بشدة	(2) غير متفق	(3) محايد	(4) متفق	(5) متفق بشدة

1 - **تحديد المعرفة (Knowledge Identification):** تحديد المعرفة هي عملية تحديد وتقييم المعرفة الصريحة أو اكتشاف معرفة جديدة استنادا على الخبرة الحالية في مجال معين (العملية التعليمية).

تحديد المعرفة الفاعل لتطوير العملية التعليمية في كليتنا يستلزم،

ت	الاسئلة	المقياس				
1	قياس الاداء المتواصل لمخرجات العملية التعليمية.	1	2	3	4	5
2	تحديد الفجوة بين المعرفة الموجودة والمعرفة المطلوبة حول العملية التعليمية	1	2	3	4	5
3	اكتشاف المعرفة المهنية (professional knowledge) المتعلقة بخدمات التعليم الحديثة (مثل المناهج، المواد الدراسية وغيرها) من مختلف المصادر.	1	2	3	4	5
4	اكتشاف و تحديد مصادر المعرفة المطلوبة.	1	2	3	4	5
5	تحديد أفضل الممارسات (best practices) لغرض تحقيق مستوى تعليمي ممتاز.	1	2	3	4	5
6	دعم البنية التكنولوجية لتمكين تحديد المعرفة.	1	2	3	4	5

2. اكتساب المعرفة (Knowledge Acquisition): اكتساب المعرفة هو عملية موجهة نحو الحصول على المعرفة اللازمة سواء من مصادر داخلية اوخارجية لتحسين العملية التعليمية.

اكتساب المعرفة الفاعل لتطوير العملية التعليمية في كليتنا يستلزم،

ت	الاسئلة	المقياس				
1	الحصول على المعرفة المطلوبة من أفضل المصادر الخارجية (مثل الجامعات العالمية الرصينة) .	1	2	3	4	5
2	تحويل المعرفة المتوفرة الى اشكال مفيدة تخدم العملية التعليمية.	1	2	3	4	5
3	توثيق المعرفة المهنية الخاصة بالكادر التدريسي في قاعدة بيانات الكلية.	1	2	3	4	5
4	الاستفادة من الخبرات والتجارب السابقة.	1	2	3	4	5
5	تحديث المعرفة المهنية المكتسبة بشكل دوري و منتظم.	1	2	3	4	5
6	توليد المعرفة المفيدة عبر الشبكة الافتراضية في البيئة التعليمية الافتراضية	1	2	3	4	5

3- خزن المعرفة (Knowledge Storage): هي عملية ترميز وتسجيل وحماية الانواع المختلفة من المعرفة الصريحة ذات الصلة بتطوير العملية التعليمية في قاعدة البيانات المحددة.

خزن المعرفة الفاعل لتطوير العملية التعليمية في كليتنا يستلزم،

ت	الاسئلة	المقياس				
1	ترميز وتسجيل الأنواع المختلفة من المعرفة ذات الصلة (المقروءة آليا وبدويا) من مصادر مختلفة.	1	2	3	4	5
2	دعم عملية خزن المعرفة بنظام تكنولوجيا فاعل يسهل من عملية المراجعة والاسترجاع.	1	2	3	4	5
3	الاستبدال والتحديث الفوري للمعرفة القديمة بالمعلومات الجديدة في قاعدة بيانات الكلية.	1	2	3	4	5
4	تقييد الدخول لبعض مواقع المعرفة باستخدام تكنولوجيا قوية.	1	2	3	4	5
5	اجراءات وسياسات صارمة لحماية المعرفة التنظيمية من الاستخدام غير الملائم.	1	2	3	4	5

4- مشاركة المعرفة (gnirahS egdelwonK): مشاركة المعرفة هي عملية اساسية في ادارة المعرفة، وهي عملية تبادل المعرفة الصريحة من مصدر لآخر بهدف تحسين العملية التعليمية.

مشاركة المعرفة الفاعل لتطوير العملية التعليمية في كليتنا يستلزم،

ت	الاسئلة	المقياس				
1	تبادل المعرفة من قسم علمي الى آخر .	1	2	3	4	5
2	تهيئة تكنولوجية تعاونية (مثل الانترنيت والانترانت) تسهل من مشاركة المعرفة.	1	2	3	4	5
3	ضمان التواصل الفاعل بين الكادر التدريسي حول انشطة، افكار جديدة أو برامج حديثة تخدم الكلية.	1	2	3	4	5
4	تأسيس حقيقي لثقافة تشارك المعرفة.	1	2	3	4	5
5	مكافئات وحوافز لجعل المعرفة الضرورية قابلة للمشاركة.	1	2	3	4	5

5- تطبيق المعرفة (Knowledge Application): تطبيق المعرفة هي عملية تشير الى الاستخدام الفعلي للمعرفة ذات الصلة بتحسين العملية التعليمية.

تطبيق المعرفة الفاعل لتطوير العملية التعليمية في كليتنا يستلزم،

ت	الاسئلة	المقياس				
1	تطوير نظام تكنولوجيا المعلومات لدعم عملية تطبيق المعرفة .	1	2	3	4	5
2	توظيف المعرفة المكتسبة من خبرات الكادر التدريسي للحفاظ على ميزة تنافسية.	1	2	3	4	5
3	استغلال المعرفة المكتسبة في تطوير خدمات تعليمية جديدة.	1	2	3	4	5
4	استخدام المعرفة المناسبة لحل المشاكل.	1	2	3	4	5
5	تهيئة وسائل استرجاع فاعلة تجعل المعرفة متاحة لمن يحتاجها.	1	2	3	4	5
6	استيعاب (فهم واستحواذ) للمعرفة المكتسبة الجديدة قبل تطبيقها فعلياً.	1	2	3	4	5
7	تطبيق أفضل الممارسات التي تم تبنيها من الجامعات الرصينة.	1	2	3	4	5

القسم الرابع: الاداء التنظيمي
Organizational Performance

هذا القسم من الاستبيان يركز على مستوى الأداء الأكاديم ي للكلية، من خلال منظورين رئيسيين للانجازات الاكاديمية هما: الانجاز الاكاديمي المرتبط بللطلبة و الانجاز الاكاديمي غير المرتبط بالطلبة.

على المقياس التالي، يرجى وضع دائرة على الرقم المناسب الذي يمثل اجابتك.

(1) غير متفق بشدة	(2) غير متفق	(3) محايد	(4) متفق	(5) متفق بشدة

أولاً. الانجاز الاكاديمي المرتبط بللطلبة (Students related Academic Achievement):

ت	الاسئلة	المقياس				
1	**المعدل التراكمي للطلبة :** معدلات الطلبة التراكمية في كليتنا تشير الى انجاز اكاديمي متميز خلال السنوات الثلاث السابقة.	1	2	3	4	5
2	**نسبة الهدر :** نسبة الطلاب الراسبين بسبب عدم الوفاء بالمعايير الأكاديمية المطلوبة خلال السنوات الثلاث الماضية آخذة في التناقص.	1	2	3	4	5
3	**درجة التقدير النهائي:** نسبة التقديرات العالية للخرجين بدرجة أمتياز و جيد جداً خلال السنوات الثلاث السابقة أخذة بالازدياد.	1	2	3	4	5
4	**نسبة التخرج** : في كليتنا نسبة تخرج الطلبة الذين اكملوا دراستهم بنجاح خلال السنوات الثلاث السابقة في تزايد مستمر.	1	2	3	4	5
5	الانجازات الاكاديمية لطللبة كليتنا بشكل عام مُشجعة خلال السنوات الثلاث السابقة.	1	2	3	4	5

ثانياً. الأنجاز الأكاديمي غير المرتبط بللطلبة (Non-students related Academic Achievement):

ت	الاسئلة	المقياس				
1	**المركز التنافسي:** تتميز كليتنا بترتيب تنافسي عالٍ مقارنةً مع بقية الكليات خلال السنوات الثلاث السابقة.	1	2	3	4	5
2	**الحصة السوقية**: نسبة الطلاب الجامعيين المتقدمين للالتحاق بكليتنا هو أعلى بكثير بالمقارنة مع غيرها من الكليات على مدى السنوات الثلاث الماضية..	1	2	3	4	5
3	**الابداع:** كليتنا مبدعة في تحسين اداء العملية التعليمية خلال السنوات الثلاث السابقة.	1	2	3	4	5
4	**الفاعلية التنظيمية** : كليتنا تواكب التغيرات في المجالات التعليمية بشكل فاعل فيما يتعلق بالشركاء التعليميين واحتياجات اصحاب المصالح خلال السنوات الثلاث السابقة.	1	2	3	4	5
5	**الاستدامة**: كليتنا تضع استراتيجيات في موقعها لدعم وتعزيز مستوى الأداء التعليمي خلال السنوات الثلاث السابقة..	1	2	3	4	5

شكرا لسعة صدرك في تعبئة الاستبيان

Appendix C: Multiple Regression Analysis between TQM Core Elements and KM Processes

Appendix C.1: Multiple Regression Analysis between TQM Core Elements and Knowledge Identification

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: KID

Model Summary[b]

				Std. Error of	Change Statistics				
Model	R	R Square	Adjusted R Square	the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.706[a]	.499	.472	.33703	.499	18.158	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KID

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.563	9	2.063	18.158	.000[a]
	Residual	18.629	164	.114		
	Total	37.192	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KID

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.261	.280		4.501	.000		
	LC	-.041	.084	-.039	-.483	.630	.470	2.126
	SP	-.054	.093	-.052	-.587	.558	.389	2.570
	CI	.069	.087	.073	.785	.434	.356	2.812
	CF	.049	.076	.052	.645	.520	.461	2.168
	PF	.518	.084	.558	6.182	.000	.375	2.667
	EI	.122	.090	.113	1.360	.176	.442	2.264
	TL	-.035	.072	-.039	-.493	.622	.488	2.047
	RR	.150	.065	.167	2.296	.023	.580	1.723
	MF	-.068	.070	-.077	-.971	.333	.488	2.048

a. Dependent Variable: KID

Collinearity Diagnostics[a]

			Condition	Variance Proportions									
Model	Dimension	Eigenvalue	Index	(Constant)	LC	SP	CI	CF	PF	EI	TL	RR	MF
1	1	9.930	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.014	26.346	.01	.02	.02	.00	.10	.05	.01	.13	.07	.15
	3	.013	28.155	.05	.06	.03	.03	.02	.08	.01	.18	.13	.03
	4	.009	32.353	.22	.03	.01	.00	.07	.06	.02	.05	.48	.00
	5	.009	33.442	.14	.01	.02	.16	.02	.00	.02	.10	.16	.27
	6	.007	39.064	.27	.05	.13	.00	.07	.20	.04	.27	.00	.06
	7	.006	40.750	.04	.03	.03	.09	.52	.04	.04	.00	.10	.38
	8	.005	42.710	.28	.07	.00	.27	.00	.01	.46	.02	.03	.03
	9	.004	49.373	.00	.52	.21	.06	.05	.18	.26	.16	.00	.01
	10	.003	57.967	.00	.21	.55	.39	.14	.38	.14	.09	.02	.07

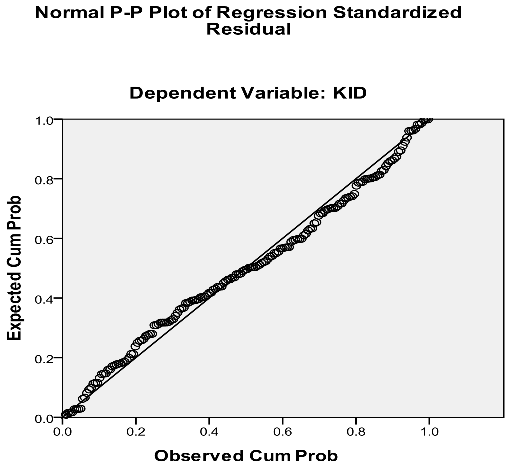
a. Dependent Variable: KID

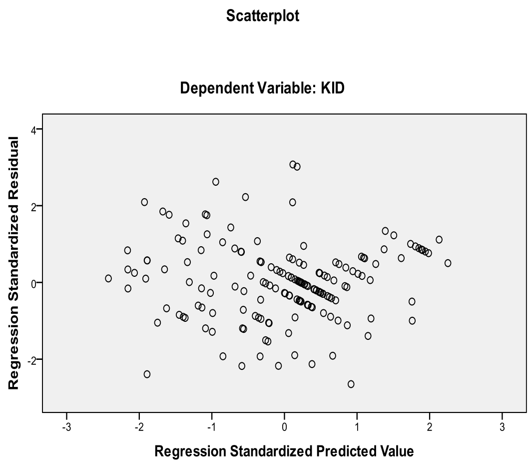
Appendix C.1 (continued)

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1319	4.6638	3.9262	.32757	174
Residual	-.89338	1.03581	.00000	.32815	174
Std. Predicted Value	-2.425	2.252	.000	1.000	174
Std. Residual	-2.651	3.073	.000	.974	174

a. Dependent Variable: KID





Appendix C.2: Multiple Regression Analysis between TQM Core Elements and Knowledge Acquisition

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.692[a]	.479	.451	.32100	.479	16.760	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KAC

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.543	9	1.727	16.760	.000[a]
	Residual	16.899	164	.103		
	Total	32.442	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KAC

Appendix C.2 (continued)

Coefficients[a]

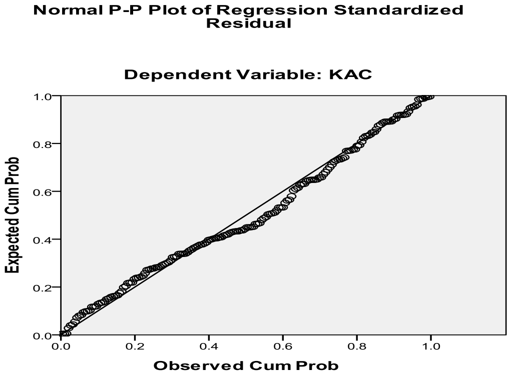
Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	.842	.267		3.156	.002		
	LC	.240	.080	.246	2.989	.003	.470	2.126
	SP	.168	.088	.172	1.900	.059	.389	2.570
	CI	.085	.083	.097	1.022	.308	.356	2.812
	CF	.091	.073	.105	1.260	.210	.461	2.168
	PF	.006	.080	.007	.080	.936	.375	2.667
	EI	-.075	.086	-.074	-.875	.383	.442	2.264
	TL	.058	.068	.068	.844	.400	.488	2.047
	RR	.138	.062	.164	2.219	.028	.580	1.723
	MF	.085	.067	.103	1.281	.202	.488	2.048

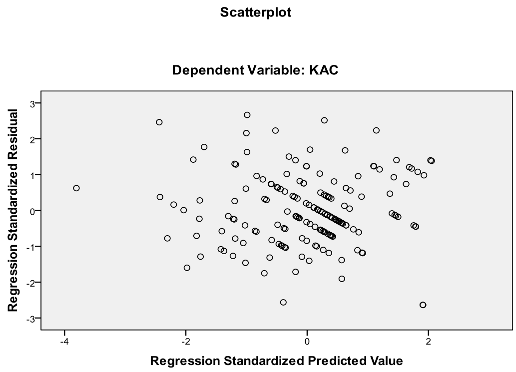
a. Dependent Variable: KAC

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8001	4.5557	3.9406	.29974	174
Residual	-.84705	.85588	.00000	.31254	174
Std. Predicted Value	-3.805	2.052	.000	1.000	174
Std. Residual	-2.639	2.666	.000	.974	174

a. Dependent Variable: KAC





Appendix C.3: Multiple Regression Analysis between TQM Core Elements and Knowledge Storage

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change
1	.498[a]	.248	.207	.46061	.248	6.005	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KST

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.466	9	1.274	6.005	.000[a]
	Residual	34.795	164	.212		
	Total	46.261	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KST

Appendix C.3 (continued)

Coefficients[a]

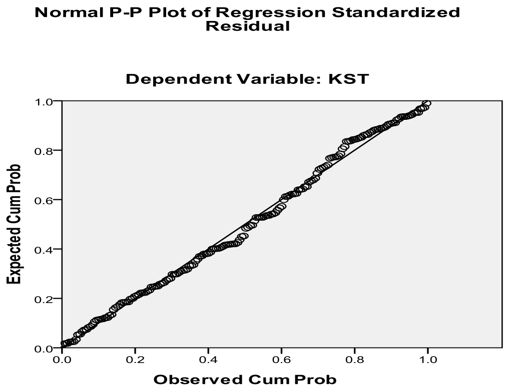
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.581	.383		4.129	.000		
	LC	.025	.115	.021	.214	.831	.470	2.126
	SP	-.165	.127	-.141	-1.299	.196	.389	2.570
	CI	.211	.119	.200	1.764	.080	.356	2.812
	CF	.136	.104	.130	1.306	.193	.461	2.168
	PF	.078	.114	.075	.678	.499	.375	2.667
	EI	.064	.123	.053	.522	.603	.442	2.264
	TL	.182	.098	.180	1.862	.064	.488	2.047
	RR	-.026	.090	-.026	-.295	.769	.580	1.723
	MF	.089	.096	.090	.927	.356	.488	2.048

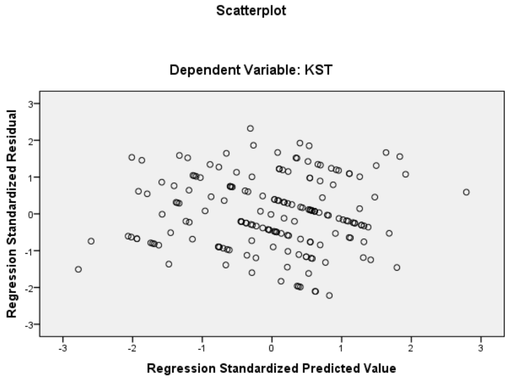
a. Dependent Variable: KST

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.0949	4.5284	3.8103	.25745	174
Residual	-1.02222	1.06957	.00000	.44847	174
Std. Predicted Value	-2.779	2.789	.000	1.000	174
Std. Residual	-2.219	2.322	.000	.974	174

a. Dependent Variable: KST





Appendix C.4: Multiple Regression Analysis between TQM Core Elements and Knowledge Sharing

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.598[a]	.358	.323	.36466	.358	10.161	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KSH

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.161	9	1.351	10.161	.000[a]
	Residual	21.808	164	.133		
	Total	33.969	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KSH

Coefficients[a]

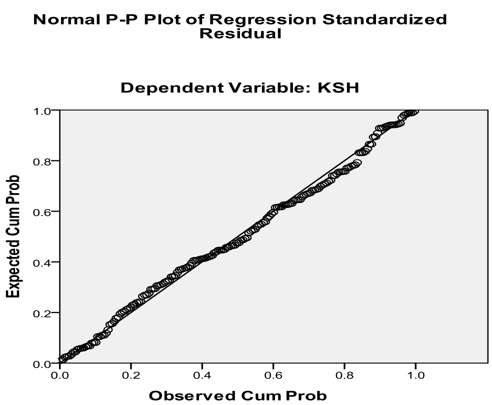
Model		Unstandardized Coefficients: B	Std. Error	Standardized Coefficients: Beta	t	Sig.	Collinearity Statistics: Tolerance	VIF
1	(Constant)	1.211	.303		3.995	.000		
	LC	-.034	.091	-.034	-.370	.712	.470	2.126
	SP	.174	.100	.175	1.740	.084	.389	2.570
	CI	.078	.095	.086	.821	.413	.356	2.812
	CF	.032	.083	.036	.394	.694	.461	2.168
	PF	.017	.091	.020	.192	.848	.375	2.667
	EI	.185	.097	.179	1.907	.058	.442	2.264
	TL	.121	.078	.140	1.565	.120	.488	2.047
	RR	.040	.071	.047	.567	.572	.580	1.723
	MF	.096	.076	.114	1.271	.206	.488	2.048

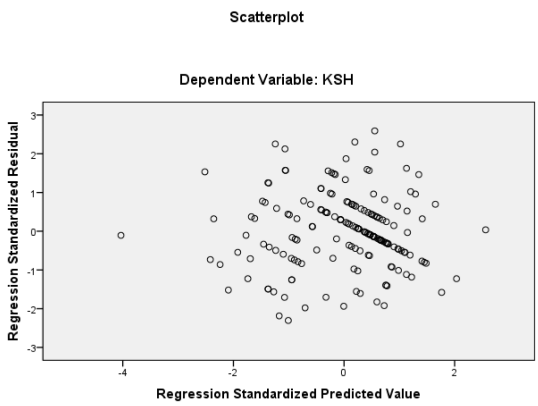
a. Dependent Variable: KSH

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8387	4.5868	3.9080	.26513	174
Residual	-.84085	.94488	.00000	.35504	174
Std. Predicted Value	-4.033	2.560	.000	1.000	174
Std. Residual	-2.306	2.591	.000	.974	174

a. Dependent Variable: KSH





Appendix C.5: Multiple Regression Analysis between TQM Core Elements and Knowledge Application

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.630[a]	.397	.364	.35153	.397	11.984	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KAP

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.329	9	1.481	11.984	.000[a]
	Residual	20.266	164	.124		
	Total	33.595	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: KAP

Coefficients[a]

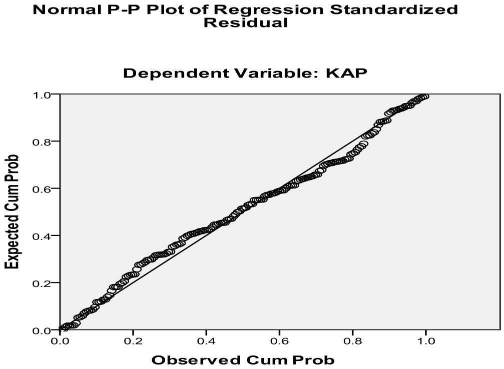
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.205	.292		4.126	.000		
	LC	.088	.088	.089	1.002	.318	.470	2.126
	SP	-.052	.097	-.053	-.541	.589	.389	2.570
	CI	.223	.091	.249	2.452	.015	.356	2.812
	CF	-.026	.080	-.030	-.331	.741	.461	2.168
	PF	.171	.087	.194	1.956	.052	.375	2.667
	EI	.110	.094	.107	1.176	.241	.442	2.264
	TL	.107	.075	.124	1.430	.155	.488	2.047
	RR	.048	.068	.056	.703	.483	.580	1.723
	MF	.036	.073	.043	.498	.619	.488	2.048

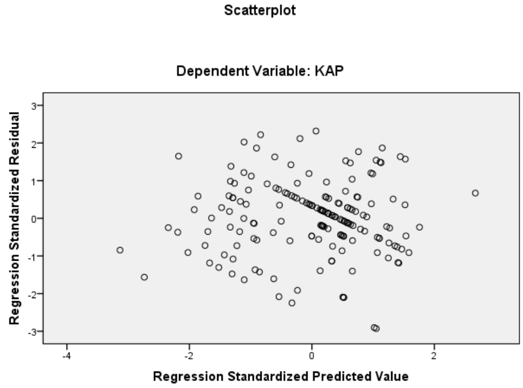
a. Dependent Variable: KAP

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.0114	4.6219	3.8810	.27757	174
Residual	-1.02954	.81497	.00000	.34227	174
Std. Predicted Value	-3.133	2.669	.000	1.000	174
Std. Residual	-2.929	2.318	.000	.974	174

a. Dependent Variable: KAP





Appendix D: Multiple Regression Analysis between TQM Core Elements and OP Measures

Appendix D.1: Multiple Regression Analysis between TQM Core Elements and Students related Academic Achievements

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	.604[a]	.364	.330	.41982	.364	10.447	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: SAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.572	9	1.841	10.447	.000[a]
	Residual	28.905	164	.176		
	Total	45.477	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: SAA

Coefficients[a]

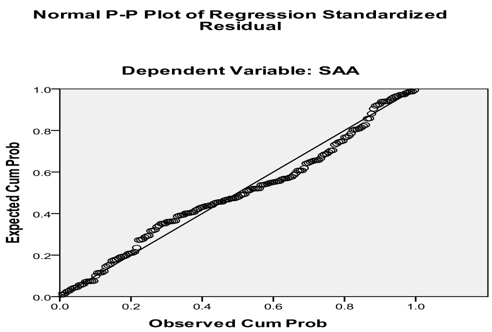
Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	.923	.349		2.647	.009		
	LC	.124	.105	.107	1.183	.238	.470	2.126
	SP	-.175	.115	-.152	-1.520	.130	.389	2.570
	CI	.252	.109	.242	2.320	.022	.356	2.812
	CF	.164	.095	.158	1.728	.086	.461	2.168
	PF	.045	.104	.044	.431	.667	.375	2.667
	EI	.283	.112	.237	2.533	.012	.442	2.264
	TL	.076	.089	.076	.856	.393	.488	2.047
	RR	.119	.082	.119	1.454	.148	.580	1.723
	MF	-.097	.087	-.099	-1.115	.266	.488	2.048

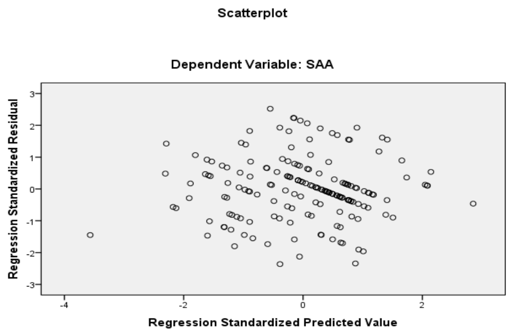
a. Dependent Variable: SAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8076	4.7940	3.9115	.30950	174
Residual	-.99187	1.05886	.00000	.40875	174
Std. Predicted Value	-3.567	2.851	.000	1.000	174
Std. Residual	-2.363	2.522	.000	.974	174

a. Dependent Variable: SAA





Appendix D.2: Multiple Regression Analysis between TQM Core Elements and Non-students related Academic Achievements

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	MF, CF, LC, TL, RR, EI, CI, SP, PF[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.581[a]	.338	.302	.41391	.338	9.306	9	164	.000

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: NSAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.348	9	1.594	9.306	.000[a]
	Residual	28.097	164	.171		
	Total	42.445	173			

a. Predictors: (Constant), MF, CF, LC, TL, RR, EI, CI, SP, PF
b. Dependent Variable: NSAA

Coefficients[a]

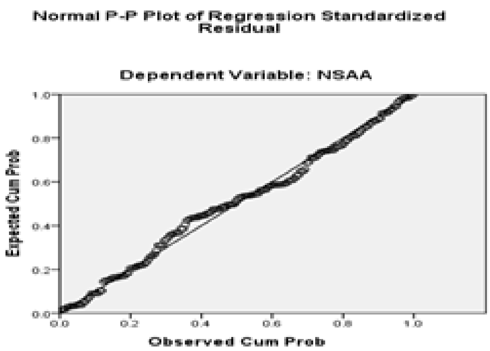
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.047	.344		3.044	.003		
	LC	.054	.103	.049	.524	.601	.470	2.126
	SP	.023	.114	.020	.199	.842	.389	2.570
	CI	.189	.107	.188	1.765	.079	.356	2.812
	CF	-.024	.094	-.024	-.253	.801	.461	2.168
	PF	.139	.103	.140	1.348	.180	.375	2.667
	EI	.288	.110	.249	2.610	.010	.442	2.264
	TL	.081	.088	.084	.924	.357	.488	2.047
	RR	.138	.080	.143	1.711	.089	.580	1.723
	MF	-.147	.086	-.155	-1.706	.090	.488	2.048

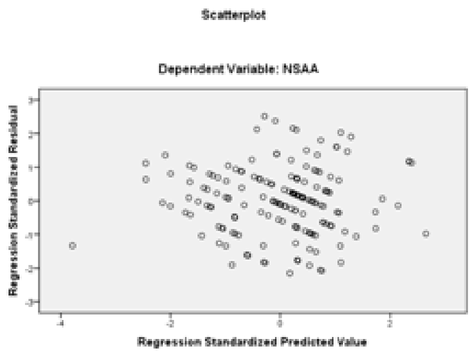
a. Dependent Variable: NSAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.7534	4.6057	3.8425	.28799	174
Residual	-.89126	1.04022	.00000	.40300	174
Std. Predicted Value	-3.782	2.650	.000	1.000	174
Std. Residual	-2.153	2.513	.000	.974	174

a. De pendent Variable: NSAA





Appendix E: Multiple Regression Analysis between KM Processes and OP Measures

Appendix E.1: Multiple Regression Analysis between KM Processes and Students related Academic Achievements

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	KAP, KST, KID, KAC, KSH[a]	.	Enter

a.All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.544[a]	.296	.275	.43650	.296	14.136	5	168	.000

a.Predictors: (Constant), KAP, KST, KID, KAC, KSH
b.Dependent Variable: SAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.467	5	2.693	14.136	.000[a]
	Residual	32.010	168	.191		
	Total	45.477	173			

a.Predictors: (Constant), KAP, KST, KID, KAC, KSH
b.Dependent Variable: SAA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.062	.358		2.964	.003		
	KID	.000	.091	.000	.003	.998	.614	1.629
	KAC	.115	.112	.098	1.030	.305	.467	2.139
	KST	.092	.079	.093	1.168	.245	.660	1.516
	KSH	.275	.110	.238	2.500	.013	.463	2.160
	KAP	.249	.118	.214	2.117	.036	.410	2.438

a.Dependent Variable: SAA

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	KID	KAC	KST	KSH	KAP
1	1	5.967	1.000	.00	.00	.00	.00	.00	.00
	2	.010	24.016	.04	.00	.05	.90	.03	.01
	3	.008	27.837	.24	.45	.02	.03	.15	.09
	4	.007	29.581	.71	.47	.02	.03	.00	.01
	5	.004	37.350	.00	.08	.78	.02	.47	.00
	6	.004	39.209	.02	.00	.14	.02	.34	.89

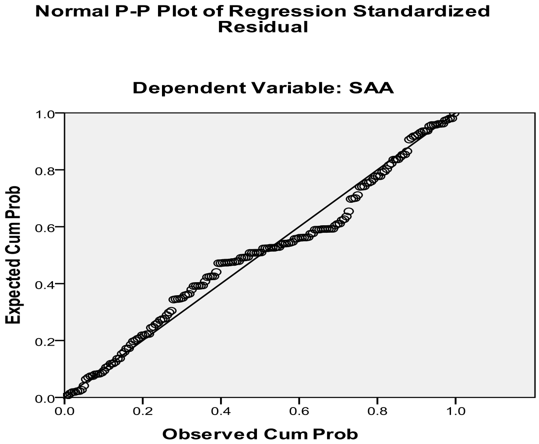
a.Dependent Variable: SAA

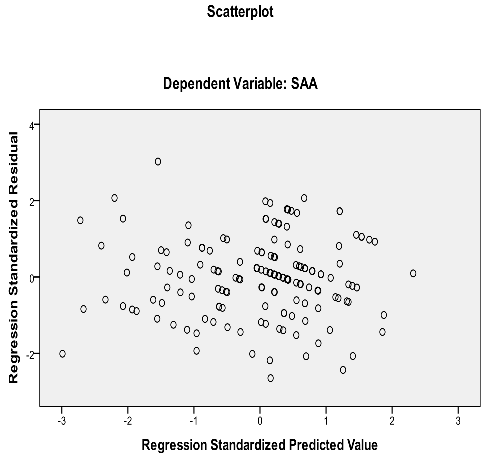
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.0772	4.5588	3.9115	.27901	174
Residual	-1.15633	1.31942	.00000	.43015	174
Std. Predicted Value	-2.990	2.320	.000	1.000	174
Std. Residual	-2.649	3.023	.000	.985	174

a. Dependent Variable: SAA

Appendix E.1 (continued)





Appendix E.2: Multiple Regression Analysis between KM Processes and Non-students related Academic Achievements

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	KAP, KST, KID, KAC, KSH[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.513[a]	.263	.241	.43149	.263	11.996	5	168	.000

a. Predictors: (Constant), KAP, KST, KID, KAC, KSH
b. Dependent Variable: NSAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.167	5	2.233	11.996	.000[a]
	Residual	31.279	168	.186		
	Total	42.445	173			

a. Predictors: (Constant), KAP, KST, KID, KAC, KSH
b. Dependent Variable: NSAA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.280	.354		3.612	.000		
	KID	.113	.090	.106	1.254	.212	.614	1.629
	KAC	-.045	.111	-.040	-.408	.684	.467	2.139
	KST	.062	.078	.065	.799	.425	.660	1.516
	KSH	.198	.109	.177	1.821	.070	.463	2.160
	KAP	.331	.116	.294	2.846	.005	.410	2.438

a. Dependent Variable: NSAA

Appendix E.2 (continued)

Collinearity Diagnostics[a]

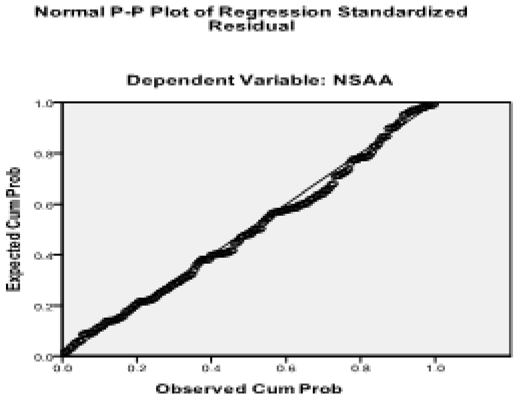
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				(Constant)	KID	KAC	KST	KSH	KAP
1	1	5.967	1.000	.00	.00	.00	.00	.00	.00
	2	.010	24.016	.04	.00	.05	.90	.03	.01
	3	.008	27.837	.24	.45	.02	.03	.15	.09
	4	.007	29.581	.71	.47	.02	.03	.00	.01
	5	.004	37.350	.00	.08	.78	.02	.47	.00
	6	.004	39.209	.02	.00	.14	.02	.34	.89

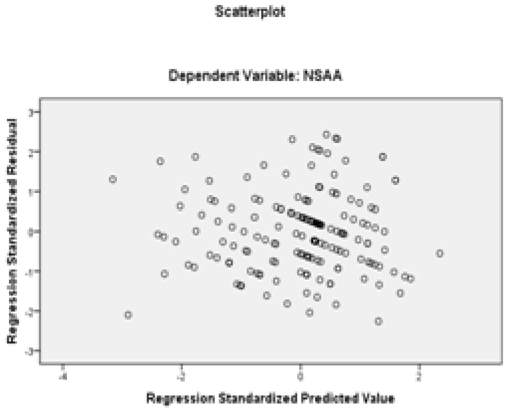
a. Dependent Variable: NSAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.0398	4.4381	3.8425	.25406	174
Residual	-.97538	1.04777	.00000	.42521	174
Std. Predicted Value	-3.160	2.344	.000	1.000	174
Std. Residual	-2.260	2.428	.000	.985	174

a. Dependent Variable: NSAA





Appendix F: Principal Component Analysis

Appendix F.1: Principal Component Analysis of TQM Core Elements

Principal Component Analysis: LC, SP, CI, CF, PF, EI, TL, RR, MF

Eigenanalysis of the Correlation Matrix

Eigenvalue	5.1189	0.8748	0.7534	0.5443	0.4618	0.3931	0.3497	0.3085
Proportion	0.569	0.097	0.084	0.060	0.051	0.044	0.039	0.034
Cumulative	0.569	0.666	0.750	0.810	0.861	0.905	0.944	0.978

Eigenvalue	0.1954
Proportion	0.022
Cumulative	1.000

Variable	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9
LC	0.320	-0.461	-0.353	-0.240	-0.260	0.103	-0.107	0.622	-0.162
SP	0.344	-0.404	-0.249	-0.216	-0.103	-0.257	0.258	-0.554	0.400
CI	0.364	0.052	0.147	-0.301	0.537	-0.076	0.420	-0.012	-0.531
CF	0.329	-0.327	0.384	0.373	-0.007	-0.347	-0.523	-0.159	-0.280
PF	0.345	-0.144	0.494	0.159	0.217	0.436	0.136	0.237	0.528
EI	0.345	0.279	0.143	-0.171	-0.541	0.517	-0.065	-0.347	-0.263
TL	0.317	0.517	0.193	-0.153	-0.300	-0.569	0.069	0.314	0.234
RR	0.308	0.177	-0.418	0.756	-0.046	0.031	0.337	0.035	-0.099
MF	0.324	0.341	-0.410	-0.131	0.450	0.121	-0.575	-0.075	0.201

Appendix F.2: Principal Component Analysis of KM Processes

Principal Component Analysis: KID, KAC, KST, KSH, KAP

Eigenanalysis of the Correlation Matrix

Eigenvalue	3.1749	0.6366	0.5326	0.3478	0.3081
Proportion	0.635	0.127	0.107	0.070	0.062
Cumulative	0.635	0.762	0.869	0.938	1.000

Variable	PC1	PC2	PC3	PC4	PC5
KID	0.420	0.367	0.788	-0.259	-0.024
KAC	0.465	-0.364	0.164	0.759	-0.222
KST	0.399	0.737	-0.500	0.181	-0.121
KSH	0.464	-0.379	-0.268	-0.557	-0.509
KAP	0.483	-0.214	-0.172	-0.120	0.823

Appendix F.3: Principal Component Analysis of OP Measures

Principal Component Analysis: SAA, NSAA

Eigenanalysis of the Correlation Matrix

Eigenvalue	1.7442	0.2558
Proportion	0.872	0.128
Cumulative	0.872	1.000

Variable	PC1	PC2
SAA	0.707	0.707
NSAA	0.707	-0.707

Appendix G: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and KM Processes

Appendix G.1: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Knowledge Identification

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1TQM[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: KID

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.587[a]	.345	.341	.37630	.345	90.654	1	172	.000

a. Predictors: (Constant), PC1TQM
b. Dependent Variable: KID

Coefficients[a]

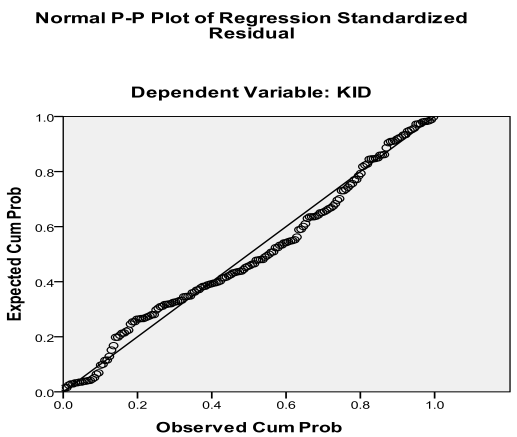
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.068	.302		3.543	.001
	PC1TQM	.250	.026	.587	9.521	.000

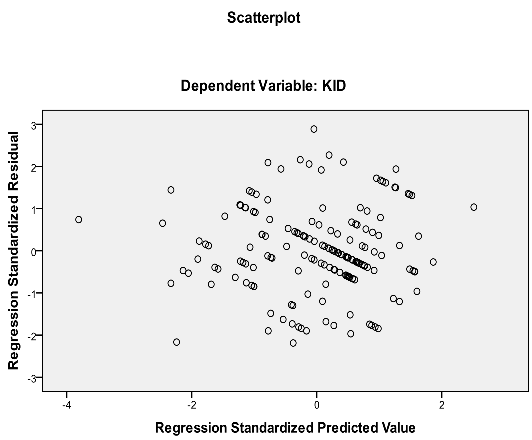
a. Dependent Variable: KID

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8885	4.6106	3.9262	.27240	174
Residual	-.82328	1.08629	.00000	.37521	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.188	2.887	.000	.997	174

a. Dependent Variable: KID





Appendix G.2: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Knowledge Acquisition

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1TQM[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: KAC

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.655[a]	.429	.426	.32822	.429	129.142	1	172	.000

a. Predictors: (Constant), PC1TQM
b. Dependent Variable: KAC

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.912	1	13.912	129.142	.000[a]
	Residual	18.529	172	.108		
	Total	32.442	173			

a. Predictors: (Constant), PC1TQM
b. Dependent Variable: KAC

Coefficients[a]

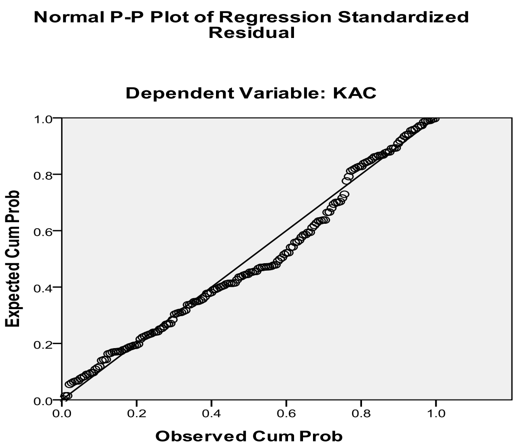
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.965	.263		3.670	.000
	PC1TQM	.260	.023	.655	11.364	.000

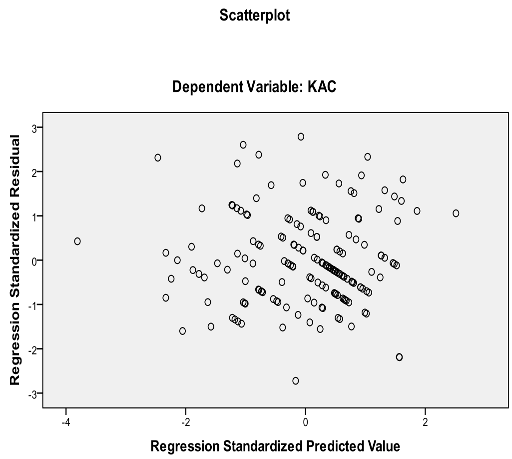
a. Dependent Variable: KAC

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8602	4.6530	3.9406	.28358	174
Residual	-.89385	.91449	.00000	.32727	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.723	2.786	.000	.997	174

a. Dependent Variable: KAC





Appendix G.3: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Knowledge Storage

Variables Entered/Removed[b]

Model		Variables Entered	Variables Removed	Method
dimension0	1	PC1TQM[a]	.	Enter

a.All requested variables entered.
b.Dependent Variable: KST

Model Summary[b]

Model		R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
						R Square Change	F Change	df1	df2	Sig. F Change
dimension0	1	.447[a]	.200	.195	.46384	.200	43.017	1	172	.000

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: KST

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.255	1	9.255	43.017	.000[a]
	Residual	37.006	172	.215		
	Total	46.261	173			

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: KST

Coefficients[a]

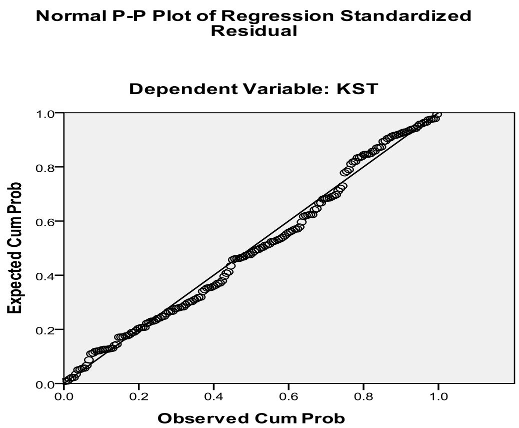
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.384	.372		3.722	.000
	PC1TQM	.212	.032	.447	6.559	.000

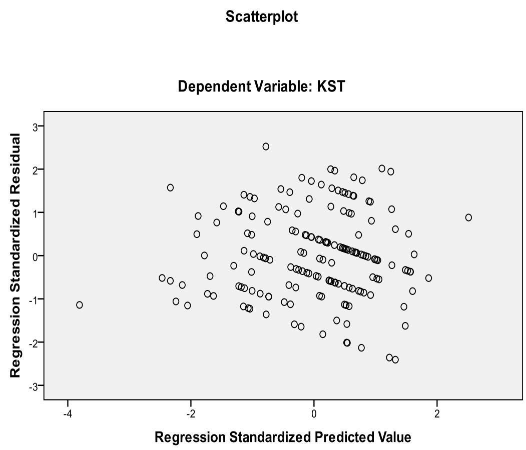
a.Dependent Variable: KST

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.9292	4.3914	3.8103	.23130	174
Residual	-1.11630	1.17045	.00000	.46250	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.407	2.523	.000	.997	174

a. Dependent Variable: KST





Appendix G.4: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Knowledge Sharing

Variables Entered/Removed[b]

Model		Variables Entered	Variables Removed	Method
dimension0	1	PC1TQM[a]	.	Enter

a.All requested variables entered.
b.Dependent Variable: KSH

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.581[a]	.337	.334	.36176	.337	87.566	1	172	.000

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: KSH

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.460	1	11.460	87.566	.000[a]
	Residual	22.509	172	.131		
	Total	33.969	173			

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: KSH

Coefficients[a]

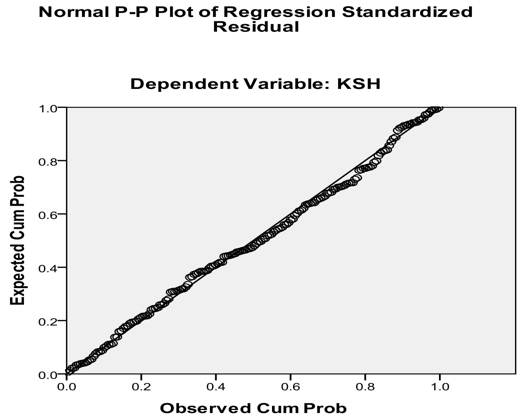
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.208	.290		4.166	.000
	PC1TQM	.236	.025	.581	9.358	.000

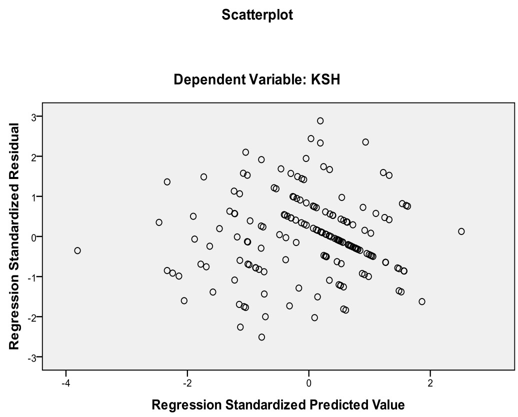
a.Dependent Variable: KSH

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.9275	4.5546	3.9080	.25737	174
Residual	-.90821	1.04329	.00000	.36071	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.511	2.884	.000	.997	174

a. Dependent Variable: KSH





Appendix G.5: Simple Regression Analysis between the First Principal Component Score of Core Elements and Knoledge Application

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1TQM[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: KAP

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.603[a]	.363	.360	.35266	.363	98.122	1	172	.000

a. Predictors: (Constant), PC1TQM
b. Dependent Variable: KAP

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.203	1	12.203	98.122	.000[a]
	Residual	21.392	172	.124		
	Total	33.595	173			

a. Predictors: (Constant), PC1TQM
b. Dependent Variable: KAP

Coefficients[a]

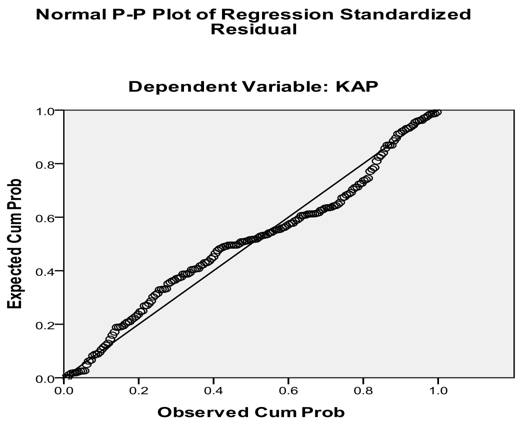
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.094	.283		3.872	.000
	PC1TQM	.243	.025	.603	9.906	.000

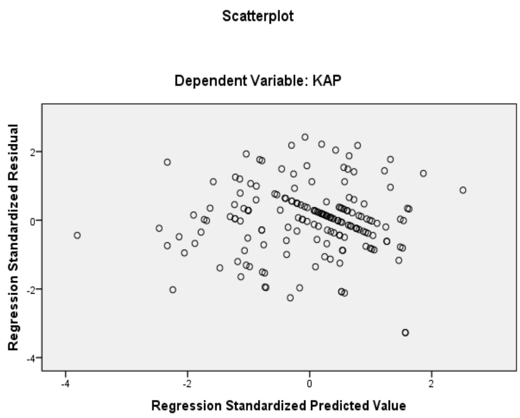
a. Dependent Variable: KAP

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8691	4.5482	3.8810	.26559	174
Residual	-1.15499	.85372	.00000	.35164	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-3.275	2.421	.000	.997	174

a. Dependent Variable: KAP





Appendix H: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Organizational Performance Measures

Appendix H.1: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Students related Academic Acheivements

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1TQM[a]	.	Enter

a.All requested variables entered.
b.Dependent Variable: SAA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.561[a]	.315	.311	.42553	.315	79.151	1	172	.000

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: SAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.332	1	14.332	79.151	.000[a]
	Residual	31.145	172	.181		
	Total	45.477	173			

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: SAA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.892	.341		2.615	.010
	PC1TQM	.264	.030	.561	8.897	.000

a.Dependent Variable: SAA

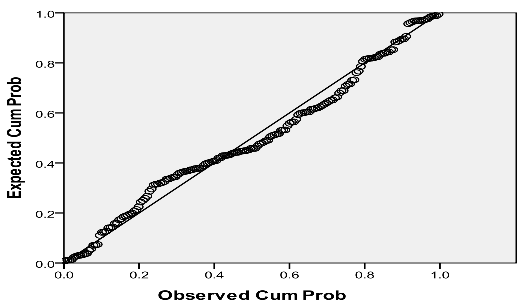
Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8149	4.6346	3.9115	.28783	174
Residual	-1.00991	1.10070	.00000	.42430	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.373	2.587	.000	.997	174

a. Dependent Variable: SAA

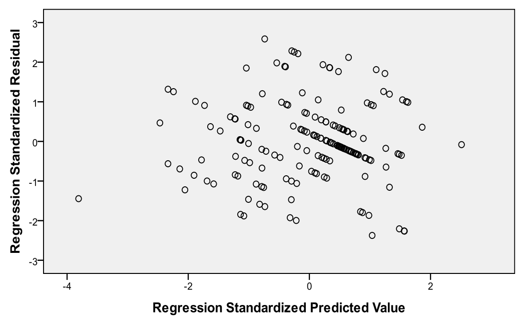
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: SAA



Scatterplot

Dependent Variable: SAA



Appendix H.2: Simple Regression Analysis between the First Principal Component Score of TQM Core Elements and Non-students related Academic Achievements

Variables Entered/Removed[b]

Model		Variables Entered	Variables Removed	Method
dimension0	1	PC1TQM[a]	.	Enter

a.All requested variables entered.
b.Dependent Variable: NSAA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.537[a]	.289	.284	.41900	.289	69.770	1	172	.000

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: NSAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.249	1	12.249	69.770	.000[a]
	Residual	30.196	172	.176		
	Total	42.445	173			

a.Predictors: (Constant), PC1TQM
b.Dependent Variable: NSAA

Coefficients[a]

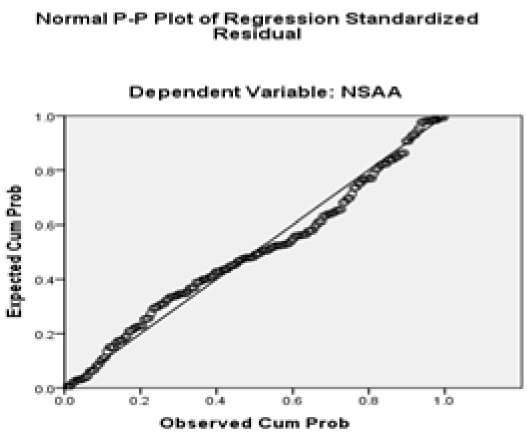
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.051	.336		3.129	.002
	PC1TQM	.244	.029	.537	8.353	.000

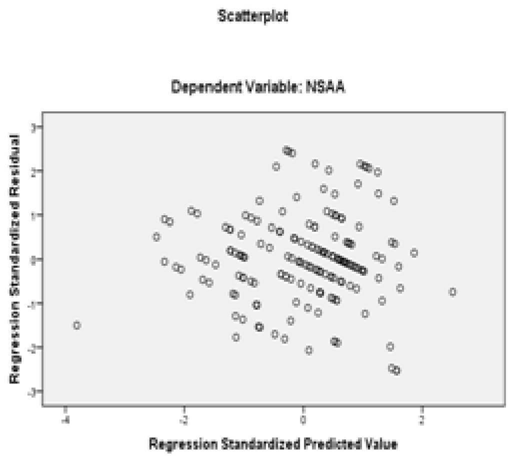
a.Dependent Variable: NSAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.8288	4.5110	3.8425	.26609	174
Residual	-1.06020	1.03481	.00000	.41779	174
Std. Predicted Value	-3.810	2.512	.000	1.000	174
Std. Residual	-2.530	2.470	.000	.997	174

a. Dependent Variable: NSAA





Appendix I: Simple Regression Analysis between the First Principal Component Score of KM Processes and Organizational Performance Measures

Appendix I.1: Simple Regression Analysis between the First Principal Component Score of KM Processes and Students related Academic Achievements

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1KM[a]	.	Enter

a.All requested variables entered.
b.Dependent Variable: SAA

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.526[a]	.277	.273	.43729	.277	65.821	1	172	.000

a.Predictors: (Constant), PC1KM
b.Dependent Variable: SAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.587	1	12.587	65.821	.000[a]
	Residual	32.890	172	.191		
	Total	45.477	173			

a.Predictors: (Constant), PC1KM
b.Dependent Variable: SAA

Coefficients[a]

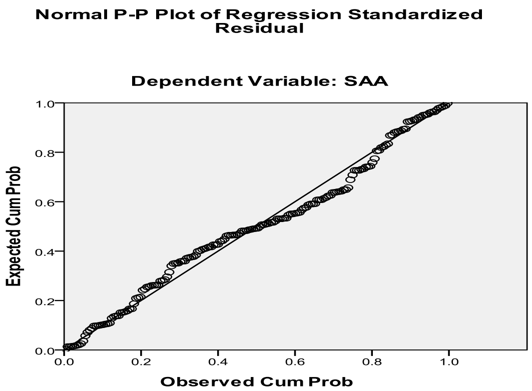
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.027	.357		2.876	.005
	PC1KM	.332	.041	.526	8.113	.000

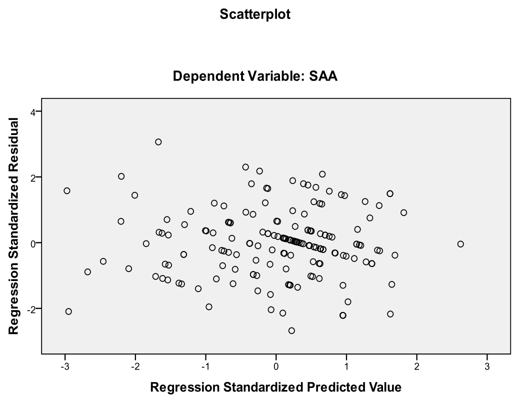
a.Dependent Variable: SAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1095	4.6189	3.9115	.26973	174
Residual	-1.17106	1.33987	.00000	.43603	174
Std. Predicted Value	-2.973	2.623	.000	1.000	174
Std. Residual	-2.678	3.064	.000	.997	174

a. Dependent Variable: SAA





Appendix I.2: Simple Regression Analysis between the First Principal Component Score of KM Processes and Non-student related Academic Achievements

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PC1KM[a]	.	Enter

a. All requested variables entered.
b. Dependent Variable: NSAA

Model Summary[b]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.492[a]	.242	.238	.43247	.242	54.948	1	172	.000

a. Predictors: (Constant), PC1KM
b. Dependent Variable: NSAA

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.277	1	10.277	54.948	.000[a]
	Residual	32.169	172	.187		
	Total	42.445	173			

a. Predictors: (Constant), PC1KM
b. Dependent Variable: NSAA

Coefficients[a]

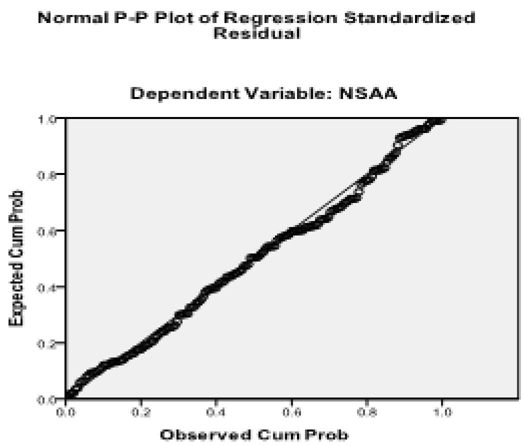
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.236	.353		3.500	.001
	PC1KM	.300	.040	.492	7.413	.000

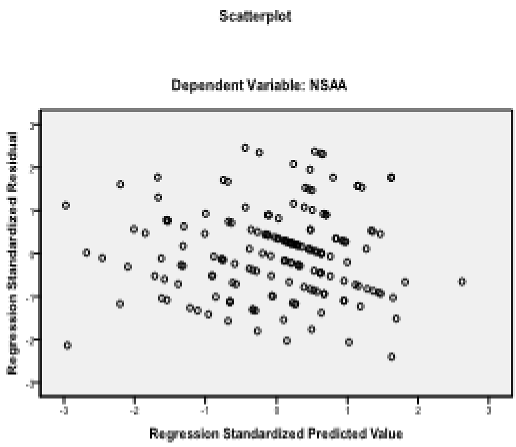
a. Dependent Variable: NSAA

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.1179	4.4818	3.8425	.24373	174
Residual	-1.03840	1.06326	.00000	.43121	174
Std. Predicted Value	-2.973	2.623	.000	1.000	174
Std. Residual	-2.401	2.459	.000	.997	174

a. Dependent Variable: NSAA





Appendix J: Canonical Correlation Analysis

Appendix J.1: Canonical Correlation Analysis between Set of TQM Core Elements and Set of KM Processes

Run MATRIX procedure:

Correlations for Set-1

	KID	KAC	KST	KSH	KAP
KID	1.0000	.5370	.4808	.4707	.5265
KAC	.5370	1.0000	.4321	.6364	.6594
KST	.4808	.4321	1.0000	.4697	.5205
KSH	.4707	.6364	.4697	1.0000	.6826
KAP	.5265	.6594	.5205	.6826	1.0000

Correlations for Set-2

	LC	SP	CI	CF	PF	EI	TL	RR	MF
LC	1.0000	.6945	.5078	.5054	.4866	.4678	.3473	.4506	.4775
SP	.6945	1.0000	.6115	.5721	.5056	.5071	.4025	.4859	.4903
CI	.5078	.6115	1.0000	.5416	.6719	.5702	.5950	.4609	.6062
CF	.5054	.5721	.5416	1.0000	.6714	.4814	.4533	.4390	.3876
PF	.4866	.5056	.6719	.6714	1.0000	.5910	.4767	.4404	.4203
EI	.4678	.5071	.5702	.4814	.5910	1.0000	.6340	.4827	.5455
TL	.3473	.4025	.5950	.4533	.4767	.6340	1.0000	.4634	.5156
RR	.4506	.4859	.4609	.4390	.4404	.4827	.4634	1.0000	.5619
MF	.4775	.4903	.6062	.3876	.4203	.5455	.5156	.5619	1.0000

Correlations between Set-1 and Set-2

	LC	SP	CI	CF	PF	EI	TL	RR	MF
KID	.3382	.3630	.4966	.4976	.6864	.4793	.3693	.4199	.3140
KAC	.5815	.5844	.5231	.4905	.4529	.4161	.4154	.5053	.4959
KST	.2462	.2384	.4259	.3504	.3782	.3606	.4011	.2545	.3295
KSH	.3653	.4597	.4830	.3918	.4155	.5049	.4792	.3967	.4641
KAP	.3962	.3945	.5621	.3985	.5229	.4933	.4787	.3908	.4369

Canonical Correlations

1	.753
2	.586
3	.386
4	.253
5	.144

Test that remaining correlations are zero:

	Wilk's	Chi-SQ	DF	Sig.
1	.222	247.722	45.000	.000
2	.512	110.153	32.000	.000
3	.780	40.865	21.000	.006
4	.916	14.344	12.000	.279
5	.979	3.431	5.000	.634

Standardized Canonical Coefficients for Set-1

	1	2	3	4	5
KID	-.563	.844	.660	-.354	.198
KAC	-.238	-1.184	.745	.315	.163
KST	-.024	-.026	-.546	.588	.937
KSH	-.109	-.197	-.706	-1.266	.126
KAP	-.267	.427	-.440	.781	-1.175

Appendix J.1 (continued)

Raw Canonical Coefficients for Set-1

	1	2	3	4	5
KID	-1.211	1.816	1.419	-.761	.426
KAC	-.549	-2.727	1.715	.725	.376
KST	-.046	-.051	-1.059	1.142	1.820
KSH	-.244	-.443	-1.589	-2.850	.283
KAP	-.604	.966	-.995	1.768	-2.658

Standardized Canonical Coefficients for Set-2

	1	2	3	4	5
LC	-.074	-.473	.339	.879	-.356
SP	-.019	-.515	.183	-1.103	-.251
CI	-.187	.068	-.411	.938	-.301
CF	-.070	-.171	.075	.121	1.361
PF	-.496	.912	.602	-.150	-.364
EI	-.124	.335	-.473	-.636	-.232
TL	-.067	-.172	-.588	.124	.171
RR	-.200	-.060	.491	-.111	-.125
MF	-.016	-.342	-.319	-.116	.189

Raw Canonical Coefficients for Set-2

	1	2	3	4	5
LC	-.167	-1.063	.762	1.974	-.799
SP	-.042	-1.159	.411	-2.481	-.564
CI	-.378	.138	-.833	1.901	-.609
CF	-.140	-.344	.151	.244	2.742
PF	-.990	1.821	1.202	-.300	-.727
EI	-.288	.779	-1.100	-1.479	-.540
TL	-.133	-.339	-1.161	.245	.337
RR	-.389	-.117	.955	-.215	-.242
MF	-.031	-.660	-.615	-.223	.365

Canonical Loadings for Set-1

	1	2	3	4	5
KID	-.894	.328	.233	-.087	.177
KAC	-.796	-.586	.124	.088	-.020
KST	-.587	-.002	-.467	.366	.551
KSH	-.718	-.274	-.478	-.423	-.039
KAP	-.807	-.057	-.367	.244	-.389

Cross Loadings for Set-1

	1	2	3	4	5
KID	-.673	.192	.090	-.022	.025
KAC	-.599	-.343	.048	.022	-.003
KST	-.442	-.001	-.180	.093	.079
KSH	-.541	-.161	-.184	-.107	-.006
KAP	-.607	-.034	-.142	.062	-.056

Canonical Loadings for Set-2

	1	2	3	4	5
LC	-.638	-.533	.232	.218	-.187
SP	-.670	-.535	.120	-.308	-.104
CI	-.819	-.113	-.268	.264	-.116
CF	-.736	-.131	.131	-.002	.614
PF	-.914	.298	.157	.017	.017
EI	-.749	.023	-.373	-.318	-.106
TL	-.659	-.138	-.556	.012	.103
RR	-.678	-.276	.162	-.146	-.035
MF	-.624	-.402	-.319	-.029	-.020

Appendix J.1 (continued)

Cross Loadings for Set-2

	1	2	3	4	5
LC	-.480	-.312	.090	.055	-.027
SP	-.504	-.314	.046	-.078	-.015
CI	-.617	-.066	-.103	.067	-.017
CF	-.554	-.077	.050	.000	.088
PF	-.688	.175	.060	.004	.002
EI	-.564	.014	-.144	-.081	-.015
TL	-.496	-.081	-.215	.003	.015
RR	-.510	-.162	.063	-.037	-.005
MF	-.470	-.236	-.123	-.007	-.003

Redundancy Analysis:

Proportion of Variance of Set-1 Explained by Its Own Can. Var.

	Prop Var
CV1-1	.589
CV1-2	.106
CV1-3	.130
CV1-4	.078
CV1-5	.098

Proportion of Variance of Set-1 Explained by Opposite Can.Var.

	Prop Var
CV2-1	.334
CV2-2	.036
CV2-3	.019
CV2-4	.005
CV2-5	.002

Proportion of Variance of Set-2 Explained by Its Own Can. Var.

	Prop Var
CV2-1	.528
CV2-2	.105
CV2-3	.084
CV2-4	.037
CV2-5	.051

Proportion of Variance of Set-2 Explained by Opposite Can. Var.

	Prop Var
CV1-1	.299
CV1-2	.036
CV1-3	.013
CV1-4	.002
CV1-5	.001

------ END MATRIX -----

Appendix J.2: Canonical Correlation Analysis between Set of TQM Core Elements and Set of OP Measures

Run MATRIX procedure:

Correlations for Set-1

	SAA	NSAA
SAA	1.0000	.7505
NSAA	.7505	1.0000

Correlations for Set-2

	LC	SP	CI	CF	PF	EI	TL	RR	MF
LC	1.0000	.6945	.5078	.5054	.4866	.4678	.3473	.4506	.4775
SP	.6945	1.0000	.6115	.5721	.5056	.5071	.4025	.4859	.4903
CI	.5078	.6115	1.0000	.5416	.6719	.5702	.5950	.4609	.6062
CF	.5054	.5721	.5416	1.0000	.6714	.4814	.4533	.4390	.3876
PF	.4866	.5056	.6719	.6714	1.0000	.5910	.4767	.4404	.4203
EI	.4678	.5071	.5702	.4814	.5910	1.0000	.6340	.4827	.5455
TL	.3473	.4025	.5950	.4533	.4767	.6340	1.0000	.4634	.5156
RR	.4506	.4859	.4609	.4390	.4404	.4827	.4634	1.0000	.5619
MF	.4775	.4903	.6062	.3876	.4203	.5455	.5156	.5619	1.0000

Correlations between Set-1 and Set-2

	LC	SP	CI	CF	PF	EI	TL	RR	MF
SAA	.3701	.3439	.4944	.4488	.4754	.5021	.4428	.3880	.3401
NSAA	.3550	.3823	.4749	.3730	.4701	.4978	.4026	.3843	.2823

Canonical Correlations

1	.631
2	.229

Test that remaining correlations are zero:

	Wilk's	Chi-SQ	DF	Sig.
1	.471	93.133	18.000	.000
2	.948	8.911	8.000	.350

Standardized Canonical Coefficients for Set-1

	1	2
SAA	-.596	-1.391
NSAA	-.472	1.438

Raw Canonical Coefficients for Set-1

	1	2
SAA	-1.159	-2.705
NSAA	-.960	2.926

Standardized Canonical Coefficients for Set-2

	1	2
LC	-.145	-.290
SP	.134	1.003
CI	-.398	-.055
CF	-.140	-1.049
PF	-.134	.514
EI	-.426	.252
TL	-.106	-.161
RR	-.230	.263
MF	.239	-.625

Appendix J.2 (continued)

Raw Canonical Coefficients for Set-2

	1	2
LC	-.326	-.651
SP	.301	2.257
CI	-.807	-.111
CF	-.281	-2.114
PF	-.267	1.026
EI	-.990	.586
TL	-.209	-.318
RR	-.446	.510
MF	.460	-1.206

Canonical Loadings for Set-1

	1	2
SAA	-.950	-.312
NSAA	-.919	.394

Cross Loadings for Set-1

	1	2
SAA	-.599	-.071
NSAA	-.580	.090

Canonical Loadings for Set-2

	1	2
LC	-.615	-.019
SP	-.611	.312
CI	-.822	-.021
CF	-.703	-.385
PF	-.801	.064
EI	-.847	.076
TL	-.720	-.162
RR	-.654	.056
MF	-.533	-.294

Cross Loadings for Set-2

	1	2
LC	-.388	-.004
SP	-.385	.071
CI	-.519	-.005
CF	-.444	-.088
PF	-.505	.015
EI	-.534	.017
TL	-.454	-.037
RR	-.413	.013
MF	-.336	-.067

Redundancy Analysis:

Proportion of Variance of Set-1 Explained by Its Own Can. Var.

	Prop Var
CV1-1	.874
CV1-2	.126

Proportion of Variance of Set-1 Explained by Opposite Can.Var.

	Prop Var
CV2-1	.348
CV2-2	.007

Appendix J.2 (continued)

Proportion of Variance of Set-2 Explained by Its Own Can. Var.

	Prop Var
CV2-1	.501
CV2-2	.041

Proportion of Variance of Set-2 Explained by Opposite Can. Var.

	Prop Var
CV1-1	.199
CV1-2	.002

------ END MATRIX -----

Appendix J.3: Canonical Correlation Analysis between Set of KM Processes and Set of OP Measures

Run MATRIX procedure:

Correlations for Set-1

	SAA	NSAA
SAA	1.0000	.7442
NSAA	.7442	1.0000

Correlations for Set-2

	KID	KAC	KST	KSH	KAP
KID	1.0000	.5370	.4789	.4704	.5266
KAC	.5370	1.0000	.4304	.6361	.6594
KST	.4789	.4304	1.0000	.4643	.5193
KSH	.4704	.6361	.4643	1.0000	.6820
KAP	.5266	.6594	.5193	.6820	1.0000

Correlations Between Set-1 and Set-2

	KID	KAC	KST	KSH	KAP
SAA	.3217	.4301	.3567	.4891	.4889
NSAA	.3544	.3523	.3341	.4330	.4788

Canonical Correlations

1	.664
2	.178

Test that remaining correlations are zero:

	Wilk's	Chi-SQ	DF	Sig.
1	.461	70.080	10.000	.000
2	.968	5.447	4.000	.244

Standardized Canonical Coefficients for Set-1

	1	2
SAA	-.655	-1.346
NSAA	-.412	1.439

Raw Canonical Coefficients for Set-1

	1	2
SAA	-1.277	-2.626
NSAA	-.832	2.906

Appendix J.3 (continued)

Standardized Canonical Coefficients for Set-2

	1	2
KID	-.078	.855
KAC	-.084	-1.056
KST	-.156	-.177
KSH	-.406	-.366
KAP	-.464	.761

Raw Canonical Coefficients for Set-2

	1	2
KID	-.168	1.843
KAC	-.195	-2.440
KST	-.301	-.342
KSH	-.916	-.825
KAP	-1.052	1.728

Canonical Loadings for Set-1

	1	2
SAA	-.961	-.275
NSAA	-.899	.437

Cross Loadings for Set-1

	1	2
SAA	-.542	-.049
NSAA	-.507	.078

Canonical Loadings for Set-2

	1	2
KID	-.633	.432
KAC	-.757	-.404
KST	-.658	.004
KSH	-.885	-.198
KAP	-.918	.174

Cross Loadings for Set-2

	1	2
KID	-.357	.077
KAC	-.427	-.072
KST	-.371	.001
KSH	-.499	-.035
KAP	-.517	.031

Redundancy Analysis:

Proportion of Variance of Set-1 Explained by Its Own Can. Var.

	Prop Var
CV1-1	.866
CV1-2	.134

Proportion of Variance of Set-1 Explained by Opposite Can.Var.

	Prop Var
CV2-1	.275
CV2-2	.004

Proportion of Variance of Set-2 Explained by Its Own Can. Var.

	Prop Var
CV2-1	.606
CV2-2	.084

Appendix J.3 (continued)

Proportion of Variance of Set-2 Explained by Opposite Can. Var.

```
                    Prop Var
CV1-1               .193
CV1-2               .003
```

------ END MATRIX

Appendix K: Modification indices (MIs-Covariances) as SSPS-Amos output

Covariances: (Group number 1 - Default model)

			M.I.	Par Change
e14	<-->	e16	6.654	.026
e9	<-->	e16	6.909	-.029
e8	<-->	e9	11.420	.047
e7	<-->	e15	4.082	-.017
e6	<-->	e15	6.369	-.016
e6	<-->	e7	6.673	.019
e5	<-->	e16	17.412	.034
e5	<-->	e15	13.155	-.028
e5	<-->	e9	13.570	-.041
e4	<-->	e16	7.018	.023
e4	<-->	e13	5.417	-.019
e4	**<-->**	**e5**	**21.239**	**.040**
e2	<-->	e16	13.283	-.025
e2	<-->	e15	18.482	.028
e2	<-->	e7	6.725	-.020
e2	<-->	e5	4.355	-.014
e1	<-->	e15	12.212	.024
e1	**<-->**	**e7**	**19.102**	**.043**
e1	<-->	e3	4.683	-.015
e1	**<-->**	**e2**	**23.169**	**.037**