

THE EFFECTS OF ORGANIZATIONAL FACTORS  
ON KNOWLEDGE MANAGEMENT EFFECTIVENESS TOWARDS  
ORGANIZATIONAL PERFORMANCE IN MALAYSIA

By

MAZITAH HUSSIN

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**Kolej Perniagaan**  
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Tandatangan  
(Signature)

Tarikh: **24 Jun 2014**  
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Nama Pelajar  
(Name of Student) : **Mazitah Hussin**

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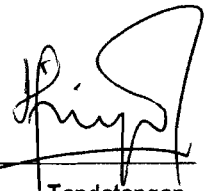
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Program Pengajian  
(Programme of Study) : **Doctor of Business Administration**

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Nama Penyelia/Penyelia-penyelia  
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## ABSTRACT

Knowledge Management (KM) has become the centre of attention in most organizations lately. Not to be left out, Malaysian Government has also structured their KM Blueprint in guiding the Malaysian Public Sectors for managing their organizational knowledge. This is to improve their service delivery and decision making process through an informed knowledge environment. Nevertheless, the study that has been done by MAMPU showed that the application of KM in the public sector was not fully optimised, due to the lack of the sharing culture and the differences in the understanding of its concept. Although organizations are implementing the KM, however the effectiveness of this process is questionable. Knowledge is seen, not to have been managed effectively and efficiently as well as not been proportionately distributed within an organization. The thesis of this study is looking at the organizational factors that will influence the knowledge management's effectiveness that would provide an impact on the organizational performance. Therefore, this study seeks to deal with the following research questions: i) What are the factors that will affect KM's effectiveness?, ii) Is there any relationship between KM's effectiveness and organizational performance? and iii) Does KM's effectiveness mediate the relationship between knowledge management practices and organizational performance?

An integrative theoretical model of KM's effectiveness and OP was developed. The hypotheses were examined by means of questionnaire surveys to address the research questions and the results were significant. Therefore, the empirical evidence has proven that this model is applicable in the Malaysian contexts. The findings confirmed that organizational factors, KW, OC, KMP and IT do affect the effectiveness of KM. These have provided an impact on OC. It was also proven that KME mediates the effect of KMP towards OP. This study has shed some lights in the area of KM. It is high time for the Malaysian Public Sectors to pay attention on the importance of managing organizational knowledge in order to be able to fulfill the commitments in the service delivery process through an informed knowledge environment.

**Keywords:** knowledge management effectiveness, organizational performance, organizational factors

## ABSTRAK

Sejak akhir-akhir ini, pengurusan pengetahuan (KM) telah menarik perhatian kebanyakan organisasi. Begitu juga kerajaan Malaysia yang telah menstruktur rangka tindakan KM dalam membimbing sektor awam bagi pengurusan pengetahuan organisasi dalam penambahbaikan mutu perkhidmatan dan penyampaian sektor awam, serta mempercepatkan proses membuat keputusan melalui persekitaran berasaskan pengetahuan. Walau bagaimanapun, kajian yang dilakukan oleh MAMPU menunjukkan bahawa penggunaan KM dalam sektor awam tidak dioptimumkan sepenuhnya kerana kekurangan budaya perkongsian dan pemahaman tentang konsep KM. Hal ini menunjukkan bahawa organisasi sememangnya melaksanakan KM, namun keberkesannya masih dipersoalkan. Pengurusan pengetahuan didapati tidak diuruskan dengan berkesan dan cekap serta pengedaran dan penggunaan pengetahuan tidak secara menyeluruh. Kajian ini dilakukan adalah untuk mengkaji faktor-faktor organisasi yang akan mempengaruhi keberkesanan pengurusan pengetahuan dan secara langsung akan memberi kesan kepada prestasi organisasi. Kajian ini bertujuan untuk menangani persoalan berikut: i) apakah faktor-faktor organisasi yang memberi kesan terhadap keberkesanan KM?; ii) adakah terdapat sebarang hubungan di antara keberkesanan KM dan prestasi organisasi?; dan iii) adakah keberkesanan KM merupakan pengantara hubungan antara amalan pengurusan pengetahuan dan prestasi organisasi?

Untuk tujuan kajian ini, satu model integratif teori keberkesanan KM dan OP telah dibangunkan. Kajian ini telah menggunakan kaedah penyebaran dan pengisian borang soal selidik bagi menguji hipotesis dan hasil analisis telah menjawab persoalan dalam kajian ini. Oleh sedemikian, bukti-bukti empirikal menunjukkan bahawa model ini boleh diaplikasikan dalam konteks Malaysia. Penemuan ini mengesahkan bahawa faktor-faktor organisasi, pekerja berpengetahuan (KW), budaya organisasi (OC), amalan pengurusan pengetahuan (KMP) dan teknologi maklumat (IT) memberi kesan kepada keberkesanan KM yang memberi impak ke atas OC. Ia juga membuktikan bahawa keberkesanan pengurusan pengetahuan (KME) memainkan peranan sebagai pengantara di antara KMP dan OP. Bagi sektor awam di Malaysia, adalah disyorkan untuk memberi perhatian kepada kepentingan pengurusan pengetahuan dalam organisasi bagi memenuhi penyampaian perkhidmatan yang komited melalui persekitaran berasaskan pengetahuan.

**Kata kunci** : keberkesanan pengurusan pengetahuan, prestasi organisasi , faktor organisasi

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## **ABBREVIATION**

CFA	-	Confirmatory Factor Analysis
CFI	-	Comparative Fit Index
CMV	-	Common Method Variance
EM	-	Expectation Maximization
HSF	-	Harman's single factor
IC	-	Intellectual Capital
ICT	-	Information & Communication Technology
IT	-	Technology
KA	-	Knowledge Application
KC	-	Knowledge Creation
KE	-	Knowledge Management Effectiveness
KLVP	-	Kuala Lumpur / Klang Valley / Putrajaya
KM	-	Knowledge Management
KMP	-	Knowledge Management Practices
KS	-	Knowledge Sharing
K-S	-	Kolmogorov-Smirnov
KW	-	Knowledge Workers
MAMPU	-	Malaysian Administrative Modernization and Management Planning Unit
MAR	-	Missing At Random
MCAR	-	Missing Completely At Random
MDEC	-	Malaysian Development Corporation
NMAR	-	Not Missing At Random
OC	-	Organizational Culture
OP	-	Organizational Performance
PA	-	Public Administration

PCA	-	Principal Component Analysis
PEOU	-	Perceived Ease Of use
PU	-	Perceived Usefulness
RMSEA	-	Root Mean Square Error Of Approximation
SRS	-	Simple Random Sampling
SEM	-	Structural Equation Modelling
SPSS	-	Statistical Package for Social Science
SRMR	-	Standardized Root Mean Residual
TLI	-	Tucker Lewis Index

# Chapter ONE

## Background of the Study

### 1.1 Introduction

Chapter ONE provides an overview of extensive study's framework and followed by other thesis chapters. Research background overview and importance of this study are explained in this chapter. In the subsequent section, research problems, research questions, research objective and research scope are offered. This chapter also discusses the significance of the study. Figure 1.1 presents the outline of Chapter ONE.

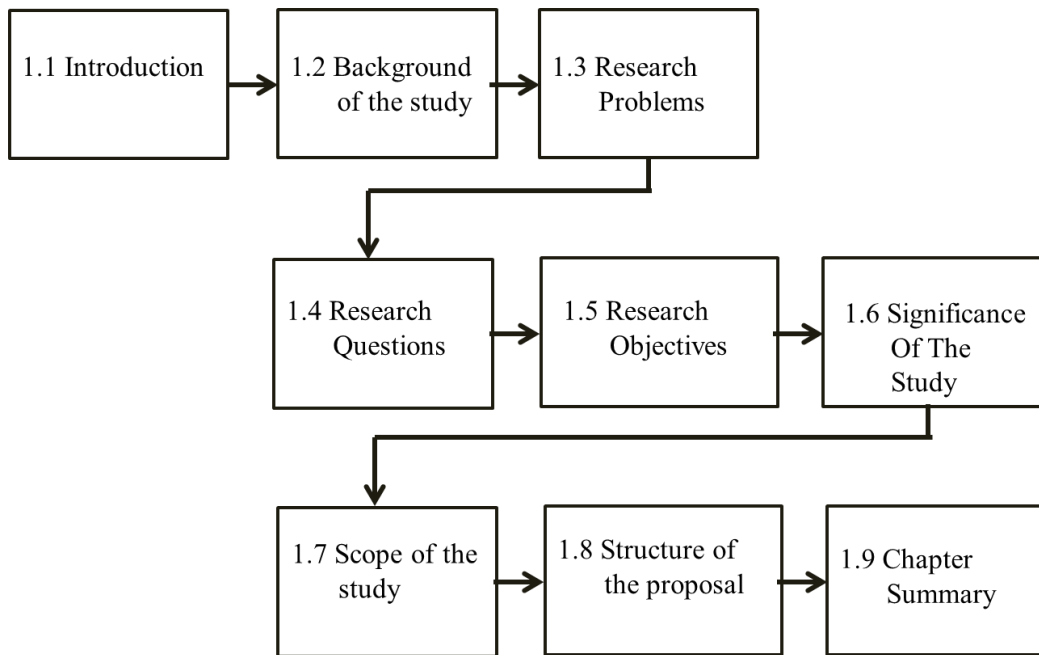


Figure 1.1  
*Chapter One Outline*

## **1.2 Background of the study**

The organizations with high-performance are the role models to others. These organizations consistently outperform others in their own ways. To remain competitive, organizations have initiated different management methods and among them are total business process re-engineering (BPR), enterprise resource planning (ERP), quality management (TQM), customer relationship management (CRM), electronic commerce (EC), supply chain management (SCM) and knowledge management (KM) (Basu & Muylle, 2003; Gattiker & Goodhue, 2004; Ketchen & Hult, 2007 ; Paper, 1998; Rahman & Bullock, 2005).

KM has generated a lot of interest within the last years (Maryam Alavi & Leidner, 2001). KM has becoming the centre of attraction of these organizations in managing their organizational knowledge. From the Resource-Based View (RBV) view point, organization most important entity is its resources (Barney, 1991; Grant, 1996b; Penrose, 1959) and RBV suggests that organizations should concentrate explicitly on knowledge as the absolute resource (Kalling, 2003). Nonaka and Takeuchi (1995) stressed that one of the main sources of lasting competitive advantage is knowledge. Knowledge has been accepted as the key differentiator in any organization for them to sustain its competitive advantage (Halawi, Aronson, & McCarthy, 2005) which will reflect their organization performance. Some researchers argued that knowledge much depend on individual and organizational competencies, for example, skills, know-how and know-what (Tomas H. Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995).

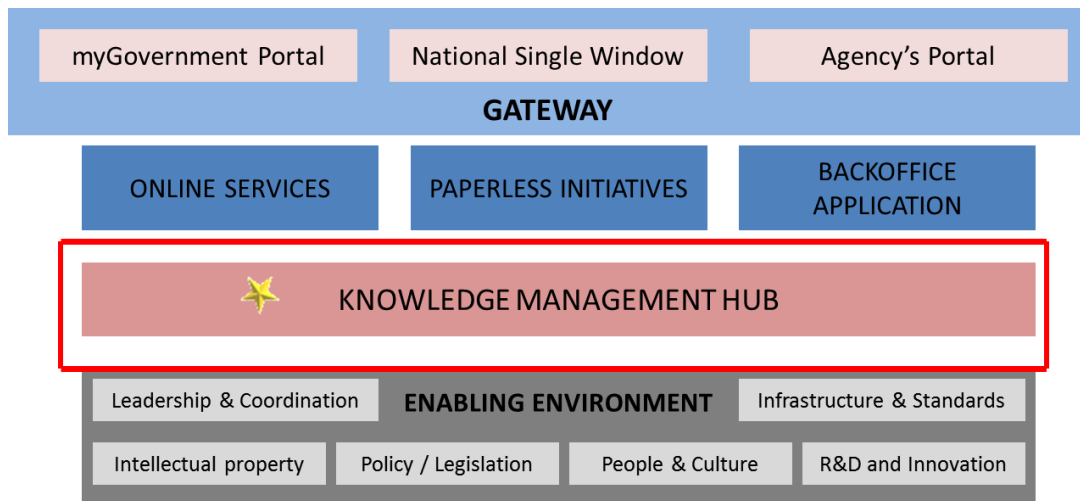
Even though knowledge is recognized as the crucial resource, nevertheless, knowledge is seem not been managed effectively and efficiently as well as not been

proportionately distributed within an organization ((MAMPU), 2011). Knowledge is categorized into two types: (1) explicit knowledge and (2) tacit knowledge (Kogut & Zander, 1992). These two knowledge types need to be managed by the organizations. Tacit knowledge is the individual experiences and know-how which is not easily tapped (Crowley, 2000) and it resides in the person's mind which makes the capturing process difficult (Nonaka & Takeuchi, 1995). Whereby, explicit knowledge is clearly articulated and documented (Alter, 2002). The nature of explicit knowledge makes it accessible and some of the example of documented explicit knowledge is in the form of books, databases, which can be accessed, read, interpreted for different purposes. Explicit and tacit knowledge is not a separate entities but mutually complementary.

Knowledge is accumulated through experience and it becomes useful when it is been articulated and shared with others. In reality, organizations realize that when an employee leaves the place, the knowledge that they have in their mind will departure. Besides that, most of the time, a lot of time spent to search for information rather than analyse and improvise existing knowledge. This is due to a situation where information cannot be retrieved on time or unable to locate the information. Therefore, organizations understand that for them to remain competitive and to further develop their competitive advantage and sustain their organization performance, the process of identifying, capturing, sharing and accumulating knowledge is very important (Husted & Michailova, 2002).

Nowadays, organizations are very concern in the way how knowledge is been managed within the organizations. Malaysian Government realizes that there is

insufficient work transition plan with regards to KM (MAMPU, 2011). There were pockets of information residing in silos. In January 2011, Malaysian Administrative Modernization and Management Planning Unit (MAMPU) has published a KM Blueprint for the public sectors. One of the issues which were highlighted was on the application of KM in public sector which was not really effective due to different opinion on KM concept as well as lack of sharing culture among the employees (MAMPU, 2011). Having understood the current KM issues in the public sectors, Malaysian Government has clearly outlined its KM strategy to improve public sector's service delivery and better decision making process based on systematic knowledge environment (MAMPU, 2011). As highlighted in the blueprint, among the KM strategies, focus was given in inculcating KM culture among KW as well to strengthen KM initiatives. KM is seen has significant roles in Public Administration (PA) in building society's intellectual capital (IC). Malaysian Government is aiming to improve PA's KM in the following areas: (1) to enhance public services decision making; (2) to enhance societal IC capabilities; and (3) to produce knowledgeable employees (source : Malaysian Government's ICT Strategic Plan : 2011 – 2015). Further to this, Malaysian Government is also moving towards standardising knowledge management practices within the agencies for easier reference. Steps have been put in place to provide the relevant infrastructure to support KM initiatives for its ministries. Figure 1.2 shows overall Malaysian Government's ICT Strategic Plan: 2011 – 2015 (MAMPU, 2011). The central point of this plan is the formation of Knowledge Management Hub which handles the IT aspects of KM initiatives among the public sectors.



Source : MAMPU (2011)

Figure 1.2

*Malaysian Public Sector ICT Strategic Plan : 2011 – 2015*

Taken into consideration the important role of KM in the Malaysian Government's PA, this study intends to explore the relationship between organizational factors and knowledge management effectiveness on its performance. Based on the review on past related literatures, this study has identified many potential factors, and for the purpose of this study, it has been narrowed down to four factors which are: knowledge workers (KW), organizational culture (OC), knowledge management practices (KMP) and technology (IT). Aside from this, this study shall also explore the impact of the effectiveness of KM (KME) on organisational performance (OP). Hence, this study has identified Malaysia as our target country and the respondents shall be drawn from public sectors. Based on the formulated constructs for this study, it is convinced that there are: (i) only a few researches in a broader context; and (ii) lack of similar study has been conducted in Malaysia. Besides that the demographic driven analysis is further expected to enrich the findings of this research. Therefore the study's findings are expected to contribute to body of knowledge in this area.

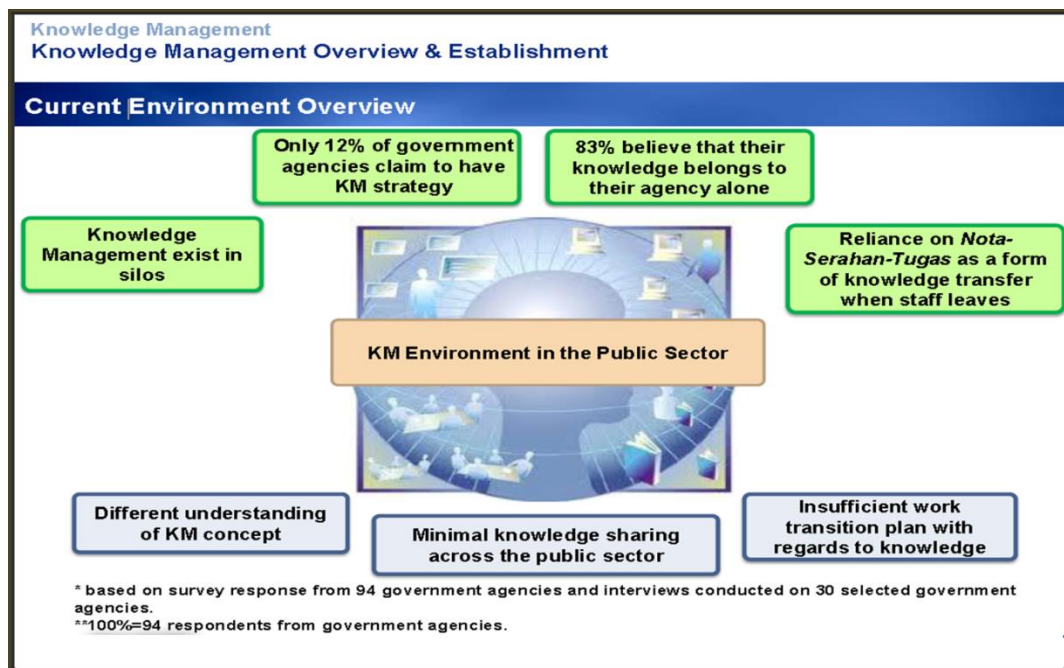
### **1.3. Research Problems**

For organization to be able to provide better services, innovative and ahead of others, they need to improve their customer service and innovation capabilities, enhance flexibility and adoption, empower their employees and continuously create new knowledge, share and learn. Therefore knowledge has been accepted as crucial resources in an organization (P.F. Drucker, 1993) in obtaining, growing and sustaining intellectual capital in organizations (Marr & Schiuma, 2001). Organizations have acknowledged that managing knowledge is very crucial and an important activity (Kingston & Macintosh, 2000). Effort of continuously updating organizational knowledge resources could keep organizations stay competitive (Harrison & Leitch, 2000).

Further to this argument, Malaysian Government realised the importance of managing organizational knowledge so that decision making process can be improved and at the same time able to provide excellent service delivery through an informed knowledge environment as highlighted in Public Sector Knowledge Management Blueprint (MAMPU, 2011). MAMPU has conducted a survey on 92 government agencies to investigate issues faced by the government agencies in implementing KM and among the findings showed that KM does exist in Malaysian Government but in was done in silos where it is more on departmental initiatives rather than organizational effort which leads to pockets of information scattered in the organizations (Figure 1.3). It was also reported that there is lack of knowledge sharing among the public sectors and 83% believe that their knowledge belong to their agencies only. Further to that, it was also reported that there is lack of proper processes of knowledge transfer to capture knowledge from employees who are



leaving the organization in which reducing collective organization wide competency. Due to lack of standardization of system development requirement across agencies affected the system quality and as a result agencies are facing difficulty in sharing their information among them which lead to reinvent the wheel effort in preparing documents which lead to duplication of same information.



Source : MAMPU (2011)

Figure 1.3

*Knowledge Management issues in the Malaysian Public Sector*

Easy and on-time access to valuable organizational knowledge is very crucial. Among the strategies introduced in the KM Blueprint was to strengthen KM initiative in the Public Sector as well as to inculcate KM culture (MAMPU, 2011). As argued by (Malhotra, 2003), managing knowledge evolve around people, processes and methods. It shows that these elements are closely link to the success of the management of organizational knowledge which in turn implies that successful and effective KM implementation ensures the acquirement and growth of intellectual capital. As explained above, Malaysian Public Sector is very concern about KM

initiative within their agencies. In order to achieve their objective in improving service delivery and decision making through an informed knowledge environment, each agencies should have their KM initiatives in place. Aspects such as involvement of KW, organized and effective KMP, aligned OC and relevant IT in place would be crucial. These elements would affect the effectiveness of KM in the organization which possibly will give an impact on OP. Without proper and effective KM implementation, possibility of Malaysian Government agencies to achieve their objective is questionable. As argued by Tracey, Mark and Lim (1999), one of the perceived organization-level performances measured overall OP. Based on the literatures review, it was found that there were few studies were done to investigate the impact of KM on OP (Harrison & Leitch, 2000; Heisig, 2009; Treacy & Wiersema, 1995; M. Zack, McKeen, & Singh, 2009). Among researchers they have different opinion of performance and among them Javier (2002) relates performance to economy, efficiency, and effectiveness of a certain program whereby (Daft, 2000) defined performance as the ability of the organization to use its resources to secure organizational goals efficiently and effectively. Hence, this study equates performance as the capability of the organization to utilise its resources in efficient and effective manner. As highlighted in literatures, knowledge is the important resources in an organization. In order for the public sectors to improve their processes in order to be able to provide better services and remain competitive, they will have major problems in their hand if organizational knowledge is not been managed effectively. Part of the expected outcome of KM implementation that was highlighted in the Malaysian Government Blueprint was to manage agency's knowledge retention for exploitation purposes as well as the capability to speed up the decision making process with better quality decision. Other expected outcomes

are: (1) to minimise bureaucracy barriers; (2) to be able to access to right, accurate and updated information; (3) to increase collaboration among KW within public sector and to reduce silos thinking style and; (4) the need to draw insights from lessons learned and past experiences. All these are link to the improvement of internal organizational processes which will lead to overall OP (Tracey, Mark, & Lim, 1999). The question here, if public sectors are not utilising its resources effectively and efficiently and at the same time, this knowledge is not been managed effectively, can the public sectors achieve these objectives?

Among the innumerable factors that influence KM, past study has consistently identified people, OC, knowledge process capability and IT; however to reduce ambiguity it is reiterated that there is lack of research investigated the influence of these factors on effectiveness of KM towards OP in Malaysian context. The rational of the study is to formulate a conceptual frame work model to examine the impact of effectiveness of KM through these selected organizational factors towards OP in Public Sectors in Malaysia. Based on the survey findings done by MAMPU, KM issues highlighted can be mapped into the following organizational factors: 1) KW; 2) OC; 3) KMP and; 3) IT. Hence this study will investigate the integrative effect of KW, OC, KMP and IT on KME. To support this, there were many researches explaining what makes KM and core competencies the critical processes for performance (Gorelick & Tantawy-Monsou, 2005), but little research has been done on the association of effectiveness of KM and OP in Malaysia. In bridging this gap, this study attempts to discover the impact of KM on OP in public sectors in Malaysia. The combination of these research problems and gaps gives the researcher

compelling combination of challenging issues but at the same time, the study is expected to reveal some findings on the under-investigated research area.

#### **1.4. Research Questions**

The fundamental aim of this study is to address the question of “the effects of organizational factors on KME towards organizational performance in Malaysia”.

This study is expected to address the following research questions:-

- 1.4.1. What are the factors that affect KM effectiveness?
- 1.4.2. Is there any relationship between KM effectiveness and organizational performance?
- 1.4.3. Does KM effectiveness mediate the relationship between knowledge management practices and organizational performance?

#### **1.5. Research Objectives**

This study aims to fill the gaps emerging from review of past researches in the areas of KM and OP. As guided by the purpose outlined above, this study has formulated the following research objectives:

- 1.5.1. To examine the effects of organizational factors on the effectiveness of knowledge management;
- 1.5.2. To examine the impact of knowledge management effectiveness on organizational performance;
- 1.5.3. To examine the impact of knowledge management practices on organizational performance.

## **1.6 Significance of the study**

The concepts of KM have been around for just over a decade (Serenko, Bontis, Booker, Sadeddin, & Hardie, 2010); and to-date, there are not many standard measurements that have been developed and adopted by those that have been implementing KM in their organization. This can be supported by Boyd (2004) who indicated that it is difficult to link KM initiatives to organizational benefit as KM is a relatively new function and there is no standard success metrics to rely on. In the absence of standardized metrics to measure KM, many organizations have taken their own effort to develop their own measurement. These measurements could range from as small as measuring knowledge nuggets that have been contributed by their KW to as big as new product development caused by innovation through knowledge acquisition, sharing and reuse. However, many KM practitioners are still unable to make sense between the organizational KM initiatives to organizational business objectives. Without this connection, it is tough to prove how KM contributes value to the business functions. The central thesis of this study is one such opportunity. From the practical viewpoint, the study's results are expected to bridge the 'ignorance-knowing' gap. It is belief that not many studies were done in Malaysia in this area, and therefore, this study, in some way contributing to the knowledge repositories for future references.

The finding is expected to help for better understanding in the following areas:-

- i. The effectiveness of KM within organizations;
- ii. The way organizations managed the organizational knowledge;
- iii. Factors that influence KM and its impact on OP

- iv. This research is expected to contribute to the body of knowledge in this area. It is hoped that, this paper will instigate more researchers to conduct studies in this area.

### **1.7 Scope of the study**

As in any research, this study has clearly identified its scope. Firstly, this study focuses on the effects of organizational factors on the effectiveness of KM and its contribution to organizational performance. Organizations realized the importance of KM as the means for organizational effectiveness and effectiveness (Hlupic *et al.*, 2002) and effective application of KM assist organizations to be more innovative, better integration of efforts and reduce redundancy of knowledge (Gold *et al.*, 2001). It is recognized that there are many factors or also known as KM enablers influence KM implementation which not only assist organizations to manage their knowledge effectively but also encourage people to share their knowledge and experiences (Yeh, Lai, & Ho, 2006). As such, this study attempts to investigate the effects of organizational factors on KM effectiveness and in turn its impact on organizational performance. Secondly, the study will be conducted in Malaysia, an Asian country with multicultural, multi-ethnic and multilingual society and also an industrialized market economic country. This study is also focuses on public sector agencies in Malaysia with its role to be an effective facilitator for the transformation of country's economy and to provide quality services to its citizens. The population will be selected from four sectors namely economy, social, public administration and security which will allow the understanding of effects of organizational factors on KME as a whole (public sectors) and by strata. Due to most of the headquarters of these agencies are located in Kuala Lumpur, the selection of population is further

narrowed down by location specifically to Kuala Lumpur/ Klang Valley/ Putrajaya (KLVP). It is argued that organizational infrastructure capabilities are much influenced by particular country's cultural, political business environment and economic which regulated its KM process capabilities. Therefore, in order to strengthen research generalisation, it is recommended to conduct cross-validation studies in different contexts, hence this study has chosen different sectors as the target population. Thirdly, this study attempts to investigate how tacit and explicit knowledge are being managed within public sector. Thirdly, quantitative method using self-monitored questionnaires is employed for data gathering using probability sampling.

### 1.8 Structure of the thesis

The thesis outline is as shown in Figure 1.4 below:

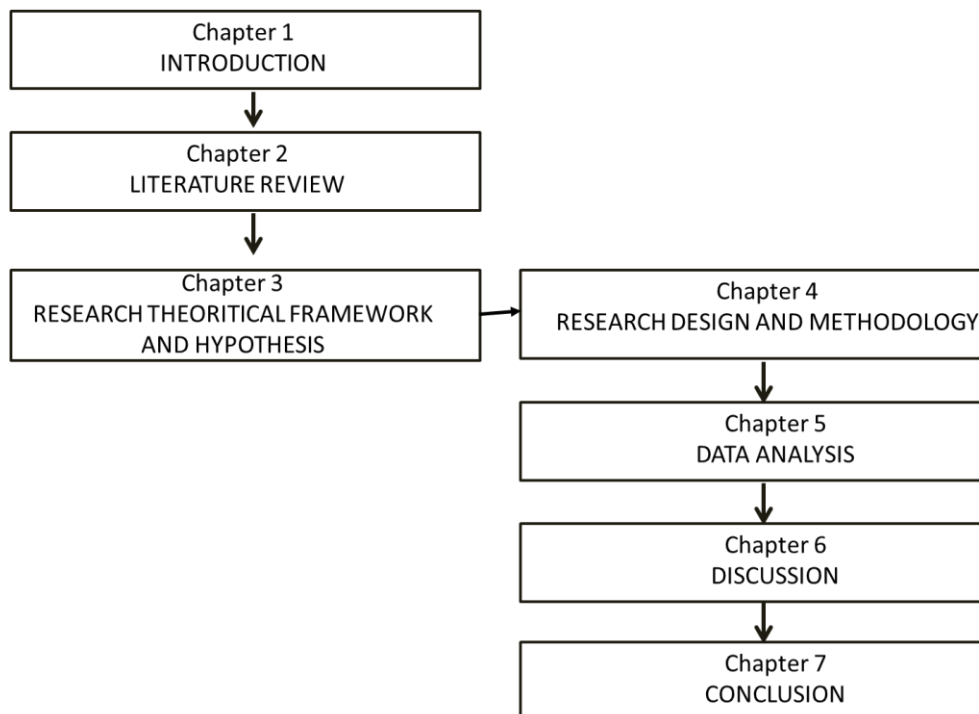


Figure 1.4  
*Thesis's Chapter*

**Chapter 1 :** introduction to the study is offered in chapter 1 which will link-up to other chapters. It provides research background overview and followed by an explanation on the importance of the study as well as literature gaps of knowledge management effectiveness (KME) influence on organizational performance (OP). In the subsequent sections, research problems, research questions, research purpose and research objectives are offered. This chapter also discusses the significance of the study.

**Chapter 2 :** covers an overview of the study, aiming to identify gaps in current body of knowledge in this area and further to develop a theoretical model by reviewing existing literatures. Two main disciplines are explored which are KM and OP which covers key constructs definition, KM definition and their development history, the key aspect of managing KM effectively as well as the importance of KM on OP. The chapter continues discussing the theories that is been used as the basis in the development of the research theoretical framework.

**Chapter 3 :** theoretical framework and hypotheses development will be offered in this chapter.

**Chapter 4 :** this chapter described the justification of this study's research methodology. It also discusses the research design process in examining the theoretical model which is developed in Chapter 3. Furthermore, it covers the development of questionnaire and measurement of items. It also reports the unit analysis that is going to be used in the study.



**Chapter 5 :** this chapter reports the pilot data analysis result in testing the reliability of the construct. Statistical Package for Social Science (SPSS) version 14 was used to test the reliability of construct. This follows by data examination and cleaning. AMOS version 16 is used to measure model fit using CFA to test measurement model fit indices. In the following step, structural model is developed to test the significance of theoretical relationship via the developed hypotheses.

**Chapter 6 :** this chapter discusses the findings of the study. It draws the conclusion based on the analysis in Chapter 5. In addition, it also discusses the theoretical contributions as well as the research practical implications.

**Chapter 7 :** this chapter concludes the overall research. It also highlights the limitations of the study and the recommendations for future research.

## **1.9 Summary**

By framing an intensive study's layout, chapter one lays the foundation to all seven thesis chapters. In the following chapter 2, this study will be discussing extensively on the research based on gaps found in literatures. It will be covering literatures review on selected organizational factors for this study (KW, OC, KMP and IT), KM and KME; and OP.

# Chapter TWO

## Literature Review

### 2.1. Introduction

Expanding from Chapter ONE, this chapter covering the gaps found in the current body of knowledge in the research area, and further to develop a theoretical model. Two main disciplines are explored which are KM and OP which covers key constructs definition, KM definition and their development history, the key aspect of managing KM effectively as well as the importance of KM on OP. The chapter continues discussing the theories that is been used as the basis in the development of the research theoretical framework. This study intends to establish theoretical relationship and to further examine empirically the influence of organizational factors on KME and its impact on OP. Therefore, the literature review in this chapter focuses on understanding of KM, managing KM effectively and OP. Figure 2.1 presents the outline of chapter TWO.

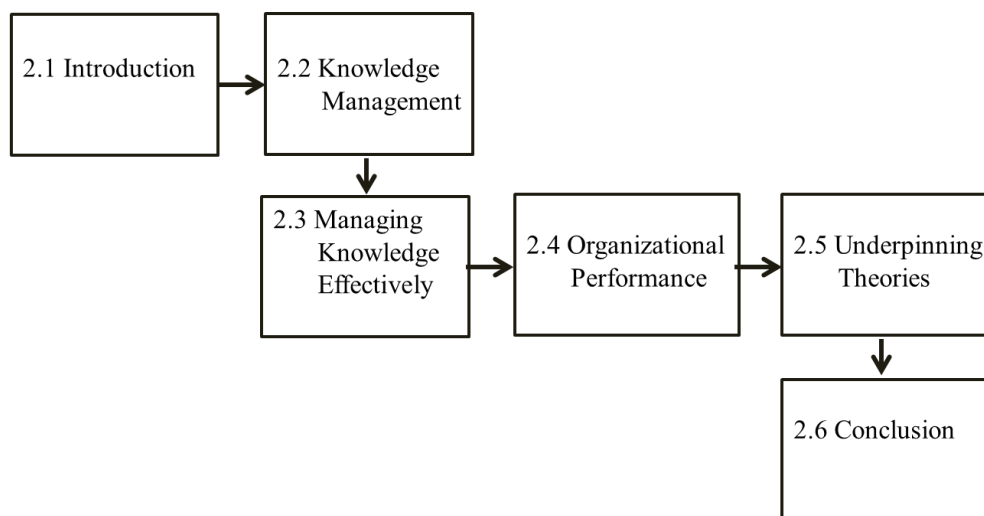


Figure 2.1  
*Chapter Two Outline*

## **2.2. Knowledge Management**

In this section, it covers an overview of knowledge, type of knowledge, overview of KM, KM evolution and the benefits of KM.

### **2.2.1 Overview of Knowledge**

Before one can discuss on KM, one has to clarify the meaning of knowledge itself. There is no standard definition of knowledge. Knowledge can be highly subjective and difficult to codify. In general, knowledge can be studied from different perspectives which are: (1) belief; (2) as an object; (3) as a process; (4) situational information access; or (5) capability (Maryam Alavi & Leidner, 2001). It starts from data such as raw numbers and facts and when put into context becomes information. Information alone may not give much insight, but when it is combined with experience and judgement, and then it became knowledge. This is supported by Schubert, Lincke and Schmid (1998) who argued that knowledge is the know-how which was gained through experience which can be applied for effective action (Huber, 1991; Nonaka, 1994). Carlsson *et al.* (1996) argued that knowledge is a process when an individual execute what he knows concurrently, based on his skills, know-how and know-what (Tomas H. Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995).

On the other hand, Carlsson *et al.* (1996) and McQueen (1998) treated knowledge as an item which can be kept and shaped. Goh (2004) postulates that knowledge has important role in the organization and it value adds organization's products, processes and people. Knowledge is seen as crucial resource for an organization. There are number of studies done to measure the relationship between organization

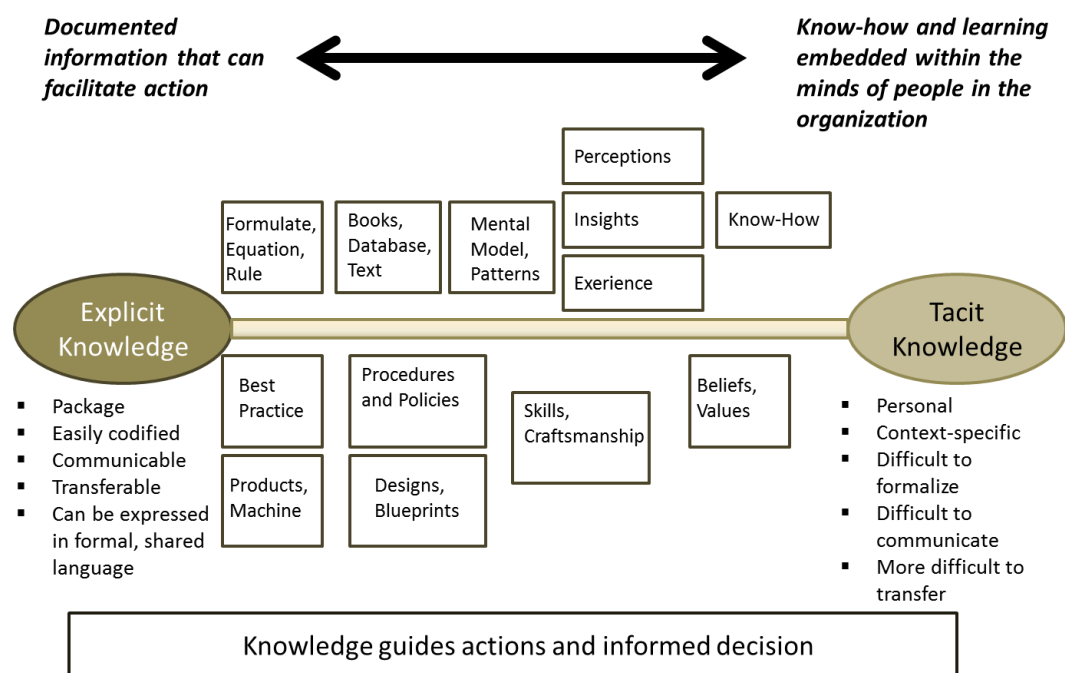
resources and its success (Barney, 1991; Grant, 1996a; Penrose, 1959), and it is known that the main ingredients of organizational wealth are its knowledge and intellectual capital which formed as the engines of economic and social development (Cantu', Bustani, Molina, & Moreira, 2009; De la Vega & Stankosky, 2006). Based on previous studies, knowledge can be categorised as codified knowledge and embodied knowledge as shown in Table 2.1.

Table 2.1  
*Knowledge Categorization Framework*

Codified knowledge	Embodied Knowledge
Effective information of all kinds – facts and figures	Knowledge that is rooted in experience, background and skill of a person, strongly related to the person that holds it
Explicit knowledge (Nonaka & Takeuchi, 1995; Michael Polanyi, 2009)	Tacit knowledge (Polanyi 1966; Nonaka & Takeuchi 1995; Williams 2006)
Knowledge of things and objects Knowledge of statements & propositions (Musgrave 1993)	Embodied knowledge (Collins 1993)
Symbolic knowledge (Collins 1993)	Embodied knowledge (Blackler 1995)
Encoded knowledge (Blackler 1995)	Know how (Process knowledge) (Lundvall 1996)
Know what (Catalogue knowledge) Know why (Explanatory knowledge) (Lundvall 1996)	Tacit knowledge Instrumentalities (Fleck 1997)
Catalogue knowledge (Millar, Demaid & Quintas 1997)	
Explanatory knowledge (Millar, Demaid & Quintas 1997)	
Formal knowledge Contingent knowledge (Fleck 1997)	
Object knowledge (Sveiby 1997, 2001; Hsu & Shen 2005)	

Source: Adapted from (Blumentritt & Johnston, 1999)

Among these categories as listed above, tacit (or embodied) and explicit (or codified) are the most notable knowledge category (Bollinger & Smith, 2001; Nonaka, 1994; Pemberton & Stonehouse, 2000). Explicit and tacit knowledge complement each other and they are not separate entities. Knowledge starts from individual and it can be expanded through communication by people within the organizations as shown in Figure 2.2. Examples of explicit knowledge in an organization are patents, processes, methodologies, strategies and services. And, the example of tacit knowledge is employee's experiences, skills and competencies, ideas and individual beliefs and values.



Source : Copyright 2000, PricewaterhouseCoopers LLP

Figure 2.2  
*Tacit and Explicit Knowledge.*

### **2.2.1.1 Tacit Knowledge**

Tacit knowledge exists in people's mind and it could be individual perceptions over subjects, experiences and insights. In sharing tacit knowledge, it can be costly, the process may not be straight forward and it takes time (Kogut & Zander, 1992; Nonaka & Takeuchi, 1995; J.-K. Wang, Ashleigh, & Meyer, 2006). Tacit knowledge is created through individual past experiences (Hasher & Zacks, 1979) and it becomes a habit or routine (R. R. Nelson & Winter, 1982). Tacit knowledge is not an overnight output, it is built up over time and it resides in an individual's mind. Even though tacit knowledge is about past experiences, whenever it is needed, individual may automatically make use of this knowledge without having to consciously plan how to apply his / her knowledge (Nonaka & Takeuchi, 1995; Reber, 1993).

In an organization, tacit knowledge resides in their knowledge worker' (P. F. Drucker, 1954) mind and therefore, every organization will have different knowledge from the other as each organizations will have different set of people (Kim, 2002). Tacit knowledge involves the interaction within people to people. Tacit knowledge has been recognized as an organizational strength, but it is not an easy process to disseminate or duplicate without the consent of knowledge owner (Nooteboom, 1999). Tacit knowledge can be shared when people meet, socialize and share their experiences and tell stories.

### **2.2.1.2 Explicit Knowledge**

Alter (2001) defined explicit knowledge as knowledge which can be codified and articulated in the form of documentations, databases, corporate procedures and best practices. Usually, explicit knowledge can be retrieved or assessed through physical media such as books, emails, databases and written policy and guidelines and can be read using common shared language. Documented information formed explicit knowledge which can facilitate action. It is expressible, constructible and can be articulated which can be stored independently (Nonaka & Takeuchi, 1995), and can be communicated (Grant, 1996b) and transferable. Codified explicit knowledge assets can be reused by others to solve problems, enhance existing work procedures, and improve their knowledge as well as to connect people through knowledge sharing. In order to store and manage explicit knowledge, an organization often needs to invest on infrastructure and information technology system (Hansen, Nohria, & Tierney, 1999).

Managing explicit knowledge effectively is very crucial. In most of the situation, people within an organization find that it is difficult to locate critical existing knowledge in time. Even though knowledge has been documented but usually, it is scattered within the organisation. Sometimes, it is residing in individual computer, stored in server with no access right, storing is not done systematically and without proper classification, documents are out-dated, no new knowledge has been deposited due to no proper document lodging policy and processes, no proper system installed to assist in document management and documents are corrupted and no back-up. Due to this, more time is spent in searching for documents rather than analysing and this is highlighted by (Conway, 2007), where she said that people

spent 15% of their time to search document. Sometimes, this will lead to re-invent process, whereby, when certain information cannot be found, the whole process has to start all over again, starting from gathering information, scrutinizing, writing, proof-reading and finalizing. In some situation, lessons learnt are not shared. This could be due to when an employee is unable to get the right platform to share their experiences or not sure where they should lodge the documented knowledge. In this scenario, it is anticipated that their expertise will be kept within the employee himself / herself. Besides that, very alarming situation where organization should pay attention is at knowledge that can be captured through mistakes done. People normally will not open up their mistakes due to their worries about the punishment that they are going to face and soon the mistakes are forgotten. The organizations should encourage their employees to share their mistakes with others by record it and make it public. This is to minimize the same mistakes to be repeated in the future. Knowledge that gained through experience is very valuable which to be shared with others.

Based on the above discussion, it is interesting to investigate how the organizations manage their explicit knowledge as these knowledge is readily to be used if it is easily can be retrieved which could improve people decision making process, problem solving and learning process. Besides that, tacit knowledge is as important as explicit knowledge. How do organizations manage the tacit knowledge which resides in their KW's mind? Proper mechanism is required to tap the tacit knowledge and record it for future reference such as using story telling method, scenario capture method, discussion forum or an attachment program. KM is not something new. Everyone is dealing with knowledge in every minutes of our life. Each organization



does have their application system to store and manage their knowledge repositories. The main concern is, how reliable and systematic these knowledge are been managed. The Malaysian Government moves in realising the Knowledge Hub for the Public Sectors is the extended centralized knowledge repositories that would be beneficial to all KW in the Public Sector. Thus, this study is focusing on the discussion of the management of organizational knowledge and the factors that influencing the effectiveness of managing this knowledge.

## **2.2.2 Overview of Knowledge Management**

As discussed above, this section will further explains the overview of KM, historical about KM and KM benefits.

### **2.2.2.1 Evolution of Knowledge Management**

The way of how organization managing and organizing their knowledge as well as systematic process of expressing and presenting it would assist to improve their employee's perception in certain area of interest. KM activities assist an organization to acquire, store and utilize their organizational knowledge for strategic planning, problem solving and decision making. Besides that, by managing knowledge, it helps preventing intellectual assets from deteriorating and improves organizational competencies. In this situation, it is well aware that KM is not something new; it has been around for many years, it has been part of organizational practices. The difference is how KM evolves throughout these years. KM growth (Gamble & Blackwell, 2001, pp. 5-6 cited in Wong, 2006, pp. 19-20) can be explained as per in Table 2.2.

Table 2.2  
*Knowledge Management Evolution*

Year	KM Evolution
1950s	Focus was given on electronic data processing which is link to quantitative management, management by objectives, technique review, program evaluation and diversification.
1960s	The beginning of attempt to harness the power of people working as a community, theory Y, conglomeration and T-groups (Training Groups).
1970s	Focus was given on portfolio management, the strategic planning (Mintzberg 1978), people experience (Porter 1979) and automation process.
1980s	Concentration was on handling competition where management giving focus on corporate culture, downsizing to manage cost and effectiveness, and management by walking around to know employees better, theory Z, and total quality management (TQM).
1990s	Focus was given on human resources where management was concentrating on developing learning organisation, reengineering process, developing core competencies, market valuation and strategic information systems, implementing intranets and extranets. Business process reengineering (BPR) has been introduced which led to a shift towards the three “Ps” - purpose, people, process of Bartlett and Ghoshal (1998).
2000s	Realized that KM is associated to corporate goal. Focus was given in creating organizational integration via a knowledge-sharing culture, recognising intellectual capital value and understanding that competition does not depend on the differential possession of physical assets, or even information, but mostly how organization can make use of their organizational knowledge.
	Over the last decade, KM has been actively recognized and given more attention, which also driven by the networked economy via increased competition, mergers, and acquisitions and the high technology with help of internet.

Nowadays, KM has been the centre stage of every organization. Even in Malaysia, organizations are taking effort to improve their KMP. Malaysian Public Sector is forming the knowledge hub to encourage the KS among the sectors. Based on a study which was done on 94 government agencies, it was revealed that 83% believe that their knowledge is belonging to their own agency (MAMPU, 2011). In order to improve KS, Malaysian Government has taken the steps to inculcate the culture of KM in the public sector as well as strengthening KM initiatives (MAMPU, 2011).

### 2.2.2.2 Knowledge Management Definition

Based on past studies, there are numerous definitions from literature but there is no universal accepted KM definition (Earl, 2001). KM is a process of identifying, collecting, managing and sharing employees' knowledge throughout the organisation. Ability in capturing useful knowledge and provide effective knowledge distribution will assist the organization in addressing organization critical issue efficiently. There were some misconceptions on KM where whenever people talked about KM, they will immediately relate it to IT. KM is not just IT, it comprises of people, processes and IT. IT is used as a tool in promoting KM. KM is an organization's enabler in assisting in meeting strategic organization objectives. Compilation of KM definition found in literatures is shown in Table 2.3. Some definitions link KM to IT while others defined KM as a process of utilizing knowledge to achieve or enhance organizational overall performance, create organization's value, to sustain long-term performance and last but not least meeting organizational objectives.

Table 2.3  
*Knowledge Management Definition*

Author	Definition
(Wiig, 1995)	Defined it as a set of processes or methods which have been clearly defined to be used to locate useful knowledge among different KM operations.
(Broadbent, 1997)	KM as "a form of expertise management which draws out tacit knowledge, making it accessible for specific purposes to improve the performance of organisation; about how the organisation's 'know-how' should be structured, organised, located and utilized to provide the most effective action at that point in time".

Table 2.3

*Knowledge Management Definition (continued)*

Author	Definition
(Duhon, 1998)	<p>KM is “a combination of technology supporting a strategy for sharing and using both the brain power resident within an organisation’s employees and internal and external information found in information containers...”</p> <p>“...the goal of KM is to simultaneously manage data, information, explicit knowledge while leveraging the information resident within in people’s head (tacit knowledge) through a combination of technology and management practices”</p>
O’Leary (1998, p. 34)	“the formal management of knowledge for facilitating creation, access, and reuse of knowledge, typically using advanced technology”
(Gupta & Govindarajan, 2000a)	KM is a process that is used by the organizations to search, choose, organize and distribute important information and expertise necessary for in performing tasks.
Walters (2002, p.7)	“the organizational capability which identifies, locates (creates or acquires), transfers, converts and distributes knowledge into competitive advantage”
Gartner Group (2005)	Defined KM as a discipline promoting an integrated approach to identify, manage and share organization’s information assets.
(Filemon & J., 2008)	KM as the broad process in searching, organizing, disseminating and applying the information and expertise within an organization.

To assist the researcher in understanding this research issue, KM is defined as effective management of organizational explicit knowledge through KMP namely creation, sharing and application to ensure that right people is getting relevant knowledge when it is needed to improve internal processes and decision making process with the use of IT in order to remain competitive and enhance OP.

### **2.2.2.3 Knowledge Management Benefits**

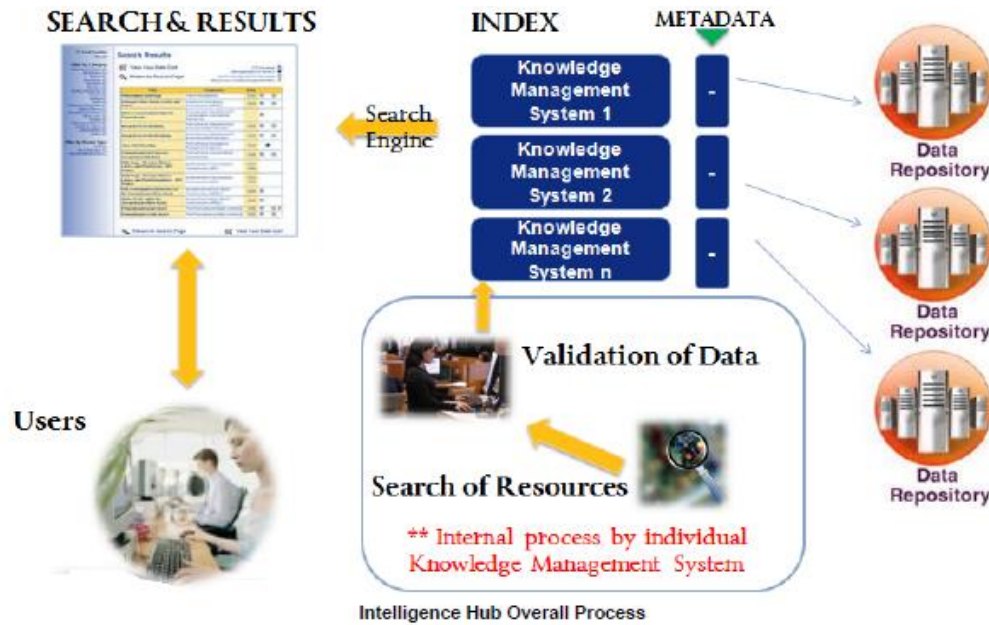
Knowledge is recognized as the basis of an organization's competitive advantage (Conner & Prahalad, 1996; Ghemawat, 1986) and proper and systematic management of organizational knowledge is the key to the success of an organization (Sabherwal & Becerra-Fernandez, 2003). Knowing knowledge as the organizational key resource in managing competitive advantage (Bristow, 2000), managing knowledge has attracted organization's attention. This is supported by (Probst, Buchel, & Raub, 1998) who claimed that competitive advantage can be achieved when an organization ensures that relevant knowledge is transformed, distributed, and integrated. KM is the way how knowledge is been created, accessed and supported. KM is an important activity that adds value and closely link to organization's strategic plans where its activities will contribute to overall organizational strategic advantage and profitability (Duffy, 2000). For an organization to maintain its competitive advantage and overall OP, among few areas that should be in their radar are: (1) to improve their customer service; (2) be more innovative; (3) shorten their cycle times in crucial documents preparation; (4) improve their response time; (5) operate with minimum overhead such as people and facilities; (6) enhance their flexibility and adoption to the current environment; and (7) capture information, create new knowledge, share and learn. This is unlikely achievable if the organization did not continuously giving their attention on creating, locating, enhancing, disseminating, sharing and applying their employee's knowledge at work and outside world.

People, processes, products, and the overall performance has the specific impact of KM to an organization (Becerra-Fernandez, Gonzalez, & Sabherwal, 2004). Firstly in relation to people, KM could facilitate the learning process through various ways such as externalisation method, internalisation method, socialisation method, and communities of practice; and this will help to build close relationship among employees and it will increase their job satisfaction. Secondly, KM could assist an organization to be more effective, efficient and more innovative. Thirdly, in term of product, KM can be seen producing value-added as well as knowledge-based products. And lastly, in term of overall OP, KM contribution can be seen in two ways: (1) direct impact which can be measured in the improvement in return of investment; and (2) indirect impact which is link to economies of scale and scope, and generation of sustainable competitive advantage.

Knowing the importance of KM and highly beneficial, Malaysian Government has taken steps in establishing the Public Sector's KM strategies, implementation approach and the guideline (MAMPU, 2011) in order to improve the Public Sector's service delivery as well to assist in decision making through an informed knowledge environment (MAMPU, 2011). Malaysian Government is taking the initiatives to increase the usage and appreciation of KM within the public sector to ensure that all crucial areas of KM needed within the public sector are covered as well as to optimise public sector KM initiative. One of the objectives of Public Sector Knowledge Hub is to encourage KS throughout the government hierarchy. This is aligned with the vision of public sector's KM which is "Knowledge Excellence as Catalyst towards Effective Service Delivery". Various KM system is been used to handle the knowledge repositories which formed the knowledge hub in order to

manage, organize and provide the searching facilities for their explicit knowledge.

Figure 2.3 shows the setup of intended knowledge repositories.

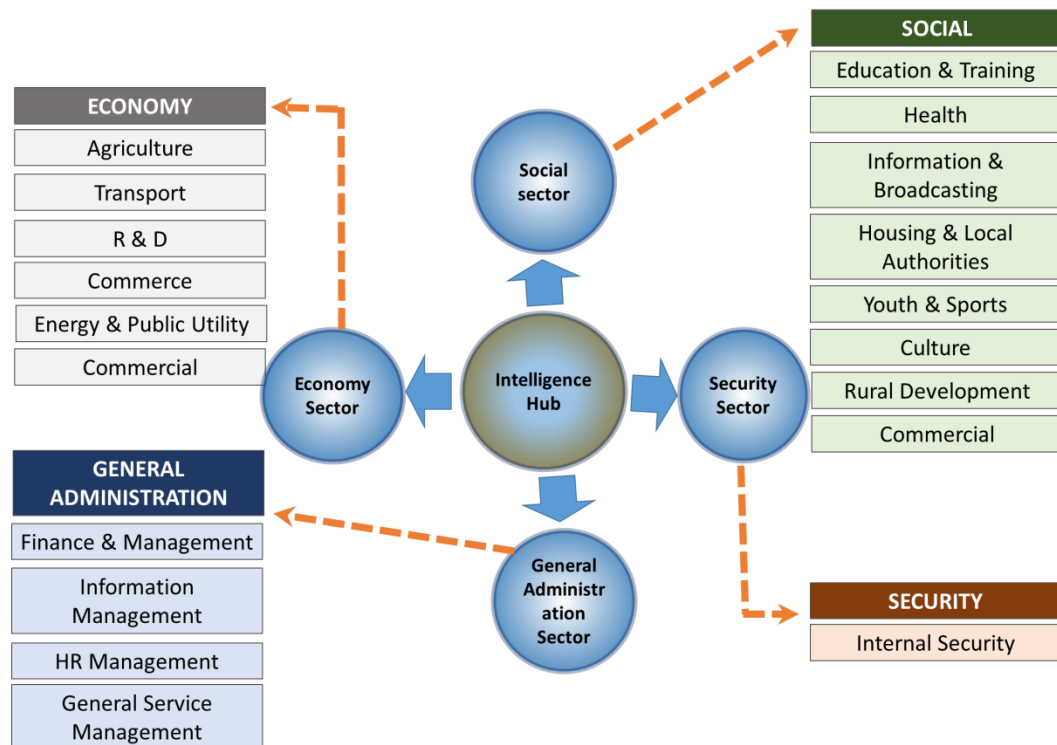


Source : KM Public Sector Blueprint (2011)

Figure 2.3

*Knowledge Management Repositories*

Various sectors are expected to benefit from the implementation of intelligence knowledge hub as shown in Figure 2.4. It is an enabler to connect the KW within the Public Sector to the relevant knowledge repositories to gain the advantage of knowledge value that has been deposited according to specific area of interest. Managing explicit knowledge is more organized and proper taxonomy is created to ease the process of retrieval.



Source : Public Sector ICT Strategic Plan 2011 – 2015

Figure 2.4

*Knowledge Management Intelligence Hub by Sectors*

### 2.3. The Effectiveness of Knowledge Management

Knowledge is to be managed fit nicely with KM term (Wiig, Hoog, & Spek, 1997). It is a procedure of creating capital from organizational knowledge-based assets (Bukowitz & Williams, 1999). Due to the importance of knowledge, organizations realized they need to manage their organizational knowledge assets (Lim, Ahmed, & Zairi, 1999). The organization success is determined by its ability to manage and develop its organizational knowledge and knowledge-based management is about connecting people with others and to information in creating competitive advantage (Nonaka, 2007). In order for organizations to become innovative, they need to manage their knowledge effectively so that they are able to release new products in the market at a better speed, able to foresee threats, more responsive to market changes and maximize available information and knowledge (Gold, Malhotra, & Segars, 2001). An effective KM initiatives and implementation will contribute more



value to the overall OP (Toften & Olsen, 2003) and it has to be supported by KM system which will integrate organization, process, people, and IT (F. Wang & Plaskoff, 2002).

Organizations realized that most of their explicit knowledge is scattered all over within the organization which created barriers to knowledge retrieval. Some knowledge are also not captured and not shared. Organizations also realized the need of knowing 'where to get what and how to get it', the need of distance collaboration among the employees regardless wherever they are, as well as the need for lessons learned and best practices. They realized that there are so much of information and knowledge that needs to be captured, stored and shared, and it has to come with the ability to distribute the knowledge internally and externally. This has led to the urgency of managing knowledge effectively. Each KW has their own skills set based on their years of experiences. This knowledge is so valuable. How an organization encourages knowledge sharing among their KW? When an employee leaves the organization, their knowledge would also departure. The right environment, motivation and facilities may encourage tacit knowledge sharing to take place.

There are various factors that influence the success of KM implementation and these factors are also known as enablers. Various studies have been conducted in the past to investigate the effectiveness of KM implementation and its success factors and among them are study done Davenport *et al.*, (1998) and the study has identified seven success factors: (1) a clear purpose and language; (2) economic performance or industry value; (3) knowledge transfer channels; (4) a standard and flexible knowledge structure; (5) technical and organizational infrastructure; (7) management

support; and (8) change in motivational practices (Wong, 2005). Another factor which has been identified is KMP. KMP is a process of acquisition, storage and applying knowledge to support organizational forceful learning, addressing problems, decision making as well as strategic planning (Sveiby, 1997) and it has been conceptualized as organizational routines (R. R. Nelson & Winter, 1982) to ensure that knowledge gets across the organization. But KMP is not the only factor that has the effect on OP (Marques & Simon, 2006), nevertheless, lately, researchers have shown their interest in this area (Tracey *et al.*, 1999).

Besides KMP, an organization's culture and structure (Armbrecht *et al.*, 2001), human resources and processes (Quintas, Lefrere, & Jones, 1997) and IT (Anderson, 1996) are equally important in KM. The process of managing knowledge i.e. creation, sharing and utilization are revolve around people (Malhotra, 2003). Knowledge sharing triggered at human level (Tomas H. Davenport & Prusak, 1998). KM basically is a discipline of human resources activities rather than purely IT. It involves people motivation making fully use of their knowledge, experiences and skills to enhance creativity which can be shared with others with the help of IT as an enabler to complement and produce better results. IT on its own will not be the total answer for KM as it requires people to get the whole KM initiatives within the organization to be effective as people has the capability and ability to analyse information lodged into the technology systems. Nevertheless, appropriate KM technology system is necessary in order to provide an effective tool to encourage knowledge generation, to ease the process of sharing and utilization (M. H. Zack, 1999). Table 2.4 summarizes the past studies on the influence of KM enablers on the success of KM implementation.

Table 2.4  
*Summary of past studies on KM enablers*

Authors	Year	KM Enablers
Earl	1997	Information Technology, people, and corporate culture.
Davenport <i>et al.</i>	1998	A clear purpose and language, economic performance or industry value, knowledge transfer channels, a standard and flexible knowledge structure, organizational infrastructure, management support and change in motivational practices
APQC	1999	Leadership, OC, measurement and technology
Holsapple and Joshi	2000	Culture, leadership, technology, organizational adjustments, employee motivation, external factors
Andrew <i>et al.</i>	2001	Information Technology, organizational structure, corporate culture, knowledge obtainers, knowledge, transfer, knowledge application, and knowledge protection.
Hasanli	2002	Leadership, OC, structure, roles and responsibilities, IT infrastructure, and measurement
Mathi	2004	Culture, KM organization, systems and IT infrastructure, effective and systematic processes and measures
Syed-Ikhsan, S,O.S and Rowland, F	2004	OC, organizational structure, technology, people/human resource and political directives
Yap, L.S <i>et al.</i>	2010	Culture, Information Technology, Organization Structure, People
M. Mills, A and A.Smith, T.	2011	Knowledge Infrastructure Capability (technology infrastructure, organizational structure, OC), Knowledge Process Capability (Knowledge acquisition, Knowledge conversion, Knowledge application, Knowledge Protection).
Fazli, S and Alishahi, A.	2012	Culture, Structure and Strategy

This study particularly focussed on examining the effect of organizational factors on KM towards OP. This is aligned with Gottschalk (2007) who highlighted the main

reason why organizations focusing and implementing KM is to enhance OP. Based on past studies on KM enablers and KM issues revealed by survey done by MAMPU on 92 Malaysian public sectors, this study has identified and mapped the potential organizational factors to the highlighted issues as per MAMPU's survey as shown in Table 2.5, and these factors are KW, OC, KMP and IT on KME towards OP. The constructs used for this study are covered in the following section.

Table 2.5  
*Organizational Factors Used For This Study*

KM issues among agencies in public sectors (MAMPU, 2011)	Organizational factors
Pockets of information residing in silos	Knowledge Workers <sup>(1)</sup> Knowledge management practices <sup>(2)</sup>
Multiple sources of the same information	Knowledge Workers <sup>(1)</sup> Knowledge management practices <sup>(2)</sup>
Public Sector agencies unable to share information easily with each other	Knowledge Wokers <sup>(1)</sup> Knowledge Management Practices <sup>(2)</sup> Culture <sup>(3)</sup> Technology <sup>(4)</sup>
Lack of standardization in application development	Technology <sup>(4)</sup>
Internal applications are not integrated	Technology <sup>(4)</sup>
Minimal knowledge sharing across public sector	Knowledge Workers <sup>(1)</sup> Knowledge Management Practices <sup>(2)</sup> Culture <sup>(3)</sup>
Insufficient work transition plan with regards to knowledge	Knowledge Management Practices <sup>(2)</sup>
Reliance of 'Nota-Serahan Tugas' as a form of knowledge transfer when staff leaves	Knowledge Management Practices <sup>(2)</sup>

<sup>(1)</sup> - Yap *et al.* (2010), <sup>(2)</sup> – Mills and Smith (2011), <sup>(3)</sup> - Fazli and Alishahi (2012),

<sup>(4)</sup> - Yap *et al.* (2010)

*Note : own compilation based on past studies*

### **2.3.1 Knowledge Workers**

Different authors define KW differently. KW is “a person who has knowledge which is important to the organisation and is often the only person who has it” (P. F. Drucker, 1954) and they are doing non-repetitive and non-routine job (Helton, 1998). Besides that KW is also highly qualified and educated professional where their work involves largely in the conversion of information to knowledge using their own expertise and competencies with some assistance for other knowledge supplier (Sveiby, 1997). And, in Malaysian context, KW is defined by MDEC as a person who has any one of these qualifications: (1) five or more years experiences in ICT; (2) any discipline university degree or graduate diploma; and (3) any discipline master degree or higher (KEMP, 2002). Based on this, Malaysian employees with the relevant qualifications are viewed by Malaysian government as KW. MDEC and Drucker’s KW definition are used in the rest of this study with the understanding that these terms reflect the concept of KW as human resources in the context of Resource-Based Theory of the organization. KW should apply their knowledge to add value to the production of products or services. To explain further, a person who works in manufacturing line, fixing a car steering wheel is not recognized as KW as their job is considered as a routine work which they repeat the same task over time. No new knowledge has been added in doing the job, they have been taught by either their supervisor or someone with the knowledge on how to complete the task. They are not involved in the whole process of car assembly and therefore, they are not adding value to the production of the product.

To emphasize the above definition, KW is one who gathers data/information from various sources; adding value to it; and finally disseminate to others (Kappes &

Thomas, 1993). In today's information era, KW is getting advantage from the information that they received from others. They further value add this information with their own knowledge and distribute it to others. The process of knowledge distribution / dissemination is crucial to any organization to improve OP and remain competitive.

KW is the engine of an organization which keeps its operational. Tymon and Stumpf (2003) postulate that it is crucial for an organization to take good care of their KW's social capital like emotional support, resources which include information, ideas, trust, goodwill, and co-operation leading to excellent organization. Tymon and Stumpf (2003) relate organizational success and KW as what they can gain from relevant information that they could access, how they apply and share with others. Based on this, it is argued that KW needs to be handled in a different way to ease the flow of knowledge among KW (Tomas H. Davenport & Prusak, 1998). Knowledge is recognized as organizational resource and it is residing everywhere in the organization; however, literature suggests that usually knowledge resides with workers and therefore they become the centre point and in this situation, KW is the owner of this resource (Von Krogh *et al.*, 1998).

It is crucial for an organization to understand and know how to utilize KW's knowledge. Getting KW engage in organizational business model, strategies and long-term plan will make them feel involved and important and this will make them want to contribute more of their knowledge. This is supported by (P. Drucker, 2000) who argued that KW doesn't believe in getting paid by working from 9 to 5, but they get paid because of their efficiency and effectiveness. Without KW, an organization

could cripple. An organization's value would depend on the strength of their KW. A car will not move without the engine. An organization will not progress without KW. Knowledge that resides with every KW is so valuable and therefore organization realizes that managing KW's knowledge is very crucial. Besides that, organization also realizes that it is tough to retain talented employees and as a result organization facing knowledge lost (Ramanathan, Richardson, & Abdul Latif, 2003). With respect to KM, organization should pay the attention in establishing a work environment which will stimulate and encourage KW to actively participate in KM activities. If there is a buy-in from the KW on the importance of KM, possibility of KMP to be organizational norm is high. Seeing KW as investors of knowledge and energy in an organization (Thomas H. Davenport, 1999; Stewart, 1998), KW is to engage in KM activities if they have the right motivation to do so.

A study was done in Greek to empirically investigate factors that influence KME within organization which as a result will positively influence total organization's performance (Theriou, Maditinos, & Theriou, 2010). They conducted this study in 109 Greek companies. Six hypotheses were developed and one of the hypotheses hypothesized that people influenced positively on KM's effectiveness. Other enablers are leadership, culture, strategy and IT. They have used structural model analysis to examine the hypothesized relationships. However, the structural model results only support three of the six hypotheses where three standardized path coefficients have t-values greater than 1.96 which indicate their statistical significance at the 0.05 level. The other enablers gave 0.09 (strategy), (0.03 (IT) and 0.12 (people). From the findings, it was proven that leadership and culture are the main factors that significantly influence KME, whereby, the other three enablers,

strategy, IT and people influence positively but it is not statistically proven. Although according to literature, people play major role in determining KME but in their study, this enabler was not supported by their sample. Furthermore, the findings cannot be generalized as it was conducted in Greek with only 109 companies which do not represent the whole Greek nation in specific and other companies in other part of the world. This finding is inconclusive leading to the need for further investigation on this enabler. To reiterate, it is argued that there is a potential relationship between KW involvement in KM and the effectiveness of KM. Thus, KW is included as the factor in this research theoretical framework.

### **2.3.2 Organizational Culture**

OC is the way how people within the organization behave and responds to its environment (Schein, 1985) which consists of core value and beliefs (DeLong & Fahey, 2000). These would formed the observable organizational norms and practices which consist of expectation, rules, stories and myths, rituals and routines, power structure, symbols, control system and organizational structures (Bloor & Dawson, 1994). Culture is defined as collective mind programming which differentiate people from others as well as thinking pattern and feeling which influence individual action (Hofstede, 1980). It is the way how people behave, interpret and react to the information that they received. When this is link to the context of KM, OC regulates the social context which dictates ownership of knowledge which determine who should have what knowledge and with whom to share (DeLong & Fahey, 2000). This is confirmed by study done by Ipe (2003) and Tong and Mitra (2009) where in their findings it was highlighted that cultural values of each employees affected the KS, communication and learning in the organization.



KS could only take place if the OC encourages it (Stoddart, 2001). How people behave in the organization is one of the factors that could influence KS.

People are not easily sharing their knowledge (Nonaka, 1999). Each organization has their distinctive culture which was developed over time reflecting their identity. Individualism and collectivism are among the five dimensions of national cultures (Hofstede, 1997). Collectivism culture is defined as interdependency of collectivist culture people within their groups such as tribe, family and nation (Hofstede, 2001) and always put priority to group's goals. They are more open among their group members. Whereby, individualism culture is defined as people who are autonomous and independent from their groups and they are more focus to their own goals and interest. In some organizations, people tend to utilize knowledge to gain power (Goh, 2002; Bogdanowicz & Bailey, 2002) for their self-advantage like promotion, salary increment, recognition and continued employment. In this situation, they are reluctant to share. When come to communication and knowledge processing, culture also dictate their employee thinking on how to act accordingly (Thomas H. Davenport, 1997). Organization with KS culture would easily share their ideas and insights as they look at knowledge sharing as natural activity without having to force (McDermott & O'Dell, 2001) and to support and encourage this practices, organizations need to establish appropriate culture in supporting KM (H. Lee & Choi, 2003).

As discussed above, there are two types of OC, individualism and collectivism which reflect self-interest, care about own well-being versus others well-being. An OC that is more open would encourage human-to-human interaction and likely to be more

receptive and supportive to KM initiatives. Organization that has this kind of environment usually has low disparity of interests because openness of mind-set will cultivate certain level of communication which will lead to common understanding and goals. People tend to be more open in working together. This type of OC would likely contribute to the effectiveness of KM initiatives within the organization. Ties among people in the individualistic culture type are loose where they are more concern about their own interest rather than others. This could form a barrier in KS to take place and their interest would be on “To what extent does this benefit me?” instead of focusing on overall benefits of KM to the organization (Gargiulo & Benassi, 2000). This can be further supported by study done by Ford and Chen (2003) which revealed that in individualistic culture it is more difficult to share knowledge as they view knowledge as their source of power. Whereby, collectivism culture reinforces society’s interest (Triandis, 1996). This is obviously contrasted of individualistic culture. Collective goals have always been the priority to collectivist people (Chatman & Barsade, 1995) and they place their focus on joint collaboration for organizational achievement. Collectivist people view sharing knowledge as beneficial as it gives benefit to them; therefore, KS is much easier (Triandis, 1996). Thus, it is likely KS is more effective which in return the effectiveness of KM implementation is higher.

Leidner *et al.* (2006) conducted a case study on two global firms. Their findings showed that people in the organization with individualism culture preferred to be unnoticed, where they work in silos, isolated and they are worried to be criticized of their ideas which led to pockets of silos information. Even though they have a very good customer information system but most of the time they end-up reinventing the

wheel. The individualistic aspects of culture would hinder free flow of knowledge and reduces collaboration effort within the employees in the organization. Such behaviour would likely affecting the effectiveness of KM implementation. Whereby study done by Ford and Chen (2003) between Japanese and North Americans employees showed that in high individualism culture, they were having more problems in KS and dissemination rather than in high collectivism culture. Brijball (2010) hypothesized that low individualism and high collectivism promotes KS and his findings showed that p-values for all questions related to these elements were less than 0.05 which suggests significant difference exists in the way how the respondents answered the questions, showing clear tendency that low individualism and high collectivism promoted KS. These studies showed possibilities of the impact of OC, viz. individualism and collectivism on KS behaviours among employees in the organizations which may contribute to the effectiveness of KM.

To further support this, Triandis (1995) postulates that both collectivists and individualists link-up their successes and failures to different events. Holmes *et al.* (1997) argued that there were number of reasonable case which can explained the impact of culture on an achievement and comprehension, hence, this study has included the organization culture, viz. individualism and collectivism dimensions to investigate its impact on KME in Malaysian context.

### **2.3.3 Knowledge Management Practices**

In KM literature, KMP is defined as the combination of knowledge acquisition, storing, sharing, dissemination and application. Attempt has been made by the organizations to adopt and adapt KMP to manage their knowledge systematically.

This is supported by O'Dell and Grayson (1998) who defined KMP as a conscious strategy where in order for people to be able to translate information into knowledge to improve OP, relevant knowledge must be able to be accessed by relevant people when needed. Barth (2001) defined KMP as a systematic approach which will assist people to be more effective and efficient as well as to learn from experience. Experience, expertise and capabilities could lead to excellent performance and encourage innovation (Beckman, 1997) within the organizations. KMP assist an organization to manage its knowledge systematically. It starts off with knowledge application / creation, knowledge is being shared and disseminated and learned knowledge is then applied. But it is not as easy as it sounds. There are many parameters and their interactions which need to be looked at to ensure the success of KMP within the organization. It was suggested that different KM strategies and processes to be implemented for different types of knowledge. However, suitability of strategy is not only depending on type of knowledge to be shared but also it depends on the environment an organization operates in. Past studies have shown that researchers have focused on specific practices and activities within KM. Thomas, Sussman and Handerson (2001) postulates four KM stages which include creation of knowledge, transfer, knowledge interpretation and KA. Whereby, Darroch (2003) paid attention on acquisition of knowledge, knowledge dissemination and responsiveness of knowledge. Table 2.6 summarizes the component of KMP by some researchers.

Table 2.6  
*Knowledge Management Practices Components*

Authors	Knowledge Management Practices Component					
	Creation	Sharing	Organizing & Storing	Application	Dissemination	Capturing
Darroch (2003)	√	√			√	
Sussman and Handerson (2001)	√			√	√	
Lawson (2002)	√		√	√	√	√
Zaim <i>et al.</i> (2007)	√	√	√	√		
Edvinsson and Malone (1997)	√	√				
Argote (1999)	√	√				

*Note : own compilation based on past studies*

Based on the earlier discussion and its popularity, this study focuses on three stages of KMP, namely, knowledge creation, knowledge sharing and knowledge application. The description for each stage is offered in the following subsection:

### **2.3.3.1 Knowledge Creation**

Davenport and Prusak (1998) emphasize knowledge creation (KC) as a process of getting the required knowledge from various sources such as research and development (R&D), buying and consulting as well as learning and self-creation. KC is discussing about the emergent of new knowledge which was developed from new ideas which lead to new product and process development. KC deals with different type of knowledge, tacit and explicit and it involves people from different background (K. C. Lee, Lee, & Kang, 2005) and process of motivation, inspiration and experimentation in important in KC (Lynn, Morone, & Paulson, 1996). This formed the characteristic of dynamic organizations; where they are not only processed

information but continuously create new information and knowledge (Nonaka, 1994). They observed, interact and adopt information, combined it with their experiences and values, and convert it into knowledge.

KC starts of from individual level, moves up to collective level and finally it moves into organizational level (Nonaka, 1994) and even sometimes, it may move further into inter-organizational level. Nonaka's model (1994) expresses the knowledge creation flow through the social and collaborative processes and not forgetting the individual cognitive processes through knowledge creation, sharing, expansion and advocate within organization. This cycle is been repeated, the conversion of tacit and explicit knowledge, as it flows from individual, groups and in the organization where the process of KC involves; (1) socialization; (2) externalization; (3) internalization; and (4) combination (Nonaka, 1994). The socialization involves the process of tacit knowledge acquisition among people through social interaction which produces new tacit knowledge. The emerge of new explicit knowledge through externalization involves the merging of tacit and existing explicit knowledge, which further are re-categorized and reclassified. Whereby, externalization and internalization are the process of interaction and conversion of both tacit knowledge and explicit. Tacit knowledge conversion to new explicit knowledge is recognized as externalization process (e.g., lessons learned) and new tacit knowledge is created from explicit knowledge through internalization process (e.g., knowledge gained through discussion). Further to this, Nonaka and Takeuchi (1998) suggest that it is essential for organization to establish 'ba', a place for KC and four types of 'ba' have been identified, which are: (1) originating ba; (2) interacting ba; (3) cyber ba; and (4) exercising ba (Nonaka & Konno, 1998). Originating ba is associated with

socialization, the starting point of KC process where people meet and share their experiences. Interacting ba is linked to the externalization process of KC where tacit knowledge conversion to explicit knowledge takes place and it been shared between individual through collaboration process. KC combination processes provide people with a virtual space or cyber ba where people could interact and exchange knowledge. And lastly, exercising ba refers to the internalization process of explicit to tacit knowledge conversion. And therefore, adopting ba approach, organization is encouraging knowledge sharing and continuous individual learning.

KC is crucial in an organization. This is to ensure that new knowledge is been generated. Knowledge has it shelf-life, after sometimes, existing knowledge may be out-dated. Not everyone in the organization will know everything and therefore, KC will assist in knowledge acquiring process. When explicit knowledge is been lodged into organizational knowledge repository and retrieved by other knowledge seekers, new knowledge may be developed through knowledge improvement and enhancement process. This relate to knowledge performance, its impact and perceives when new knowledge was created (Lai & Chu, 2000). With the knowledge that the person has, he / she may add-on to the existing knowledge and it becomes new knowledge and this knowledge will be re-deposited in the knowledge repositories. Organization will benefit tremendously from the KC process.

Classifying, storing and applying explicit knowledge will extract information from knowledge owner and make it known by others. It is transformed into useful, proven and workable guide or solution which can be used in the same or similar situation (Hansen et al., 1999). Proper KC process would assist an organization to manage the organizational knowledge effectively. Zaim conducted a case study on Global System for Mobile Communications (GSM) operator in Turkey (Zaim, Ekrem, & Selim, 2007). In their conceptual framework, KMP comprises of four main components, namely: generation, storing, transfer and utilization of knowledge. It was hypothesized that KM process significantly affects KMP performance. The findings show that knowledge generation has significant effect on KM process ( $\beta = 0.42, p < 0.01$ ) and KM process standardized regression weight is significant ( $p < 0.05$ ), which supported their hypothesis.

It was explained that KC (or knowledge generation) has an impact on the effectiveness of KM, but it cannot be generalized as they used case study method which was conducted on GSM in Turkey, thus, KAQ factor is included in this study to investigate its impact in Malaysian context in general and in Malaysian Public Sector in specific.

### **2.3.3.2 Knowledge Sharing**

The effectiveness and usefulness of organizational knowledge highly depending on its people, the way how they create knowledge, share among them and how they make use of the knowledge. Basically, knowledge sharing (KS) is about individual willingness in converting his knowledge into understandable form and making it available and assessable to others within the organization (Sharratt & Usoro, 2003).



Sharing does not mean that the owner of the knowledge forgoes the ownership but it leads to joint knowledge ownership between the owner and the recipient (Ipe, 2003). It is crucial as it enable individual knowledge to flow within the organization where it can be converted into economic and competitive value for the organization (Hendriks, 1999). KS takes place at various levels in organization either at individual, group or department level and it might also happen at the inter-organization level (Erhardt, 2003). Decision whether to share knowledge would depend on individual's behavioral choice (Dougherty, 1999). Each individual having their own expertise and experience and they will decide with whom they want to communicate, how to communicate and what type of knowledge to explore (Bhatt, 2002).

KS is influenced by many factors in the organization. Culture, structure, processes and strategy; and technology contributed to the effectiveness of organizational KS. (Ives, Torrey, & Gordon, 2003; Spender, 1996) and knowledge will flow easily when employees view knowledge as benefit to them and organization (Ardichvili, Page, & Wentling, 2003). The realization of the importance of KS encourages everyone in the organization to share their knowledge without any barriers (Dyer & Nobeoka, 2000; Gupta & Govindarajan, 2000b). But, in some situation, sharing does not take place as expected. This is due to how people perceived over people with knowledge. Someone with knowledge is considered as having power in their hand and when this knowledge is being shared, they are worried that their power will be reduced. Perceived reward is one way to overcome this fear and encourage people to share (Irmer, Bordia, & Abusah, 2002; Kaser & Miles, 2001). Incentives encourage people to share knowledge, and not to keep to themselves (Min & Yoon, 2002). The

effectiveness of new knowledge learned would depend on people's absorptive capacity which means how much they adopting, assimilate and apply the knowledge (Cohen & Levinthal, 1990; Gupta & Govindarajan, 2000b) which differ from people to people (Gupta & Govindarajan, 2000b).

The effectiveness of KM would depend on KS activities within the organization. Past studies have shown that KS can be facilitated by encouraging communication across departments and informal meetings (Liebowitz & Megbolugbe, 2003). OC plays a role in KS. Non-knowledge sharing culture will hinder KS among KW. Some might feel afraid to share their knowledge as they feel that others will take away their knowledge which gives them less chance in term of recognition. It is not so easy to inculcate a KS culture to be successful in KM, and this is where management will play a major role in forming and promoting the KM policies which part of it to make KS as part of organizational processes. Organization should encourage KS activities to take place by creating the suitable environment for their employees such as equipped meeting rooms, state-of-art technology for KS to take place online such as online forum which can record the discussion thread which can be deposited in the knowledge repository and reward system. As people are more aware of the importance of KS, their willingness to share knowledge will increase where knowledge integration and sharing in an organization require people involvement (Swart & Kinnie, 2003). Azudin *et al.* (2009) conducted a study on organizations in Cyberjaya, Malaysia and their findings show that 52% of KW spent their time during lunch break discussing about their office matters which are related to their organizations project, organization development and meeting overall organization objectives.

When KW starts sharing their knowledge among their co-workers, more knowledge is created. Jen-te Yang (2007) study revealed that effective KS enables an organization improved the organizational behaviours through advanced knowledge creation and better understandings, and therefore they become more innovative and competitive; which fundamentally, will contribute in the increment of organization profits and overall, it enriches organizational effectiveness. Zaim *et al.* (2007) case study hypothesized that KM process positively affects performance of KMP. The findings show that KS was found to be the most important criteria in KM process with standardized regression weight of 0.45 ( $p < 0.01$ ).

To recapitulate, it is argued that there is a potential relationship between KS and the effectiveness of KM which will contribute towards OP. This study intends to investigate KS impact on KME in Malaysian context. Thus, this factor is included in the research theoretical framework.

#### **2.3.3.4 Knowledge Application**

Knowledge by itself will not bring any value. Any knowledge created when it is been applied could assist the organization to improve their capabilities and abilities in creating learning organization which lead to OP improvement. Value creation from organization's knowledge resources is very important which later can be applied and use by others in the organization (Ordaz, Allez, Alcazar, Fernandez, & Cabrera, 2004). In most organizations, knowledge are scattered all over the place, i.e with individuals, personal desktops, filing cabinets, databases and emails and therefore knowledge integration is crucial in ensuring KA to be effective. Individual will not be aware of what knowledge is available in organizational memory or even to

specifically tell in advance what type knowledge is needed, where and when. The integration of individuals' specialized knowledge could contribute to the overall organizational capability through the conversion of inputs to outputs which will produce organizational products and services (Grant, 1996a). KM activities influenced changes in behavior forming new ways of doing things which led to development of new ideas, processes and practices (Bender & Fish, 2000) and the success of KM implementation would depend on the efficiency of newly acquired knowledge usage for effective action (Wilhelmij & Schmidt, 2000). Improved sharing and application of internal and external knowledge minimize redundant efforts within the organization. This is supported by Demarest (1997) who argued that knowledge must be converted into actions so that it will be useful and beneficial to the organization.

What KW observed and learned from others or knowledge that has been deposited can be applied in other similar situation to address arise problems. The cycle of knowledge creation, storage and retrieval and dissemination may not necessarily lead to the enhancement of OP but effective KA would. OP often relies on the ability to convert knowledge to effective action. Effective KA gives an advantage to an organization in adjusting its strategic directions, speed of solving problems, and more effective in converting knowledge into action (Gold *et al.*, 2001). Therefore, organizations that managed to apply their knowledge effectively and shared across functional boundaries tend to improve their transformative capability and functionality, which in return, will generate new products, better service quality, more innovative and ahead of others or in other words, it is an opportunity to the organization to harvest returns from its knowledge resource (Cohen & Levinthal,

1990; Seleim & Khalil, 2007). Zaim *et al.* (2007) case study on Global System for Mobile Communications (GSM) operator in Turkey hypothesized that KM process directly and positively affects performance of KMP. Nevertheless, knowledge utilization (or knowledge application) gave contrast results from other processes (knowledge transfer, sharing and generation as discussed in the previous section) where process  $\beta = 0.28$ ,  $p < 0.05$  indicated less impact on KM process. In another study done by Emadzade *et al.* (2012) investigated on the impact of KM resources on OP. It was hypothesized that KA is positively related to OP. The result for KA is significant ( $\beta = 0.502$ ;  $p \leq 0.001$ ) which supported the hypothesis. These two studies gave contrast results. Thus it is interesting to find out the impact of KA on the effectiveness of KM in Malaysian context and therefore, it is included in the theoretical framework.

#### **2.3.4 Technology**

Information technology (IT) acted as KM enabler. With the advancement in IT has made the process of knowledge creation, storing and dissemination much easier than before. IT and tools such as document management system, database engines, retrieval engines, data mining, knowledge portals, workflow systems, help-desk applications, chat rooms, conferencing software, emails, messaging and electronic publishing systems (Gray & Tehrani, 2003; Marwick, 2001) have been used to facilitate KS and integration. It eases the dissemination of valuable knowledge across geographic proximity (Decarolis & Deeds, 1999; Dyer & Nobeoka, 2000; Gupta & Govindarajan, 2000). Nonaka and Takeuchi (1995) and O'Dell, Grayson and Essaides (1998) specifically defined IT as the mode of dissemination of explicit knowledge which can be internalized by individual to gain better understanding. IT is

also recognized as an intermediary tool and act as knowledge integrator (Dixon, 2000). With the help of IT, the organization can manage both their explicit and tacit knowledge; codification and personalization (Hansen *et al.*, 1999). More centralized and common knowledge repositories can be developed to store the explicit knowledge which can be accessed and shared by people within the organization. In general, organization's KM initiatives can be linked to three common applications of IT: (1) best practices coding and sharing; (2) organizational knowledge repositories development; and (3) knowledge networks creation.

IT enables effective and systematic knowledge management and it supports the process of creation, transfer, and application of knowledge within the organizations (Alavi & Leidner, 1999). With the click of a mouse, people can be connected to either internal or external knowledge repositories. Usage of IT with proper knowledge classification (Maddouri, Elloumi, & Jaoua, 1998), will ease the process of searching, retrieval and dissemination of knowledge. Valuable knowledge can be shared among the KW from anywhere at any time. IT which comes with appropriate document classification will make the process of managing and retrieval at ease. Knowledge can be easily shared among organization's KW. Nevertheless, an organization needs to have proper processes and methodologies to manage their knowledge repositories else garbage in, garbage out. If KW finds that they can get useful knowledge from the repository and the method of searching and retrieval is easy, they will keep coming back and it will also lead to new knowledge which will be deposited into the repositories. But, if they find that the information is out-dated or it is so troublesome to search, it will gain less popularity. There were number of models that have been applied investigating the information technologies usage

behaviour and among most frequently used is Technology Acceptance Model (TAM), (Davis, 1989). TAM specifically identified two components; perceived ease of use (PEOU) and perceived usefulness (PU) in determining the individual behavioural intention towards IT usage.

Noor *et al.* (2005) conducted a study where TAM was used as a conceptual model. Their results showed positive relationship between PU and PEOU with intention to share behaviour. Hsu and Lin (2008) also included TAM in their study to investigate the effect of social factors on blog usage behaviour. The findings showed ease of use has positive relationship with enjoyment, together with reputation and altruism towards blogging attitude. Both cases showed that IT does play a role in encouraging people to share and disseminate knowledge. Furthermore, based on the study done by Handzic *et al.* (2008), it was indicated that IT played a relatively greater role to support the knowledge codification than personalization KM strategy. This shows that knowledge codification depending heavily on information technology in order to provide high-quality, reliable, effective and systematic and fast systems to assist in preservation and reuse of explicit knowledge (Hansen *et al.*, 1999).

Based on the above discussion, it is likely indicated that IT has an impact on the effectiveness of KM and therefore this study has included IT as one of the factor to investigate its effect on KME in Malaysian context.

## **2.4 Organizational Performance**

The organizations always put their performance as their priority in sustaining the competitive advantage and KM representing organizational most important competitive advantage factor (P.F. Drucker, 1993). Lee and Sukoco (2007) postulate that for many organizations, their performance improvement does not only depending on the success of tangible assets deployment and natural resources but also on how knowledge is been managed effectively. This is supported by Gloet and Barrell (2003) who highlighted that organizations treat KM as their path towards competitive advantage where indirectly it has an impact to their bottom line.

There are various methods in measuring OP from the views of different stakeholders' perspectives. From the financial perspective, more often organizational success is linked to tangible units of financial outcomes like profit and cost saving (Thurbin, 1994), economic value-added, cash flow and net operating income, whereby Dixon (1999), Thurbin (1994) and Smith (1999) measured financial perspective from the aspect of assets, budgets, products and services, operations, markets and human resources. And, from the customer perspective, OP will be measured from the value proposition that it brings such as customer satisfactions with the possibility of generating more sales (Chen, Huang, & Cheng, 2009). The measurements covering both the value that the customers are getting such as quality of products, response time and service performance as well as the outcomes of these value propositions. From the internal process perspective, it focuses on all key processes and activities that an organization need to provide in order to give better value to the customers (Robinson *et al.*, 2006). And, lastly, innovation and learning perspective focuses on



skills and capabilities development to support the internal processes (Robinson *et al.*, 2006).

Nevertheless, knowledge is seen as crucial resources in any organization, and therefore effective KM via capabilities development could contribute to key aspects of OP (Andrew, 2001). Darroch (2005) defined effective KM as effectively and accurately usage of resources which will produce better financial performance and innovation. Whereas, Holsapple and Wu (2008) stressed the role of KM on the improvement of innovation, more organized efforts coordination, and assist in better decision making process give an impact on organization performance. For a long run, KM effort is considered as an investment where in return, these organizations are expecting better organization performance. Therefore, KM is viewed as the critical success factor in an organization.

Marques hypothesized that the degree of KMP implementation in an organization has positive impact on its performance (Marques & Simon, 2006). Five dimensions were measured which are: (1) growth; (2) capital profitability; (3) stakeholder satisfaction; (4) operational and financial efficiency; and (5) competitive position and all these five dimensions are statistically significant. Another study by Rasula also hypothesized that KM has a positive impact on OP and the construct was measuring the financial and non-financial perspective which covers financial, supplier, innovation and learning, customer, internal processes and reputation (Rasula, Vuksic, & Stemberger, 2012). The empirical investigation's results confirmed a positive effect of KM on OP.

The above findings can be emulated by other organizations to further improve their KMP as well as other organizational factors in order to gain better OP. Effective KM does give an impact to OP, thus, this study intended investigating KM' impact on OP in Malaysian context generally and in Malaysian Public Sector specifically. Table 2.7 represents past studies and its findings on the same area.

Table 2.7  
*Past studies with its findings and recommendation*

Scholar	Title	Findings	Recommendation
Marques, D.P., and Simon, F.J.G. (2006).	The effect of knowledge management practices on firm performance	The findings show that firms that have adopted knowledge management practices achieved better results than their competitors.	Proposed to conduct longitudinal study to determine how and when firm performance changes with the introduction of KM. Also, to consider analysis from the aspects of account stocks and flows of knowledge.
Raja Suzana, R.K. (2010)	The Relationship of Knowledge Management Practices, Competencies and the Organizational Performance of Government Departments in Malaysia	There is positive, linear, and significant relationship between KM practices, competencies and organizational performance.	Future research should examine alternative measures of OP, KMP, and competencies through other theories or perspectives in the discipline given.
Haque, A. and Anwar, S. (2012)	Mediating Role of Knowledge Creation and Sharing between Organizational Culture and Performance: An Empirical Analysis of Pakistan's Banking Sector	It is proven that that organizational culture significantly improves the knowledge creation and sharing practices. And these practices contributed significantly in enhancement of organizational performance.	The data was collected from single source and therefore the results cannot be generalized for the entire banking sector of Pakistan. It was recommended to also include other organizational factors like management support, IT infrastructure and communication as antecedents of KM practices.

Table 2.7

*Past studies with its findings and recommendation (continued)*

Scholar	Title	Findings	Recommendation
Law, C.H. & Ngai, W.T. (2008)	An empirical study of the effects of knowledge sharing and learning behaviours on firm performance	The study has empirically supported the hypotheses that knowledge sharing and learning behaviours would lead to better performance in business process improvement and product and service offerings of a firm.	This study was based only on four of the endogenous constructs (KSL, BPI, PSO and OP) which not necessarily a serious limitation. It was suggested to incorporate other antecedent and consequent constructs which could form more comprehensive framework and to expand to other business settings beside manufacturing industry.
Zack <i>et al.</i> (2009)	Knowledge management and organizational performance: an exploratory analysis	Based on the findings, it was found that KM practices is directly related to organizational performance but there was no direct relationship between KM practices and financial performance.	The study was done on organizations from North America and Australia and it may not reflect KM practices in other geographic, economic or cultural settings.
Rasula, J, Vuksic, BV, Stemberger, MI (2012)	The Impact of Knowledge Management on Organizational Performance	Organizational elements, technology and knowledge are positively affecting organizational performance.	This study was done in Slovenia and Croatia. The study was done for 3089 companies but the response rate was only slightly over 10 % with only 329 respondents in both countries. Recommended to conduct further research to compare the results and to check the improvement as well to also conduct the study in other countries.

Table 2.7

*Past studies with its findings and recommendation (continued)*

Scholar	Title	Findings	Recommendation
Tseng, S-M. (2010).	The correlation between organizational culture and knowledge conversion on corporate performance	The findings showed that organizational culture and knowledge conversion have a positive effect on corporate performance.	The researcher conducted the study under a Chinese-centric set of societal, cultural and linguistic attitudes and behaviours. Further study was recommended as different countries have different cultures.
Ladd & Heminger (2003)	An Investigation of Organizational Culture Factors That May Influence Knowledge Transfer	The study showed a correlation exists between some types of organizational culture and some factors influencing knowledge transfer.	Among correlational research limitation is it cannot prove causation. Even though, in this study, it shows correlation between organizational culture types and indicators of knowledge transfer, one can only guess if one of the constructs actually causes the other. Third construct or few construct may also cause these two constructs to act the way they do.
Edwards, J. S. <i>et al.</i> (2005)	Knowledge management systems: finding a way with technology	The study highlighted few aspects that need to be considered in using technology to assist in KM implementation such as 1) quantity and quality of information/knowledge 2) centralized and decentralized organization. (3) “push” and “pull” processes. Even with that, there is other aspect which is crucial, especially human relating aspect.	The research was conducted on organizations that keen in knowledge management, and wished to be assisted by the researcher. Therefore, the findings may therefore represent only “average” organizations, not the very best practice.

Table 2.7

*Past studies with its findings and recommendation (continued)*

Scholar	Title	Findings	Recommendation
Mládková, L. (2009).	Knowledge Management for knowledge workers.	The results of the study which was done in Czech Republic shows organizations that were involved in the interview do not create an environment and knowledge management systems supportive for their knowledge workers.	Study was conducted in Czech Republic. Recommended to conduct similar study in other country
Mládková, L. (2009).	Management of knowledge workers.	This research involved knowledge workers from highly knowledge demanding fields. It was reported that availability of necessary knowledge is important to respondents (61%). It was proven that tacit knowledge is important for knowledge work (27%); only 15% of respondents rely on only explicit knowledge, 57% of respondents work with both dimensions.	In the future, the researcher intended to study the role of knowledge worker as well as role of manager of knowledge worker. Area of interest was to compare the management style and managerial tools they have as knowledge workers with the style they use to manage their subordinates.

Overall, KM has the potential to create competitive advantage which will positively link to OP (Schulz & Jobe, 2001). Organizations that are practising KM are concern to find out the outcomes of KM implementation in their organization but in most cases they are not sure how to link and measure the outcomes of KM implementation to the KM effort. As indicated above, beside KMP, there are also other variables that could affect the outcomes. In this scenario, it is very crucial for organizations to correlate KM activities with business outcomes. This would also allow the organizations to monitor these activities and to align in adopting the changes that are

taking place. It is well understood that KM is used as an enabler for business processes; therefore, it is vital for the organizations to understand the critical success factors of KM activities which led to organizations performance. This would assist organizations to develop relevant measurements to measure KM activities with business outcomes.

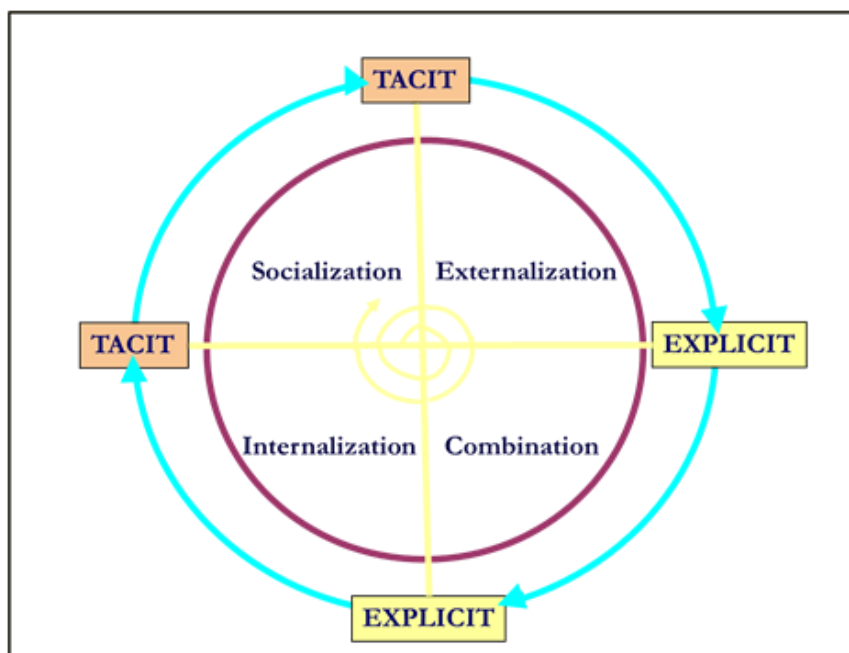
As highlighted above, every study focused on different aspects of KME on OP, such as effect of OC on certain KMP, the role of IT on KM and the involvement of KW in implementation of KM. There is no universally model has been accepted as KM implementation model. Therefore, in this study has selected organizational factors as the independent variables to investigate its impact on the effectiveness of KM towards OP and the identified factors are; (1) KW; (2) OC; (3) KMP and; (4) IT. This study is constructed based on different variables which are supposed to form integrative contribution in KM and its objective is to empirically investigate and measure the critical factors that influence the effectiveness of KM in organizations, which will affect OP.

## **2.5. Underpinning Theories**

### **2.5.1 Knowledge Conversion**

In KM, tacit-explicit dimension of knowledge has been widely discussed among the researchers. SECI model as shown in Figure 2.5, presented new description of knowledge in an organizational context (Nonaka & Takeuchi, 1995).The epistemological dimension refers to social interaction between tacit and explicit knowledge where knowledge is converted from one type to another, and new knowledge created (Nonaka et. al. 1994). It is obvious that successful knowledge

conversion can be achieved through four knowledge conversion processes which are socialisation, externalisation, combination and internalisation which involve full cycle of tacit knowledge to explicit and tacit again. Tacit knowledge such as experiences that has been externalized, documented, stored will make knowledge retrieval at ease. Whereas, the combination of explicit knowledge held by different individual which has been sorted, categorized, re-contextualized may produce new knowledge. Whereby, the ontological dimension explains the flow from individual to inter-organizational knowledge amplified and crystallized as part of organizational knowledge network (Nonaka & Takeuchi, 1995). Therefore, SECI model has been adopted to discuss the process of KMP in organization.



Source : Nonaka and Takeuchi (1995)

Figure 2.5

*SECI Model*

## **2.5.2 Organizational Factors**

### **2.5.2.1 Knowledge Workers**

Drucker (1959) highlighted the transformation of the society into post-industrial state where the KW plays an important role in achieving organizational competitive advantage where it involves the perennial processing of non-routine issues which would require creative thinking. Drucker (1959) defined KW as a person with knowledge and it is important to the organization and this can be supported by Davenport (2005) described KW as an educated people and very experienced person. KW involvement in knowledge sharing within the organization is crucial as they are the knowledge investors and the energy of an organization (Efimova, 2004).

### **2.5.2.2 Knowledge Management Practices**

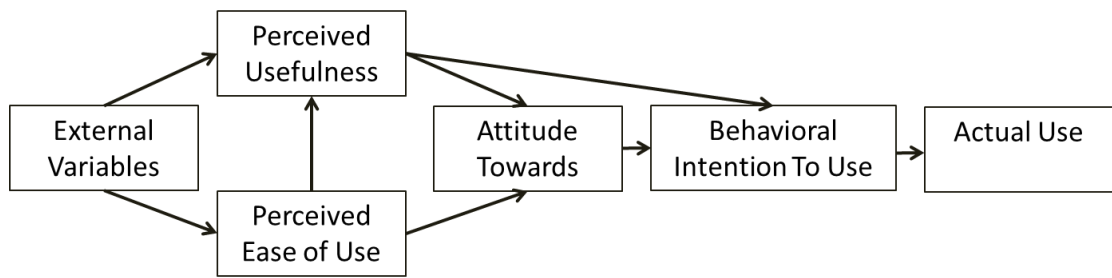
Knowledge conversion process tends to be larger and faster when more individual in an organization is getting involved in the process. It starts from individual, move up to group and organizational level and may also reach out to inter-organization. In the process, new knowledge are been acquired, shared and disseminate within the people in the organization and inter-organization. The adoption of KMP in managing the knowledge conversion is bringing value to an organization. KS within KW will lead to socialization and externalization activities. The acquisition, sharing, dissemination and application of knowledge in an organization have become a critical factor in an organizations success and competitiveness. KMP is crucial in an organization to assist the process of acquiring, storing, sharing and application of knowledge to support strategic planning, dynamic learning, problem solving and decision-making (Sveiby, 1997). Past studies recognized that the prerequisites of organizations success rely on their KMP (Porter, 2004). Some authors segregate KMP into several



components that are acquire, collaborate, integrate, create, disseminate, gather and exploit (D.J. Teece, 1998); create, disseminate and apply (Skyrme & Amidon, 1998); acquisition, conversion, application and protection.

### **2.5.2.3 Technology**

The more people sharing their knowledge, the more knowledge starts flowing throughout the organization. The proper acquiring and storing of knowledge would assist the organization to ease the process of retrieval at any time from any place for problem solving, minimize re-invent the wheel tasks and improve work process for the benefit of the organization. More organizations turned into IT as the KM enabler to organize their organizational knowledge systematically. Lately, researchers paid attention on IT adoption and diffusion in the information technology area. In the area of information systems, technology acceptance model (TAM) is used by researchers to study individual behaviour towards intention of using IT and actual usage of IT (Davis, 1989). Based on TAM model, both PU of IT and PEOU are prognosticators of individual behaviour towards use of IT which will lead to behavioural intentions and definite usage (Davis, 1985) as presented in Figure 2.6. According to TAM model, users believe on technology usefulness in improving their work can be presented by PU whereby, PEOU referring to effort taken in using the IT. IT can support KMP through its collaboration support system (Bhatt, Gupta, & Kitchens, 2005) to facilitate interaction and connectivity among individuals (M. Alavi & Tiwana, 2003) in organization during task performance (Bhatt *et al.*, 2005). TAM model gain its popularity in explaining and predicting system use that has been cited in most researches that are dealing with technology user acceptance (Y. Lee, Kozar, & Larsen, 2003).



Source: Davis (1989).  
 Figure 2.6  
*Technology Acceptance Model*

With more than 700 citations to the original work for TAM (Davis, 1989), it has been adapted and extended in many ways. TAM2 is an extension of TAM model (Venkatesh & Davis, 2000) which few antecedents have been added to PU variable. And, another extension introduced by Venkatesh (2000), TAM3, added few other antecedents of PEOU variable which are grouped as anchors and adjustments. TAM2 and TAM3 variables are shown in Table 2.8.

Table 2.8  
*TAM Extended Model (TAM2 & TAM3)*

Model	Variables	Author	
TAM (Davis, 1989)	Perceived Usefulness	<p><b>TAM2</b></p> <ul style="list-style-type: none"> <li>- Voluntariness</li> <li>- Experience</li> <li>- Subjective Norm</li> <li>- Image</li> <li>- Job Relevance</li> <li>- Output Quality</li> <li>- Result Demonstrability</li> </ul>	Venkatesh and Davis (2000)
	Perceived Ease Of Use	<p><b>TAM3</b></p> <p>Anchors</p> <ul style="list-style-type: none"> <li>- Computer Self-Efficacy</li> <li>- Perceptions of External Control</li> <li>- Computer Anxiety</li> <li>- Computer Playfulness</li> </ul> <p>Adjustments</p> <ul style="list-style-type: none"> <li>- Perceived Enjoyment</li> <li>- Objective Usability</li> </ul>	Venkatesh (2000)

Source : *Compilation from TAM2 and TAM3 models*

TAM extended model (TAM 2 & TAM3) has been adopted in this study as both PU and PEOU are suitable to investigate how it would facilitate KM in the organization with the following variables (Table 2.9):

Table 2.9  
*Adopted Variables For The Study*

Model	Variables	Author	
TAM (Davis, 1989)	Perceived Usefulness	<p><b>TAM2</b></p> <ul style="list-style-type: none"> <li>- Job Relevance</li> <li>- Result Demonstrability</li> </ul>	Venkatesh and Davis (2000)
	Perceived Ease Of Use	<p><b>TAM3</b></p> <ul style="list-style-type: none"> <li>- Perceived Enjoyment</li> </ul>	Venkatesh (2000)

#### **2.5.2.4 Organizational Culture**

OC also plays a role in the success of the implementation of KM initiatives. Organisational culture is often difficult to understand and it varies from one organization to another which is influenced by many factors. Geert Hofstede's cultural dimensions theory explains society's culture effects on its member's values. Hofstede *et al.* (2010) defines culture as the way how people think which differentiate them from others. The initial study done by Hofstede covers five dimensions; (1) power distance; (2) collectivism vs. individualism; (3) femininity vs. masculinity; (4) uncertainty avoidance; and 5) long-term vs. short-term orientation. For further discussion, this study concentrated on individualism and collectivism dimension. In the environment with more individualist culture, the ties between people are loose, whereas in the collectivist culture, the ties between people are stronger and cohesive in-groups. This may also influence the way how people treat each other. Hofstede's work has been consolidated and updated by the Global Leadership Organizational Behaviour Effectiveness (GLOBE) Research Program (1992 – 2000). This study focused on leadership and OC of 825 organizations located in 62 countries (House, Hanges, Javidan, Dorfman, & Gupta, 2004). Among Hofstede's culture dimensions, GLOBE has incorporated individualism and collectivism. This study has included both individualism and collectivism dimensions to examine the impact of OC on KM effectiveness. Table 2.10 shows the characteristic differences between collectivist and individualist. Individualist is more skewed to 'me' consciousness; priority would be to himself or herself. KS may not be effective in this environment. People who are collectivist is more open to 'we' consciousness, open for ideas from the groups and this will encourage KS to take place.

Table 2.10  
*Differences Between Collectivist and Individualist Societies*

<b>Individualism</b>	<b>Collectivism</b>
Everyone is supposed to take care of him – or herself and his or her immediate family only	People are born into extended families or clans which protect them in exchange for loyalty
“I” – consciousness	“We” – consciousness
Right of privacy	Stress on belonging
Speaking one’s mind is healthy	Harmony should always be maintained
Others classified as individuals	Others classified as in-group or out-group
Personal opinion expected: one person one vote	Opinions and votes predetermined by in-group
Transgression of norms leads to guilt feelings	Transgression of norms leads to shame feelings
Languages in which the word “I” is indispensable	Languages in which the word “I” is avoided
Purpose of education is learning how to learn	Purpose of education is learning how to do
Task prevails over relationship	Relationship prevails over task

Source : The Berkeley Electronic Press, 2011

### **2.5.3 Organizational Performance**

An individual’s knowledge on its own will not give much impact to the organization unless it been shared among people in the organization (Nonaka & Takeuchi, 1995). Organization that is practising KS through transfer and exchange of knowledge will develop its capital (Quinn, Anderson, & Finkelstein, 1996; Wide´n-Wulff & Soumi, 2007). When this happen, job performance is improved and lead to better OP with new and relevant knowledge. Tracey *et al.* (1999) perceived organization-level performance measured five aspects which are; (1) customer satisfaction with regards to products and services; (2) profitability relative to competitors; (3) customer

retention rate; (4) sales growth and; (5) overall OP. Where Germain *et al.* (2001) argued that performance can be categorized in two types which is; (1) internal performance relates to issues such as product quality, costs and profit level; and (2) benchmarked performance which benchmarking costs comparison, customer satisfaction, quality and operations to the industry or market leader. An organization's competitive capabilities in managing their business processes and developing its products and services are crucial in meeting customer needs and satisfaction, to meet market's need and its financial performance (Tracey *et al.*, 1999). This study is adopting perceived organization-level performance in measuring OP from the aspect of effectiveness of internal processes and improvement of KW knowledge capacity aligned with Malaysian Government's ICT Strategic Plan : 2011 – 2015) in term of; (1) enhancing public services decision making; (2) building competitive societal IC capabilities; and (3) developing knowledge competitive work force.

#### **2.5.4 Theories – An Integrated Schema**

During the process of theoretical framework development, rigorous literature review has been conducted as explained in the previous sections. The theories and concepts identified as explained above came from disparate researches and disciplines measuring different areas. Figure 2.7 shows an integrated schema that link-up these theories and concepts which formed this research theoretical framework.

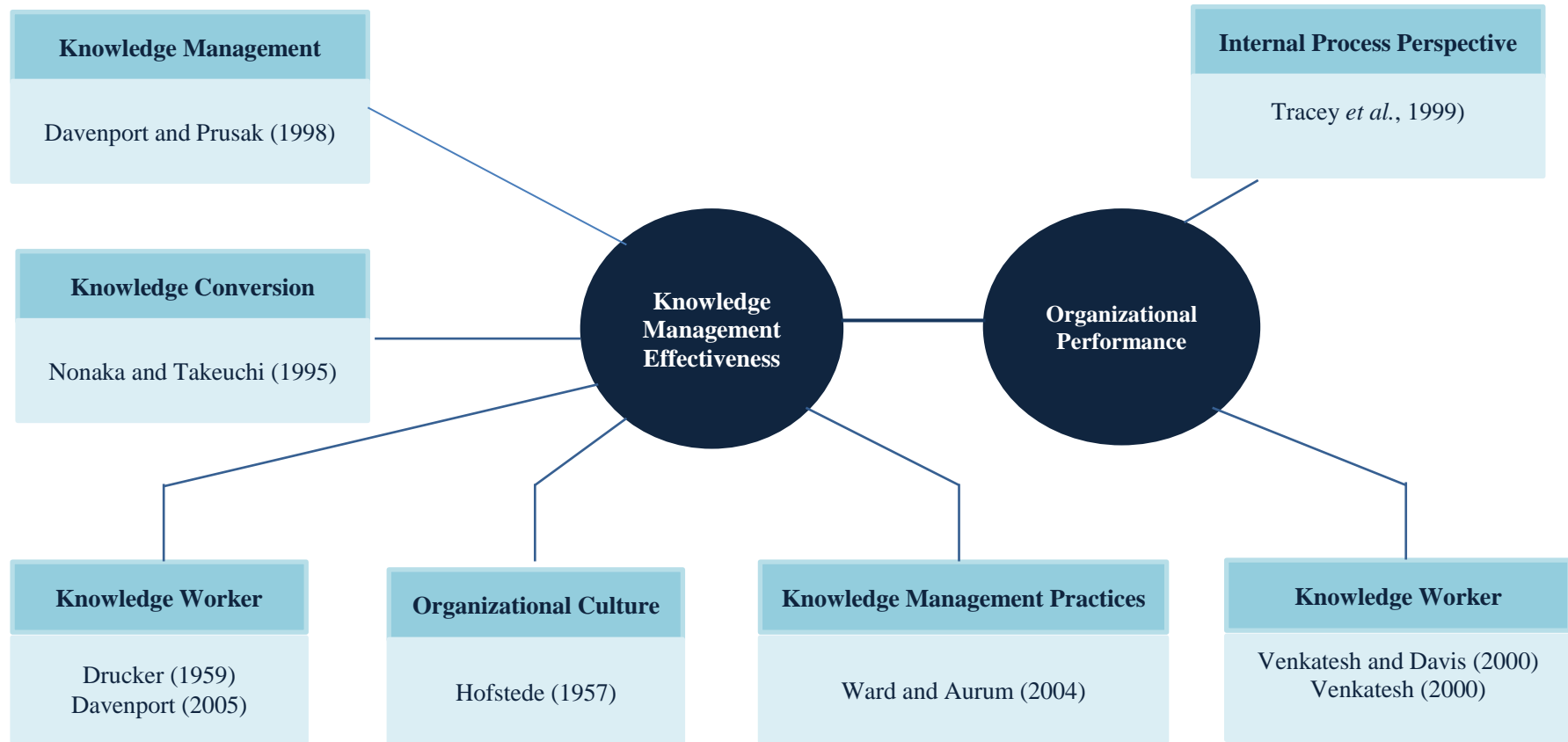


Figure 2.7  
Theories – An Integrated Schema

## **2.6 Summary**

In this chapter, a comprehensive explanation of literature review on KM, effectiveness of KM and OP was provided. It is argued that managing knowledge has become an important strategy in an organization in order to remain competitive. The organization should consider more proactive approach when managing their knowledge asset. Sharing cultural element is crucial to encourage KS to take place. If there is lack of KS among the employees then it would be tough for the organization to compete in today's competitive environment and to improve OP. Investment in relevant technology tool would be something that to be considered in order to provide systematic and organized way of managing organization's knowledge asset.

This study has identified organizational factors that possibly influence the effectiveness of KM which will give an impact on OP and it has been included in the theoretical framework. The following chapter three will discuss the theoretical framework, hypothesis development as well as the research methodology employed in this study.



## Chapter THREE

### Research Theoretical Framework and Hypothesis

#### 3.1 Introduction

The previous chapter describes the background and theoretical information of this study and also has identified the constructs that formed the theoretical framework. In this chapter, the research theoretical framework and hypotheses development will be discussed in depth. Figure 3.1 presents the chapter's outline.

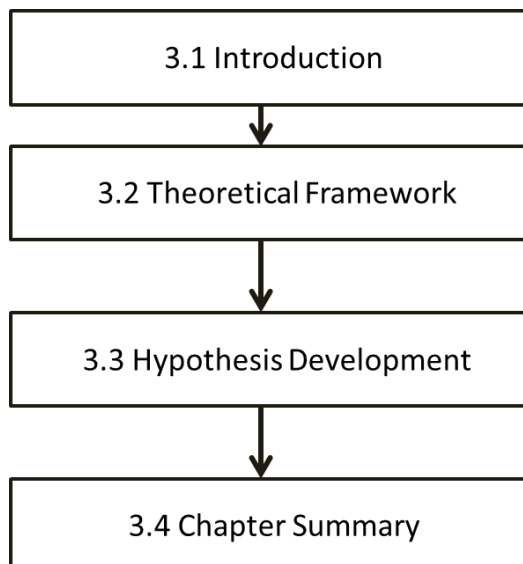


Figure 3.1  
*Chapter Three Outline*

#### 3.2 Theoretical Framework

The development of theoretical framework in a study is crucial in research methodology (Hussey & Hussey, 1997). It is an abstract that explained the logical structure of meaning that is used in the development of a study. The theoretical framework which will be explained later is based on the findings presented in literature review covered in Chapter 2. It provides the framework for research design

and data analysis. The theoretical framework as in figure 3.2 served as the based to the proposed model to examine the effect of organizational factors on the effectiveness of KM and its impact on OP. For the purpose of this study, four organizational factors shall be discussed on their effectiveness on KM which is: (i) KW; (ii) OC; (iii) KMP which cover creation, sharing and application of knowledge; and (iv) IT.

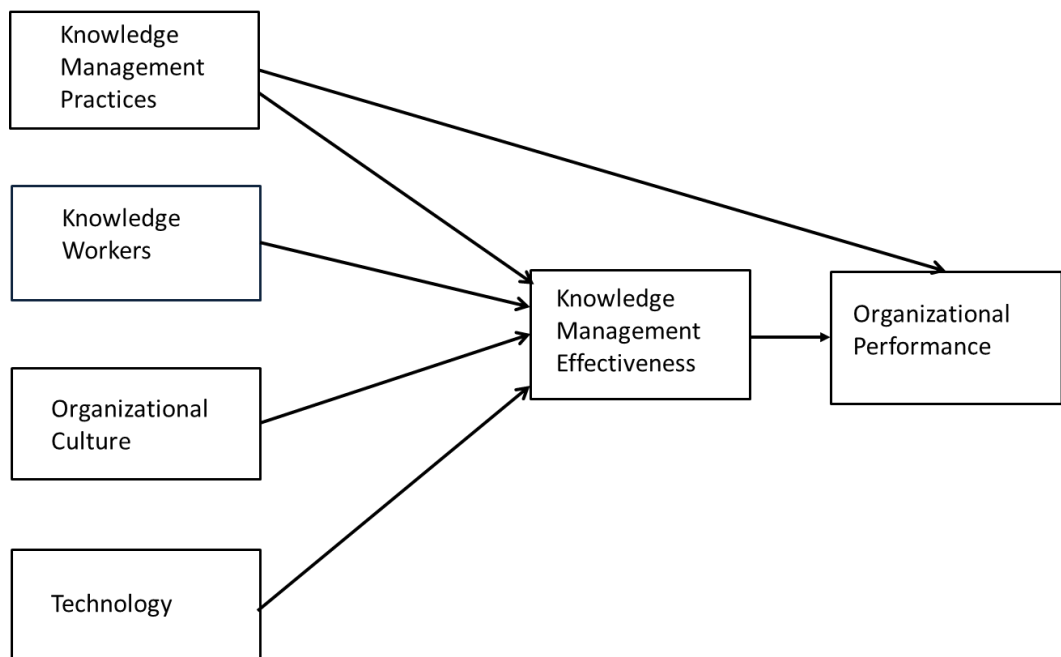


Figure 3.2  
*Theoretical Framework*

### 3.3 Hypothesis Development

This section discusses the hypothesis of this research. Hypothesis is a relation statement between two or more variables which represent the independent variables and dependent variables expected relationship (Creswell, 1994). It represents clear proclamation on areas to be investigated and usually hypothesis development is done before a research is been conducted which will identify the key abstract concepts involved in the research. The research theoretical framework is presented in figure 3.2. This will be discussed in the next subsections.

### 3.3.1 Knowledge Workers

Human is the main factor in the process of creating, sharing and utilizing of knowledge (Malhotra, 2003) and sharing starts off at human level (Tomas H. Davenport & Prusak, 1998). KW is workers whose main capital is knowledge. Organization's employees are KW, people who have important knowledge and use knowledge at work (P. F. Drucker, 1954). Knowledge is the raw materials and major tools to KW. The output of KW not only depend on their ability to create, disseminate and share knowledge but also it depends on how knowledge is organized within the organizations and whether they have the right environment (Amar, 2002) and these KW are self-managing and they are responsible for their own contribution (Drucker, 1999). In any organizations, KW form the integral part of the engine room. The knowledge that these KW have can be the multiplier effect if it been shared among other KW within the organization. It can be expanded and improved to the benefit of the organization. Hence, in order for an organization to be successful, it needs to create the echo system to support interaction and knowledge sharing within KW (Nonaka & Takeuchi, 1995). It is crucial for the organization to ensure that their KW is motivated and willingly to participate in knowledge sharing (Wong, 2005). Therefore, organization has to consider making available suitable and convenient environment for KW to access knowledge. An unorganized environment and non-systematic KM will create barriers to KW to get access to important organizational asset.

Even though literatures have highlighted the important role of KW in arbitrating KME, but Theriou *et al.* (2010) study showed that KW was not supported by their sample as indicated in Table 3.1. They conducted the study in Greek which involved

930 companies under manufacturing and construction with minimum of 50 employees per company.

Table 3.1  
*Hypotheses Testing in Therious*

Hypothesis	Path	Patch Coefficient	t-values	Remarks
H4 <i>People influences positively knowledge management effectiveness</i>	Technology >> KM effectiveness	0.12	0.96 < 1.96	Not Supported

Source : Theriou *et al.* (2010)

The above finding was contradicts with what was highlighted in literatures leading to the needs to further investigate this factor in Malaysian context. Therefore, this study proposed to examine the following hypothesis:

H<sub>1</sub>: There is a relationship between knowledge workers and the effectiveness of knowledge management

### 3.3.2 Organizational Culture

On the other hand, knowledge is also looked as source of power (Ford & Chen, 2003). In individualism culture, people would think of themselves first and do their own thing and also to be the best (Triandis, 1995) whereby in collectivism culture, people merge themselves with their group and decisions are made collectively (Triandis, 1995). Type of culture would define whether people would share their knowledge among KW within the organization. People who are self-centered may not want to share their knowledge with others as knowledge would be their source of power for recognition, promotion as well differentiation (Ford & Chen, 2003). People in collectivism culture would work together with others to achieve organizational objectives (Hofstede, 2001). Having to understand this, it is likely to

say that knowledge sharing would be easily take place in this environment. This can be supported by study done by Ipe (2003) and Ford and Chen (2003) who highlighted that knowledge sharing, communication and learning in an organization has strong relationship with employee's cultural values.

But Triandis (2001) also suggested that it is not right to make an assumption if someone is from an individualistic culture, will make him as solely individualistic person and if he/she is from collective culture would make him/her a collectivistic person. In this situation, it is not be able to make a judgment that KS in individualism culture will not be effective as in collectivism culture and vice-versa. The above statement by Triandis (2001) has thrown off-gear on the opinion of people behavior in individualism and collectivism culture which lead to the need to further investigate on these factors. Therefore, this study developed the following hypothesis:

H<sub>2</sub>: There is a relationship between organizational culture and the effectiveness of knowledge management

### **3.3.3 Technology**

IT is seen as an enabler in KM strategy to manage the process of creation, dissemination and utilisation of knowledge. Databases, search engines, document management system, knowledge discovery facility and knowledge collaboration system are seen as the effective IT tools to support KM (Gray & Tehrani, 2003; Marwick, 2001; Tyndale, 2002). It mitigates access to information, speedy search as well as cooperation and communication among individual in the organizations (Yeh, Lai, & Ho, 2006). It is argued that IT is one of the key factors that have the influence on KM implementation (McC Campbell, Clare, & Gitters, 1999). Relevant and well

planned IT implementation will accelerate KM (Mohamed, Stankosky, & Murray, 2006). The organizations have to invest in infrastructure and technology in order to provide the state-of-art KM system to facilitate KM implementation in the organization. Even though, past studies have shown the impact of IT on KM, but nevertheless, if the implementation of these technologies are not well established and explained on the overall organization's objectives and how it could assist in achieving these objectives, organizations may not enjoy the return of their investment on technologies (Curley & Kivowitz, 2001). It depends on how people within the organization perceived the usefulness of implemented technology and PEOU (Davis, 1989).

Study done by Nikolaos *et al.* (2010) showed evidence that IT only played minor role in the effectiveness of KM in organization. Even though, it is known that IT could accelerate KM but there are other factors which will influence the success of IT implementation in KM. One of the aspects is job relevancy. It is about individual's perception on how applicable the system technology to his/her job. Job relevancy is hypothesized to have the relationship with PU where when one believes that if the system is relevant to one's job then it will contribute to their high performance. Result demonstrability is also believes to have a relationship with PU. When the result or impact of the usage of IT can be observed then individual perceive that the system technology is useful. Another aspect which give the impact of the effectiveness of IT is individual's perception on how enjoyable to use the IT. Individual feels that when the system technology is enjoyable in its own right then individual perceive that the system technology has ease of use characteristic which simplify system usage.

Hence, this study posited the following hypothesis:

H<sub>3</sub>: There is a relationship between technology and the effectiveness of knowledge management

### **3.3.4 Knowledge Management Practices**

Managing knowledge effectively is crucial to an organization. The organizations that have better KM capabilities are usually more innovative and have better performance (Darroch, 2005). Ward and Aurum's (2004) 7-stage defined KMP stages as create, acquire, identify, adapt, organize, disseminate and use. Davenport and Prusak (1998) argued that OP can be improved through effective KMP via searching and sharing of useful knowledge. This is supported by study done by Marque's and Simo'n (2006) who found out that those companies implementing KMP have better results than their competitor and their findings shows that KMP has positive influence on OP.

Knowledge is dispersed within the organization and therefore organization needs to have proper KMP to capture, manage, store and disseminate this knowledge. Knowledge will only be meaningful and useful if it is been codified, classified, documented and stored in understandable format and it can be used by relevant person, when it is needed for certain need (Nemati & Barko, 2002). Zaim et al (2007) hypothesized that KM process precisely and significantly affects performance of KM. In their conceptual framework, four main processes have been identified, namely (1) knowledge acquisition and expansion; (2) knowledge codification and storage; (3) dissemination and knowledge sharing; and (4) knowledge application. The result of hypothesis testing revealed that KMP positively influenced the

performance of KM which aligned with existing literature. But nevertheless, this finding cannot be generalized to whole population as the research was conducted based on case study approach in one GSM company in Turkey. Hence, this has led to the need to further investigate these factors in Malaysian context. Therefore, the following hypotheses are developed:

H<sub>4</sub>: There is a relationship between knowledge management practices and the effectiveness of knowledge management.

### **3.3.5 Knowledge Management Effectiveness and Organizational Performance**

It was argued that when the implementation of KM is done effectively, it will add more value to an organization's overall performance (Toften & Olsen, 2003). There were number of studies conducted in the past investigated KM and OP relationship and based on their findings it was shown that KM and OP has positive relationship (Marques & Simon, 2006; W.-T. Wang & Belardo, 2009; M. Zack *et al.*, 2009). According to resource-based view theory (Penrose, 1959), an organization's resources is based on their internal resources, i.e. people, skills, experiences, financial and knowledge. Thus, the organizations have to accept that it is crucial for them to manage their resources effectively in order for them to remain competitive and innovative which will improve their bottom line. The organizations treat KM as one of the main elements which contribute to their success factor. Knowledge is viewed as the main organizational asset which needs to be maintained effectively. More KM initiatives have been introduced within the organizations to encourage KM implementation as well as to inculcate the buy-in and acceptance within people in the organization. If KM application is been carried out successfully, it will enables an organization to be more innovative, able to manage market threat accordingly, able



to harmonize its efforts better, able to produce and market new products faster as well as will be more responsive to market change (Gold *et al.*, 2001). When critical knowledge is been managed, transformed, disseminated and applied, it helps the organization to achieve its competitive advantage (Probst *et al.*, 1998).

Rasula *et al.* (2013) hypothesized that KM has a positive impact on OP. In their study, they had hypothesised that organizational elements (culture, climate and collaboration) and IT influenced the management of knowledge which give an impact on OP. Their findings revealed that there is a positive effect of KM on OP. They argued that their finding is a useful kick-start to further investigate other KM elements and its influence on OP. Based on this recommendation, the following hypothesis is proposed:

H<sub>5</sub>: There is a relationship between effectiveness of knowledge management and organizational performance.

On the other hand, Annette and Trevor (2011) studied on KM capabilities. Their aim was to investigate the relationships between selected knowledge resources and OP which could help organizations to identify and establish relevant strategies in deploying knowledge resources. Based on their findings the acquisition, application, protection of knowledge and organizational structure were significantly related to OP but there was not significant impact between OC, IT and knowledge conversion on OP. Looking at the overall perspective, their findings suggested that even though the individual resources will collectively induce an organisation's overall KM capability which compound to OP but each resources does not directly linked to performance. Therefore, the decomposed model is inconclusive leading to the need for further investigation of these variables. Hence, the following hypotheses are proposed.

H<sub>6</sub>: There is an indirect relationship between knowledge management practices and organizational performance.

### 3.4 Summary

This chapter presents the theoretical framework affiliated with this study based on past research. The framework consists of the organizational factors that is associated with KME which to measure the OP. Six hypotheses were developed addressing the research questions as shown in Table 3.2 which will be tested using survey method approach. In the following chapter four, the methodology used for this study is dealt with.

Table 3.2  
*Research objectives and hypotheses of this study*

Research Objectives	Hypotheses
Q1. What are the factors that affect KM effectiveness?	H <sub>1</sub> : There is a relationship between knowledge workers and the effectiveness of knowledge management H <sub>2</sub> : There is a relationship between organizational culture and the effectiveness of knowledge management H <sub>3</sub> : There is a relationship between technology and the effectiveness of knowledge management H <sub>4</sub> : There is a relationship between knowledge management practices and the effectiveness of knowledge management
Q2. Is there any relationship between KM effectiveness and organizational performance?	H <sub>5</sub> : There is a relationship between effectiveness of knowledge management and organizational performance.
Q3. Does KM effectiveness mediate the relationship between knowledge management practices and organizational performance?	H <sub>6</sub> : There is an indirect relationship between knowledge management practices and organizational performance.

## Chapter FOUR

### Research Design and Methodology

#### 4.1 Introduction

In the previous chapter, the research theoretical framework and development of hypotheses have been explained. This study adopted quantitative survey research design method and the data collection was done using questionnaire. The chapter is divided into ten sections. Figure 4.1 presents the chapter's outline.

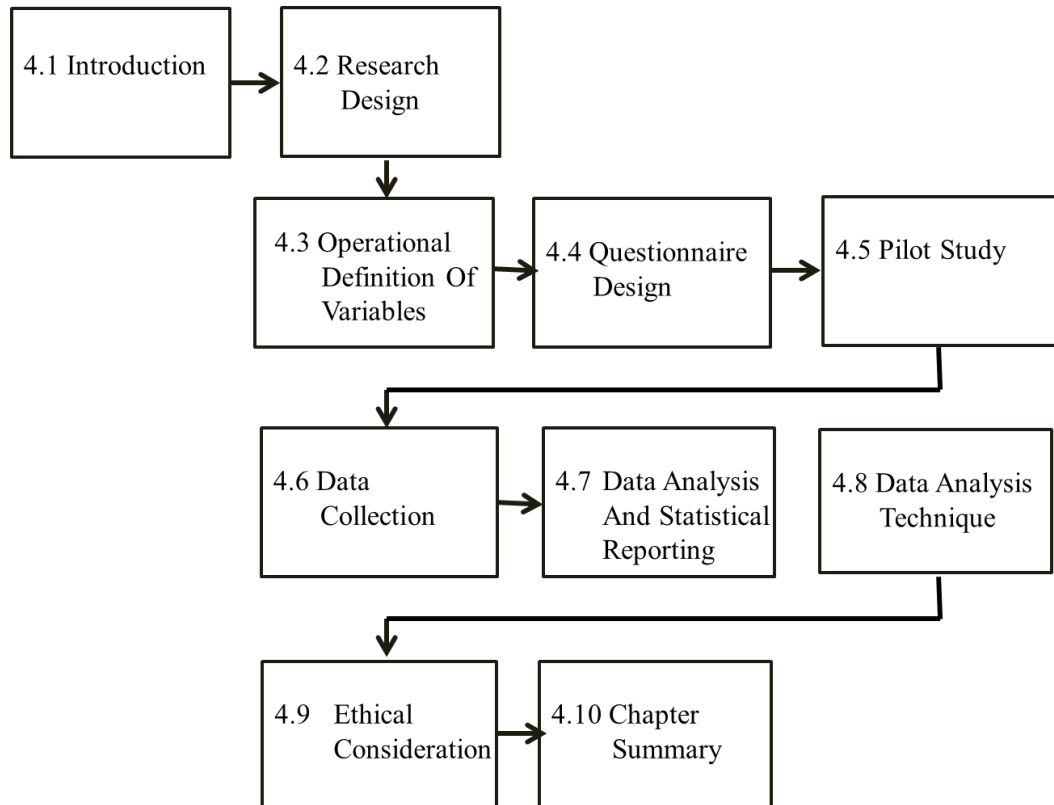


Figure 4.1  
*Chapter Four Outline*

## 4.2 Research Design

Research design covers the overall research approach right from theoretical framework to the collection and analysis of collected data (Hussey & Hussey, 1997). It assists the researcher to make an informed decision on research methodology, to cater limitation and constraints and to make the selection of right research method for the intended study (Saunders, Lewis & Thornhill, 1997). Research methodology differs from one study to another and it relates to the overall strategy taken by the researcher (Leedy & Ormrod, 2001). Saunders *et al.* (1997) highlighted the importance of paying attention on research questions focusing on contemporary issues rather than historical phenomena during consolidation of research methodology. Whereas, Yin (1994) postulates that researchers may consider different strategy to formulate their research as shown in Table 4.1.

Table 4.1  
*Various Research Strategies And Its Approaches*

Strategy	Form of Research Questions	Require Control Over Events	Focus on Contemporary Events
Experiment	How, Why	Yes	Yes
Survey	Who, What, Where, How Many, How Much	No	Yes
Archival Analysis	Who, What, Where, How Many, How Much	No	Yes / No
History	How, Why	No	No
Case Study	How, Why	No	Yes

Source : Yin (1994)

Based on the strategies described by Yin (1994) and Saunders *et al.* (1997), it was deemed agreed that survey strategy is the most appropriate for this study and following are the reasoning to support this decision:

- i) This study intends to examine the effects of organizational factors on OP through effective KM and to identify what are the factors that affect KME. Yin (1994) indicates that ‘what’, ‘who’ and ‘where’ questions favour survey which tends to describe phenomena with the intention to predict the outcomes.
- ii) This study focuses on contemporary event which is examining the impact of KME on current OP and therefore the choice of considering retrospective/historian data is not feasible.
- iii) The nature of this study does not require longitudinal research method; therefore, survey questionnaire for data collection within shortest period is more suitable which will not incur much cost and time.
- iv) The study intends to examine a set of organization’s representative sample. Survey method approach is used in this study seeking discovering common relationships across organizations which may lead to generalizable statements of research’s object.
- v) Past empirical studies in similar area had adopted the survey method using questionnaires (Fazli & Alishahi, 2012; Syed-Ikhsan & Rowland, 2004; Tseng, 2010).

There are two types of approach to a study, namely, qualitative and quantitative. There are numerous arguments on these two approaches with regards to the validity and reliability of research results. Mintzberg (1973) and Hodgson, Levison and Zaleznik (1965) who are more favouring quantitative method argued the objectivity

and validity of qualitative results which they feel that the researcher could be bias and in this case it is difficult to compare the research result done by different researchers (Gill & Johnson, 1997). Whereas, Neustadt (1960) and Burgess (1993) who are more skewed to qualitative study argued whether quantification is possible in all situation and the possibility of uncontrolled bias in quantitative study.

Qualitative research is suitable to accommodate factors which cannot be translated into number-based result which usually is used to study human factor and cause-and-effect level. Additionally, it is influenced by the interaction between researcher and subject. Therefore, in order to minimize this to happen, researcher skills and objectivity over the study must be beyond the situation. Quantitative research focuses on numerical based result and limiting human factor influence. This approach provides objective and unbiased result which possibly can be influenced by researcher (Hussey & Hussey, 1997). It is about primary data collection from a set of sample which is used to make presumption over larger population (Manheim & Rich, 1995). This study has adopted the survey method is predominantly quantitative in nature.

### **4.3 Variables' Operational Definition and Measurement**

An operational definition can be explained as a detailed specification on how the given variables to be measured. It can range from a very simple and straightforward to a very complex depending on the need of the study. Operational definitions are tied back to the theoretical constructs of the study. All constructs in this study (KW, OC, KMP, IT, KME and OP) are measured using Likert-7 point scale and the scale is rated as; 1 - Strongly Disagree, 2 - Disagree, 3 - Somewhat Disagree, 4 - Neither

Agree or Disagree, 5 - Somewhat Agree, 6 - Agree, and 7 - Strongly agree, indicating 1 (strongly disagree) as the low level of effect through 7 (strongly agree) indicating the high level of effect. Subsections 4.3.1 till 4.3.6 will discuss this in details.

#### **4.3.1 Knowledge Workers**

What makes an organization differ from others is the valuable knowledge that it has; the knowledge that it's KW has (Kokavcova & Mala, 2009). There are many views on the definition of KW but in general KW is defined as people who utilise more of their brain than muscle in doing their work. Drucker (1954) defined KW as a person who has an important knowledge which is useful to the organization and most often only the person has the knowledge. They much depend on their knowledge and their ability to learn (Vinson, 2009) and KW use their brain to think for a living (Thomas H. Davenport, 2005). KW is the people with a lot of experience, educated and they have the expertise (Thomas H. Davenport, 2005). KW is the hub for knowledge related tasks and they are involved in creation, distribution, sharing and application of knowledge. It is the responsibilities of the organizations to provide the infrastructure and facilities to enable KW to create, share and apply their knowledge. Based on these definitions, this study defines KW as experienced organizational employees with important knowledge which is crucial to the organizational growth.

Twelve items are used to measure the influence of KW on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in the study. If the total point gives lowest point of 12 (1 for strongly disagree x 12 items), it shows that the respondents do not agree that KW involvement does influence the effectiveness of KM. But if the total point give maximum point of 84 (7 for strongly agree x 12), it shows that the respondents agree that KW involvement does influence the effectiveness of KM. Table 4.2 describes the list of items used to measure the construct related to KW and its sources.

Table 4.2  
*Item Measures of Knowledge Workers*

Item	Description	Likert Scale						
KW1	I would take the initiative to provide my colleagues with useful tools I have developed (e.g. precedents, memos, process flow, justification paper).	1	2	3	4	5	6	7
KW2	I would allow my colleagues to spend significant time observing me in order for them to better understand and learn from my work.	1	2	3	4	5	6	7
KW3	I would willingly share my new ideas with my colleagues.	1	2	3	4	5	6	7
KW4	I would eagerly receive and use tools developed by my colleagues including precedents, memos, and process flow and justification paper.	1	2	3	4	5	6	7
KW5	I would welcome the opportunity to spend significant time observing my colleagues in order for me to better understand and learn from their work.	1	2	3	4	5	6	7
KW6	I would eagerly receive and consider any new ideas my colleagues might have.	1	2	3	4	5	6	7
KW7	The information I received from each of my colleagues is likely to make the contributions to organizational benefit.	1	2	3	4	5	6	7
KW8	I believed that my colleagues and I shared a commitment to a common purpose.	1	2	3	4	5	6	7



Table 4.2

*Item Measures of Knowledge Workers (continued)*

Item	Description	Likert Scale						
KW9	I believed that my colleagues and I shared enthusiasm about pursuing the collective goals and mission of the whole organization.	1	2	3	4	5	6	7
KW10	My colleagues do not regularly ask me for my opinion on work matters that they are working on.	1	2	3	4	5	6	7
KW11	I do not regularly ask my colleagues for their opinions on work matters that I am working on.	1	2	3	4	5	6	7
KW12	I feel that I have access to all of the information that I need to be an effective professional.	1	2	3	4	5	6	7

Source : Evans (2012)

### 4.3.2 Organizational Culture

OC is defined as how people think, behave and do as a member of their community (Ferraro, 1998). It forms the social behaviour and integrated action. In an organization, OC represents organizational character, how people work among their group, how they communicate and how they behave which represent how company hierarchy is developed (Ribiere & Sitar, 2003). This study defines OC as how people within the organization do things around them and how they interact with people. Every single person in the organization has their own unique characteristics and behavioural styles. OC has an impact on the success of KM initiatives either it helps to promote or it becomes the barrier in KM implementation.

Fifteen items are used to measure the influence of OC on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in the study. If the total point gives lowest point of 15 (1 for strongly disagree x 15 items), it shows that the respondents do not agree that OC does influence the effectiveness of KM. But if the total point give maximum point of 105 (7 for strongly agree x 15), it shows that the respondents agree that OC does

influence the effectiveness of KM. Table 4.3 describes the list of items used to measure the construct related to OC and their sources.

Table 4.3  
*Item Measures of Organizational Culture*

Item	Description	Likert Scale						
OC1	I'd rather depend on myself than others.	1	2	3	4	5	6	7
OC2	I rely on myself most of the time; I rarely rely on others.	1	2	3	4	5	6	7
OC3	I often do my own thing.	1	2	3	4	5	6	7
OC4	My personal identity, independent of others, is very important to me.	1	2	3	4	5	6	7
OC5	It is important that I do my job better than others.	1	2	3	4	5	6	7
OC6	Winning is everything.	1	2	3	4	5	6	7
OC7	Competition is the law of nature.	1	2	3	4	5	6	7
OC8	When another person does better than I do, I get tense.	1	2	3	4	5	6	7
OC9	If my colleagues get a prize, I would feel proud	1	2	3	4	5	6	7
OC10	The well-being of my colleagues is important to me.	1	2	3	4	5	6	7
OC11	I enjoyed spending time with my colleagues	1	2	3	4	5	6	7
OC12	I feel good when I cooperate with others.	1	2	3	4	5	6	7
OC13	Colleagues must stay together as much as possible.	1	2	3	4	5	6	7
OC14	It is not my duty to take care of my colleagues and I am not going to sacrifice on what I want.	1	2	3	4	5	6	7
OC15	It is important to me that I respect the decisions made by my groups.	1	2	3	4	5	6	7

Source : McFeeters (2003); Brijball (2010)

### 4.3.3 Knowledge Management Practices

When people applying knowledge that they have, more knowledge will flow and exchanged within the organization. KMP are defined as: acquire, collaborate, integrate, and experiment (Leonard-Barton, 1995); capture, transfer, and use (DeLong, 1997); create, transfer, and use (Skyrme & Amidon, 1998; Spender, 1996);

create, transfer, assemble, integrate, and exploit (D.J. Teece, 1998); and 7-stage processes, create, acquire, identify, adapt, organize, disseminate, use (Ward & Aurum, 2004). Every single step in the KMP will not be effective if the organization do not recognize, nourish and appreciate the value of organizational knowledge. It requires supportive work environments which include top management recognition, cooperation within peers, some semblance of knowledge processes and cost effective and efficient IT as the KM enabler to support the entire KMP. Thus this study defines KMP as the process of creating, sharing and applying knowledge for organizational competitive advantage.

#### **4.3.3.1 Knowledge creation**

Knowledge is crucial in every organization but it is not very clear how this knowledge is being created and managed. One aspect on how this knowledge creation process can be discussed is through the differentiation of two different categories of knowledge, tacit and explicit (M. Polanyi, 1966). Explicit knowledge can be codified which are transmittable in understood language and tacit knowledge exists in people's mind and it is not easy to formalize and communicate (M. Polanyi, 1966). Knowledge is created through tacit knowledge conversion to explicit and back to tacit. Nonaka (1994) identified four cycles of tacit and explicit knowledge interaction which explains how new knowledge can be generated from existing knowledge. The first knowledge conversion cycle that was identified is the tacit to tacit knowledge conversion. Tacit knowledge can be learned through observation, imitation and practice. The process of knowledge creation through experience is also known as socialization. The second cycle is from explicit to explicit knowledge. Individuals own their own set of codified knowledge. This knowledge when is been

shared can be combined and categorised which would create new dimension of knowledge. This process of knowledge interaction is known as combination. The third and fourth cycle relate to both tacit to explicit knowledge conversion. Both tacit and explicit knowledge are complimentary and it can be enhanced further through mutual interaction between knowledge seeker and knowledge provider. The conversion from tacit to explicit knowledge is known as externalization whereby from explicit to tacit knowledge is called internalization. These four cycles are the daily activity of an organization. The conversion of this knowledge helps the organization to continuously create new knowledge. Based on these definitions, this study defines KC as formation of new ideas through the knowledge conversion, tacit knowledge to explicit.

Nine items are used to measure the influence of KC on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 9 (1 for strongly disagree x 9 items), it shows that the respondents do not agree that KC does influence the effectiveness of KM. But if the total point give maximum point of 63 (7 for strongly agree x 9), it shows that the respondents agree that KC does influence the effectiveness of KM. Table 4.4 describes the list of items used to measure the construct related to KC and its sources.

Table 4.4  
*Item Measures of Knowledge Creation*

Item	Description	Likert Scale						
KC1	My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, inter-department and external sources.	1	2	3	4	5	6	7
KC2	My organization encourages and has processes for the exchange of ideas and knowledge between individuals and groups.	1	2	3	4	5	6	7
KC3	My organization rewards employees for new ideas and knowledge.	1	2	3	4	5	6	7
KC4	My organization has mechanisms for creating new knowledge from existing knowledge and uses lessons learnt and best practices from processes/projects to improve successive processes/projects.	1	2	3	4	5	6	7
KC5	My organization does not document employee's ideas for further development.	1	2	3	4	5	6	7
KC6	My organization has mechanisms in place to absorb and transfer knowledge from employees, inter department and external sources into the organization.	1	2	3	4	5	6	7
KC7	My organization has mechanisms for converting knowledge into action plans and the design of new processes and services.	1	2	3	4	5	6	7
KC8	My organization has policies in place to allow employees to present new ideas and knowledge without fear and ridicule.	1	2	3	4	5	6	7
KC9	My organization showcases new ideas from employees to other staff.	1	2	3	4	5	6	7

Source : Lawson (2002); Lee *et al.* (2004)

#### 4.3.3.2 Knowledge sharing

KS is a voluntary dissemination of acquired skills and experience of an individual to the rest in the organization (Thomas H. Davenport, 1997). KS is very crucial, else an individual's knowledge will not be made known unless it been shared with others (Nonaka & Takeuchi, 1995). Furthermore, during sharing of knowledge, when existing knowledge is combined with shared knowledge will form new knowledge (T.H. Davenport & McElroy, 2000). Referring to the main objective of KM as

managing and encouraging knowledge flow among individuals (Chua, 2004), KS has been recognized as the core process of KM and lack of KS may hinder KM in an organization (Ipe, 2003). Thus, this study defines KS as when people exchange their knowledge among others in the organization.

Sixteen items are used to measure the influence of KS on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 16 (1 for strongly disagree x 16 items), it shows that the respondents do not agree that KS does influence the effectiveness of KM. But if the total point give maximum point of 112 (7 for strongly agree x 16), it shows that the respondents agree that KS does influence the effectiveness of KM. Table 4.5 describes the list of items used to measure the construct related to KS and its sources.

Table 4.5  
*Item Measures of Knowledge Sharing*

Item	Description	Likert Scale						
KS1	My organization has a culture intended to promote knowledge and information sharing.	1	2	3	4	5	6	7
KS2	Employees are encourage to share with others what they have learned from their recent assignments.	1	2	3	4	5	6	7
KS3	Senior staffs are too busy to reflect on their experiences and share them.	1	2	3	4	5	6	7
KS4	My organization has a well-organised system for sharing knowledge within departments.	1	2	3	4	5	6	7
KS5	My organization has a well-organised system for sharing knowledge within inter-departments.	1	2	3	4	5	6	7
KS6	There is an expectation that employees will have to take a regular turn to provide a reflection on learning experiences.	1	2	3	4	5	6	7
KS7	Sharing knowledge systematically is not part of my organization's culture.	1	2	3	4	5	6	7

Table 4.5  
*Item Measures of Knowledge Sharing (continued)*

Item	Description	Likert Scale						
KS8	Employees share their knowledge through formal procedures (e.g. project reports, organisational procedures and instructions and organization publications).	1	2	3	4	5	6	7
KS9	Employees consider their knowledge as an organisational asset and not their own source of strength.	1	2	3	4	5	6	7
KS10	Employees obtain a good extent of new knowledge from written sources (e.g. previously implemented projects documentation, organisational procedures, instructions and other documented sources).	1	2	3	4	5	6	7
KS11	Knowledge sharing and learning enhances employee capabilities to improve work practices and processes.	1	2	3	4	5	6	7
KS12	My colleagues that I work with regularly share information on errors or failures openly.	1	2	3	4	5	6	7
KS13	My colleagues that I work with regularly use information on failures or errors to address problems constructively.	1	2	3	4	5	6	7
KS14	Among my colleagues that I work with regularly, it is normal for individuals to keep information to themselves.	1	2	3	4	5	6	7
KS15	I often exchange information with my colleagues that I work with regularly.	1	2	3	4	5	6	7
KS16	I often exchange information with people outside of my regular work unit but within my organization.	1	2	3	4	5	6	7

Source : Detlor *et al.* (2006); Gottschalk (2002); Law and Ngai (2008)

#### 4.3.3.3 Knowledge application

Knowledge that has been created, acquired and stored will not bring any value or meaning if it does not been applied. It also neither gives an organization any advantage nor increase OP. Only knowledge that has been turned into effective action would be useful in decision making and problem solving process which could contribute to OP. Pfeffer and Sutton (2000) argued that there are gaps between what organizations know with what they do. Literatures highlighted several reasons on

why people within the organization accessed and assimilate knowledge but did not take further action and among the reasons are doubt on originality of knowledge, lack of chance in applying knowledge, or worry if it would lead to mistake and get punishment (Tomas H. Davenport & Prusak, 1998). In turn, this study defines KA as the decision of people within the organizations whether to use the knowledge retrieved.

Seven items are used to measure the influence of KA on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 7 (1 for strongly disagree x 7 items), it shows that the respondents do not agree that KA does influence the effectiveness of KM. But if the total point give maximum point of 49 (7 for strongly agree x 7), it shows that the respondents agree that KA does influence the effectiveness of KM. Table 4.6 describes the list of items used to measure the construct related to KA and it sources.

Table 4.6  
*Item Measures of Knowledge Application*

Item	Description	Likert Scale						
KA1	My organization has different methods for employees to further develop their knowledge and apply them to new situations.	1	2	3	4	5	6	7
KA2	My organization has mechanisms to protect knowledge from inappropriate or illegal use inside and outside of the organization.	1	2	3	4	5	6	7
KA3	My organization applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving.	1	2	3	4	5	6	7
KA4	My organization has methods to analyze and critical evaluate knowledge to generate new patterns and knowledge for future use.	1	2	3	4	5	6	7



Table 4.6  
*Item Measures of Knowledge Application (continued)*

Item	Description	Likert Scale						
KA5	I did modify my own work activities to incorporate what I learn from others for better work performance.	1	2	3	4	5	6	7
KA6	I have made significant improvements of my work performance	1	2	3	4	5	6	7
KA7	My method of work performance is much more effective comparatively	1	2	3	4	5	6	7

Source : Lawson (2002), Ngoc (2005)

#### 4.3.4 Technology

People spent more time in searching rather than analyzing. Most of the time, people are not able to locate the information that they require. It is scattered everywhere in the organization, could be in individual personal computers, stored in the dispersed repositories, in emails, physical hard copy which is filed in various cabinets, scanned documents with no access right, knowledge in people's mind which is not codified and unrecorded events or achievement. In order to overcome this problem, some organizations have invested in technology system such as document management system, collaboration system, discovery system and databases aiming to ease the process of knowledge storing, retrieval, distribution and sharing. According to TAM (Davis, 1989), PEOU and PU would predict systems usage. People will start using the IT if they think that it will improve their work process and performance and it is easy to use and user friendly. IT is seen as a mode of explicit knowledge transfer which will assist in knowledge internalization to improve individual understanding and experience (Nonaka & Takeuchi, 1995; O'dell & Grayson, 1998). Nevertheless, tacit knowledge is equally important in any organization, which will determine to what extent organizations will be competitive in their industry (Nonaka & Takeuchi, 1995; Sweeney, 1996; David J. Teece, Pisano, & Shuen, 1997). Trust and strong

relationship ease the conversion process of tacit to explicit knowledge (Nonaka & Takeuchi, 1995). And therefore, this is the challenge to the organization to make personal tacit knowledge to organizational explicit knowledge to ensure collective reflection. Based on these definitions, IT is then defined as the enabler in managing organizational knowledge effectively and efficiently.

Sixteen items are used to measure the influence of IT on the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 16 (1 for strongly disagree x 16 items), it shows that the respondents do not agree that IT does influence the effectiveness of KM. But if the total point give maximum point of 112 (7 for strongly agree x 16), it shows that the respondents agree that IT does influence the effectiveness of KM. Table 4.7 describes the list of items used to measure the construct related to IT and it sources.

Table 4.7  
*Item Measures of Technology*

Item	Description	Likert Scale						
IT1	My organization makes use of information technology to facilitate knowledge and information sharing.	1	2	3	4	5	6	7
IT2	The implementation of information technology systems is primarily triggered by consideration of the organization's needs for information	1	2	3	4	5	6	7
IT3	The implementation of information technology systems is primarily triggered by the need to transform the organization by automating employees' knowledge work	1	2	3	4	5	6	7
IT4	In applying information technology to support knowledge management, organization encourages knowledge sharing	1	2	3	4	5	6	7

Table 4.7  
*Item Measures of Technology (continued)*

Item	Description	Likert Scale						
IT5	In applying information technology to support knowledge management, organization encourages knowledge development	1	2	3	4	5	6	7
IT6	My organization utilizes various databases, repositories and information technology systems to store the knowledge they captured from employees.	1	2	3	4	5	6	7
IT7	My organization do not provide retrieval information technology systems for easy access to all knowledge stored	1	2	3	4	5	6	7
IT8	The information technology systems is facilitating management of knowledge within the organization	1	2	3	4	5	6	7
IT9	The information technology systems does not help to improve employee's work efficiency	1	2	3	4	5	6	7
IT10	The information technology systems help to improve employee's work effectiveness	1	2	3	4	5	6	7
IT11	Using the system enables the employee to accomplish tasks more quickly	1	2	3	4	5	6	7
IT12	Using the system increases employee's productivity.	1	2	3	4	5	6	7
IT13	Interaction with the technology information systems is clear and understandable	1	2	3	4	5	6	7
IT14	Learning to operate the technology information systems was easy	1	2	3	4	5	6	7
IT15	In my organisation, I see the advantage of using technology information systems in the fact that it prevents the loss of knowledge.	1	2	3	4	5	6	7
IT16	I search information for tasks from various knowledge sources administered by the organization	1	2	3	4	5	6	7

Source : Detlor *et al.* (2006); Gottschalk (2002); Lee *et al.* (2004)

#### 4.3.5 Knowledge Management Effectiveness

Knowledge is defined as justified belief which increases the capacity for effective action (Huber, 1991; Nonaka, 1994). There are several views on the perspectives of understanding knowledge which are (1) capability; (2) a state of mind; (3) a process; (4) an object; and (5) accessibility to information. Due to this, it has created different perceptions of KM (Carlsson, EL Sawy, Eriksson, & Raven, 1996). Davenport and

Prusak (1998) defined KM as an attempt of making use of knowledge in doing something beneficial in order to meet organizational objectives through people structuring, IT and knowledge content. KM perceptions can be summarized as in Table 4.8.

Table 4.8  
*Various Perspectives of Knowledge and Knowledge Management Perceptions*

Various views on knowledge perspectives	Knowledge Management Perceptions
<p>Carlsson <i>et al.</i>, (1996), McQueen (1998) and Zack (1998) viewed knowledge as an object which can be stored and manipulated.</p> <p>An extension of this view, focuses on condition of access to information (McQueen, 1998). Based on this view, organizations should organize their organizational knowledge to ease the process of retrieval.</p>	<p>In this scenario, it equated with information access, and therefore KM should be around developing and managing knowledge stocks.</p>
<p>Alternatively, knowledge can also be looked at as a process of simultaneously knowing and acting (Carlsson <i>et al.</i>, 1996; McQueen, 1998; M. Zack, 1998) where it focuses on individual expertise (M. Zack, 1998).</p>	<p>In this case, KM should be focusing on knowledge flow which includes knowledge creation process, knowledge sharing and knowledge distribution.</p>
<p>Knowledge also viewed as a capability with the potential for influencing future action (Carlsson <i>et al.</i>, 1996). It suggested that knowledge is not so much on capability for action but capacity to use information, the learning process and experiences and the ability to interpret information and to decide on which information more useful in decision making.</p>	<p>Under this view, it suggested KM strategies to be around building core competencies, understanding the strategic advantage of know-how, and creating intellectual capital.</p>

Swan *et al.* (1999) defined KM as a process of creation, capturing, sharing and use of knowledge, regardless wherever the knowledge is in order to enhance organizational learning and performance. Based on the various perceptions on KM, it suggests a different strategy to manage organizational knowledge and each organizations may

have different ways of handling their KM processes, the background of their knowledge workers as well as they may have invested in different technology system to assist in supporting their KM effort. In this research, KME is defined as organization capabilities in managing their organizational knowledge right from acquiring, sharing and applying knowledge throughout the organization which in turn linked to various measures of OP.

Ten items are used to measure the effectiveness of KM. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 10 (1 for strongly disagree x 10 items), it shows that the respondents do not agree that KM is been implemented effectively in the organization. But if the total point give maximum point of 70 (7 for strongly agree x 10), it shows that the respondents agree that KM is been implemented effectively in the organization. Table 4.9 describes the list of items used to measure the construct related to KE and it sources.

Table 4.9  
*Item Measures of Knowledge Management Effectiveness*

Item	Description	Likert Scale						
KE1	My organization becoming more creative in creating more value to customers	1	2	3	4	5	6	7
KE2	My organization becoming more efficient in handling customers	1	2	3	4	5	6	7
KE3	My organization becoming more innovative in improving work procedures	1	2	3	4	5	6	7
KE4	My organization has improved its decision making process, responsiveness and efficiency	1	2	3	4	5	6	7
KE5	My organization has not seen a significant growth in the knowledge capacity of its employees.	1	2	3	4	5	6	7
KE6	The knowledge storage capacity is significantly increased	1	2	3	4	5	6	7

Table 4.9

*Item Measures of Knowledge Management Effectiveness (continued)*

Item	Description	Likert Scale						
KE7	The knowledge transmission capacity is significantly increased	1	2	3	4	5	6	7
KE8	The speed of transferring and acquiring information is significantly increased	1	2	3	4	5	6	7
KE9	The accessibility to the wide range and depth of information is significantly increased	1	2	3	4	5	6	7
KE10	The process of exchanging knowledge is more convenient	1	2	3	4	5	6	7

Source : North *et al.* (2004), Ngoc (2005)

#### 4.3.6 Organizational Performance

It is widely accepted that knowledge is one of the main resources and it is the key organizational asset. If KM is managed systematically and efficiently, it will lead to positive OP. However, according to Chakravarthy, *et al.* (2003) and Foss and Mahnke (2003) the impact of KM has not been successfully realized, whereas, Law and Ngai (2008) uncovered that KS and learning behaviours positively improved business processes and offerings which lead to the increment in OP.

Tseng (2010) investigated the correlation between OC and knowledge conversion on OP. She grounded her study based on Germain *et al.* (2001) two performance controls, namely, (1) internal performance which relates to cost, product quality and level of profit, and (2) benchmarked performance between organizations and its industry leaders from the aspects of customer satisfaction, quality, costs and operations. Whereas, OP was measured from the perspective of customer satisfaction, process improvement, financial performance and people development. The results in their study indicated that knowledge conversion significantly affect

corporate performance. Thus, this study defines OP as an improvement from the perspective of internal processes.

Eight items are used to measure the impact of effective KM on OP. The score for the construct is ascertained by totalling the responses to various items measuring the construct in study. If the total point gives lowest point of 8 (1 for strongly disagree x 8 items), it shows that the respondents do not agree that effective KM does gives an impact on OP. But if the total point give maximum point of 56 (7 for strongly agree x 8), it shows that the respondents agree that effective KM does gives an impact on OP. Table 4.10 describes the list of items used to measure the construct related to OP and its sources.

Table 4.10  
*Item Measures of Organizational Performance*

Item	Description	Likert Scale						
OP1	My organization is constantly using new knowledge to improve their services to increase its competitive advantage.	1	2	3	4	5	6	7
OP2	My organization has achieved high customer satisfaction on services rendered	1	2	3	4	5	6	7
OP3	With organized information, my organization has increased process transparency	1	2	3	4	5	6	7
OP4	With organized information, it reduces errors in work processes in my organization	1	2	3	4	5	6	7
OP5	With organized information, it reduces work redundancies	1	2	3	4	5	6	7
OP6	With organized information, it reduces administration cost	1	2	3	4	5	6	7
OP7	My organization can attribute high return on investment to its knowledge management initiatives.	1	2	3	4	5	6	7
OP8	My organization has seen significant growth and usage in knowledge resources (repositories, patents, publications).	1	2	3	4	5	6	7

Source : North *et al.* (2004); Lawson (2002)

## 4.5 Questionnaire Design

As stated above, this study adopted survey method. The survey was conducted using standardized structured close ended and self-monitored questionnaire. The copy of the questionnaire is illustrated in Appendix 4.3. A summary of the questionnaires of this study is tabulated in Table 4.11.

Table 4.11  
*Data Collection Method*

No	Subject Matter	Instrument	Approach
1.	Knowledge Workers	Questionnaire	Structured and Standardized
2.	Organizational Culture	Questionnaire	Structured and Standardized
3.	Knowledge Management Practices	Questionnaire	Structured and Standardized
4.	Technology	Questionnaire	Structured and Standardized
5.	Knowledge Management Effectiveness	Questionnaire	Structured and Standardized
6.	Organizational performance	Questionnaire	Structured and Standardized

The questionnaire comprises of two sections. Section A seeks respondents to provide information on their background as shown in Table 4.12.

Table 4.12  
*Information on Respondent's Background*

Item	Measurement				
Age (next birthday)	<input type="radio"/> < 21	<input type="radio"/> 21 – 30	<input type="radio"/> 31 – 40	<input type="radio"/> 41 – 50	<input type="radio"/> > 50
Gender	<input type="radio"/> Male		<input type="radio"/> Female		
Race	<input type="radio"/> Malay	<input type="radio"/> Chinese	<input type="radio"/> Indian	<input type="radio"/> Others	
Highest education level	<input type="radio"/> SPM/STPM or equivalent	<input type="radio"/> Diploma/Degree or equivalent		<input type="radio"/> Masters/Doctorate or equivalent	
Position	<input type="radio"/> Executive	<input type="radio"/> Mid Management	<input type="radio"/> Top Management	<input type="radio"/> Others ( <i>please specify</i> )	



Table 4.12  
*Information on Respondent's Background (continued)*

Job Orientation (please select the one which best describes your role in your workplace)	Please tick <b>one</b> only:				
	<input type="radio"/> Internal (e.g. Accounts, Audit, Corporate, IT, Legal, Human Resource, etc.) <input type="radio"/> External (e.g. Customer service/relations, Marketing, Sales, etc.) <input type="radio"/> Product/service (e.g. Production, Quality assurance, R&D, etc.) <input type="radio"/> Others (please specify) : _____				
Work experience (years)	<input type="radio"/> < 1	<input type="radio"/> 1 – 5	<input type="radio"/> 6 – 10	<input type="radio"/> 10 – 20	<input type="radio"/> > 20

Section B seeks respondents to answer questions on their perception on the influence of organizational factors on the effectiveness of KM towards OP. Please refer to Table 4.13 for details.

Table 4.13  
*Perception On The Influence of Organizational Factors On KME Towards OP*

No.	Variable		Indicators	No of items
	Name	Type		
1	Knowledge Workers	Independent	Willingness to share knowledge (*1) Willingness to use knowledge (*1)	12
2	Organizational Culture	Independent	Individualism (*2) Collectivism (*2)	15
3	Knowledge Management Practices	Independent	Knowledge Creation (*3) Knowledge Sharing (*4) Knowledge Application (*3)	9 16 7
4	Technology	Independent	Result Demonstrability (*5) Job Relevance (*5) Perceived Enjoyment (*6)	16
5	Knowledge Management Effectiveness	Mediator	Knowledge Process Capability (*7)	10
6	Organisational performance	Dependent	Internal Processes Perspective (*8)	8

These constructs were adopted from the studies by (\*1) Holste (2003); (\*2) Hofstede (1997), House *et al.* (2004); (\*3) Lawson (2002); (\*4) Law and Ngai (2008); (\*5) Venkatesh and Davis (2000); (\*6) Venkatesh (2000) (\*7) Gold *et al.* (2001) and; (\*8) Rasula *et al.* (2012).

To further explain the indicators, it has been tagged as follows:

Table 4.14  
*Indicators Categorization*

KW		OC		KC	KS	KA	IT		KE	OP
Code	Group	Code	Group	Code	Code	Code	Code	Group	Code	Code
KW1	WSK	OC1	IC	KC1	KS1	KA1	IT1	JR	KE1	OP1
KW2	WSK	OC2	IC	KC2	KS2	KA2	IT2	JR	KE2	OP2
KW3	WSK	OC3	IC	KC3	KS3	KA3	IT3	JR	KE3	OP3
KW4	WSU	OC4	IC	KC4	KS4	KA4	IT4	RD	KE4	OP4
KW5	WSU	OC5	IC	KC5	KS5	KA5	IT5	RD	KE5	OP5
KW6	WSU	OC6	IC	KC6	KS6	KA6	IT6	PE	KE6	OP6
KW7	WSU	OC7	IC	KC7	KS7	KA7	IT7	PE	KE7	OP7
KW8	WSK	OC8	IC	KC8	KS8		IT8	RD	KE8	OP8
KW9	WSK	OC9	CC	KC9	KS9		IT9	JR	KE9	
KW10	WSK	OC10	CC		KS10		IT10	JR	KE10	
KW11	WSK	OC11	CC		KS11		IT11	RD		
KW12	WSU	OC12	CC		KS12		IT12	RD		
		OC13	CC		KS13		IT13	PE		
		OC14	CC		KS14		IT14	PE		
		OC15	CC		KS15		IT15	JR		
					KS16		IT16	PE		

Notes:

- WSK - Willingness to share knowledge
- WSU - Willingness to use knowledge
- IC - Individualism culture
- CC - Collectivism culture
- KC - Knowledge creation
- KS - Knowledge sharing
- KA - Knowledge application
- JR - Job relevance
- RD - Result demonstrability
- PE - Perceived enjoyment

Variables used in the survey have been summarized in Table 4.15. The variables consisted of four independent variables, one mediating variable and one dependent variable.

Table 4.15

*Summary of independent variables, mediating variable and dependent variable*

Independent Variables (n = 4)	Mediating Variables (n = 1)	Dependent Variables (n = 1)
1. Knowledge Workers 2. Organizational Culture 3. Knowledge Management Practices 4. Technology	Knowledge Management Effectiveness	Organizational Performance

## 4.6 Pre-Test and Pilot Study

The pre-test and pilot study is necessary which involved primary data. The term pre-test was used as suggested by Varkevisser, Pathmanathan and Brownlee (2003) which involves small scale trial to validate the survey instrument.

### 4.6.1 Pre-Test

Two stages of pre-test were conducted. The first stage involved a discussion with an experienced academician and two KM expert to fulfill the face validity test. Feedbacks from the experts help the researcher to identify the gaps in the research instrument. The research questionnaire was tuned and edited accordingly. The second stage involved distribution of edited questionnaire to selected respondents using purposive sampling. Ten respondents were given the questionnaire to interpret the items in the questionnaire and to provide their feedbacks on their understanding of the questionnaire. The number of respondents met the minimum respondents as highlighted by Johanson and Brooks (2010) who argued that 10 – 30 is ideal.

#### **4.6.2 Pilot Study**

Literatures highlighted the importance of pilot studies. Various reasons have been highlighted such as confirming design of a study or used as instrument's testing (Koch & Rowell, 1997; Roberts & Taylor, 1997). This is to confirm that the researcher is clear with the steps involve in a research and persistent in collecting data (Baird, 2000). Pilot study actually is a smaller scale of experiment which was designed to collect information and testing the logistics prior to a larger study to improve information quality and efficiency. It helps to reveal deficiencies in the research instrument which can be addressed before the actual study commenced. Pilot study can be conducted by asking potential respondents or those who have a similar demographic profile to provide interpretation and understanding of the survey questions (Schwab, 2005). After that, the same group may respond to the questions to see if the scores behave as expected.

This study has conducted a pilot study using purposive sampling method (Martin Jr. & Bridgmon, 2009) to strengthen the survey instrument and to determine the validity and reliability of the constructs. The participants were selected based on a very clear informant qualification (Allen, 1971) and these are; (1) education background with minimum diploma education qualification; and (2) public sector's KW. Purposive sampling is more suitable for the pilot study which allow easy access to the respondents from the same profile background of the study (Allen, 1971; Lewis & Sheppard 2006) for any further explanation and follow-up to be done which will save much time and effort (Allen, 1971; Bernerd *et al.*, 1986).

Issac and Michael (1995) cited in Johanson & Brooks (2010) stated that sample size between 10 to 30 is ideal. Johanson & Brooks (2010) argued that the precision increases as the sample size grows and grounded on this premise they recommended a minimum of 30 participants would be sufficient for the pilot study. Based on these arguments, this study has conducted the pilot study with 30 respondents to test the level of consistency among the items of each variable developed in this study. Hence, the Statistical Package for Social Science (SPSS), version 14, was used to test the reliability of construct. Cronbach's alpha is commonly used to test the reliability coefficient (Coakes, Steed, & Ong, 2010). Based on literatures, an alpha of 0.70 was recommended by some authors as the minimum acceptable standard to check internal consistency (MacKenzie, Podsakoff, & Podsakoff, 2011; Yi, 2009). The Cronbach's Alpha values for the pilot study are illustrated in Table 4.16. The Cronbach's alpha value for all indicators were above .70 demonstrating acceptable internal consistency.

Table 4.16  
*Pilot study - Cronbach's Alpha Value*

Variable Name	Cronbach's Alpha	Items
Knowledge Worker	.81	KW1, KW2, KW3, KW4, KW5, KW6, KW7, KW8, KW9, KW10, KW11, KW12
Organizational Culture	.79	OC1, OC2, OC3, OC4, OC5, OC6, OC7, OC8, OC9, OC10, OC11, OC12, OC13, OC14, OC15

Table 4.16  
*Pilot study - Cronbach's Alpha Value (continued)*

Knowledge Creation	.92	KC1, KC2, KC3, KC4, KC5, KC6, KC7, KC8, KC9
Knowledge Sharing	.95	KS1, KS2, KS3, KS4, KS5, KS6, KS7, KS8, KS9, KS10, KS11, KS12, KS13, KS14, KS15, KS16
Knowledge Application	.87	KA1, KA2, KA3, KA4, KA5, KA6, KA7
Technology	.95	IT1, IT2, IT3, IT4, IT5, IT6, IT7, IT8, IT9, IT10, IT11, IT12, IT13, IT14, IT15, IT16
Knowledge Management Effectiveness	.94	KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8, KE9, KE10
Organizational Performance	.89	OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8

## 4.7 Data Collection

### 4.7.1 Sampling

When set of units are being selected from a larger group of unit, it is known as sample (Baker, 1988) and research generalizations will be affected by quality of sample data (Patten, 2004). Nesbary (2000) postulates that the bigger the sample size, the greater the probability will reflect the general population. Quantitative data is been collected to classify the behaviour and described the attributes and activities of population (Parahoo, 2006), and it should be done systematically and objectively (Lacey, 2010). Robson (2007) highlighted the importance of using simple manner to collect data in order to address the research question and should not collect data more than what is necessary. Researchers have indicated the importance of having appropriate samples and therefore this study has taken all steps to examine the relevant population, sample frame as well as sample size according to established academic practices.

#### **4.7.2 Target population definition**

Polit and Hungler (1999) defined population as an aggregate of all the subjects or members that conform to the study requirement. This study intends to observe the effects of organizational factors on the effectiveness of KM towards OP in the public sectors in Malaysia. Malaysian Government has formulated a strategy to inculcate the KM culture among KW as well as to strengthen KM initiatives where it had introduced KM Foundation programs and Knowledge Practitioner Development program (MAMPU, 2011). Besides that, focus has been given to KM projects to strengthen the KM initiatives and in the long run, Malaysian Government is targeting to develop the KM Knowledge Hub to link-up all agencies within Malaysian Public Sectors. In this case, Malaysian Public Sector is considered as the population of this research. The respondents of this study are the KW of the organizations.

#### **4.7.3 Sampling method definition**

Probability and non-probability sampling methods are two broad sampling techniques (Zikmund, 2003). In probability sampling, the sampling units from a population have comparable chance to be selected as sample objects, whereby the sampling units in non-probability sampling have no pre-set chance to be selected as sample objects. In this study, probability sampling was chosen as: (1) it allows researcher to conduct rigorous analysis to determine possible bias and likely error (Henry, 1990); and (2) it enables certain level of confidence in the data collection (MacNealy, 1999). There are four types of probability sampling: systematic random sampling, simple random sampling, cluster sampling and stratified random sampling (Henry, 1990) which will be discussed in section 4.7.6.

#### **4.7.4 Identifying Sampling frame**

Hussey and Hussey (1997) and Robson (1993) argued that there is no idle sample size in research data collection. It depends on level of confidence that is expected in the answer, discipline and expected response rate. This study focuses on public sector in Malaysia and the respondents are public sector KW. Geographically, Malaysia is split into two, West and East Malaysia. West Malaysia comprises of Pahang, Terengganu, Kelantan, Negeri Sembilan, Melaka, Johor, Perlis Kedah, Pulau Pinang, Perak, Selangor, Wilayah Persekutuan Putrajaya and Wilayah Persekutuan Kuala Lumpur. On the other hand, East Malaysia comprises of Sabah, Sarawak and Wilayah Persekutuan Labuan. Malaysian government offices are located throughout West and East Malaysia. Due to practicality and time frame, this study focuses on Kuala Lumpur/ Klang Valley/ Putrajaya (KLVP) area only. This is because KLVP is the most industrialized and the fastest growing region economically in Malaysia and is the seat of Malaysian capital where most of the headquarters of the public sector are located.

The next factor that was taken into consideration when developing the sampling frame for this study was the type of public sector. The sector segregation was based on KM Blueprint (2011). There are four main sectors which were described in the blueprint: (1) economic, (2) social, (3) security and; (4) general administration, as shown in Table 4.17. Various ministries and agencies have been listed according to these sectors. There are four hundred ninety seven (497) ministries and agencies throughout Malaysia (source : ministries websites). This list was compiled from various ministries and agencies web-sites. Various sectors background could assist the researcher to compare KME among organizations in different sectors. For



practical reason, 30 public organizations distributed across four sectors were selected to provide information on diversity and variances of public sector in large (Martin & Bridgmon, 2009). In each public organization, 20 KW were participated to ensure there is sufficient variability in observation from different sectors.

Table 4.17  
*Knowledge Hub*

Hub	Sector	Agencies
Knowledge Hub	Economic	Agriculture, Transport, R&D, Commerce & Industry, Energy & Public Utility, Communication
	Social	Education & Training, Health, Information & Broadcasting, Housing & Local Authorities, Youth & Sports, Culture, Rural Development, Welfare & Development
	Security	Internal Security
	General Administration	Financial Management, Information Management, HR Management, General Service Management

Source : KM Blueprint (MAMPU, 2011)

#### **4.7.5 Determining Sample size**

To determine sample size in a study is a common task to a researcher. Sample size must be adequate enough to meet the goal of the study. In term of economic reason, an undersized study will not be maximizing the resources and unable to produce useful findings, whereas, an oversized study will be utilizing resources more than what is required. As described earlier, this study employed quantitative survey method. The advantage of quantitative survey research is the use of small samples in making inferences about large population, which would be excessively incurs high

cost to study (Holton & Burnett, 1997). But most of the time, the question that will be in the researcher's mind is 'what is the sample size that would be sufficient to make valid inferences about the target population?' Apparently, there is no universal guideline on 'how big' the sample size should be.

Nevertheless, when commenting on business education researches, there are two most common pitfalls in defining sample size, namely, (1) ignoring sampling error when deciding sample size; (2) ignoring both response and nonresponse bias (Wunsch, 1986). However, the appropriate sample size would depend on type of statistical methods that are going to be used (Hair *et al.*, 2006). They recommended that if the researcher considering SEM, 50 would be sufficient as minimum sample size. On the other hand, McQuitty (2004) argued that sample size should not be less than 100 and estimation precision would be best with larger sample size. This is supported by Tomarken and Waller (2005) who argued that minimum of 200 sample sizes would be sufficient and able to fit in most contexts. Based on these arguments, this study decided on 400 responses as the sample size which would meet the minimum requirement of 200 responses (Tomarken & Waller, 2005) as well as estimation precision would be better with a factor of two (McQuitty, 2004).

Other sampling factor that equally important in this study is number of respondents that should be considered to meet the sample size identified above. In order to have a broad idea of sufficient respondents, past studies with some level of research framework similarity has been reviewed as indicated in Table 4.18.

Table 4.18  
*Past Studies Showing Questionnaire Response Rate*

Past Studies Conducted in Malaysia				
Sampling Method	No. of questionnaire distributed	Questionnaire returned		References
		Number	Rate	
Simple Random Sampling	500	435	87%	Raja Suzana (2004)
Simple Random Sampling	675	171	24.4%	Cheng Ling and Aizzat (2010)
Purposive Sampling	204	154	75.5%	Syed-Ikhsan, S.O.S. and Rowland, F. (2004)
Convenience Sampling	365	203	56%	Chong, Salleh, Ahmad & Sharifuddin (2011)

The data gathered in Table 4.18 shows that the response rate ranges from 24.4% to 87%. Dillman (2000) postulates that 60% response rate would be applicable in a survey. Based on sample size of 400, and 65% response rate, 600 respondents were targeted for this study. The minimum academic qualification is diploma (KEMP, 2002, pg. 43).

#### **4.7.6 Sampling Method Adopted In This Study**

This study has chosen probability sampling because it is universally accepted and the result produced is high in generalizability. Specifically, stratified random sampling was adopted due to as follows: (1) it allows more efficient sample to be selected; and (2) it ensures that the population is reflected accurately by the sample (Zikmund, 2003). Combination of simple random and systematic sampling is known as stratified sampling which is expected to generate more accurate and representative samples (DeVaus, 2002). Population in stratified sampling is divided into sub-group which is

known as strata. In public sector aforementioned the four sectors are categorized as different strata, which will represent the whole population. The number of agencies chosen from list of sectors was commensurate to the list of agencies for particular sector.

From each stratum, the respondents were drawn using simple random sampling (SRS) method. SRS without replacement was chosen over SRS with replacement. SRS with replacement method allows the sample to be returned to the population pool with the chances to be selected again whereas in the case of SRS without replacement the sample will not be returned to the pool for repeated selection (Thompson, 2002). If the organization is returned to the population pool, it has a chance to be selected again and the information that is going to be collected from the same organization may not contribute much different from what has been collected earlier and therefore this study has opted for SRS without replacement.

Proportional distribution of sampling units (KW) and sampling frame (organizations) was done on 4 stratum: (1) economic; (2) social; (3) general administration; and (4) security. This study had established 600 respondents from 30 organizations with 20 KW from each organization and with the estimation of 65% response rate. Based on this computation, proportion of the organization from each stratum was determined as shown in Table 4.19. Economic sector represent 21% of total population, 15%, 58% and 6% for general administration, social and security sectors respectively. Based on these percentages, number of agencies under each sectors is computed, which resulted in six from economic sector, five, seventeen and two from general administration, social and security sectors respectively.

Table 4.19  
*Sampling Units*

Sector (Stratum)	Total number of agencies under particular stratum	%	Number of agencies proportioned for each stratum
Economic	103	21	6
General Administration	76	15	5
Social	280	58	17
Security	28	6	2
	<b>497</b>	<b>100</b>	<b>30</b>

In the next process, list of agencies from each stratum was generated. The list was taken from the website of each ministry. Each agency was given a sequential number. The selection of organization was done using Research Randomizer, a number generating software (Urbaniak & Plous, 2011), which generates set of random numbers. The generated number was then matched with the sequential number that was assigned to each agency and this process was repeated until the required number of organizations for this study was reached. The selected organizations were then contacted and explained about the background of the study. The liaison officer from these organizations differs from one organization to another. In some organization, the contact person is the senior officers from the human resource department and in other organization; the contact person comes from either the training or corporate development department. Having established the right contact person, made the communication process became much easier. A letter was also sent to the selected organizations to get their consent to participate in this study (Appendix 4.1 and 4.2). Once the approval was obtained, the questionnaires were distributed to the participated organizations. Each organization received 20 questionnaires through the contact person which later were distributed to the KW within the organization that at least have diploma. Two weeks were allocated for the organizations to collect the completed questionnaire. After one week of distribution

of questionnaires, follow-up process was undertaken by calling the contact person to remind him/her about the survey questionnaire collection. Token of appreciation in the form of voucher from an established fast-food chain was given to the respondents for their participation in the study.

#### **4.8 Data Analysis and Statistical Reporting**

SPSS version 14 was used to analyze the data. SPSS commonly used for statistical analysis in social science. Prior data analysis, collected data were keyed-in into a spreadsheet with relevant column to ease the data entry task. The questionnaires were firstly checked and returned statistic was recorded. Once the data entry has completed, the data set was uploaded into SPSS for in-depth analysis. Responses statistics, descriptive statistics, missing data, outliers, normality, reliability and factor analysis were analysed using SPSS.

Once the above data cleaning process has completed, Structural Equation Modelling (SEM) was performed. In this case, AMOS software version 16 was used in testing the theoretical model. In SEM several multivariate techniques can be performed like factor analysis and multiple regression analysis (Hair, Black, Babin, Anderson, & Tatham, 2006) and therefore it allows researchers to analyse scale measurement and estimate the independent and dependent variables relationship (Sanchez *et al.*, 2005). SEM is an extensible model which support the complexity of multivariate data modelling (Sanchez *et al.*, 2005). They stated that SEM is based on three aspects: (1) its ability in explaining the entire set of relationships; (2) its ability in generating multiple and inter-related dependence relationships estimates; and (3) its ability in presenting unobserved relationships and generating measurement error during

estimation process. Due to this, SEM has becoming popular because of its powerful multivariate technique in the social sciences study and therefore this study also has employed SEM as the tool for data analysis in addressing research questions and hypotheses. Please refer to subsection 4.9.4 for details of SEM.

#### **4.9 Data Analysis Techniques**

This study employed descriptive and inferential data analysis techniques. Descriptive analysis is used to describe and discuss a data set more meaningful rather than using raw data. It helps to summarize and assert facts, which include numbers, charts, graphs and tables. In this study, descriptive statistics is used to describe the sample that is being studied which is the selected public sectors in Malaysia. The following characteristics were examined in this study; (1) central tendency such as mean, median and mode; (2) dispersion of data; and (3) skewness of data - how concentrated data are at the low or high end of the scale. In order to determine whether the sample has a normal distribution, histogram with distribution curve is generated. The findings are then used to analyze the distribution of factors involve in this study namely KW, OC, KMP and IT.

For inferential analysis, statistical research was conducted in order to understand about phenomena in a population. This study investigates the effects of organizational factors on the effectiveness of KM towards OP in the public sector in Malaysia. It is not feasible to distribute the questionnaire to the entire Malaysian public sectors; thus analysis was conducted on a sample and inference about the population was made based on the sample.

#### **4.9.1 Data Quality Test**

In making sure that the study has a set of quality data, paying attention to the details of data set is necessary. Thus the following four basic areas were investigated: (1) missing data; (2) outliers; (3) normality tests and (4) common method variance.

##### **Missing Data**

In any research, missing data is one of the issues that require attention regardless how well the questionnaire has been designed. One of the sources of missing data was, questions were not fully answered. In quantitative study, missing data can be categorized as: Missing Completely At Random (MCAR), Missing At Random (MAR) and Not Missing At Random (NMAR). MCAR refers to data where the missingness does not depend on any variable or on the variable of interest, which being observed in the dataset. In MAR, missing data is anything but missing at random which means it is conditional on certain 'X-variable' which is been observed in the data set and yet not on the 'Y-variable' of interest (Schafer, 1997). In NMAR, missingness mechanism would depend on the actual value of the missing data. This study has employed Little's MCAR test (Hair, Black, Babin, & Anderson, 2010; Little, 1988) to identify type of missing data.

The next step is to deal with missing data. There are few ways to treat missing data. The most common way used in research was deletion method and among them listwise and pairwise. Listwise deletion (Pigott, 2001; Graham, 2009) excludes cases with missing value from an analysis which the remaining cases potentially will be biased subsample which will lead to biased result (Bennett, 2001). Whereas in the case of pairwise deletion, variable in the missing data are not used to calculate



variables correlation coefficient but are paired in other correlation and as a result it will be difficult to compare the correlation. These two methods have been commented by Wilkinson and American Psychological Association Task Force on Statistical Inferences (cited in Baraldi & Enders, 2010, p. 6) as “among the worst methods available for practical applications”. Imputation method is another way to treat missing data by substituting a plausible value for the missing data. Among the imputation methods, expectation maximization (EM) is more superior in deletion method as compared to nonstochastic imputation and stochastic regression imputation methods (Roth, 1994). In SPSS statistics software, there are few ways to impute missing values and based on the above argument, this study has employed EM method.

### **Outliers**

In any study, outliers detection is one of the steps that researchers would usually conducted. Hawkins (1980) defined an outlier as an observation which clearly deviates from other observations which will trigger uncertainty. Johnson (1992) defined an outlier as data set observation which appears to be inconsistent from the rest of data. More often researchers do not have specific ways in identifying outliers (Aguinis, Gottfredson, & Joo, 2013) and they have determined 39 methods to identify outliers and 20 different methods to treat them. Whereas, Hair *et al.* (2010) recommended in detecting outliers, a study should take into account number of variables that is used. The detection method could be either univariate, bivariate, or multivariate method. Based on the above recommendation, multivariate detection method is more suitable for outliers detection and therefore this method has been employed in this study.

## Normality

Normality is an important test in most statistical methods. But, in many statistical analyses, random variable is commonly assumed that it is normally distributed without empirical evidence or test. Normality assumption is very crucial during reference intervals construction for variables (Royston, 1991). When this assumption is violated, inference and interpretation may not be reliable. In testing the normality, researchers can conduct graphical (visual inspection) or conduct numerical statistical test as shown in Table 4.20. Graphical methods are easy to interpret where distribution of variables can be visualized whereas in numerical methods normality is examined objectively. This study has conducted both methods which will be explained in Chapter 5.

Table 4.20  
*Graphical and Numerical Methods of Normality Examination*

	Graphical Methods	Numerical Methods
Descriptive	Box Plot, histogram, Stem-and-leaf plot, dot plot	Skewness Kurtosis
Theory Driven	P-P Plot Q-Q Plot	Shapiro Wilk test Kolmogorov-Smirnov test Anderson-Darling test Skewness-Kurtosis test

## Common Method Variance

Chang, Witteloostuijn, and Eden (2010) highlighted area of concern of common method variance (CMV) on self-reporting questionnaires which may affect the research findings (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Error in variance could have serious confounding influence on empirical results which will lead to misleading conclusions (Campbell & Fiske, 1959). Different authors have

different conclusions to what extent that CMV is problematic depending on the methodology used in their studies (Crampton & Wagner, 1994; Doty & Glick, 1998). The question normally asked was, what are the common causes of CMV in research? Podsakoff *et al.* (2003) postulated commonly CMV potential causes in research as: (i) common rater effects when responses for both dependent and explanatory variables are derived from the same respondent; (ii) item characteristic effects refers to respondents responses are influenced by certain characteristic of particular item possesses; (iii) item context effects occur when respondent response is immensely influenced by other items in the survey instrument; and (iv) measurement context effects referring to inaccurate covariation due any or combination of the following: dependent and independent variables are observed at the same location, or same time, or using the same medium. Chang *et al.* (2010) suggested few methods to control CMV which include procedural techniques as well as statistical techniques. This study has adopted both mix procedural and statistical techniques to control CMV as follows:

- a) Procedural technique: the sequence of the items in the survey questionnaires has been mixed, unclear wording has been re-worded and the study conforms to anonymity conditions.
- b) Statistical technique: Harman's single factor test has been adopted in this study. Podsakoff *et al.* (2003, p. 889) described Harman's single test as a "diagnostic technique for assessing the extent to which common method variance may be a problem".

#### **4.9.2 Instrument Reliability Test**

Reliability relates to consistency of data that is collected in quantitative study (Mertler, 2006). Reliability is the ability of a tool to measure a concept in a consistent manner. Hair *et al.* (2010) argued that there is no one test which capture all needed attributes but Cronbach's alpha is commonly used tools to test the reliability coefficients (Coakes *et al.*, 2010). A value between 0 and 1 represent internal scale consistency. An alpha value of 0.70 was recommended as the minimum value for internal consistency (Nunnally, 1978). However Kline (1999) argued that value below 0.7 can still be accepted when come to psychological constructs due to diversity of the constructs being measured (cited from Field, 2005, p.668). Increasing alpha value partially dependent on number of items in the scale in which Cronbach's alpha with high value shows reliable internal consistency for the measured items. The Cronbach's alpha for all scales involve in this study will be tested, namely, KW, OC, KMP, IT, KME and OP.

Hair *et al.* (2010) said that there is no single test which captures all desired attributes and to further support this argument, Cortina (1993) did deliberate on relying on Cronbach's alpha as "the" only test. Thus this study adopts Item-Total Statistic and Corrected Item-Total to test the internal consistency. If the alpha-if-item-deleted statistics show that if any one of the item is removed the alpha value reduces, it is advisable to retain all items. But if the alpha-if-item-deleted statistics show increase in alpha by removing an item then it is worth to consider removing the item in order to improve scale internal consistency. Corrected Item-Total assesses the correlations between scores of each item and total scale scores (Hair *et al.*, 2010). Correlations

between items are considered reasonably strong if the scale is internally consistent. This study utilizes a lower limit threshold of .30 as suggested by (de Vaus, 2002).

#### **4.9.3 Factor Analysis**

Factor analysis deals with correlation matrix, where the inter-correlations between the studied variables are investigated. The step involves compressing original variables into smaller factors without compromising the information. Floyd and Widaman (1995) and Treiblmaier and Filzmoser (2010) highlighted that factor analysis is commonly used for data analysis and it is very important in human behavioural research. Furthermore, Agresti and Finlay (1997) highlighted that the use of factor analysis has always been found to be robustly free of type one error. In multivariate statistical procedure, factor analysis is used for many reasons and among them are it reduces number of variables and examines the relationship between measured variables and latent constructs which lead to theory formation and refinement (Nunnally, 1978).

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) are the two main approaches in factor analysis. This study has employed the theoretical concepts from various past studies to rationalize the theoretical framework based on the existence concepts. Therefore, EFA is used in this study to analyse the theoretical framework according to the new established factors. In research, generally, EFA was used for two reasons: (1) data reduction; and (2) data summarization (Hair *et al.*, 2010) where common factor analysis describing data summarization and principal component analysis (PCA) for data reduction (Floyd & Widaman, 1995; Hair *et al.*, 2010). In data summarization data set is suppressed into smaller number of factors as

compare to the initial number of items whereas in data reduction is to identify multiple items that are measuring same latent construct in order to achieve parsimony.

EFA, as the title suggests, is an exploratory approach where researcher is able to explore the factors relationship in generating a model from set of latent constructs which usually represented by number of items. Whereas in CFA, allows the researcher to test a proposed model based on priori theory and to find best fit indices.

In factor analysis, sample size is crucial but nevertheless, there is no universal guideline on the required sample size but there are several guideline which were cited in the literature (Tabachnick & Fidell, 2007). This lack of standardized guideline is noted by Hogarty *et al.* (2005) who postulate that different views on sample size does not giving much help to researchers. Among the cited guidelines are Tabachnick's rule of thumb (Tabachnick & Fidell, 2007) which suggested to have at least 300 cases in order to conduct the factor analysis. Comrey (1973) who indicated the following: 100 falls as poor, 200 is considered as fair, 300 is categorised as good, 500 falls under very good category, and 1000 or more as excellent. In the case of this study with the sample size of 345, the above guidelines are met successfully.

Prior to the execution of factor analysis, few tests should be conducted to determine suitability of the survey data which are Kaiser-Meyer-Olkin (KMO) in measuring the sampling adequacy (Kaiser & Guggenberger, 2007) with .60 is considered suitable

for factor analysis (Hair et. al, 2010) and Bartlett's Test of Sphericity with  $p < .05$  (Hair et. al, 2010) is appropriate to proceed with factor analysis.

In evaluating factorability, correlation matrix is commonly used in displaying individual variable relationships (Henson & Roberts, 2006). Tabachnick and Fidell (2007) and P. Allen and Bennet (2010) recommended inspecting the correlation matrix for correlation coefficients between items over 0.30 which shows that they are collectively contribute towards the factor and suitable for factor analysis.

Next step in factor analysis is the selection of rotation method. The objective of rotation is to simplify items group factor structure where high item loadings on one factor and smaller item loadings on the remaining factor (Costello & Osborne, 2005), which will produce more interpretable and simplified output. Various methods can be used to extract factors which are: Principal components analysis (PCA), principal axis factoring (PAF), maximum likelihood, image factoring, canonical and alpha factoring (Tabachnick & Fidell, 2007). Nevertheless, PCA and PAF are commonly used in literature (Henson & Roberts, 2006; Tabachnick & Fidell, 2007). Among these two methods, PCA is the default method in most statistical programs and therefore it is most commonly used (Thompson, 2004). Pett *et al.* (2003) recommended using PCA in establishing preliminary solutions in EFA.

Another consideration in EFA is the rotation method where generally there are two common rotation techniques which are: orthogonal rotation and oblique rotation and options available for both rotation techniques are orthogonal varimax/quartimax or oblique oblimin/promax. Orthogonal Varimax rotation produces factor structures

which are uncorrelated (Costello & Osborne, 2005). Oblique rotation produces factors which are correlated, this is more often relevant for human behaviour study (Costello & Osborne, 2005). In this study, it is not assumed that the variables are uncorrelated and therefore oblique rotation is deemed more suitable for this study. In oblique rotation, promax is most commonly recommended in studies (e.g. Floyd & Widaman, 1995; J. M. Nelson & Canivez, 2012). Oblique promax rotation produces two type of matrix which are: (1) factor structure matrix which displaying the correlation coefficients between the factors and the variables; and (2) factor pattern matrix which reflect variables factor loading (Norusis, 2008).

This study is interested to find out which items poorly contribute to the construct measure and therefore factor pattern matrix is more suitable. This is aligned with the suggestion made by Hair *et al.* (2010) where factor pattern matrix is more preferable. The minimum threshold used in this study for EFA to indicate the factorability is shown in Table 4.21.

Table 4.21  
*Factorability Threshold Used in This Study*

Test	Reference Range	Reference
1. Correlation	.30	Tabachnick and Fidell (2007)
2. Measure of sampling adequacy	$\geq .60$	Hair <i>et al.</i> (2010)
3. Bartlett's Test of Sphericity	$< .05$	Hair <i>et al.</i> (2010)
4. Factor loading	$\pm .30$ to $\pm .40$ (minimum acceptance level) $\pm .50$ to $< \pm .70$ (practically significant) $> \pm .70$ (well-defined)	Hair <i>et al.</i> (2010)



#### **4.9.4 Structural Equation Modelling**

In social science SEM has becoming very popular technique to conduct multivariate analysis. This is supported by Hair *et al.* (2006) who described SEM as a consolidation of multivariate techniques like factor analysis and multiple regression analysis and therefore by using SEM it helps researchers to investigate each scale item contribution and to estimate dependent and independent variables relationship (Sanchez *et al.*, 2005). This is supported by Hair *et al.* (2006) who argued that SEM is an efficient method in examining inter-related dependence relationship simultaneously. They further qualify SEM based on its major characteristics: (1) capability to grant multiple and inter-related dependence relationships estimation simultaneously (2) during estimation process, SEM is able to exhibit unobserved concepts in the multiple and inter-related dependence relationships as well as measurement; (3) its ability to illustrate the entire set of relationships. Based on the performance explained above, SEM was used as the tool to analyse the data in addressing research questions and hypotheses of this study.

##### **4.9.4.1 Variable Types**

In SEM, variables are known as observed, latent, exogenous and endogenous. Observed variables are constructed in the research instrument and also known as indicator, item, observed variable or observed measure (Bollen & Lennox, 1991). Latent variable is variables which are not directly being observed but it was inferred from other observed variables (Byrne, 2010). Endogenous latent variables are identical to dependent variables, whereby exogenous latent variables are identical to independent variables (Byrne, 2010). SEM able to address deficiency in other statistical techniques like multiple regression and analysis of variance (ANOVA)

whereby these two statistical techniques assume that independent variables are measured completely (Kline, 2011), whereas SEM produces residual or error term, when variables are measured and produced the error variance (Kline, 2011).

#### **4.9.4.2 Reflective and Formative Indicators**

In a research, sensitivity over formative and reflective measures is very crucial as proper measurement model specification is important to define meaningful relationships in the structural model (Anderson & Gerbing, 1988). Generally, there are three general theoretical considerations in defining whether it is reflective or formative measurement model: (1) construct's nature, (2) indicators and latent construct causality direction; and (3) indicators characteristics which are used in measuring the construct. In the first consideration, for a reflective model, the latent construct exists independent of the measures (Borsboom *et al.*, 2004; Rossiter, 2002). In the case of formative model, the latent construct is dependent upon constructivist, operationalist or instrumentalist interpretation of the scholar (Borsboom *et al.*, 2004).

In the second consideration which is causality direction, in the reflective models the arrow flows from the construct to the indicators whereby in the formative models the arrow flows from the indicators to the construct (Figure 4.2). And therefore, in reflective models, if there is change in the construct will cause a change in the indicators. Whereas, in formative models, it is the opposite, if there is a change in the indicators will cause a change in the construct that is being studied (Figure 4.3). The causal direction in reflective and formative model has serious impact on measurement error (Diamantopoulos & Siguaaw, 2006).

Third consideration discusses about the characteristic of the indicators. As for reflective model, change in latent variable must anticipate variation in the indicator(s) and therefore, indicators in the reflective model are sharing common theme and they are interchangeable which enable researchers to sampling few relevant indicator to measure the construct (Churchill, 1979; Nunnally & Bernstein, 1994). In this case, any addition or deletion of indicators from the domain will not alter the construct content validity. But in the case of formative model, it is not the same. In formative model, indicators are defining the construct and therefore, the domain of the construct is sensitive to the type and numbers of indicators. And in this situation, any deletion and addition of indicators will change the construct conceptual domain. However, Rossiter (2002) postulates that it is not necessary to have census of indicators as what Bollen and Lennox (1991) have suggested. If the domain of interest can be represented by the selected indicators, then it can be accepted as sufficient in the view of empirical prediction.

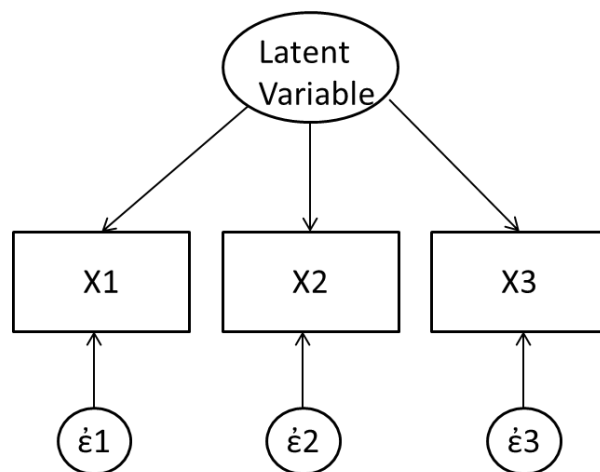


Figure 4.2  
*Reflective Construct*

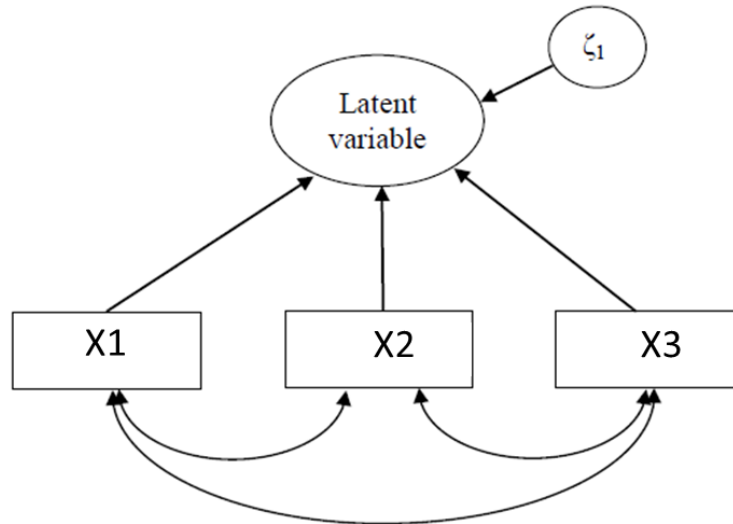


Figure 4.3  
Formative Construct

This study has taken into consideration the aspect of reflective and formative model during our questionnaire designing stage. The theoretical model was formulated based on extensive literature reviews on related area. All measured variables in this study are reflective indicators which are reflecting the measured factor.

#### 4.9.4.3 Modelling

Model analyse in SEM involves two major steps (Anderson & Gerbing, 1988; Hair *et al.*, 2010). First step would be measurement model assessment to investigate model validity by assessing the goodness-of-fit and looking for specific evidence for construct validity. CFA is executed to conduct the confirmatory test on the measurement theory which will reveal the relationship between measured variables and latent constructs, whereby when goodness-of-fit and construct validity are obtained, then measurement theory validity is supported. Second step in SEM model analysis is structural theory testing (Hair *et al.*, 2006). Prior to structural theory testing, measurement model testing has to be executed. In structural theory testing,

further test were conducted to assess the overall model and parameter estimates in testing hypothesised theoretical relationship.

As other research, this study is also looking at reporting the model fit indices. Various studies have reported different indices which were deemed relevant to their studies. Based on past literature, few measures were selected as a basis in this study.

Table 4.22 shows the model fit indices which were used in this study.

Table 4.22  
*Model Fit Indices and Proposed Acceptance Threshold*

Name	Symbol	Acceptance Index	Notes
Chi-Square statistic	$\chi^2$	p>0.05 (insignificant)  p<0.05 (N>250, m>12)	Chi-Square is prone to distortions, due to sample size (Kline, 2011; Bagozzi & Yi, 2012) and model complexity. However, authors still recommend reporting this (Bagozzi & Yi, 2012; Ackerman & Russel, 2009).
		This study has adopted the cut-off value of $\chi^2/df \leq 3.0$ (Hair <i>et al.</i> , 2010)	
Comparative fit index	CFI	>0.90 (N>250, m>30)  >0.95 (N>250, m<12)	CFI is an improved version of NFI (normed fit index) (Hair <i>et al.</i> , 2010). Relatively it is insensitive to model complexity.
		This study has adopted the cut-off value of > .90 (Hair <i>et al.</i> , 2010).	Values range between 0 (poor fit) and 1 (perfect fit) where higher values indicate better fit.

Table 4.22

*Model Fit Indices and Proposed Acceptance Threshold (continued)*

Name	Symbol	Acceptance Index	Notes
Tucker Lewis Index or also known as non-normed fit index (NNFI)	TLI	>0.90 (N>250, m>30)  >0.95 (N>250, m<12)	TLI values can be from the range of 0 and above 1 which higher values suggest a better fit.  This study has adopted the cut-off value of > .90 (Hair <i>et al.</i> , 2010).
Root mean square error of Approximation	RMSEA	This study has adopted the cut-off value of <.07 with CFI ≥ .90 (Hair <i>et al.</i> , 2010).	RMSEA commonly cited as a badness-of-fit index (Kline, 2011).  Usually, RMSEA is used to correct the impact of sample size or model complexity on $\chi^2$ with lower values indicates better fit (badness-of-fit measures) and values over 0.10 indicate poor fit.
Standardised root mean residual	SRMR	This study has adopted the cut-off value of ≤ .08 with CFI ≥ .92 (Hair <i>et al.</i> , 2010).	SRMR is a standardised value of root mean square residual (RMSR) and it is the better alternative to determine model fit (Hu & Bentler, 1999).

For example, Tabachnick and Fidell (2007) reported that at least Root Mean Square Error Of Approximation (RMSEA) and Comparative Fit Index (CFI) to be reported for model fit indices, whereas Bentler (2007) argued that in order to give decent model fit report, a study should be reporting  $\chi^2$  together with CFI, RMSEA and CFI. Jackson *et al.* (2009) postulates that the commonly reported model fit indices are chi-square, CFI, Tucker Lewis Index (TLI) and RMSEA. Further to this example, Hair *et*

*al.* (2010) recommended to include  $\chi^2$  value associated with *df*, either RMSEA, GFI or Standardized Root Mean Residual (SRMR) from absolute index, CFI or TLI from incremental fit index, CFI, GFI or TLI from goodness-of-fit and RMSEA or SRMR from badness-of-fit index in the model fit report. Lastly, Bagozzi and Yi (2012) reported  $\chi^2$ , CFI, TLI, RMSEA and SRMR. Based on these recommendations, this study has decided to report  $\chi^2$ , CFI, RMSEA, TLI and SRMR for its model fit indices.

There is no universal cut-off value for model fit indices as it depends on factors such as distribution and sample size (Hu & Bentler, 1998). As explained above, this study has adopted the cut-off value proposed by Hair *et al.* (2010) due to the following reasons: (1) they have taken into consideration the complexity of the model as well as sample size; and (2) their work has been widely cited.

#### **4.9.4.4 Model Re-fit**

This study has adopted the model re-fit strategy to address issue of initial model that does not fit adequately with the data set. In this situation, in order to improve model fit, the measured variables may be dropped. The question is how many measured variables should be sufficient for a latent construct. Hair *et al.* (2010) postulates that three observed variables to a construct is practical and Kline (2011, p.114) recommended that “the absolute minimum for CFA models with two or more factors is two indicators per factor”. The initial model of this study has a range of three to nine observed variables per construct which met the suggested criteria as described earlier.

#### 4.9.4.5 Unidimensional and Construct Validity

Hair *et al.* (2006) postulated that in unidimensional, it measures a set of measured variables and it is referring to only one underlying latent construct. Unidimensionality are impacted by two types of relationship between the variables (Gerbing & Anderson, 1988). First, more than one constructs influencing the behaviour of a single measure variable where cross-loadings are not zero. Second, the error terms covariance of two measured variables, which include between-construct error covariance and within-construct error variance. If these relationships exist in the model assessment, it shows lack of construct validity.

Construct validity is referring to the level of measurement that it measured on what the items are supposed to measure which can be assessed using convergent, discriminant and nomological validity (Hair *et al.*, 2010). In SEM, convergent validity is usually represented by its average variance extracted (AVE) which reflects the degree of variance that is explained by the latent variable. Fornell and Larcker (1981) highlighted that if the measurement error is greater than the variance of a construct then the construct validity can be questioned. Fornell and Larcker (1981), Carlson and Herdman (2011) and Hair *et al.* (2010) suggested that AVE above .50 satisfies construct validity needs.

Hair *et al.* (2006, p. 778) defined discriminant validity as to what level a construct is different from other constructs which means that individual measured variable measure only one latent construct, and therefore significant cross-loadings shows lack of discriminant validity. Hair *et al.* (2010) suggested a comparison between latent construct's AVE and squared inter-construct correlation ( $R^2$ ) with other



associate factors. If the construct AVE is greater than the corresponding inter-construct  $R^2$ , it shows the existence of discriminant validity. This study has taken this step to investigate initial measurement model discriminant validity.

#### **4.9.4.6 Reliability Test**

The ability to measure what supposed to be measured consistently is what reliability test is all about and Hair *et al.* (2010, pp. 618, 687) proposed that “reliability is also an indicator of convergent validity”, and “is inversely related to measurement error”. Composite reliability (CR) (Peterson & Kim, 2013) and cronbach’s alpha (Kelly, Gow, Mitchell, & Trace, 2012) are some of commonly used in studies to test the reliability. However, as reported by Hair *et al.* (2010) CR is commonly used in SEM and therefore this study has adopted CR reliability to test the construct reliability. Good reliability represented by the value of  $\geq .70$ . Nevertheless Hair *et al.* (2010) argued that the value between .60 and .70 can also be accepted provided that other indicators of construct validity conditions have been met. Therefore, this study abides to all these guidelines.

#### **4.9.4.7 Structural Model Testing**

Once the first step in model assessment is completed which is measurement model validation, the next step is to conduct structural model validity test (Gerbing & Anderson 1988; Hair *et al.* 2006). The processes that are conducted in the measurement model analysis are repeated to test the structural model validity. Firstly, the structure model overall fit is assessed and followed by the examination of individual parameter estimates that represent each specific hypothesis. Structural

model is supported if model gives good fit, significant hypothesised paths and manifest hypothesised direction.

#### **4.10 Ethical Consideration**

In social science research, one of the crucial areas that need to be looked at is the way how the researchers handle the ethical issues (Beauchamp & Bowie, 2004; Zikmund, 2003). The respondents in social science research involve human being and therefore sensitive issues have to be taken care off so that there should not be any issues which could harm them such as: psychological abuse, physical harm, loss of self-esteem, stress and legal jeopardy (Neuman, 2006). This is to ensure: (1) it is a voluntary participation; (2) to preserve confidentiality and anonymity of the organization; (3) to protect the respondent privacy is protected; and (4) no deception is involved in the research (Manning, 2006).

This study complies with aforementioned requirements. Thus there is no harm when participating in the survey and participation is on voluntary basis. A letter was drafted and sent to the organization inviting them to be involved in the survey. The copy of the letter is illustrated in Appendix 4.1. Upon approval the questionnaires were distributed. At this point of time, the respondents were still can withdraw their participation without any consequence. Furthermore, the collected data was strictly kept confidential and anonymous. The respondents' details such as name and contact number were not collected. The organizations were given case number, as explained in the explanatory statement in Appendix 4.2, and their names were not mentioned. All responses were analysed and presented as a whole and therefore no individual

responses identified. Overall, this study has taken all necessary steps to ensure confidentiality.

#### **4.11 Summary**

Research design and methodology are the important factors in a research. The probability of the success would likely depending on these two factors. If the research design and methodology are precise and well defined, the execution of the research is effective and efficient. For the purpose of this research, necessary components of the research have been defined, cross referenced against past empirical research and analysed the details. It is strongly believed that the adopted research design and methodology used are complete and it could ensure effective research.

## Chapter FIVE

### Data Analysis

#### 5.1 Introduction

This study covers three main interests. Firstly it is to examine the effects of organizational factors on the effectiveness of KM. Secondly is to examine the impact of KME on OP and lastly; to investigate whether KME mediates the relationship between KMP and OP. This chapter discusses the findings of this study. Figure 5.1 presents the chapter's outline.

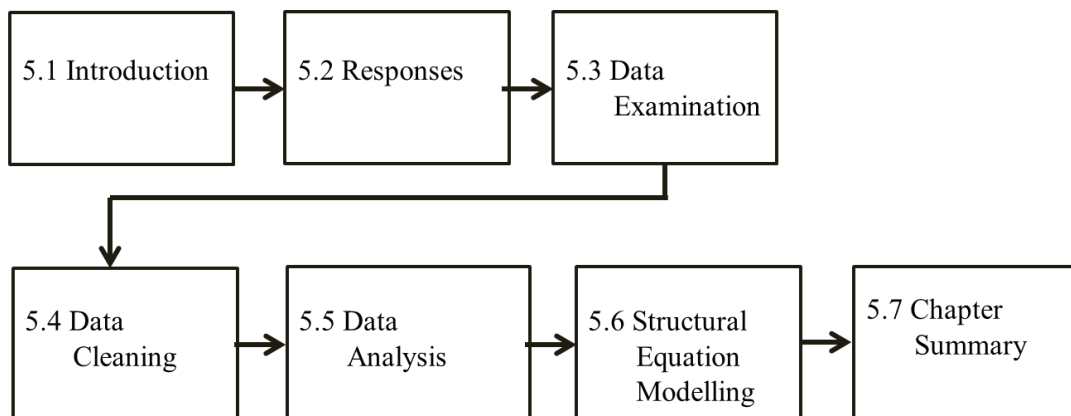


Figure 5.1  
*Chapter Five Outline*

#### 5.2 Responses

This study has adopted SRS without replacement method as explained in section 4.7.6. The invitation was sent to list of public sector organizations which were generated by Research Randomizer software. At any one time, 30 organizations were kept for follow-up. Any withdrawal was replaced with another organization, which in total 48 invitations was sent out. Out of 30 public sector organizations, only 19 were agreed to participate in the study. 11 organizations declined from participating in the

study based on various reasons such as: (1) was not keen in the study; (2) did not get approval from human resource department; (3) unable to allocate personnel to manage the distribution of questionnaires; (4) organization is pre-occupied with other activities; and (5) totally no response. A total of 380 survey questionnaires were distributed to the 19 organisations and 352 questionnaires were returned. The overall response rate was 93%.

Kline (2005) suggests that any incomplete questionnaire should be removed and data screening is usually recommended to be part of the analytic process to get a “clean” data set (Tabachnick & Fidell, 2007). Eventually, seven responses were removed from the data as shown in Table 5.1. As a result, only 345 responses can be used for data analysis. The finalized size of the sample was acceptable as it met Tomarken and Waller (2005) recommendation who suggested that minimum of 200 sample sizes would be sufficient and able to fit in most contexts.

Table 5.1  
*Survey Questionnaire Item Deleted Statistics*

No	Organization Code	Case No	Item Code Missing Value
1	04	01	KA1, KA2, KA3, KA4, KA5, KA6, KA7 IT1, IT2, IT3, IT4, IT5, IT6, IT7, IT8, IT9, IT10, IT11, IT12, IT13, IT14, IT15, IT16
2	04	03	KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8, KE9, KE10 OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8
3	04	08	KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8, KE9, KE10 OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8
4	04	16	KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8
5	04	18	KE5, KE6, KE7, KE8 OP2, OP3, OP4, OP5, OP6, OP7, OP8

Table 5.1  
*Survey Questionnaire Item Deleted Statistics (continued)*

No	Organization Code	Case No	Item Code Missing Value
6	25	08	OC9, OC10, OC11, OC12, OC13, OC14, OC15 KC1, KC2, KC3, KC4, KC5, KC6, KC7, KC8, KC9 KS1, KS2, KS3, KS4, KS5, KS6, KS7, KS8, KS9, KS10, KS11, KS12, KS13, KS14, KS15, KS16 KA1, KA2, KA3, KA4, KA5, KA6, KA7 IT1, IT2, IT3, IT4, IT5, IT6, IT7, IT8, IT9, IT10, IT11, IT12, IT13, IT14, IT15, IT16 KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8, KE9, KE10 OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8
7	26	09	KE1, KE2, KE3, KE4, KE5, KE6, KE7, KE8, KE9, KE10 OP1, OP2, OP3, OP4, OP5, OP6, OP7, OP8

In the following section, respective organizations and respondent's descriptive statistics are offered.

### 5.2.1 Organization's Profile

The profiles of the participating organizations are illustrated in Table 5.2. Economic sector represents 42% of the whole population and followed by 21%, 16% and 21% respectively by general administration, security and social sectors.

Table 5.2  
*Profile of Organizations*

No	Organization Code	Sector	No	Organization Code	Sector
1	002	Economic	11	022	Security
2	004	Economic	12	023	Social
3	005	General Administration	13	024	Economic
4	006	Social	14	025	Economic
5	008	Economic	15	026	Economic
6	015	Social	16	027	Economic
7	016	General Administration	17	028	Economic
8	018	Security	18	029	Social

Table 5.2  
*Profile of Organizations (continued)*

No	Organization Code	Sector	No	Organization Code	Sector
9	019	General Administration	19	030	General Administration
10	021	Security			
Summary :					
	Economic				: 42%
	General Administration				: 21%
	Security				: 16%
	Social				: 21%

### 5.2.2 Respondents' Demographic Profile

This section discusses general information about research's respondents. Section A of the survey questionnaire requires respondents to provide demographic data which are useful sense-making process of this research. The demographic data that were captured are as follows:-

- i. The age group of the respondents which has been grouped into 5 bands, that are; under 21, 21 – 30, 31 – 40, 41 – 50, and over 50;
- ii. The gender of the respondent, male or female;
- iii. The respondents' ethnicity. Options are offered based on the main ethnic groups in Malaysia, that are; Malay, Chinese, or Indian. Fourth group was labelled as 'Others' to accommodate the respondents who do not fall within any one of the previous 3 ethnic groups identified;
- iv. The respondents' highest education level and options were SPM/STPM (Malaysian certificate of high school education), Diploma/Degree, and Masters/PhD qualifications;
- v. The respondents' position in the organisation, which could fall under executive, mid-management, or top-management categories;

- v. The respondents' job orientation. The respondents are required to select from either one of these categories; internal (e.g. accounts, audit, corporate, IT, legal, human resources, etc.), external (e.g. customer service/relations, marketing, sales, etc.), product/service (e.g. production, quality assurance, R&D, etc.), others (respondents to specify); and
- vii. The respondents' working experience and options were under 1 year, 1 – 5 years, 6 – 10 years, 11 – 20 years, and over 20 years.

#### **5.2.2.1 Respondents' Age**

Table 5.3 illustrates respondents' age. The age of the respondents was grouped into 5 bands that are under 21, 21 – 30, 31 – 40, 41 – 50, and over 50. Majority of them (81%) are 40 years old and below, with 31–40 years being the largest group (44.8%) followed by the age group between 21 – 30 years (36.2%). Only 9.5 % were between 41–50 years and 9.5% were aged over 50 years. The table also reveals that there are no respondents below the 21 age group level. This was expected as this study did not anticipate that knowledge workers would fall under this age category; however it was necessary to capture and report this. Most of the respondents were between 21 – 40 years. This may imply a tendency of encouraging new blood among the knowledge workers within public sector where public organizations may want to consider more knowledge sharing initiatives within the organization as this group of people still has number of years of service to serve and organizations may also want to provide more facilities for knowledge sharing to take place such as discussion corner, story-telling slot and idea drop box using technology facility.



Table 5.3  
*Respondents' Age*

Age	Frequency	Valid Percentage	Cumulative Percentage
Under 21 years	-	-	-
21 – 30 years	122	36.2	36.2
31 – 40 years	151	44.8	81.0
41 – 50 years	32	9.5	90.5
Over 50 years	32	9.5	100.0
Missing	8		
Total	345	100.0	

### 5.2.2.2 Respondents' Gender

As shown in Table 5.4, females outnumbered males as shown in the cross tabulation (57.14% against 42.9%), which reflects female dominance as knowledge workers in the public sector. The management may consider this as a basis for providing more feminine knowledge sharing environment.

Table 5.4  
*Respondents' Gender*

Gender	Frequency	Valid Percentage	Cumulative Percentage
Male	146	42.9	42.9
Female	194	57.1	100.0
Missing	5		
Total	345	100.0	

### 5.2.2.3 Education Level and Work Experience

Table 5.5 shows the cross tabulated table of the education level and work experiences of the respondents in this study. 4.5% of the respondents had minimal work experience, which is less than 1 year. The data peaks at the 6 - 10 years band (32.6%) and trails off gradually around the 1-5 years (30.8%), 11-20 years (19.8%) and over 20 years (12.3%) working experience bands. These groups have years of valuable knowledge through their number of years working experiences. Managers in

the public sector may want to consider relevant mentoring and tutoring programmes to capture their tacit knowledge from their experienced work force.

Table 5.5  
*Education Level and Work Experience*

Work Experience (Years)	SPM/STPM		Diploma/Degree		Masters/Doctorate		Total	
	No	%	No	%	No	%	No	%
Under 1	2	6.3%	10	4.1%	3	5.2%	15	4.5%
1 – 5	8	25.0%	94	38.5%	1	1.7%	103	30.8%
6 – 10	7	21.9%	84	34.4%	18	31.0%	109	32.6%
11 – 20	8	25.0%	40	16.4%	18	31.0%	66	19.8%
Over 20	7	21.9%	16	6.6%	18	31.0%	41	12.3%
Total	32	100.0%	244	100.0%	58	100.0%	334	100.0%

#### 5.2.2.4 Position and Age

Table 5.6 indicates that younger respondents between the age of 21 – 30 and 31 - 40 form the bulk of the executive position and middle management positions. Age band 21 – 30 holds 39.5% of executive position and 23.5% of middle management position, whereby age band 31 – 40 holds 52.6% of executive position and 44.1% of middle management position. Top management position is held by group age band between 41 to above 50 with 30.0% from age band 41 – 50 and 50.0% from age over 50 years. This scenario could be driven by seniority promotion system or it could also reflect the capability that this people developed through their experience. Some phenomenon related to tacit knowledge sharing behaviour may be able to be interpreted from this data.

Table 5.6

*Position and Age*

Age (years)	Executive		Middle Management		Top Management		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Under 21	-	-	-	-	-	-	-	-	-	-
21 – 30	61	39.6%	24	23.5%	1	10.0%	29	49.2%	115	35.4%
31 – 40	81	52.6%	45	44.1%	1	10.0%	22	37.3%	149	45.8%
41 – 50	5	3.2%	18	17.6%	3	30.0%	5	8.5%	31	9.5%
Over 50	7	4.5%	15	14.7%	5	50.0%	3	5.1%	30	9.2%
Total	154	100.0%	102	100.0%	10	100.0%	59	100.0%	325	100.0%

**5.2.2.5 Job Orientation and Work Experience**

Table 5.7 shows the cross tabulation findings by job orientation and work experience. 186 respondents from the internal group job orientation with work experience between 1- 20 years is the largest group (83.0%), whereby 1 – 5 years formed 34.8%, 6 – 10 year formed 32.6% and 11 – 20 years formed 15.6%. This is followed by 30 respondents from the external group job orientation with work experience between 1 – 20 years (81%) with the breakdown of 1 – 5 years (21.6%), 6 – 10 years (29.7%) and 11 – 20 years (29.7%). The management of the public sectors may want to consider encouraging knowledge sharing and other KMP initiatives to improve the management of organizational knowledge for better internal and external work processes and provide better services.

Table 5.7

*Job Orientation and Work Experience*

Work Experience (years)	Internal		External		Product/Service		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Under 1	10	4.5%	2	5.4%	2	7.1%	1	2.9%	15	4.6%
1 – 5	78	34.8%	8	21.6%	8	28.6%	5	14.7%	99	30.7%
6 – 10	73	32.6%	11	29.7%	7	25.0%	16	47.1%	107	33.1%
11 – 20	35	15.6%	11	29.7%	9	32.1%	9	26.5%	64	19.8%
Over 20	28	12.5%	5	13.5%	2	7.1%	3	8.8%	38	11.8%
Total	224	100.0%	37	100.0%	28	100.0%	34	100.0%	323	100.0%

Note :

*Internal* : e.g. Accounts, Audit, Corporate, IT, Legal, Human Resource, etc.

*External* : e.g. Customer service/relations, Marketing, Sales, etc.

*Product/Service* : e.g. Production, Quality Assurance, R&D, etc.

*Others* : to be specified by the respondents.

### 5.2.3 Descriptive Statistics

The dependent, independent and mediating variables have been outlined and discussed in chapter 4. Table 5.8 lists these variables, their labels and indicators.

Table 5.8  
*Variables*

No.	Type	Variables	
		Name	Indicators
1	Independent	Knowledge Workers	Mean value of the following indicators: Willingness to share knowledge Willingness to use knowledge
		Organizational Culture	Mean value of the following indicators: Individualism Collectivism
		Knowledge Management Practices	Mean value of the following indicators: Knowledge Creation Knowledge Sharing Knowledge Application
		Technology	Mean value of the following indicators: Result Demonstrability Job Relevance Perceived Enjoyment
2	Mediating	Knowledge Management Effectiveness	Mean value of the following indicators: Knowledge Process Capability
3	Dependent	Organisational Performance	Mean value of the following indicators: Internal Processes Perspective

#### 5.2.3.1 Descriptive Statistics Of Knowledge Workers

Table 5.9 illustrates the characteristic of KW. Scores marked by respondents for most of the items are ranging from 1 to 7, except one item with minimum score of 2. The mean for KW falls between 4.0 to 6.07 and standard deviation falls between 0.791 to 1.638 indicating that most of the responses were close to the mean.

Table 5.9  
*Descriptive Statistics of Knowledge Workers*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
KW1	344	1	1	7	5.85	0.921
KW2	344	1	1	7	5.60	0.987
KW3	345	0	1	7	6.07	0.791
KW4	343	2	1	7	5.75	0.938
KW5	345	0	1	7	5.77	0.839
KW6	345	0	2	7	5.87	0.853
KW7	343	2	1	7	5.87	0.841
KW8	345	0	1	7	5.84	0.810
KW9	345	0	1	7	5.76	0.892
KW10	345	0	1	7	4.00	1.601
KW11	345	0	1	7	4.21	1.638
KW12	344	1	1	7	5.16	1.224

*Note : N represents total number of respondents*

### 5.2.3.2 Descriptive Statistics of Organizational Culture

Table 5.10 illustrates the characteristic of OC. Scores marked by respondents for most of the items are ranging from 1 to 7, except one item with minimum score of 2 and four items with minimum score of 3. The mean for OC falls between 3.99 to 6.05 and standard deviation falls between 0.72 to 1.633 indicating that most of the responses were close to the mean.

Table 5.10  
*Descriptive Statistics of Organizational Culture*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
OC1	345	0	1	7	4.72	1.488
OC2	343	2	1	7	4.52	1.508
OC3	342	3	1	7	4.61	1.525
OC4	343	2	1	7	5.14	1.373
OC5	344	1	1	7	5.34	1.367
OC6	345	0	1	7	4.41	1.606
OC7	345	0	1	7	5.11	1.344
OC8	345	0	1	7	3.99	1.610
OC9	345	0	3	7	5.86	0.800
OC10	344	1	1	7	5.84	0.822
OC11	344	1	3	7	5.85	0.727
OC12	345	0	3	7	6.05	0.720

Table 5.10  
*Descriptive Statistics of Organizational Culture (continued)*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
OC13	344	1	2	7	5.64	0.955
OC14	342	3	1	7	4.46	1.633
OC15	343	2	3	7	5.90	0.840

*Note : N represents total number of respondents*

### 5.2.3.3 Descriptive Statistics of Knowledge Management Practices

Table 5.11 illustrates the characteristic of KMP. Scores marked by respondents for most of the items are ranging from 1 to 7, except eight items with minimum score of 2 and one item with minimum score of 3. The mean for KMP falls between 3.84 to 5.78 and standard deviation falls between 0.81 to 1.64 indicating that most of the responses were close to the mean.

Table 5.11  
*Descriptive Statistics of Knowledge Management Practices*

	N	Minimum	Maximum	Mean	Std. Deviation
KC1	345	2	7	5.38	0.99
KC2	345	2	7	5.40	0.99
KC3	345	1	7	5.01	1.24
KC4	345	1	7	5.23	1.13
KC5	345	1	7	4.00	1.55
KC6	345	1	7	5.03	1.17
KC7	345	1	7	5.11	1.09
KC8	345	1	7	5.06	1.17
KC9	345	2	7	5.00	1.11
KS1	345	1	7	5.34	1.01
KS2	345	1	7	5.43	0.98
KS3	345	1	7	4.43	1.44
KS4	345	1	7	4.87	1.28
KS5	345	1	7	4.89	1.26
KS6	345	1	7	4.95	1.13
KS7	345	1	7	3.84	1.64
KS8	345	1	7	5.22	1.03
KS9	345	1	7	4.77	1.19
KS10	345	1	7	5.26	0.92
KS11	345	1	7	5.78	0.85

Table 5.11  
*Descriptive Statistics of Knowledge Management Practices (continued)*

	N	Minimum	Maximum	Mean	Std. Deviation
KS12	345	2	7	5.36	1.05
KS13	345	2	7	5.31	1.05
KS14	345	1	7	4.35	1.47
KS15	345	2	7	5.62	0.88
KS16	345	1	7	5.15	1.19
KA1	345	1	7	5.07	1.06
KA2	345	1	7	4.91	1.35
KA3	345	1	7	5.02	1.09
KA4	345	1	7	5.00	1.24
KA5	345	1	7	5.44	1.09
KA6	345	2	7	5.61	0.81
KA7	345	3	7	5.54	0.85

Note : N represents total number of respondents

### 5.2.3.4 Descriptive Statistics of Technology

Table 5.12 illustrates the characteristic of IT. Scores marked by respondents for most of the items are ranging from 1 to 7, except seven items with minimum score of 2. The mean for IT falls between 4.03 to 5.79 and standard deviation falls between 0.845 to 1.748 indicating that most of the responses were close to the mean.

Table 5.12  
*Descriptive Statistics of Technology*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
IT1	344	1	1	7	5.64	0.955
IT2	342	3	1	7	5.58	0.899
IT3	344	1	2	7	5.49	0.954
IT4	345	0	2	7	5.59	0.845
IT5	345	0	1	7	5.58	0.928
IT6	345	0	1	7	5.32	1.058
IT7	344	1	1	7	4.03	1.586
IT8	344	1	2	7	5.35	1.044
IT9	342	3	1	7	4.58	1.748
IT10	344	1	2	7	5.72	0.962
IT11	345	0	1	7	5.75	0.968
IT12	345	0	2	7	5.79	0.920
IT13	344	1	2	7	5.50	0.975
IT14	343	2	1	7	5.39	0.994
IT15	345	0	2	7	5.70	0.883
IT16	345	0	1	7	5.58	1.015

### 5.2.3.5 Descriptive Statistics of Knowledge Management Effectiveness

Table 5.13 illustrates the characteristic of KME. It has balance number of scores marked by respondents with five items with minimum score of 1 and also five items with minimum score of 2. The mean for KME falls between 3.33 to 5.49 and standard deviation falls between 0.943 to 1.525 indicating that most of the responses were close to the mean.

Table 5.13

#### *Descriptive Statistics of Knowledge Management Effectiveness*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
KE1	345	0	1	7	5.34	1.001
KE2	345	0	1	7	5.43	0.956
KE3	343	2	1	7	5.38	1.010
KE4	345	0	1	7	5.37	0.986
KE5	344	1	1	7	3.88	1.525
KE6	342	3	2	7	5.32	1.016
KE7	343	2	2	7	5.33	0.990
KE8	345	0	2	7	5.30	1.016
KE9	344	1	2	7	3.33	0.974
KE10	345	0	2	7	5.49	0.943

*Note : N represents total number of respondents*

### 5.2.3.6 Descriptive Statistics of Organizational Performance

Table 5.14 illustrates the characteristic of OP. Scores marked by respondents for most of the items are ranging from 1 to 7, except three items with minimum score of 2. The mean for OP falls between 5.33 to 5.53 and standard deviation falls between 0.915 to 1.129 indicating that most of the responses were close to the mean.



Table 5.14

*Descriptive Statistics of Organizational Performance*

Items	N	Missing	Minimum	Maximum	Mean	Std. Deviation
OP1	345	0	1	7	5.33	0.986
OP2	344	1	1	7	5.34	0.947
OP3	344	1	1	7	5.34	0.940
OP4	345	0	2	7	5.42	0.921
OP5	345	0	2	7	5.52	0.937
OP6	345	0	2	7	5.53	0.915
OP7	344	1	1	7	5.42	0.999
OP8	344	1	1	7	5.38	1.129

*Note : N represents total number of respondents*

### 5.3 Data Examination

Research always emphasise on data quality but nevertheless, the process of data examination more often missed by researchers due to its exhausting process (Hair *et al.*, 2010). Based on past literatures on data analysis (e.g. (Aguinis *et al.*, 2013; Tabachnick & Fidell, 2007), this study concentrated on three basic areas of data examination, namely, missing data, outliers, and normality tests. In the following step, reliability test was conducted to detect any weaknesses in the measures that are used in this study. To conclude the data examination process, exploratory factor analysis was performed to compare the conceptualised theoretical assumptions of factor structures with structures that were demonstrated by the collected data. Lastly data cleaning was conducted where applicable.

### **5.3.1 Missing Data**

In order to better understand results, proper reporting and managing missing data is important in research but more often this part of data analysis has been ignored from the report (Peng, Harwell, Liou, -M., & Ehman, 2006). This study reported variable missing data not exceeding 2.7% and based on literature (Hair *et al.*, 2010; Tabachnick & Fidell, 2007) this will not raise an alarm for serious concern. Besides identifying the number of missing data and cause of missing data, the researchers should also look into the pattern of missing data either they are randomly missing, or they are non-random and potentially biasing. In quantitative studies, researchers have expanded the missingness of data as: missing completely at random (MCAR), missing at random (MAR), and not missing at random (NMAR). In MCAR, there are no missing data patterns and missing values are not related to any variables under study (Acock, 2005) which means that if all data in data set are examined, the missing data could be distributed randomly across the data set. This study has employed Little's MCAR test (Hair *et al.*, 2010; Little, 1988) to identify type of missing data. Little's MCAR test returned a value of  $p = .000$  which was significant and suggested that type of missing data for this study were not MCAR. In the following step, the missing data has been treated using Expectation Maximization (EM) method.

### **5.3.2 Outliers**

In data analysis, one of initial steps in obtaining coherent analysis is to conduct outlying observation. Even though outliers are regularly considered a glitch, nevertheless they may contain useful information. Detection of outliers possibly leading to abnormal data identification or else may adversely lead to biased

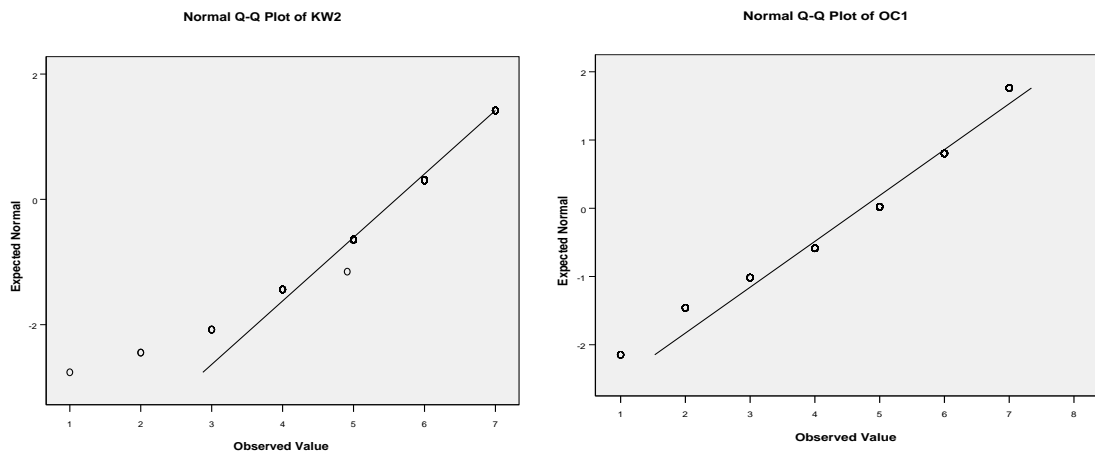
parameter estimation, questionable results and model misspecification (Liu, Shah, & Jiang, 2004; Williams, Baxter, He, Hawkins, & Gu, 2002) therefore it is necessary to spot it prior to modelling and analysis.

To detect outliers, this study employed multivariate detection method and in this case Mahalanobis' distance is more applicable (Aguinis *et al.*, 2013; Hair *et al.*, 2010). Most outlier detection methods use some measure of distance to evaluate the distance of an observation from the centre of the data. SPSS was used to compute Mahalanobis distance ( $D^2$ ) where higher  $D^2$  means observation is further clear away from overall distribution of dataset.  $D^2/df$ , where df indicates the number of variables used to calculate  $D^2$ , produces t-value (Hair *et al.*, 2010) and the number of variables used three. Previous authors suggested that for a small sample size, 80 or fewer, that gives  $D^2/df$  value greater than 2.5 and large sample size which gives value of three or four could have potential outliers. In this study (n=345), the return values of  $D^2/df$  were ranging from 0.09 to 2.28, which is below than the suggested value of three, suggested that intervention is not required.

### **5.3.3 Normality**

Oztuna *et al.* (2006) stated that visual inspection can be used to assess normality, although the reliability is questionable and it does not assure normal distribution. Nevertheless, when it is presented visually, the readers could evaluate the distribution themselves (Altman & Bland, 1996). Beside visual inspection, normality tests are also used to assess normality. Among them, Kolmogorov-Smirnov (K-S) test is the most common and used (Thode, 2002). K-S compares sample's scores to a normally distributed set of scores with the same mean and standard deviation. If the

K-S test result is significant means the distribution is non-normal. This study has executed the K-S test and the result is shown in Appendix 5.2.1 whereby all items were significant ( $p < 0.05$ ). Based on the K-S test of the data, it was not able to indicate that there is no encroachment on the assumption of normal distribution. As argued by Oztuna *et al.* (2006), in the case of small-scale sample size, normality tests have no reasons to reject the null hypothesis and therefore usually in this case, normality tests often passed. To further examine the normality, this study has conducted the visual inspection using graphical plots and it was found that the observation was quite close to the diagonal, which means that it is approximately normally distributed, as shown in Figure 5.2.



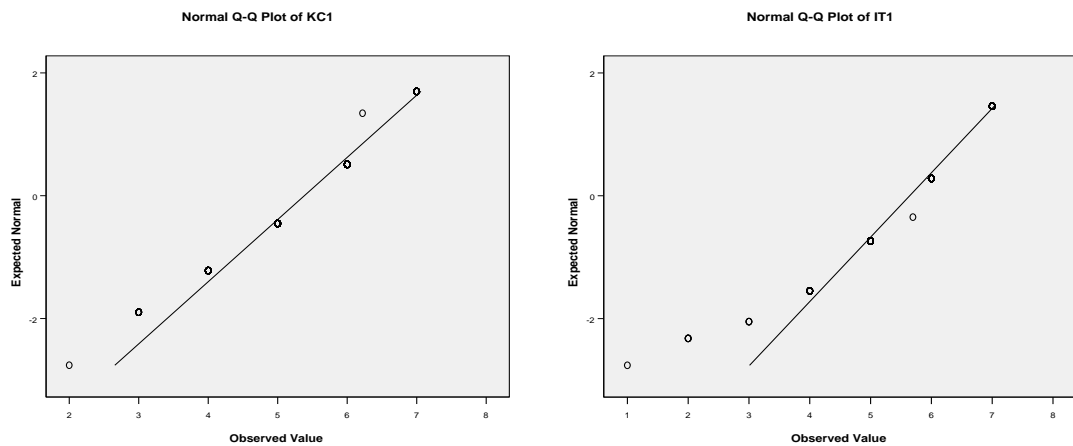


Figure 5.2  
*Q-Q plots of selected variables*

### 5.3.4 Common Method Variance

As discussed in Chapter 4, this study has taken into consideration the effect of CMV on research findings from the onset of the study by conducted appropriate procedural steps to control the CMV. Next, the study has also conducted the Harman’s single factor (HSF) test in detecting whether CMV would astonish the findings. The HSF test is used as a diagnostic technique which is not meant for remedial action (Podsakoff *et al.*, 2003) which was sufficient to be adopted in this study. Assumption made, “if a substantial amount of common method variance is present, either (a) a single factor will emerge from the factor analysis or (b) one general factor will account for the majority of the covariance among the measures” (Podsakoff *et al.*, 2003, p. 889).

This study has examined the measured variables unrotated factor structure where a single-factor analysis was done. The result showed only 25.58% of the variance is explained by the single factor (as shown in Appendix 5.6). In summary the test demonstrated that more than one factor emerged, and no single factor was able to

account for the majority ( $\geq 50\%$ ) of variance in the data. Therefore CMV was not a cause for concern in this study.

### 5.3.5 Reliability

Researchers are more concern with the reliability of survey instrument. Reliability is generally defined as the consistency of measurement measuring the same way each time within the same condition with the same subjects (Chin-Loy, 2003). It is a tool to measure internal consistency of an instrument. However, Hair *et al.* (2010) argued that there is no one test which could capture all needed attributes. This study has taken the following steps to measure internal consistency.

#### 5.3.5.1 Cronbach's Alpha

Nunnally (1978 cited in Yi, 2009, p.72) suggested that an alpha of 0.70 be the minimum acceptable standard for demonstrating internal consistency. This study has computed the Cronbach's Alpha as shown in Table 5.15. The returned Alpha values are greater than .70 which indicate internal consistency among variables and therefore are considered as reliable (Nunnally, 1994).

Table 5.15

*Reliability Statistics – Cronbach's Alpha for variables*

Variable	Cronbach's Alpha
Knowledge Workers	.77
Organizational Culture	.77
Knowledge Management Practices	.90
Technology	.82
Knowledge Management Effectiveness	.88
Organizational Performance	.90

Although Cronbach's Alpha is often cited in literature as the instrument reliability common test (Hair *et al.*, 2010), Nunally cited in Cortina (1993) cautioned on the dependency of Cronbach's Alpha as "the" only test. In turn, this study has also observed other indices such as Item-Total Statistics and Corrected Item-Total Correlation as discussed below.

### 5.3.5.2 Item-Total Statistics

The increase in Alpha values indicates a problematic item which may need further attention. For this study, the Alpha value if item is deleted is listed in Table 5.16. The increment of Alpha value was marginal which may not require any intervention. Please refer to Appendix 5.2.3 for details.

Table 5.16  
*Cronbach's Alpha Value Increase if Item is Deleted*

Variable	Cronbach's Alpha	Cronbach's Alpha if Item Deleted	
		Item Code	Alpha
Knowledge Workers	.77	KW10	.81
		KW11	.82
Organizational Culture	.77	OC14	.79
Knowledge Management Practices	.90	KC5	.91
		KS7	.91
Technology	.82	IT7	.86
		IT9	.89
Knowledge Management Effectiveness	.88	KE5	.94
Organizational Performance	.90	-	-

### 5.3.5.3. Corrected Item-Total Correlation

Appendix 5.2.3 shows the Corrected Item-Total Correlation which explains the correlation between a given item and the summated score of other items in the construct (Hair *et al.*, 2010). This study used a lower limit threshold of .30 proposed by Vaus (2002), as the measurement for item-analysis. Basically, it assesses to what level the item is internally consistent with the composite correlation of all other items. Items that obtain corrected item-total correlation which was less than .30 are listed in Table 5.17.

Table 5.17  
*Corrected Item-Total Correlation with  $r < .30$*

Variable	Item Code	Corrected Item-Total Correlation
Knowledge workers	KW10	.09
	KW11	.02
Organizational Culture	OC9	.12
	OC10	.16
	OC11	.15
	OC12	.17
	OC13	.17
	OC14	.11
	OC15	.10
Knowledge Management Practices	KC5	-.06
	KS3	-.02
	KS12	-.30
	KS14	.13
	KS15	.28
	KS16	.28
Technology	KA5	.25
	IT7	-.10
	IT9	-.14
Knowledge Management Effectiveness	KE5	-.07
Organizational Performance	-	-



### 5.3.6. Factor Analysis

As explained in chapter 4, this study has conducted EFA using PCA technique with promax factor rotating method for reasons explained in section 4.9.3 and the minimum threshold used in this study for EFA to indicate the factorability is shown in Table 5.18:

Table 5.18  
*Factorability Threshold Used in This Study*

Test	Reference Range	Reference
1. Correlation	.30	Tabachnick and Fidell (2007)
2. Measure of sampling adequacy	$\geq .60$	Hair <i>et al.</i> (2010)
3. Bartlett's Test of Sphericity	$< .05$	Hair <i>et al.</i> (2010)
4. Factor loading	$\pm .30$ to $\pm .40$ (minimum acceptance level) $\pm .50$ to $< \pm .70$ (practically significant) $> \pm .70$ (well-defined)	Hair <i>et al.</i> (2010)

For a better understanding, the item codes that are used to define the items in this study are shown in Table 5.19.

Table 5.19  
*Reference of Item Codes*

Variable	Indicator	Item Code Range
Knowledge Workers	Willingness To Share Knowledge	KW1, KW2, KW3, KW8, KW9, KW10, KW11
	Willingness To Use Knowledge	KW4, KW5, KW6, KW7, KW12
Organizational Culture	Individualism Culture	OC1 – OC8
	Collectivism Culture	OC9 - OC15

Table 5.19  
*Reference of Item Codes (continued)*

Variable	Indicator	Item Code Range
Knowledge Management Practices	Knowledge Creation	KC1 – KC9
	Knowledge Sharing	KS1 – KS16
	Knowledge Application	KA1 – KA7
Technology	Job Relevance	IT1, IT2, IT3, IT9, IT10, IT15
	Result Demonstrability	IT4, IT8, IT11, IT12
	Perceived Enjoyment	IT6, IT7, IT13, IT14, IT16
Knowledge Management Effectiveness	Knowledge Process Capability	KE1 – KE10

The details of EFA findings can be found in Appendix 5.3. The finding of EFA is explained as follows.

### 5.3.6.1 Knowledge Workers

KW is the first construct in this study's conceptual framework. The scale was constructed on 2 indicators and predicated on 12 items. As explained in section 4.5, the KW's indicators are willingness to share knowledge and willingness to use knowledge. The factorability of the 12 KW items was examined based on criteria described above. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 12 items should correlate minimum at .30 with at least one other item. In the next step, KMO value was tested and the result shows a value of .88 which is greater than .60 (Hair et a.2010), the minimum threshold used in this study and Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that KW's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 12 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned two factors with value above one. The two factors reported cumulative total of 61% of variance with first factor returned 46% of the variance and the second factor 15% of the variance. There is no standardized threshold for cumulative percentage of variance and this has been debated by researchers in various disciplines like psychology, natural sciences and humanities (Henson & Roberts, 2006) where it can be as low as 50 – 60% in humanities discipline (Pett, Lackey, & Sullivan, 2003). In social science it is acceptable when the cumulative percentage of variance explains 55% (Hair *et al.*, 2010). Align to this argument the two factors were retained as it is also aligned with the study's theoretical framework.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

### **5.3.6.2 Organizational Culture**

OC is the next construct in this study conceptual framework. The scale was constructed on 2 indicators and predicated on 15 items. As explained in section 4.5, the OC's indicators are individualism and collectivism. The factorability of the 15 OC items was examined based on criteria described earlier. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 15 items should correlate minimum at  $.30$  with at least one other item.

In the next step, KMO value was tested and the result shows a value of .85 which is greater than .60 (Hair et al. 2010) the minimum threshold used in this study and Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that OC's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 15 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned four factors with value above one. The four factors reported cumulative total of 66% of variance with first factor returned 28% of the variance and the second factor 23% of the variance. The third and fourth factor returned 8% and 7% of the variance respectively. Further examination on factor four showed that only one item had acceptable ( $|l| > .30$ ) factor loadings and therefore this item was marked to be dropped. The three factors cumulatively explain about 59% of variance which is within the acceptable range in psychology, natural sciences and humanities discipline (Henson & Robert, 2006) and an acceptable cumulative variance (55%) in social science (Hair *et al.*, 2010). Nevertheless during the stage of theory development, this study only identified two factors, individualism and collectivism for OC construct. Items which are measuring collectivism loaded significantly on first factor. However items which are measuring individualism factor are loaded on factor two and three. This study was not design to investigate individualism at a very microscopic level and therefore the initial construct was retained.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-

loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

### **5.3.6.3 Knowledge Management Practices**

KMP is the third construct in this study's conceptual framework. The scale was constructed on 3 indicators and predicated on 32 items. As explained in section 4.5, the KMP's indicators are: KC, KS and KA. The factorability of the 32 KMP items was examined based on criteria described earlier. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 32 items should correlate minimum at .30 with at least one other item. In the next step, KMO value was tested and the result shows a value of .90 which is greater than .60 (Hair et al. 2010), the minimum threshold used in this study and Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that KMP's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 32 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned seven factors with value above one. The seven factors reported cumulative total of 66% of variance with first factor returned 34% of the variance and the second factor 8% of the variance. Other 5 factors returned 8%, 5%, 4%, 4% and 3% of the variance respectively. Further investigation on factor six showed that only two items with acceptable ( $l > .30$ ) factor loadings which was presumed inadequate to explain factors' measure and therefore these items are marked to be dropped. Whereas, factor seven has only one item with acceptable ( $l > .30$ ) factor loadings and the other three

items cross-loaded with items in factor one and five, which was presumed inadequate to explain factors' measure and therefore these items are marked to be dropped. The five factors accumulatively returned about 59% of the variance which is as per the acceptable value in social science when the cumulative percentage of variance explains 55% (Hair *et al.*, 2010). Nevertheless during the stage of theory development, this study only identified three factors, KC, KS and KA for KMP construct. This study was not design to investigate KMP at a very microscopic level and therefore the initial construct was retained.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

#### **5.3.6.4 Technology**

IT is the fourth construct in this study conceptual framework. The scale was constructed on 3 indicators and predicated on 16 items. As explained in section 4.5, the IT's indicators are: job relevance, result demonstrability and perceived enjoyment. The factorability of the 16 IT items was examined based on criteria described earlier. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 16 items should correlate minimum at  $.30$  with at least one other item. In the next step, KMO value was tested and the result shows a value of  $.89$  which is greater than  $.60$  (Hair et a.2010), the minimum threshold used in this study and Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that IT's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 16 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned three factors with value above one. The three factors reported cumulative total of 63% of variance with first factor returned 43% of the variance, second factor returned 11% of the variance and the third factor returned 9% of the variance. Further investigation on third factor showed that there were only three items with acceptable ( $l > .30$ ) factor loadings. Even though there were only three items with acceptable factor loadings, this factor was supported in TAM3 model (Venkatesh & Davis, 2000), thus it was retained.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

#### **5.3.6.5 Knowledge Management Effectiveness**

KME's scale was constructed on one indicator and predicated on 10 items. As explained in section 4.5, the KME's indicator is knowledge process capability. The factorability of the 10 KME items was examined based on criteria described earlier. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 10 items should correlate minimum at  $.30$  with at least one other item. In the next step, KMO value was tested and the result shows a value of  $.90$  which is greater than  $.60$  (Hair et al. 2010), the minimum threshold used in this study and Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that KME's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 10 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned two factors with value above one. The two factors reported cumulative total of 73% of variance with first factor returned 60% of the variance and second factor returned 12% of the variance. First factor could meet the threshold of cumulative percentage of variance 55% (Hair *et al.*, 2010). Nevertheless during the stage of theory development, this study only identified one factor, knowledge process capability for KME construct. Items were loaded significantly on both factors. However this study was not design to investigate KME at a very microscopic level and eventually this study merged the two factors into one as the original construct.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

#### **5.3.6.6 Organizational Performance**

OP's scale was constructed on one indicator and predicated on 8 items. As explained in section 4.5, the OP's indicator is internal process perspective. The factorability of the 8 OP items was examined based on criteria described earlier. The correlation matrix table can be found in Appendix 5.4. In order to suggest whether the items are factorable, the 8 items should correlate minimum at  $.30$  with at least one other item. In the next step, KMO value was tested and the result shows a value of  $.89$  which is greater than  $.60$  (Hair *et al.* 2010), the minimum threshold used in this study and



Bartlett's Test of Sphericity ( $p < .001$ ) was significant. This further confirmed that OP's items are suitable for factor analysis.

The following step was factor identification to identify to what level the 8 items describing these factors and to identify solution. This was done by employing PCA. Further investigation revealed that the initial eigenvalues returned two factors with value above one. The two factors reported cumulative total of 73% of variance with first factor returned 60% of the variance and second factor returned 13% of the variance. First factor could meet the threshold of cumulative percentage of variance 55% (Hair *et al.*, 2010). Nevertheless during the stage of theory development, this study only identified one factor, internal process perspective for OP construct. Items were loaded significantly on both factors. However this study was not design to investigate OP at a very microscopic level and eventually this study merged the two factors into one as the original construct.

The examination of pattern matrix was conducted as the final step in EFA. The pattern matrix table can be found in Appendix 5.3. Items loading  $< .30$ , items cross-loading and items loading sparsely (less than 4 items with  $l \geq .30$  on a factor) were tagged for further attention.

#### **5.4 Data Cleaning**

Prior to proceeding to next level of data analysis, it is crucial to conduct data cleaning to detect and remove data errors and data inconsistencies in order to improve data quality (Rahm & Do, 2000). Few tests and visual inspection were done to examine the data which include reliability tests, assessment of correlation between

items and factor loading. Data with weak statistical report that has been identified in section 5.3 were further examined for removal. This study had used item loading reference values suggested by Hair *et al.* 2010 to identify items for removal as shown in Table 5.20.

Table 5.20  
*Item Loading References Used for Item Deletion*

Item Loading Value	Action
< .40	Items are removed
Between .40 to .50	Items were retained if it is considered an important reflection of the construct
> .50	Items were retained for further test in structural equation modelling

Source : Hair *et al.* (2010)

The items which were removed after conducted these test are listed in Table 5.21.

Table 5.21  
*Deleted Items*

Item	Remarks
KW10	Item loaded ( $l = .90$ ) highly on factor 2 but nevertheless insufficient justification to retain the item as only two items loading above the threshold value (.40) on factor 2.
KW11	Item loaded ( $l = .87$ ) highly on factor 2 but nevertheless insufficient justification to retain the item as only two items loading above the threshold value (.40) on factor 2.
KW12	Item cross-loaded ( $> .40$ ) on two factors.
OC4	This item loaded ( $l = .57$ ) reasonably well on factor 2 but nevertheless insufficient justification to retain the item as construct's significant indicator.
OC5	Item cross-loaded ( $> .40$ ) on two factors.

Table 5.21  
*Deleted Items (continued)*

Item	Remarks
OC6	Item loaded ( $l = .82$ ) highly on factor 3 but nevertheless insufficient justification to retain the item as it had only two items loading above the threshold value (.40) on factor 3.
OC7	Item loaded ( $l = .83$ ) highly on factor 3 but nevertheless insufficient justification to retain the item as it had only two items loading above the threshold value (.40) on factor 3.
OC8	Item cross-loaded ( $> .40$ ) on two factors.
OC14	Item loaded ( $l = .93$ ) highly on factor 4. Insufficient justification to retain as it had only one item loading above the cut-off value.
KA1	This item loaded ( $l = .49$ ) slightly above the threshold on factor 1 but nevertheless insufficient justification to retain the item as construct's significant indicator.
KA2	Item cross-loaded ( $> .40$ ) on two factors.
KA6	Item did not load above the threshold value (.40) on any of the factors.
KA7	Item did not load above the threshold value (.40) on any of the factors.
KC6	This item loaded ( $l = .49$ ) slightly above the threshold on factor 2 but nevertheless insufficient justification to retain the item as construct's significant indicator.
KC7	This item loaded ( $l = .47$ ) slightly above the threshold on factor 2 but nevertheless insufficient justification to retain the item as construct's significant indicator.
KC8	Item did not load above the threshold value (.40) on any of the factors.
KC9	Item did not load above the threshold value (.40) on any of the factors.
KS1	Item did not load above the threshold value (.40) on any of the factors.
KS2	Item did not load above the threshold value (.40) on any of the factors.

Table 5.21  
*Deleted Items (continued)*

Item	Remarks
KS9	Item loaded ( $l = .67$ ) highly on factor 10 but nevertheless insufficient justification to retain the item as it had only this item loading above the threshold value (.40).
KS12	This item loaded ( $l = .88$ ) highly on factor 6 but nevertheless insufficient justification to retain the item as it had only two items loading above threshold value (.40) on factor 6
KS13	This item loaded ( $l = .80$ ) highly on factor 6 but nevertheless insufficient justification to retain the item as it had only two items loading above threshold value (.40) on factor 6
KS14	Item cross-loaded ( $> .40$ ) on two factors.
KS15	This item loaded ( $l = .57$ ) reasonably well on factor 9 but nevertheless insufficient justification to retain the item as it had only two items loading above threshold value (.40) on factor 9
KS16	Item loaded ( $l = .83$ ) highly on factor 9 but nevertheless insufficient justification to retain the item as it had only two items loading above the threshold value (.40) on factor 9.
IT7	Item loaded ( $l = .79$ ) highly on factor 3 but nevertheless insufficient justification to retain the item as only two items loading above the threshold value (.40) on factor 3.
IT8	Item loaded ( $l = .54$ ) slightly above the threshold on factor 1 but
IT9	Item loaded ( $l = .84$ ) highly on factor 3 but nevertheless insufficient justification to retain the item as only two items loading above the threshold value (.40) on factor 3.
IT14	Item cross-loaded ( $> .40$ ) on two factors.
KE5	Item cross-loaded ( $> .40$ ) on two factors.
OP7	Item cross-loaded ( $> .40$ ) on two factors.

## 5.5 Measurement Model Development

As explained in section 4.9.4, measurement model development is the first step in SEM analysis involving specifying the indicators (observed variables) for each construct (latent variable) then followed by construct reliability and validity assessment (Gerbing & Anderson, 1988; Hair *et al.*, 2006). This study measuring eight first-order constructs and one second-order construct which was adapted from prior research. The scale was adopted from past literatures and it has been pretested in this study pilot survey. As recommended by Hair *et al.* (2006), CFA was conducted to test model fit and construct validity and reliability of the proposed measurement model through constructs factor loadings, constructs average variance extracted, and construct composite reliability. During the measurement model examination, the observed variables which do not meet the statistical threshold were removed and this process was repeated until acceptable model fit indices were observed. As described in section 4.9.4.2, all observed variables in this study are reflective indicators, and therefore removing the variables will not affect the theoretical model of this study and this would allow the researcher to sampling few relevant indicators in order to measure the construct (Churchill, 1979; Nunnally & Bernstein, 1994).

At the onset of measurement model development, the initial model was examined to investigate the goodness-of-fit and followed by reliability and validity assessment of all constructs. The initial measurement model is shown in figure 5.3.

CMIN = 3352.576 df = 1062 p-value = .000  
 CMIN/df = 3.157  
 CFI = .801 TLI = .789  
 RMSEA = .079  
 SRMR = .0744

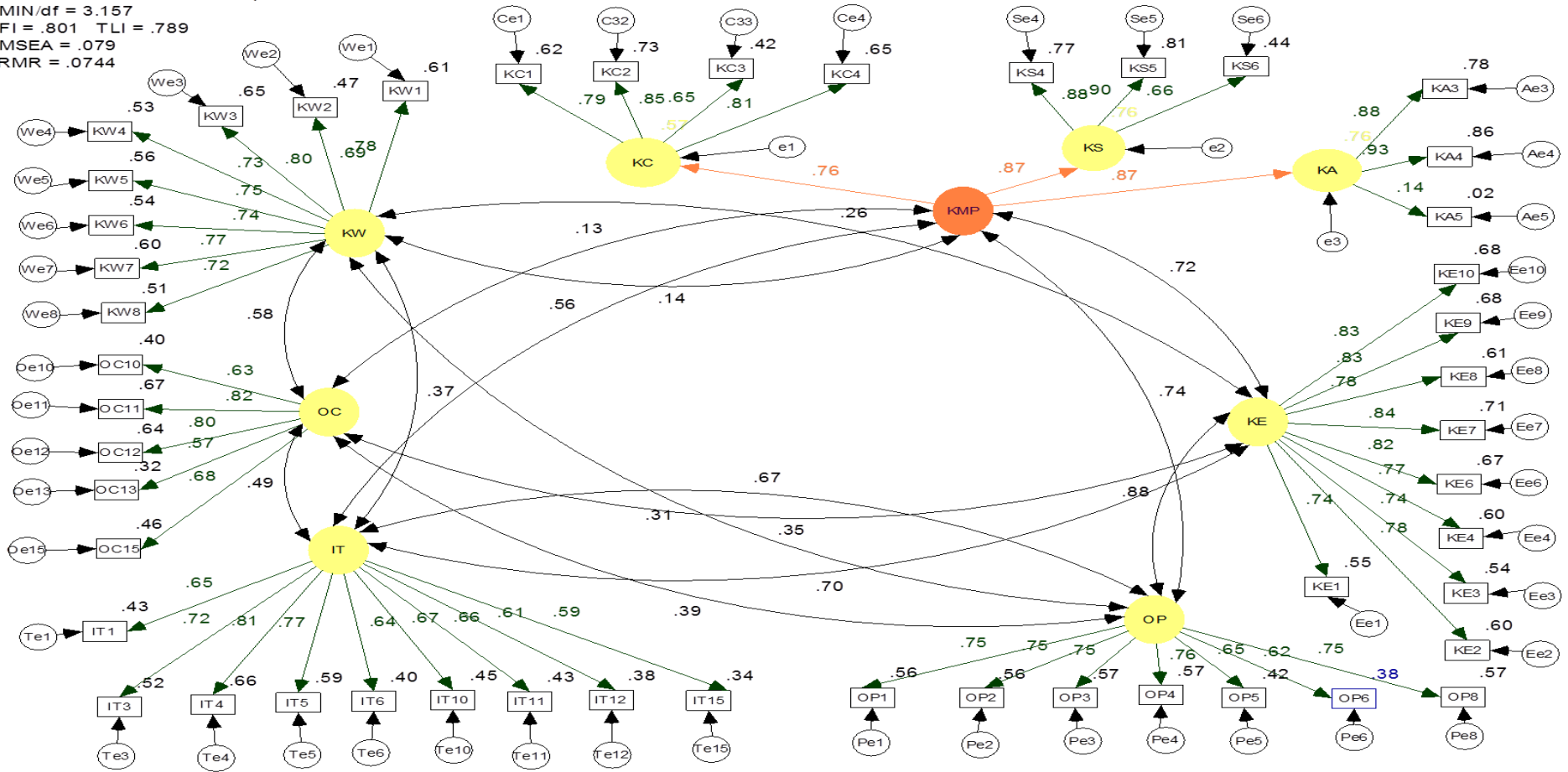


Figure 5.3  
 Hypothesised Initial Measurement Model

### 5.5.1 Initial Model Assessment

The variables count for the initial model is shown in Table 5.22.

Table 5.22

*Variables Count*

Description	
Number of variables in the initial model	: 108
Number of observed variables	: 48 ( $p$ )
Number of unobserved variables	: 60
Number of exogenous variables	: 57
Number of endogenous variables	: 51
Number of parameters	: 114

Based on the above statistic, the number of distinct sample moment is  $1176 (p(p+1) / 2)$ , and therefore the degrees of freedom is 1062 (number of distinct sample moment – number of parameter =  $1176 - 114$ ). The next step is to assess the model fit indices for initial model. The values returned were:  $\chi^2_{(1062)}=3352.58$ ;  $\chi^2/df=3.16$ ; CFI=.80; TLI=.79; SRMR=.07; RMSEA=.079. The initial model fit indices returned values were compared against the goodness-of-fit cut-off values as shown in Table 5.23. Some indices are within the cut-off values and some are not indicating good model fit.

Table 5.23

*Measurement Model Fit Indices for Initial Model*

Index	Initial-model fit indices	Goodness-of-fit cut-off values
$\chi^2$ p-value	.000	> .05
Normed chi-square (NC)	3.16	$\leq 3.0$
CFI	.80	> .90
TLI	.79	> .90
SRMR	.07	$\leq .80$ with CFI > .92
RMSEA	.08	< .70 with CFI $\geq .90$

From the comparison above, it shows that NC index (3.16) was above than the cut-off value ( $\leq 3.0$ ) and TLI and CFI are also not meeting the cut-off value. These indicate that the initial model is not fitting the data very well. The indices for RMSEA and SRMR were below the cut-off values but once the condition in the examination ( $CFI \geq .90$  for RMSEA and  $CFI > .92$  for SRMR) was included it shows that it doesn't meet the threshold set.

From this analysis, it can be concluded that the initial model is not fitting the data adequately which may have to go through model re-fit process by examining the average variance, factor loadings, and composite reliability for all constructs. The returned values of observed variables which are not meeting the required statistical value were taken out accordingly and this process was repeated until acceptable model fit indices as what has been set as the cut-off value was obtained.

#### **5.5.1.1 Validity and Reliability Assessment of Knowledge Workers**

KW construct was hypothesized as a unidimensional construct which is measured by eight observed variables, as shown in Figure 5.4. CFA was executed in assessing the initial measurement model validity of KW. The factor loadings ranged from .69 to .81.



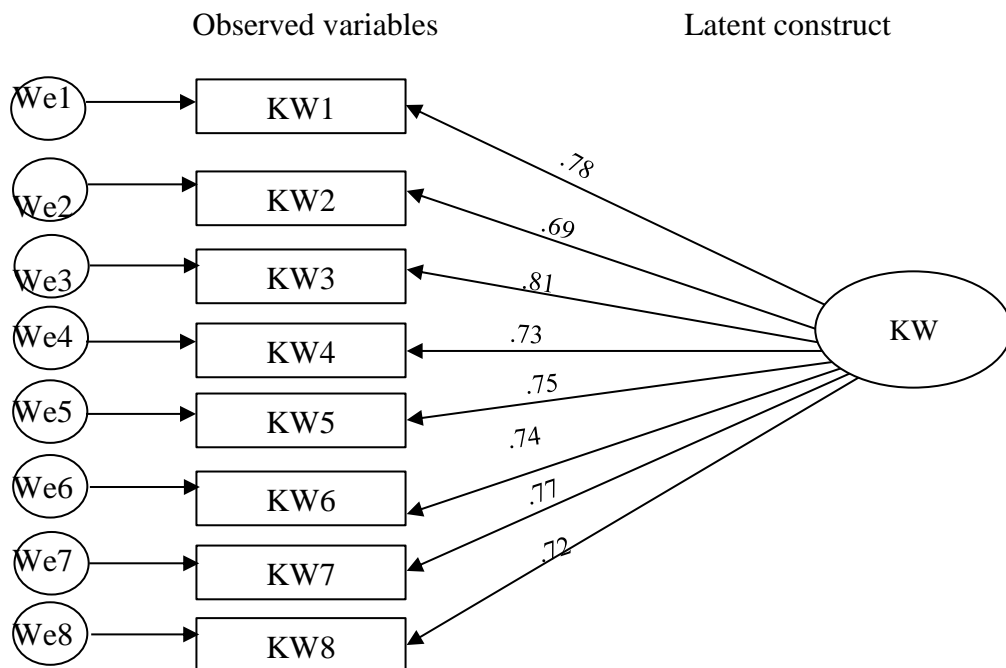


Figure 5.4  
*Hypothesised Initial Measurement Model of Knowledge Worker*

Based on these loadings, average variance extracted (AVE) as shown in Table 5.24 was computed and it returned a value of .56 which is more than the threshold (.50). This means that KW constructs in the initial model met the pre-regulated criteria for convergent validity. This finding suggested that the indicators of KW construct converged high proportion of variance in common (Hair *et al.*, 2006). Composite reliability (CR) is .91 (Table 5.24) which is more than the threshold value of .70, hence this construct met the pre-regulated criteria for reliability. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore eight items (KW1, KW2, KW3, KW4, KW5, KW6, KW7 and KW8) were used to measure KW construct.

Table 5.24  
*Knowledge Workers - Factor Loading, AVE, and CR*

Observed variable	Latent Factor	Factor loading ( <i>l</i> )	<i>l</i> <sup>2</sup>	Measurement error ( <i>e</i> )	AVE	CR
KW1	← KW	.78	.61	0.39	.56	.91
KW2	← KW	.69	.47	0.53		
KW3	← KW	.81	.65	0.35		
KW4	← KW	.73	.53	0.47		
KW5	← KW	.75	.56	0.44		
KW6	← KW	.74	.54	0.46		
KW7	← KW	.77	.60	0.40		
KW8	← KW	.72	.52	0.48		

### 5.5.1.2 Validity and Reliability Assessment of Organizational Culture

OC construct was hypothesized as a unidimensional construct which is measured by five observed variables, as shown in Figure 5.5. CFA was executed in assessing the initial measurement model validity of OC. The factor loadings ranged from .57 to .82.

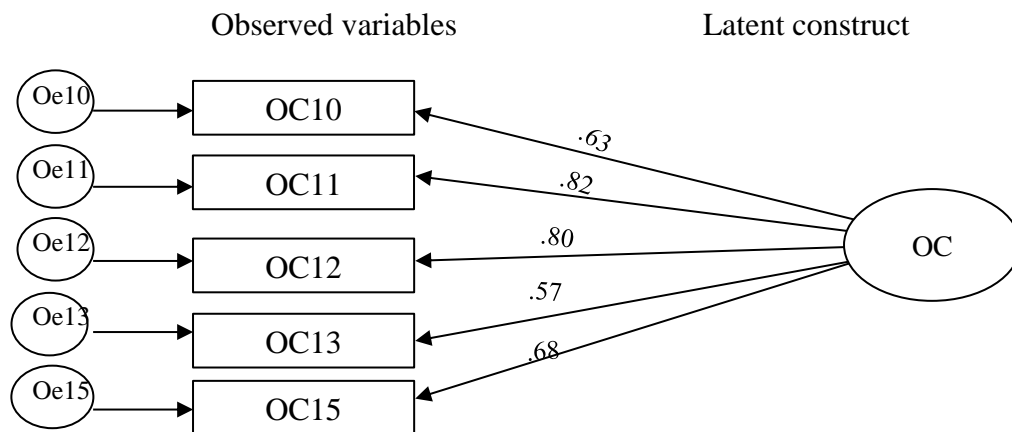


Figure 5.5  
*Hypothesised Initial Measurement Model Of Organizational Culture*

Based on these loadings, AVE as shown in Table 5.25 was computed and it returned a value of .50 which is meeting the minimum threshold (.50). This means that OC constructs in the initial model met the pre-regulated criteria for convergent validity. This finding suggested that the indicators of OC construct converged high proportion

of variance in common (Hair *et al.*, 2006). CR is .83 (Table 5.25) which is more than the threshold value of .70, hence this construct met the pre-regulated criteria for reliability. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore five items (OC1, OC2, OC3, OC4 and OC5) were used to measure OC construct.

Table 5.25  
*Organizational Culture - Factor Loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	$l^2$	Measurement error ( <i>e</i> )	AVE	CR
OC10	←	OC	.63	.40	.60		
OC11	←	OC	.82	.67	.33		
OC12	←	OC	.80	.64	.36	.50	.83
OC13	←	OC	.57	.32	.68		
OC15	←	OC	.68	.46	.54		

### 5.5.1.3 Validity and Reliability Assessment of Technology

IT construct was hypothesized as a unidimensional construct which is measured by nine observed variables, as shown in Figure 5.6. CFA was executed in assessing the initial measurement model validity of IT. The factor loadings ranged from .58 to .81.

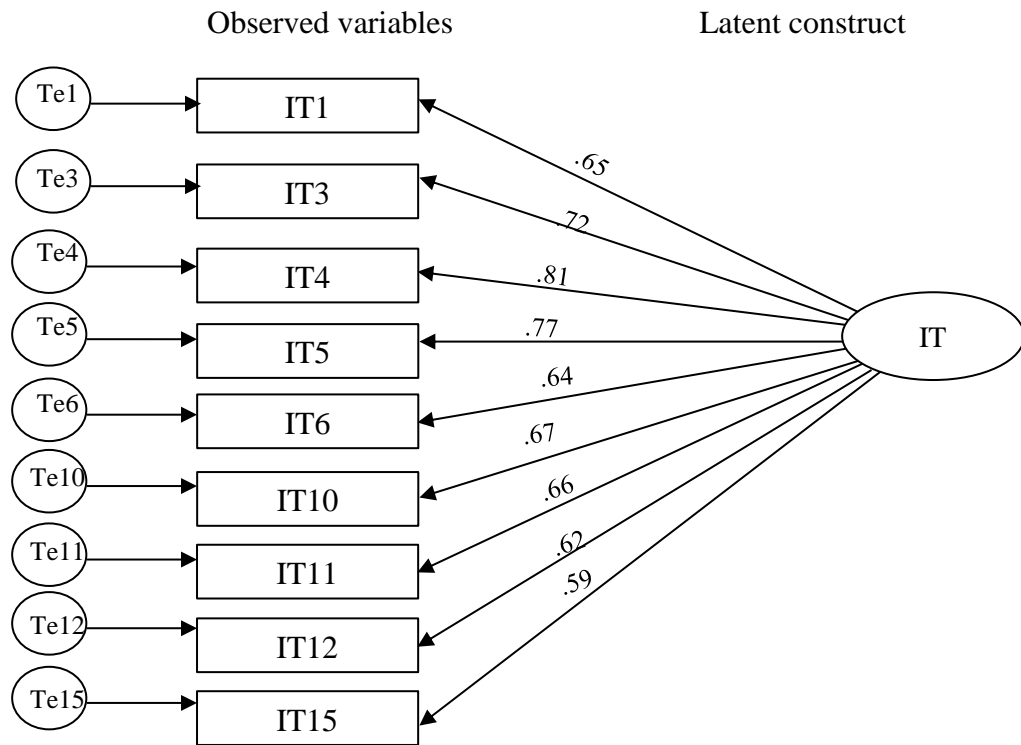


Figure 5.6  
*Hypothesised Initial Measurement Model of Technology*

Based on these loadings, AVE as shown in Table 5.26 was computed and it returned a value of .47 which is below than the threshold (.50). This means there was insufficient evidence to show that the convergent validity criteria are met. Nevertheless, Gerbing and Anderson (1988) and Hair *et al.* (2006) stated that the factor loading of items measured which is 0.5 or higher can be used in measuring the adequacy of convergent validity. And, CR for IT is .89 (Table 5.26) which is more than the threshold value of .70. This means that reliability criteria are met. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore nine items (IT1, IT3, IT4, IT5, IT6, IT10, IT11, IT12 and IT15) were used to measure IT construct.

Table 5.26  
*Technology - Factor Loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	<i>l</i> <sup>2</sup>	Measurement error ( <i>e</i> )	AVE	CR
IT1	←	IT	.65	.42	.58		
IT3	←	IT	.72	.52	.48		
IT4	←	IT	.81	.66	.34	.47	.89
IT5	←	IT	.77	.59	.41		
IT6	←	IT	.64	.41	.59		
IT10	←	IT	.67	.45	.55		
IT11	←	IT	.66	.44	.56		
IT12	←	IT	.62	.38	.62		
IT15	←	IT	.59	.35	.65		

#### 5.5.1.4 Validity and Reliability Assessment of Knowledge Management Practices

KMP construct was posited as a second-order latent construct, which is identified by three first-order latent variables that are KC, KS and KA as shown in Figure 5.7. CFA was executed in assessing the initial measurement model validity of KMP. The factor loadings for second-order construct ranged from .76 to .88 and the first-order construct returned factor loadings ranged from .15 to .93.

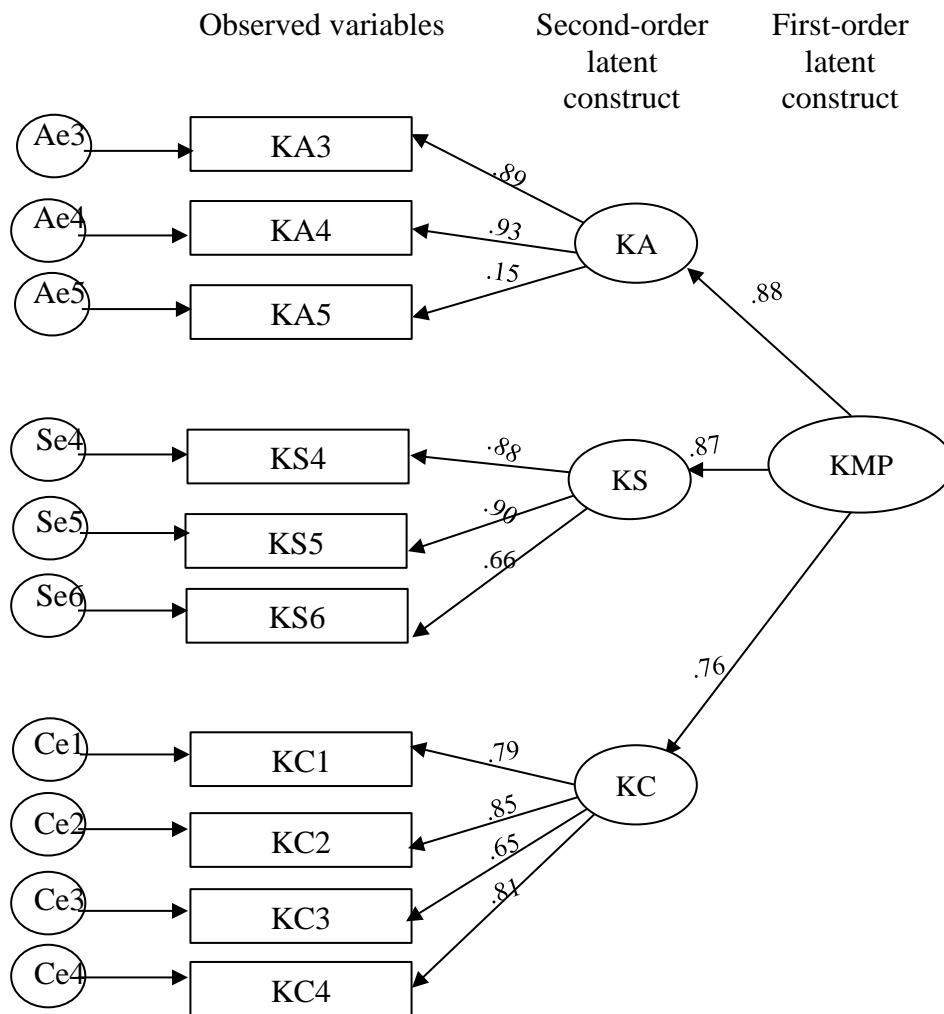


Figure 5.7  
*Hypothesised Initial Measurement Model of Knowledge Management Practices*

Based on these loadings, AVE as shown in Table 5.27 was computed and it returned a value of .61 which is more than the threshold (.50) and in turn means that the convergent validity criteria are met. This means that KMP constructs in the initial model met the pre-determined criteria for convergent validity. This finding suggested that the indicators of KMP construct converged high proportion of variance in common (Hair *et al.*, 2006). CR is .94 (Table 5.27) which is more than the threshold value of .70. That means this construct met the pre-regulated criteria for reliability. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore KC items (KC1, KC2, KC3 and KC4), KS

items (KS4, KS5 and KS6) and KA items (KA3, KA4 and KA5) were used to measure KMP construct.

Table 5.27

*Knowledge Management Practices - Factor Loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	<i>l</i> <sup>2</sup>	Measurement error ( <i>e</i> )	AVE	CR
KC1	←	KC	.79	.62	.38	.61	.94
KC2	←	KC	.85	.73	.27		
KC3	←	KC	.65	.42	.58		
KC4	←	KC	.81	.65	.35		
KS4	←	KS	.88	.77	.23		
KS5	←	KS	.90	.81	.19		
KS6	←	KS	.66	.44	.56		
KA3	←	KA	.88	.78	.22		
KA4	←	KA	.93	.86	.14		
KA5	←	KA	.15	.02	.98		

**5.5.1.5 Validity and Reliability Assessment of Knowledge Management Effectiveness**

KME construct was posited as a unidimensional construct measured by the nine observed variables, as shown in Figure 5.8. CFA was executed in assessing the initial measurement model validity of KME. The factor loadings ranged from .74 to .84.

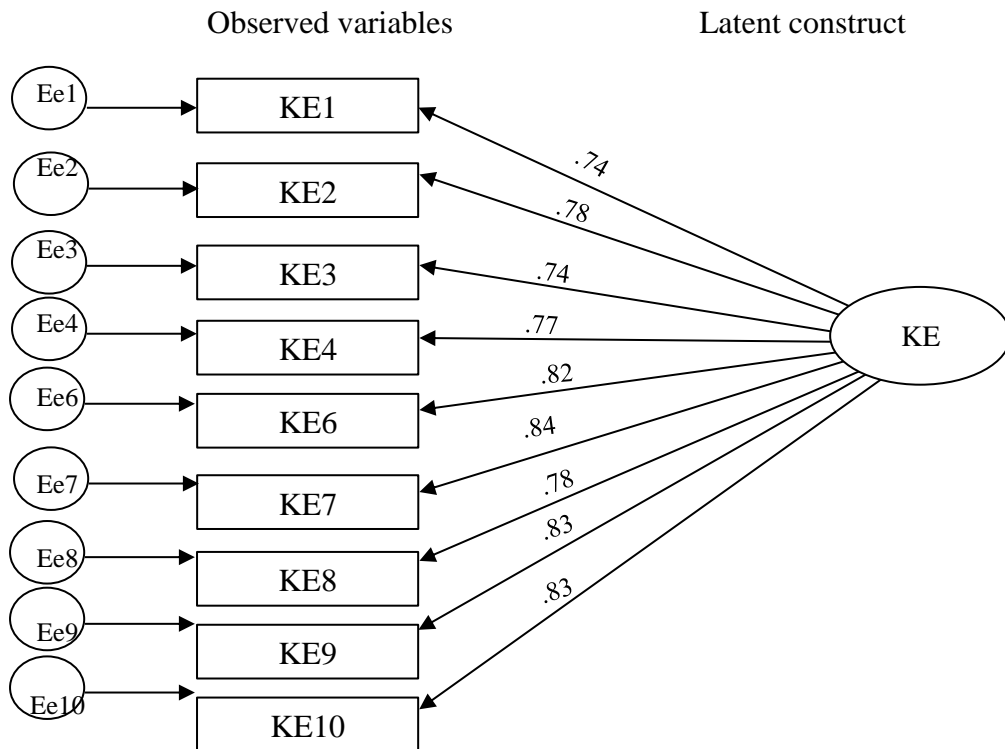


Figure 5.8  
*Hypothesised Initial Measurement Model of Knowledge Management Effectiveness*

Based on these loadings, AVE as shown in Table 5.28 was computed and it returned a value of .63 which is more than the threshold (.50). This means that KME constructs in the initial model met the pre-regulated criteria for convergent validity. This finding suggested that the indicators of KME construct converged high proportion of variance in common (Hair *et al.*, 2006). CR is .94 (Table 5.28) which is more than the threshold value of .70. Hence, this construct met the pre-regulated criteria for reliability. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore KME items (KE1, KE2, KE3, KE4, KE6, KE7, KE8, KE9 and KE10) were used to measure KME construct.



Table 5.28

*Knowledge Management Effectiveness - Factor Loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	<i>l</i> <sup>2</sup>	Measurement error ( <i>e</i> )	AVE	CR
KE1	←	KE	.74	.55	.45	.63	.94
KE2	←	KE	.78	.61	.39		
KE3	←	KE	.74	.55	.45		
KE4	←	KE	.77	.59	.41		
KE6	←	KE	.82	.67	.33		
KE7	←	KE	.84	.71	.29		
KE8	←	KE	.78	.61	.39		
KE9	←	KE	.83	.69	.31		
KE10	←	KE	.83	.69	.31		

**5.5.1.6 Validity and Reliability Assessment of Organizational Performance**

OP construct was posited as a unidimensional construct measured by the seven observed variables, as shown in Figure 5.9. CFA was executed in assessing the initial measurement model validity of OP. The factor loadings ranged from .62 to .76.

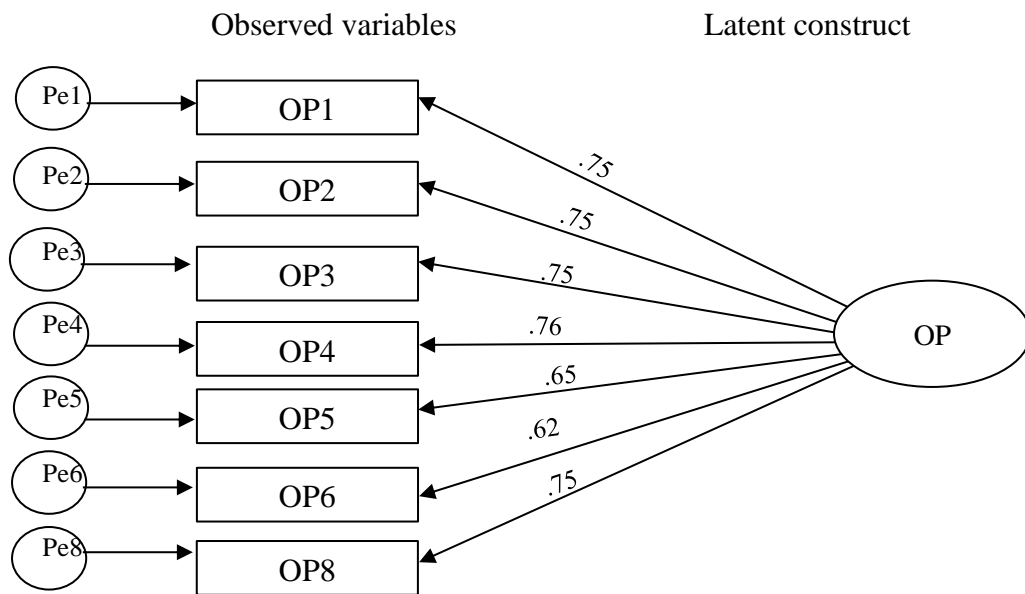


Figure 5.9

*Hypothesised Initial Measurement Model of Organizational Performance*

Based on these loadings, average variance extracted (AVE) as shown in Table 5.29 was computed and it returned a value of .52 which is more than the threshold (.50). This means that OP constructs in the initial model met the pre-determined criteria for convergent validity. This finding suggested that the indicators of OP construct converged high proportion of variance in common (Hair *et al.*, 2006). Composite reliability (CR) is .88 (Table 5.29) which is more than the threshold value of .70. That means this construct met the pre-regulated criteria for reliability. The results provide the evidence that the initial model convergent validity and unidimensionality are supported, therefore OP items (OP1, OP2, OP3, OP4, OP5, OP6 and OP6) were used to measure OP construct.

Table 5.29  
*Organizational Performance - Factor Loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	$l^2$	Measurement error ( <i>e</i> )	AVE	CR
OP1	←	OP	.75	.57	.43	.52	.88
OP2	←	OP	.75	.56	.44		
OP3	←	OP	.75	.57	.43		
OP4	←	OP	.76	.57	.43		
OP5	←	OP	.65	.42	.58		
OP6	←	OP	.62	.38	.62		
OP6	←	OP	.62	.38	.62		
OP8	←	OP	.75	.57	.43		

### **5.5.2 Final Measurement Model Assessment**

As explained in section 4.9.4.4, this study has conducted the model re-fit process to address issue of initial model which does not fit adequately with the data set. Measured variables which were not meeting the statistical threshold were dropped. All measured variables in this study are reflective indicators which are reflecting the measured factor. In the case of reflective variables, removing measured variables will not cause any variations as it is measuring the same concept (Bollen & Lennox, 1991; Coltman, Devinney, Midgley, & Venaik, 2008; Jarvis, MacKenzie, & Podsakoff, 2003).

The following steps have been taken during the model re-fit process: (1) items with relatively low factor loading as compared to other items which are measuring the same latent construct were dropped; and (2) indicators which returned theoretically unjustifiable correlation with indicators in other constructs were dropped. The above process was repeated until model fit indices were not giving any further improvement. The final measurement model is shown in Figure 5.10.

CMIN = 408.317 df = 234 p-value = .000  
 CMIN/df = 1.745  
 CFI = .964 TLI = .957  
 RMSEA = .047  
 SRMR = .0527

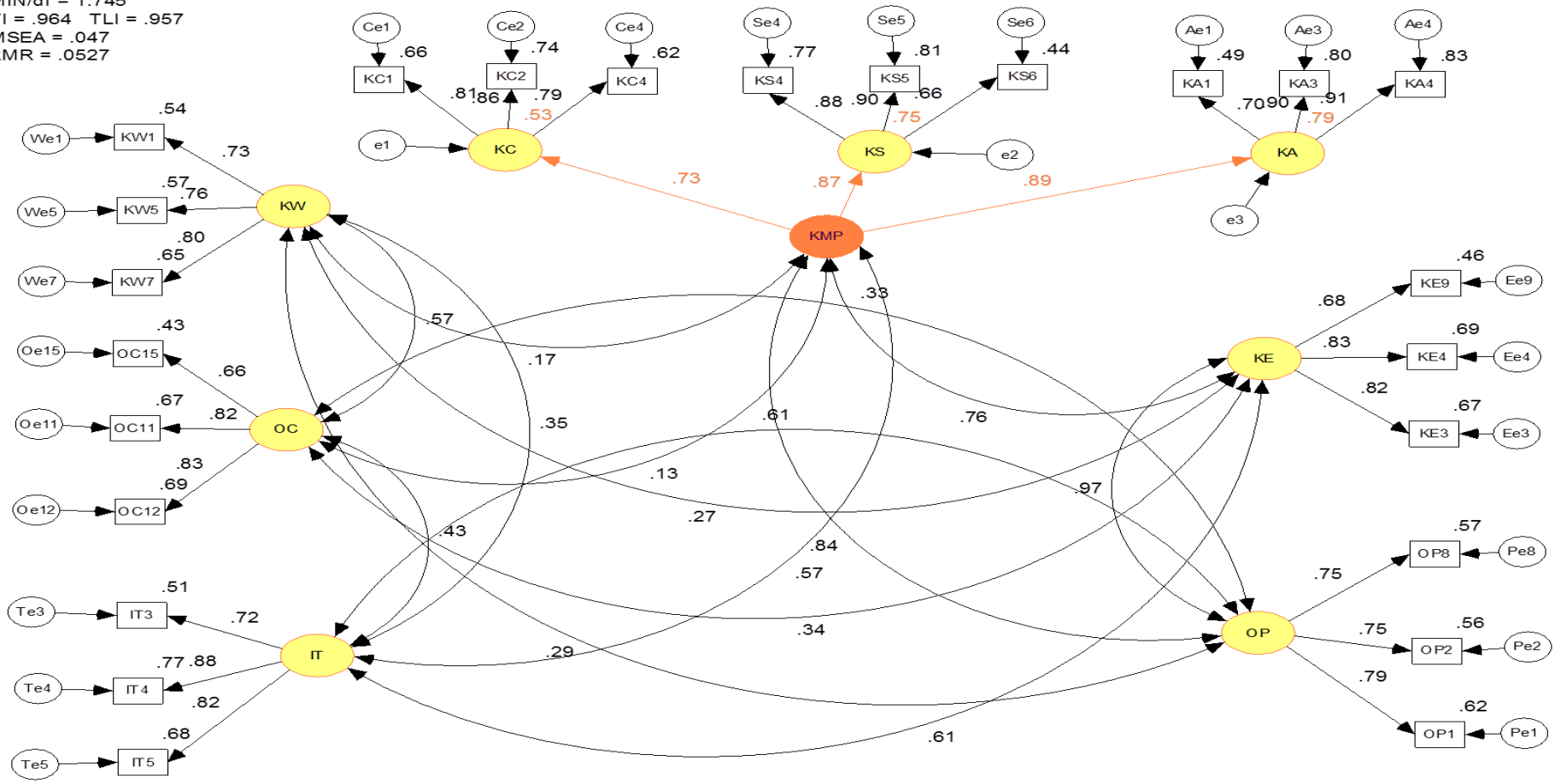


Figure 5.10  
 Hypothesised final measurement model

### 5.5.2.1 Final Measurement Model Reliability Assessment

Reliability values of final measurement model were observed and it ranges from .66 to .91 as shown in Table 5.30. As discussed in section 4.9.4.6 good reliability represented by the value of  $\geq .70$  and therefore it can be suggested that final model is also as per the initial model, which fulfils the reliability statistical requirement.

Table 5.30

*Final Measurement Model - Factor loading, AVE, and CR*

Observed variable		Latent Factor	Factor loading ( <i>l</i> )	<i>l</i> <sup>2</sup>	Measurement error ( <i>e</i> )	AVE	CR
KW1	←	KW	.73	.54	0.464	.59	.81
KW5	←	KW	.76	.57	0.425		
KW7	←	KW	.80	.65	0.354		
OC11	←	OC	.82	.67	0.33	.60	.82
OC12	←	OC	.83	.69	0.31		
OC15	←	OC	.66	.43	0.57		
IT3	←	IT	.72	.51	.49	.65	.85
IT4	←	IT	.88	.77	.23		
IT5	←	IT	.82	.68	.32		
KE3	←	KE	.82	.67	.33	.61	.82
KE4	←	KE	.83	.69	.31		
KE9	←	KE	.68	.46	.54		
OP1	←	OP	.79	.62	.38	.58	.81
OP2	←	OP	.75	.56	.44		
OP8	←	OP	.76	.57	.43		
KC1	←	KC	.81	.65	.35	.72	.96
KC2	←	KC	.86	.74	.26		
KC4	←	KC	.79	.62	.38		
KS4	←	KS	.89	.78	.22	.72	.96
KS5	←	KS	.88	.77	.23		
KS6	←	KS	.90	.81	.19		
KA1	←	KA	.70	.49	.51	.72	.96
KA3	←	KA	.90	.80	.20		
KA4	←	KA	.91	.83	.35		

### 5.5.2.2 Final Measurement Model Convergent Validity

AVE of the latent constructs for final measurement model can be found in Table 5.30. It ranges from .58 to .72 which is higher than the cut-off value of .50. This means that the measured variables were able to explain more than 50% of the variance of the respective constructs and therefore it can be suggested that the convergent validity criteria are met.

### 5.5.2.3 Final Measurement Model Discriminant Validity

Table 5.31 summarizes the construct AVE and inter-construct squared correlation. Almost all returned inter-construct squared relation lower than the AVE value except one case, which is KME. Nevertheless, this can be treated as an exceptional case as it shows marginal differences of AVE value (.30). Therefore the final measurement model was able to meet the criteria of inter-construct squared correlations where the value should be lower than of AVE value of the construct. It can be suggested that that sufficient discriminant validity exist in the final measurement model.

Table 5.31

*Summary of Construct AVE and Inter-construct Squared Correlation Range*

Latent Variable	AVE	Inter-construct $r^2$ Range	Discriminant Validity
KW	.59	.03 to .33	Satisfied
OC	.60	.02 to .18	Satisfied
KME	.61	.37 to .94	Acceptable
OP	.58	.37	Satisfied
KMP	.72	.33 to .71	Satisfied

Based on the validity tests that were conducted, overall results show that the final model has sufficient reliability, convergent and discriminant validity. The results provide the evidence that supports the unidimensionality and convergent validity of

the final model and therefore KW items (KW1, KW5 and KW7), OC items (OC11, OC12 and OC15), KMP items (KC1, KC2, KC4, KS4, KS5, KS6, KA1, KA3 and K4), IT items (IT3, IT4 and IT5), KME items (KE3, KE4 and KE9) and OP items (OP1, OP2 and OP8) were used to measure the constructs.

### 5.5.3 Overall Measurement Model

Comparison was done between the initial and final measurement model. The parameter estimates were examined. Table 5.32 shows part of the parameter estimates for the purpose of examining the model adequacy. The parameter estimates returned value ranged between .66 and .91, which is more than the threshold of .50 and below the maximum impractical benchmark of 1.0 (Hair *et al.*, 2010). The standard errors (SE) were also examined and it was found that SE values ranged between .04 and .08 which is deemed not to be an issue. Next that was examined was the signs which all show positive as what has been theorized. Lastly, critical ratio (C.R.) values were also examined. All C.R. returned value > 1.96 which means that factor covariance is significant and their p-values were all < .001.

Table 5.32  
*Final Measurement Model – Unstandardized and Standardized Regression Weights*

			Regression Weight					
			Unstandardized	Standardized	S.E.	C.R.	P	Label
IT3	<---	IT	0.90	0.72	0.07	13.79	***	par_14
IT4	<---	IT	0.97	0.88	0.06	17.24	***	par_15
IT5	<---	IT	1.00	0.82				
KA1	<---	KA	0.66	0.70	0.04	15.36	***	par_20
KA3	<---	KA	0.86	0.90	0.04	23.92	***	par_31
KA4	<---	KA	1.00	0.91				
KC1	<---	KC	1.00	0.81				
KC2	<---	KC	1.06	0.86	0.06	17.52	***	par_17
KC4	<---	KC	1.11	0.79	0.08	14.86	***	par_18

Table 5.32  
*Final Measurement Model – Unstandardized and Standardized Regression Weights*  
*(continued)*

KE3	<---	KE	1.00	0.82					
KE4	<---	KE	1.00	0.83	0.06	17.72	***	par_5	
KE9	<---	KE	0.80	0.68	0.06	12.92	***	par_4	
KS4	<---	KS	1.00	0.88					
KS5	<---	KS	1.00	0.90	0.05	21.37	***	par_19	
KS6	<---	KS	0.66	0.66	0.05	13.60	***	par_9	
KW1	<---	KW	1.00	0.73					
KW5	<---	KW	0.94	0.76	0.08	12.13	***	par_2	
KW7	<---	KW	1.00	0.80	0.08	12.43	***	par_1	
OC11	<---	OC	1.00	0.82	0.07	14.69	***	par_3	
OC12	<---	OC	1.00	0.83					
OC15	<---	OC	0.92	0.66	0.08	11.87	***	par_12	
OP1	<---	OP	0.91	0.79	0.06	14.80	***	par_30	
OP2	<---	OP	0.84	0.75	0.06	14.00	***	par_13	
OP8	<---	OP	1.00	0.76					

\*\*\*  $p < .001$  (S.E. – Standard Error. C.R. – Critical Ratio)

The overall measurement model validity inspection indicates that the level of model fit was satisfied. To recapture, the initial measurement model of this study returned the value of goodness-of-fit indices as:  $\chi^2_{(1062)}=3352.58$ ;  $\chi^2/df=3.2$ ; CFI=.80; TLI=.79; SRMR=.07; RMSEA=.08. Whereas, for the final measurement model, the indices were:  $\chi^2_{(234)}=408.32$ ;  $\chi^2/df=1.8$ ; CFI=.96; TLI=.96; SRMR=.05; and RMSEA=.047. Table 5.33 summarizes the indices for initial and measurement model to ease the process of comparison. Other model fit indices produced by AMOS can be found in Appendix 5.5. From the comparison, it can be suggested that model re-fit had improved the final measurement model goodness-of-fit than initial model.



Table 5.33

*Initial and final measurement models fit indices comparison*

Index	Initial-model fit	Final-model fit	Goodness-of-fit cut-off values (*)
$\chi^2$ p-value	.000	.000	> .05
Normed chi-square	3.2	1.8	$\leq 3.0$
CFI	.80	.96	> .90
TLI	.79	.96	> .90
SRMR	.07	.05	$\leq .08$ with CFI > .92
RMSEA	.079	.053	< .07 with CFI $\geq .90$

(\*) Suggested for  $N > 250$  and number of observed variables exceeding 30 (Hair et al., 2010, p. 654)

Model fit indices showed that  $\chi^2$  in initial model has reduced from 4745.17 to 408.32 in final model, which suggests noticeable reduction in term of mismatch degree between the model and sample data, showing ample sign that final model is a better model. Beside the chi-square statistic, the normed chi-square (NC) also showed an improvement from initial to final model (from 3.2 to 1.8). Tabachnick and Fidel (2007) postulated that  $NC < 2.0$  is a good model fit index. The comparative fit index (CFI) and Tucker-Lewis index (TLI) also gave better indices in final model as compared to initial model. The indices have improved from .80 to .96 for CFI and from .79 to .96 for TLI. The initial model CFI and TLI indices were below than the cut-off value (.90). Furthermore, both CFI and TLI met the threshold of .95 as suggested by Bentler's (1999).

As explained in chapter 4, the threshold for RMSEA was set at  $<.07$  with condition that CFI is  $\geq .90$  (Hair et. al., 2010). The indices has reduced from .079 (CFI = .80) to .053 (CFI = .96). This shows that the model fit the data well. Lastly, Standardized Root Mean Square Residual (SRMR) also was observed. The cut-off value used in this study is as per Hair et. al.'s (2010) suggestion which is  $SRMR \leq .08$  with conditions that CFI > .92. The SRMR for final model is .05 which also shows that the model fit the data well.

Combined all together, considering size of the study's samples size (number of observations of this study N=345) and model complexity (number of observed variables m=24), the results suggest that the good fit of the data is moderate. Therefore, the first step of SEM two-step has been completed and next to proceeds to the subsequent assessment of the structural model.

## **5.6 Structural Equation Modelling**

In the previous sections, the assessment of the final overall measurement model which comprises of eight first-order constructs, namely KW, OC, IT, KE, OP, KC, KS and KA; and one second-order construct which is KMP have been discussed. As discussed in section 5.5.2, this study has employed few assessment criteria in examining the model fit and construct validity such as model fit indices, standardised factor loadings, composite reliability, and inter-construct correlations and they gave satisfactory results. Proceeding from here, the structural model is subsequently specified and assessed in order to examine the theoretical links among the latent variables as discussed in the following sections.

### **5.6.1 Structural Model Fit**

In SEM, model is treated as a saturated structural when the number of structural relationships is equal to the number of possible correlations in the CFA. Based on this, saturated theoretical model fit statistics should be the same as the results obtained during CFA model analysis (Hair *et al.*, 2006). In this study, SEM results showed that the structural model met the level of model fit. The Chi-square value was significant ( $\chi^2/df=2.7$ ,  $p=0.00$ ) and CFI value was 0.92, TLI = .90 and RMSEA (badness-of-fit) = .07. Looking at the extensive sample size of the study (N-345)

model complexity (observed variables = 24), these results support the overall structural model fit. Figure 5.11 shows the theoretical model used in addressing the research questions and hypotheses testing.

CMIN = 649.745 df = 239 p-value = .000  
 CMIN/df = 2.719  
 CFI = .915 TLI = .902  
 RMSEA = .071  
 SRMR = .1889

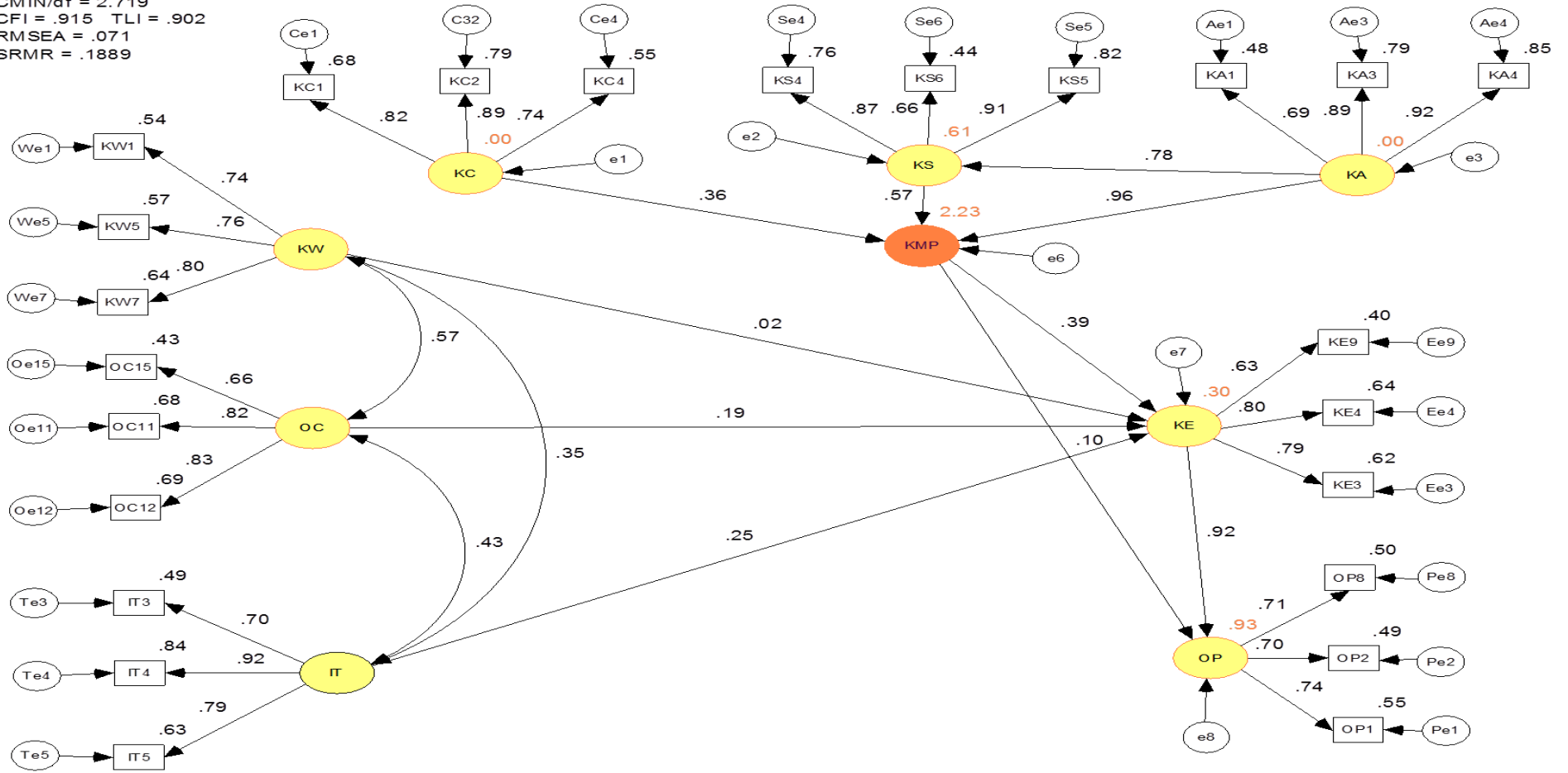


Figure 5.11  
 Structural Equation Modelling of Theoretical Model

## 5.6.2 Hypotheses Testing

Upon completion of overall structural model fit assessment and confirmation of model fit indices, the following step is to test the causal relationships by examining the individual parameter estimates. The first question in this study is dealing with factors that affect KME as follows:

### Q1. What are the factors that affect KM effectiveness?

The KME is represented by four hypotheses, H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub> and H<sub>4</sub> as follows:

- H<sub>1</sub>: There is a relationship between knowledge workers and the effectiveness of knowledge management
- H<sub>2</sub>: There is a relationship between organizational culture and the effectiveness of knowledge management
- H<sub>3</sub>: There is a relationship between technology and the effectiveness of knowledge management
- H<sub>4</sub>: There is a relationship between knowledge management practices and the effectiveness of knowledge management

Figure 5.11 shows the hypothesized path estimates. The hypotheses were developed to deal with the interrelationships among variables. SEM was conducted to test the hypotheses through path coefficients and critical ratio as shown in Table 5.34.

Table 5.34  
*Structural Model Parameter Estimates (H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>4</sub>)*

Hypotheses	Correlation	Standardization Regression Weights	S.E.	C.R.	p-value
H <sub>1</sub>	KE ← KW	0.02	0.07	0.35	0.72(*)
H <sub>2</sub>	KE ← OC	0.19	0.08	2.75	0.006(**)
H <sub>3</sub>	KE ← IT	0.25	0.06	3.85	***
H <sub>4</sub>	KE ← KMP	0.40	0.05	2.89	0.004 (**)

\*  $p < .10$     \*\*  $p < .05$     \*\*\*  $p < .001$  (S.E. – Standard Error. C.R. – Critical Ratio)

H<sub>1</sub> suggests that there is a relationship between KW and the effectiveness of KM. SEM's result shows that the p-value is < .10 (path coefficient  $\lambda=0.02$ ; C.R. =0.35;  $p=0.72$ ). Results suggested that the path coefficients are significant, means that there is a relationship between KW and the effectiveness of KW. In other words, research hypothesis H<sub>1</sub> is supported by the data.

H<sub>2</sub> suggests that there is a relationship between OC and the effectiveness of KM. The study found out that the p-value < .05 (path coefficient  $\lambda=0.19$ ; C.R. =2.75;  $p=0.006$ ). This result suggests that path coefficients are significant means that there is a relationship between OC and the effectiveness of KM and therefore research hypothesis H<sub>2</sub> is accepted.

H<sub>3</sub> suggests that there is a relationship between IT and the effectiveness of KM. SEM's result shows that C.R. value is > 1.96 and p-value is < 0.001 (path coefficient  $\lambda=0.25$ ; C.R. =3.85;  $p=0.000$ ). This result suggests that path coefficients are significant and means that there is a relationship between IT and the effectiveness of KM and therefore research hypothesis H<sub>3</sub> is supported by the data.

H<sub>4</sub> suggests that there is a relationship between KMP and the effectiveness of KM. SEM's result shows that C.R. value is > 1.96 and p-value is < 0.05 (path coefficient  $\lambda=0.40$ ; C.R. =2.89;  $p=0.004$ ). These results suggest that path coefficients are significant and mean that there is a relationship between KMP and the effectiveness of KM and therefore the research hypothesis H<sub>4</sub> is accepted.

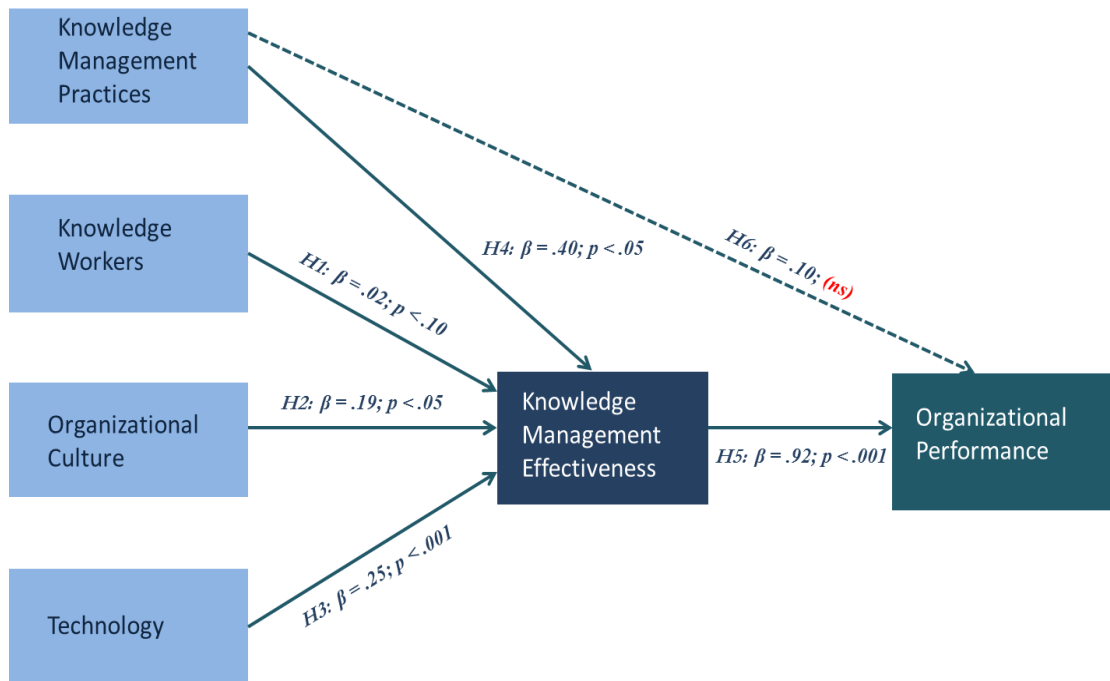


Figure 5.12  
*Hypothesized Path Estimates*

The second question of this study is to examine whether there is any relationship between KME and OP as follows:

**Q2. Is there any relationship between KM effectiveness and organizational performance?**

This relationship is represented by one hypothesis,  $H_5$  as follows:

$H_5$ : There is a relationship between effectiveness of knowledge management and organizational performance.

SEM was conducted to test the hypothesis through path coefficients and critical ratio, as shown in Table 5.35.

Table 5.35  
*Structural Model Parameter Estimates (H<sub>5</sub>)*

Hypotheses	Correlation	Standardization Regression Weights	S.E.	C.R.	p-value
H <sub>5</sub>	OP ← KE	0.92	0.13	7.10	***

\*  $p < .10$     \*\*  $p < .05$     \*\*\*  $p < .001$  (S.E. – Standard Error. C.R. – Critical Ratio)

H<sub>5</sub> suggests that there is a relationship between KME and OP. SEM’s result shows that C.R. value is > 1.96 and p-value is < 0.001 (path coefficient  $\lambda=0.92$ ; C.R. =7.10;  $p=0.000$ ). These results suggest that path coefficients are significant and mean that there is a relationship between KME and OP and therefore research hypothesis H<sub>5</sub> is supported by the data.

The third question in this study attempts to investigate whether KME mediates KMP and OP relationship as follows:

**Q3. Does KM effectiveness mediate the relationship between knowledge management practices and organizational performance?**

This relationship is represented by one hypothesis, H<sub>6</sub> as follows:

H<sub>6</sub>: There is an indirect relationship between knowledge management practices and organizational performance.

SEM was conducted to test the hypothesis through path coefficients and critical ratio as shown in Table 5.36.



Table 5.36  
*Structural Model Parameter Estimates (H<sub>6</sub>)*

Hypotheses	Correlation	Standardization Regression Weights	S.E.	C.R.	p-value
H <sub>6</sub>	OP ← KMP	0.10	0.04	1.50	0.133

\*  $p < .10$     \*\*  $p < .05$     \*\*\*  $p < .001$  (S.E. – Standard Error. C.R. – Critical Ratio)

H<sub>6</sub> suggests that KMP per se do not influence OP directly and significantly (path coefficient  $\lambda=0.10$ ; C.R. =1.50;  $p=0.133$ ). Whereas, the structural model result KMP >> KME showed that KMP demonstrated a significant direct impact on KME (path coefficient  $\lambda=0.40$ ; C.R. =2.89;  $p=0.004$ ). There was also a significant relationship between KME and OP (path coefficient  $\lambda=0.92$ ; C.R. =7.10;  $p=0.000$ ). Hair *et al.* (2006) postulates that indirect effect size is nontrivial relative to the strength of the direct effect, therefore at least one significant relationship should be included. The structural model (Figure 5.11) showed the direct path between KMP and OP was lower (path coefficient  $\lambda=0.10$ ; C.R. =1.50;  $p=0.133$ ) when KME was modelled as mediator. Thus, there is an indirect relationship between KMP and OP, therefore, H<sub>6</sub> hypothesis is supported by the data.

## 5.7 Summary

This chapter reported the results of data examination followed by results of data cleaning process and results. Two-step SEM analysis was conducted using AMOS version 16, the statistical software. In the first step of SEM, CFA was conducted to assess the construct validity and measurement model fit in order to ensure that the overall measurement model was satisfied. This is followed by structural model that was then specified and it was found that model fit conditions was met and, therefore, the model was used in addressing the research questions and to test the theoretical

relationships through the hypotheses which were developed earlier. To summarize the hypotheses testing, all six were supported as what has been predicted as shown in Table 5.37.

Table 5.37  
*Hypotheses Assessment Summary*

Hypothesis	Statement	Structural Path	Estimate		Hypothesis
			Significant	Sign	
H <sub>1</sub>	There is a relationship between knowledge workers and the effectiveness of knowledge management	KE ← KW	Yes	Positive	Supported
H <sub>2</sub>	There is a relationship between organizational culture and the effectiveness of knowledge management	KE ← OC	Yes	Positive	Supported
H <sub>3</sub>	There is a relationship between technology and the effectiveness of knowledge management	KE ← IT	Yes	Positive	Supported
H <sub>4</sub>	There is a relationship between knowledge management practices and the effectiveness of knowledge management	KE ← KMP	Yes	Positive	Supported

Table 5.37  
*Hypotheses Assessment Summary (continued)*

Hypothesis	Statement	Structural Path	Estimate		Hypothesis
			Significant	Sign	
H <sub>5</sub>	There is a relationship between knowledge management effectiveness and organizational performance	OP ← KE	Yes	Positive	Supported
H <sub>6</sub>	There is an indirect relationship between knowledge management practices and organizational performance	OP ← KMP	Yes	Positive	Supported

In Chapter 6, further discussion on the main findings will be offered.

## **Chapter SIX**

### **Discussion**

#### **6.1 Introduction**

The purpose of this study is to develop a theoretical model on the effect of organizational factors on KME towards OP and to empirically examine the model in Malaysian Public Sectors. The chapter's summary is presented below.

In Chapter ONE, the research overview and the three research questions as stated below have been explained.

- Q1. What are the factors that affect KM effectiveness?
- Q2. Is there any relationship between KM effectiveness and organizational performance?
- Q.3 Does KM effectiveness mediate the relationship between knowledge management practices and organizational performance?

To address these research questions, chapter TWO covered the relevant areas with regards to KM supported by existing literatures and past studies. Various factors or also known as enablers that influence the success of KM implementation have been identified. This study had focused on KW, OC, KMP and IT as the organizational factors. This followed by chapter THREE, a theoretical model and six hypotheses were developed to address the above research questions.

In chapter FOUR, research methodologies were explained in details. The instruments that were developed were based on past studies. In this chapter, the approach taken in handling the data collection as well identifying and defining the sampling are explained. This chapter also covered data analysis techniques and ethical considerations of the study.

Chapter FIVE explained the details of data analysis. SPSS version 14, was used to analyze the data and reported the descriptive statistics. Data examination was also been conducted to report the missing data, outliers, normality as well as factor analysis. This chapter also covers the result of SEM two-step approach using AMOS statistic software version 16 to investigate the theoretical model and test the hypotheses which was explained in chapter 3.

In the current chapter SIX, discussion of the three research questions and the findings from all six hypotheses are covered. The study elaborated on factors that influenced the effectiveness of KM and the effect of KM on OP. Figure 6.1 presents chapter's outline.

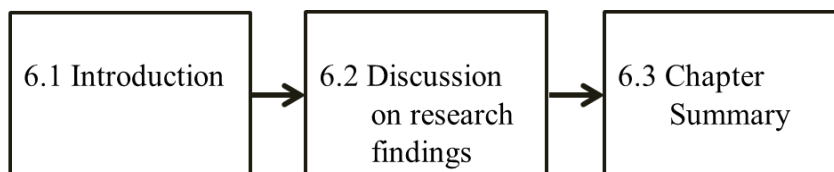


Figure 6.1  
*Chapter Six Outline*

## 6.2 Discussion of Research Findings

In this section, the discussion on research findings is covered. As reported in chapter 5, SEM results indicated that both proposed measurement model and structural model met the model fit indices. Based on these results, in order to address the research questions, six research hypotheses were tested.

Firstly, this study intended to produce an extensive measurement model on the effects of organizational factors on KME and its impact on OP and to test the model in Malaysian Public Sectors as indicated in the following research question.

### **Q1. What are the factors that affect KM effectiveness?**

Existing KM literatures were examined and few organizational factors or also known as enablers have been identified as explained in chapter 2. Various studies have been conducted in the past to investigate the effectiveness of KM implementation and its success factors and among them are study done by Earl (1997) who focused on IT, people and corporate culture, whereas Yap *et al.* (2010) had chosen culture, information technology, OC and people as the enablers and Fazli and Alishahi (2012), studied culture, structure and strategy. In this study, KW, OC, KMP and IT are investigated and target population was Malaysian Public Sectors. The following hypotheses were developed:

- H<sub>1</sub>: There is a relationship between knowledge workers and the effectiveness of knowledge management
- H<sub>2</sub>: There is a relationship between organizational culture and the effectiveness of knowledge management
- H<sub>3</sub>: There is a relationship between technology and the effectiveness of knowledge management
- H<sub>4</sub>: There is a relationship between knowledge management practices and the effectiveness of knowledge management

The two-step SEM analysis was conducted and it was found that all four hypotheses were supported by the data. The first hypothesis hypothesised that there is a relationship between KW and KME. SEM's result shows that the  $p$  value is 0.72 (path coefficient  $\lambda=0.02$ ; C.R. =0.35;  $p=0.72$ ) which suggest significant path coefficients at level  $p <.10$ , which means that positive relationship exists between KW and the effectiveness of KM. With this result it is suggested that KW does contribute to the effectiveness of KM. This finding is contradicted to Theriou *et al.* (2010) where they found that leadership and culture are the main factors that significantly influence KME but not strategy, IT and people. This can be clearly supported by Individualism Culture Index (Hofstede, 2010) where Greece was ranked as individualism culture which the nature of individualistic people would give priority to their self-interest as compare to collectivist people who would pay attention to group interest. According to Hofstede (2010) index, Malaysia is ranked as collectivism culture. This study had statistically proved that KW do influenced the effectiveness of KM.

The KW indicators constitute of the following components: (1) willingness to share knowledge; and (2) willingness to use knowledge (Holste, 2003). The standardized regression weights for each of these components shows that willingness to use knowledge is the most significant (KW7=.80 and KW5=.76) and followed by willingness to share knowledge (KW1=.74). This empirical finding leading us to some sense making. KW interaction is influenced by some social factors such as; trust (Yang, 2004; O'Dell, 2001; and Schrader, 1990), and emotional engagement and relationship quality (Weiss, 1999). When come to sharing information and ideas, trust has been said to have its influence on individual's eagerness to share (Empson,

2001; Husted & Michhailova, 2002). These beliefs appeared to influence KW's behavior in term knowledge utilization and sharing. The element of trust may relate to the perceived value of information, relevancy of information received and reciprocity which they believe that other KW will also provide them with relevant information. The exchange of knowledge between KW involves at least two actors (Boer, van Baalen, & Kumar, 2002). SECI model explains this scenario. The owner of knowledge initiates the process of knowledge sharing through externalization act followed by internalization process by the knowledge recipient to absorb new stimulus (Hendricks, 1999). The results suggest that when KW trusted the source of the information and they find it useful and relevant, it increases the usage of information received or accessed and at the same time, KW didn't hesitate to share their own knowledge with others. This can be explained by willingness factor (Duguid, 2005) who defined it as voluntary constraints on sharing, which further explained as ethical entailments of practice which differentiate between can/can't and will/won't of knowledge flow.

On the aspect of emotional commitment, it may relate to the strength of ties among KW which they belief that organizational goals are achievable by contributing, sharing and using the contributed knowledge rather than treated it as personal retention. The externalization and internalization process in this situation can be explained further by resonance concept in which some understanding on knowledge sharing between KW has been achieved (Boisot, 2002). Generally, knowledge sharing which takes place between actors is usually different due to resonation differences based on their needs. But this study has revealed that KW has common



understanding on the importance of knowledge sharing towards organizational benefit and this is supported by the data.

Based on the findings of this study, it is proven that KW does affect the effectiveness of KM in an organization. Their willingness to share and use knowledge will contribute to KME. Public sector may want to consider empowering their KW to create conducive environment to encourage effective KM. For example, mistakes made to be shared with others without punishment. In certain scenario, some KW may not want to open up their mistakes as they are worried that they will be reprimanded. If this happens, mistakes may be repeated again in the future as there is no trusted source for others to refer to. By sharing the incidences, others may be able to contribute their ideas to improve and avoid the same mistake to take place again.

Davenport (2005) devoted KW as people with education, high degrees of expertise or experience and KW's fundamental job purposes are inclusive of creation, sharing and application of knowledge. Based on the demographic profile of the respondents discussed in Section 5.2.2, majority respondents (81%) were from the group of 40 years old and below with 31–40 years being the largest group (44.8%) followed by the age group between 21 – 30 years (36.2%). Only 9.5 % were between 41–50 years and 9.5% were aged over 50 years. This finding is almost similar with those of Norzanah *et al.* (2006). These groups are young and energetic with full of ideas. This may imply a tendency of encouraging new blood among the KW within public sector in which organizations may want to consider more knowledge sharing initiatives within the organization as this group of people still has number of years of service to serve. Another consideration which an organization may consider is by

providing more facilities for knowledge sharing to take place such as discussion corner, story-telling slot and idea drop box using IT facility.

Every organization will have different set of knowledge from the other as each organization will have different set of people (Kim, 2002). In order to motivate KW, organizations need to continuously ensure that KW's job is interesting as well as to create attractive environment (Drucker, 1999). As suggested by this research's findings, KW is willing to use the knowledge if they find it useful and relevant. With their own knowledge and skills, new knowledge will be created when they interact among KW.

Besides that, based on the findings, it was found that in term of work experience, the data peaks at the 6 - 10 years band (32.6%) and trails off gradually around the 1-5 years (30.8%), 11-20 years (19.8%) and over 20 years (12.3%). These groups, if reflective of the population, would have years of valuable knowledge through their number of years working experiences. Managers in the public sector may want to consider looking at mentoring and tutoring programmes to capture their tacit knowledge from their experienced work force. As highlighted in KM Blueprint (MAMPU, 2011), one of the issue that was brought up was reliance on the "Nota Serahan Tugas (delegation notes)" as the tool to transfer knowledge when the employee leaves the organization which may not be sufficient. KW may only document what he / she feels that needs to be documented based on their job scope. He / she may not know what other KW may want to know and therefore there might be a huge knowledge gaps which organization may face. With the proper knowledge sharing mechanism, it can be an effective platform for KW to share their experiences. Knowledge sharing initiatives should be a continuous effort within the

organizations to encourage KW to interact among them and generate new knowledge. This is aligned with past studies which relate the success of KM to managing KW effectively such as Allee (1997), Greengard (1998), Suk Choi (2000) and Rao (2002).

In Table 5.5 in chapter 5, it was found that most of the respondents are having either diploma or bachelors' degree and above with 94 respondents with diploma/degree and 1-5 years of experiences; 84 respondents with diploma/degree and 6 - 10 years of experiences; 40 respondents with diploma/degree and 11 - 20 years of experiences; and 16 respondents with diploma/degree and over 20 years of experiences. Total number of respondents in these groups is 244 as compared to 32 respondents with SPM/STPM qualification and 58 respondents with Masters/Doctorate qualification. This shows that the respondents' qualification fitted MDEC's definition of KW as a person who has any one of these qualifications: (1) five or more years experiences in ICT; (2) any discipline university degree or graduate diploma; and (3) any discipline master degree or higher (KEMP, 2002). Nevertheless, this study also found that there were also respondents with SPM/STPM which is equivalent to General Certificate of Secondary Education (GCSE) in the United Kingdom. This study is using MDEC and Drucker (1954) KW definition as explained in section 2.3.1, and therefore, this group was not ignored as their responses may shed to some lights in KM area. Some of these employees have more than 5 years working experience (6 – 10 years working experiences, 21.9%; 11 – 20 years working experiences, 25.0%; over 20 years working experiences, 21.9%). Based on their number of years of working experiences, they have valuable knowledge, and groups could also be categorized as

KW and therefore, this study finds that there is a possibility to refine the definition of KW from Malaysian Public Sectors perspective.

The second hypothesis hypothesised that there is a relationship between OC and KME. SEM's result shows that the  $p$ -value is 0.006 (path coefficient  $\lambda=0.19$ ; C.R.=2.75;  $p=0.006$ ). These results suggest that path coefficients are significant at level of  $p < 0.05$ , which means that positive relationship exists between OC and the effectiveness of KM. With this result it can be suggested that OC does contribute to the effectiveness of KM and this aligned with the study done by Theriou *et al.* (2010). In their study; they hypothesized that people, leadership, culture, strategy and IT influenced positively on KM's effectiveness and the results showed that the standardized regression value was 0.39 and t-value is 2.96 and their hypothesis is supported by the data. This is also confirmed by study done by Ipe (2003) and Tong and Mitra (2009) where in their findings it was highlighted that cultural values of each employees affected KS, communication and learning in the organization. With this finding, it can be suggested that KS could only take place if the OC encourages it (Stoddart, 2001).

The OC indicator in the final model constitute of collectivism culture dimension (Hofstede, 1997). The standardized regression weights for each items in this component met the threshold of .7 (OC11=.82, OC12=.83 and OC15=.66). Linn (2008) refers OC as group of people who has been working together for period of time. This is one most critical factor which will influence people behaviour. The way how people interact among each other will lead to a lot more activities. OC can be treated as knowledge resource where knowledge is managed within a context through

creation, acquisition and sharing (Jones, Cline, & Ryan, 2006). Collectivism culture is defined as interdependency of collectivist culture people within their groups such as tribe, family and nation (Hofstede, 2001) and always put priority to group's goals. The result from this study suggests that the culture type in the Malaysian Public Sector is more skewed to collectivism culture. KW is comfortable to work with others. This finding is aligned with Triandis (1995) who argued that collectivist tend to think generally about themselves and more on the interconnectedness with others in their community. This means that collectivists collaborate with others to share outcomes and non-material resources such as effort and time (Hui, 1988) in creating cooperation in learning situation (Hofstede, 1986).

As discussed above, OC can be treated as knowledge resource where KW within the organization manages the organizational knowledge through the creation and sharing. In the collectivism culture, KW tends to work together; focus is given towards group's goal. The amicable relationship among KW motivates them to work closely, encourages group motivation to collectively achieve higher goal (Eisenberg, 1999). This study documented that KW prefers to work with their colleagues which make knowledge sharing among them more effective. The results suggest that within collectivism culture, KW does not feel detached; they are together and they feel they are part of the organization which encourages KS which gives an impact on KME. This study suggests that the organizational culture that manifested in KW behaviour plays a significant role on the effectiveness of KM in an organization.

Therefore, Malaysian public sectors may want to consider providing their KW with more facilities to encourage knowledge sharing to take place. As discussed in chapter

2, 'ba' is an ideal place for knowledge conversion to take place (Nonaka & Takeuchi, 1998) and with the nature of collectivism culture; 'ba' may work well in this environment. Originating ba encourages tacit knowledge sharing where new knowledge could be developed through socialization among KW. Tacit knowledge is explicitly documented through the collaboration among KW as an output of interacting ba. The proper mechanism using technology tools to store organizational knowledge provides the organization with cyber / virtual ba which will create more awareness among KW on the importance of managing organizational knowledge. As a result, these practices provide a platform for social context which will influence people behaviour in communication and their action (DeLong & Fahey, 2000). This study suggests that people within collectivism culture don't feel isolated; they feel the sense of belonging, which encourages knowledge sharing among KW. Therefore, organizational culture is an important entity in an organization (Gold *et al.*, 2001) for effective KM and this is supported by the data.

The third hypothesis hypothesised that there is a relationship between IT and KME. SEM's results show that  $p$ -value is 0.000 (path coefficient  $\lambda=0.25$ ; C.R.=3.85;  $p=0.000$ ). These results suggested that path coefficients are significant at level of  $p < 0.001$ , which means that positive relationship exists between IT and the effectiveness of KM. With this result it can be suggested that IT does contribute to the effectiveness of KM and this is aligned with the study done by Theriou *et al.* (2010). In their study; they hypothesized that people, leadership, culture, strategy and IT influenced positively on KM's effectiveness and the results showed that the standardized regression value was 0.39 and  $t$ -value is 2.96 and their hypothesis was supported by the data.

The IT indicators in the final model constitute of PU - job relevance and result demonstrability dimension (Venkatesh & Davis, 2000). The standardized regression weights for each items in this component met the threshold of .7 (IT3=.70, IT4=.92 and IT5=.79, where IT3 refers to job relevance and IT4 and IT5 refer to result demonstrability). The result suggests that job relevance and result demonstrability characteristics collectively influenced the effectiveness of managing organizational knowledge. Knowledge that is effectively stored eases the process of retrieval which helps KW to get access to relevant knowledge. With the use of IT, managing knowledge is becoming more effective. It supports knowledge storing, sharing and application between KW in the organization regardless wherever they are. It helps to overcome the issue of time and space barriers for group interactions, helps KW to collaborate and share their expertise, to ease the communication process regardless of the location (Weill & Broadbent, 1998). According to TAM model, PU is hypothesized to affect intention to use. In PU, individual believed that IT and system usage could boost their work performance (Davis, 1989). It will influence an individual behaviour towards usage of IT which is link to their emotional evaluation whereby when IT is adopted; it enables KW to complete their task within shorter time and effort which increases their job deliverables and productivity. The result of this study is consistent with previous research where job relevance and result demonstrability of PU are supported by the data. KW believes that with the use of IT as the enabler it will give an impact on their work performance which will influence stronger behaviour in using IT. The study's result demonstrated that TAM3 constructs has a direct effect on the effectiveness of KM. KW within the organization will always refer to the stored knowledge in the knowledge repositories if they find that information that they retrieved is useful.

The advantage of IT in KM implementation is in its functionalities and flexibility and therefore KW finds it useful and with the features it offers, information that been stored can be filtered easily and relevant to their work. IT helps the organizations to manage their knowledge effectively which will encourage the knowledge activities to take place. With the latest IT, it could offer the state-of-art applications where with the click of a mouse, KW could get hold of required information either from internal repositories or external repositories. Even though, it is known that IT is just an enabler in KM implementation but it is still an important tool to assist organizations to manage their organizational knowledge effectively and efficiently.

With this finding, the Malaysian public sector may want to consider allocating procurement budget to invest in getting relevant IT system as the KM enabler to provide effective and efficient tools for KM implementation.

The fourth hypothesis hypothesised that there is a relationship between KMP and KME. SEM's result shows that  $p$ -value is 0.004 (path coefficient  $\lambda=0.40$ ; C.R.=2.89;  $p=0.004$ ) which suggest significant path coefficients at level  $p < 0.05$ , which means that positive relationship exists between KMP and the effectiveness of KM. With this result it can be suggested that KMP does contribute to the effectiveness of KM and this aligned with the study done by Zaim et al (2007). In their study, they hypothesized that KM process positively affect the performance of KM and the results showed that KM process standardized regression weight was significant ( $p < 0.05$ ), which supported their hypothesis.



There were number of studies done in the past to investigate the impact of KMP on KM and it is widely accepted in KM literatures that KMP does significantly influence the effectiveness of KM. As discussed above, Zaim et al (2007) study also found that KMP significantly affects the performance of KM. Nevertheless, the result cannot be generalized to whole population as the research was conducted based on case study approach in one GSM company in Turkey. This study intends to address the gap by examining the relationship between KMP and KM in Malaysian Public Sector contexts. The KMP indicators in the final model constitute of KA, KS and KA dimensions. It was found that KA to be the most important criteria where the standardized regression weight was 0.96. Next is KS with standardized regression weight value of 0.57 and followed by KC with 0.36. This result is opposite of Zaim et al (2007) in which in their findings, KS was the most important element, with standardized regression weight of 0.45, 0.42 for knowledge generation and finally knowledge utilization, 0.28.

This study suggests that in Malaysian public sector contexts, knowledge application was found to be more important criterion in KMP. This is aligned with Ordaz *et al.* (2004) who highlighted that in KM implementation, the ability of creating value from organizational knowledge is very crucial when this knowledge are transformed into application and action to improve organization's performance. Although the result showed that KC has less impact on KMP, but it is well recognized that KMP is interrelated (Thomas *et al.*, 2001). And therefore, in order for public organizations to improve their KMP, the KMP indicators should be treated as a whole. Overall, the standardized regression weights of KMP are found to be significant ( $p < 0.001$ ). The results suggest that KMP characteristics collectively influenced the effectiveness of

KM. This finding may be useful for the organization to look at the way how knowledge is been managed. It has been argued that KM activities success are depending on the effectiveness and efficiency of knowledge usage and how it is been used for action (Wilhelmij & Schmidt, 2000).

Knowledge constitutes of tacit and explicit and it will be useful once it has been codified, classified and stored properly to ease the process of searching and retrieval. Important point to take note is that knowledge is diffused and dispersed everywhere in the organization. It resides in people's mind, ingrained in procedures and artefacts, organizational processes, in the form of hardcopy, stored in optical media and disks (Bhatt, 2002). Information possessed by KW in an organization was gained through their observations and experiences. The role of KW is crucial in knowledge conversion (Nonaka, 1994). As discussed above, KA was identified as the most criteria, followed by KS and KC respectively. Information that they received which KW finds it useful was then internalized. They store the organizational memory in their own capacity to commemorate and articulate their experience and applied it to aid knowledge processing. However, all these knowledge conversion processes are depending on individual's willingness (Bock *et al.*, 2005). In this situation, the process of managing knowledge is seen as tough aspect of KM. It has been contended that organizations which precisely, systematically, passionately and enthusiastically find ways to encourage new knowledge creation and to ensure that existing knowledge is disseminated within organization, will continuously sustain as well as will also transcend (O'dell & Grayson, 1998) where knowledge is applied for action (Ordaz *et al.*, 2004). As explained above, this study found out that KMP has significant impact on the effectiveness of KM. Therefore, it is vital for the

organization to manage and collate their intellectual resources and provide accessibility across boundaries (Robertson, 2002).

As to address the first research question, the results of CFA found that the hypothesis one until four was supported by the data. The path coefficients are significant at level of  $p < .10$  ( $H_1$ ),  $p < 0.05$  ( $H_2$ ),  $p < 0.001$  ( $H_3$ ) and  $p < 0.05$  ( $H_4$ ). The reliability of the four constructs which are KW, OC, IT and KMP, were also satisfied and met the reliability statistical requirement. The convergent validity for these constructs was also satisfied and met the validity criteria. Therefore, it is statistically proven that the selected constructs were fit. With these findings it can be suggested that the four constructs, KW, OC, IT and KMP are the organizational factors that affect the effectiveness of KM. Based on this result it is suggested that the four factors should not be viewed in isolation but it should be looked at as a whole in measuring the effectiveness of KM in an organization.

The next question in this study was to investigate whether there is any relationship between KME and OP as follows, which was presented by hypothesis five.

**Q2. Is there any relationship between KM effectiveness and organizational performance?**

The two-step SEM analysis was conducted and it was found that hypothesis five was supported by the data. SEM's result shows that  $p$  value is 0.000 (path coefficient  $\lambda=0.92$ ; C.R. =7.10;  $p=0.000$ ) which suggest significant path coefficients at level  $p < .001$ , which means that positive relationship exists between KME and OP. With this result it can be suggested that KME does affect OP. This is aligned with study done by Rašula *et al.* (2012) who hypothesized that KM has a positive impact on OP. In their study, they found out that KM component positively affect OP. Totfen and

Olsen (2003) argued that implementation of KM which was done effectively would add value to the overall OP. This was supported by Gold *et al.* (2001) who said that organizations that successfully implement KM will be more innovative, more effective in effort coordination, able and faster in producing new products and becoming very responsive to change in market. Theriou *et al.* (2010) also had conducted a study to empirically investigate factors that influence KME within organization which influence total organization's performance. This study was done in Greece over 109 companies. One of the hypotheses hypothesized that KME affect the OP. The hypothesis was supported by the data with path coefficient = 0.73 and t-value = 8.98 > 1.96.

KM is seen as an important element for organizational performance due to its impact on innovation improvement, better way of getting work done, improve decision making process, and an improvement in financial status (Holsapple & Wu, 2008). In this study, performance was measured from the internal processes perspective which relate to all activities and processes which are necessary for organizations to excel in meeting customer's expectation (Rasula *et al.*, 2008). The organizations that were involved in this study declared that the most important benefits of KM in their organizations are from the aspect of services improvement which increases customer satisfaction as the outcome of organizational knowledge resources utilization. Further to that, the results empirically prove that there is a relationship between KME and OP, and it is found that KME is a significant predictor of OP. The results show strong positive relationship between KME and the three determinants of OP which is aligned with those Rasula *et al.* (2012). With this finding, it can be suggested that public organizations with effective implementation of KM could

improve their overall OP as argued by Wong & Aspinwall (2005) who said that organizations could excel and accomplish positive outcomes through an effective KMP.

Lastly, this study was to examine the third research question which is to investigate whether KME mediates the relationship between KMP and OP as follows:

**Q3. Does KM effectiveness mediate the relationship between knowledge management practices and organizational performance?**

The above research question is presented by hypothesis six. The two-step SEM analysis was performed and the result returns  $p$  value of 0.133 (path coefficient  $\lambda=0.10$ ; C.R. =1.50;  $p=0.133$ ). This result suggests that KMP per se do not influence OP directly and significantly. Whereas, the structural model result KMP >> KME showed that KMP demonstrated a significant direct impact on KME (path coefficient  $\lambda=0.40$ ; C.R. =2.89;  $p=0.004$ ). There was also a significant relationship between KME and OP (path coefficient  $\lambda=0.92$ ; C.R. =7.10;  $p=0.000$ ). The results show that the relationship between KMP and OP is insignificant however their indirect positive relationship was found to have a strong positive impact on OP. This is supported by Wong and Aspinwall (2005) who argued that in order for organizations to excel and accomplish positive outcomes, their organizational knowledge should be managed effectively. These results support the organizational knowledge-based view where KM does not only depend on managerial practice, but it is a combination of other elements includes and not limited to KW, OC and IT. In other words, KMP does not affect OP directly but its effect was mediated via KME. Therefore, with this result it is suggested that the level and how effective knowledge is been managed is associated with how it can be translated into value to the organization. An

organization that improves its KMP will realise improvement in KME in order to achieve higher OP.

### **6.3 Summary**

This chapter discusses the findings that were presented in chapter 5. It discusses the result of all six hypotheses where it was found that all six hypotheses were supported by the data. The chapter further discusses the path coefficient results which were analyzed using SEM. The findings provide insights of organizational factors that have significant impact on the effectiveness of KM which affect OP from the internal processes perspective from the Malaysian Public Sectors contexts. In the following chapter 7, the conclusion, contributions, implication, limitation and recommendation for future research will be offered.

# Chapter SEVEN

## Conclusion

### 7.1 Introduction

This chapter focuses on the study's findings which were discussed in chapter SIX. It provides an overview and conclusion of this study. Besides that, the theoretical contribution and practical implications will also be discussed as well as an explanation on how this study contributed to body of knowledge. Figure 7.1 presents the chapter's outline.

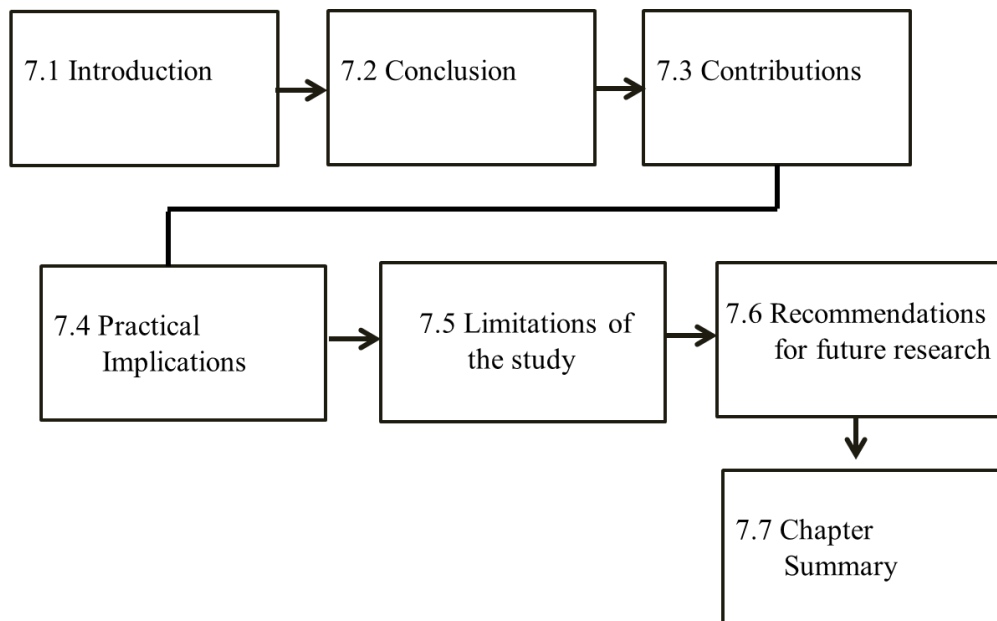


Figure 7.1  
*Chapter Seven Outline*

## **7.2 Conclusion**

This study aimed to investigate whether the chosen organizational factors, viz. KW, OC, KMP and IT give an impact on the effectiveness of KM which contributes to OP. In other words, this study attempts to contribute to existing KM literatures through significant findings. At the onset, this study had gone through and conducted review on existing KM and OP literatures which had led to detailed overview of past relevant studies on the research area by which some research gaps have been identified. From here, a theoretical model on effect of organizational factors on KME and OP was developed. In doing so, this study includes eight first-order constructs and one second-order construct which was adapted from prior research. Six hypotheses were developed and tested. It was found that all hypotheses were significant and was supported by the data. The findings shed light on some research gaps which was discussed in chapter three. Besides providing some empirical evidence on the relationship between KME and OP, this study suggests that KME could be arbitrating mechanism between organizational factors and OP.

Based on the study's results, it can be suggested that KW, OC, KMP and IT are the related components that formed the organizational factors that influenced the effectiveness of KM in the public sector organization in Malaysia. Among the organizational factors which were mentioned earlier, KMP is the most critical dimension followed by IT, OC and KW respectively. IT is still considered as crucial dimension in KM implementation to assist in effective storing and dissemination of useful organizational knowledge throughout the organization regardless wherever KW are which encourages knowledge sharing to take place. Nevertheless, this study



does not view these factors in isolation. Based on the findings, it showed strong positive correlation between the factors (Figure 5.11).

KMP comprises of KC, KS and KA with application being the most important dimension, followed by sharing and creation respectively. Knowledge will only be effective once it is been applied to solve problems or to improve decision making process or to improve existing work processes. This study proved the interrelationship between the organizational factors towards the effectiveness of KM in the Malaysian public sector. The results showed strong support towards knowledge-based view of an organization where KM does not only depending on managerial practice, but it is a combination of other factors such as KW, OC and use of IT. This coincides with Penrose's (1959) opinion who argued that organizational resources usefulness would varies with changes in organizational knowledge. Managing knowledge effectively acts as the most important area in organizations. Secondly, this study also confirmed that KME has a positive relationship with OP. Effectiveness of KM has contributed to the improvement of organizational internal processes. Finally, it was also found that KME mediates the effect of KMP towards OP. This result suggests that how effective knowledge is been managed is depending on the efficiency and effectiveness of knowledge creation, how it been shared and applied within the organization which could improve OP from the internal processes context. Furthermore based on the results it showed that KMP has a greater impact on KME than the other three factors which were examined. With these results, it shows strong evidence for an organization to pay attention on the importance of establishing effective KMP within the organization to enhance OP as argued by Roth (2003) and Beveren (2002) who said that organization's ability to create knowledge

and disseminate it throughout the organization is recognized as a major strategic capability in order to gain sustainable competitive advantage.

Further to this, the findings of this study can be suggested supporting Malaysian Government plan in establishing the knowledge hub to inculcate the KM culture among KW and strengthening KM initiatives. The study has revealed that the culture in Malaysian public sector is skewed to collectivism culture, and therefore creating conducive environment for KW to work together which encourages KS to take place would be ideal. Effective KM within the public sector is seen as the gateway in assisting PA in building IC in order to improve the effectiveness of public decision making process as well as situation handling (Malaysian Government's ICT Strategic Plan : 2011 – 2015).

### **7.3 Contributions**

This study contributed to the literature of KM and OP in its own manner. This section will describe its contribution both practically and theoretically as follows.

Based on the existing literatures, it was found that there is lack of empirical evidence in the literature on KME and OP in Malaysian Public Sectors context. This study has filled this gap by conducting a questionnaire survey in Malaysian Public Sectors. 30 Public Sectors were randomly chosen using SRS without replacement method. Each agency was given a sequential number. The selection of organization was done using Research Randomizer, a number generator software (Urbaniak & Plous, 2011), whereby a number was generated and matched against the organization sequential number. Proportional distribution of sampling units (KW) and sampling frame

(organizations) was done on four stratum; (1) economic; (2) social; (3) general administration; and (4) security. This enables data collection to be done from different sectors with different business model which allowed varieties of respondent's views. Questionnaires were distributed to 19 Public Sectors who had agreed to participate in the study. The data that were collected enabled this study to test the theoretical links in the proposed model. Based on the analysis, the empirical findings showed that it supported the theoretical model which was developed for this study. It was confirmed that the chosen organizational factors (KW, OC, KMP and IT) have positive relationship with KME and it contributed to positive OP. It provides the empirical evidence of the connection between organizational factors and effectiveness of KM which has an impact on organizational performance. Besides that the empirical results also confirm that this model can be applied in Malaysian Public Sectors context.

Secondly, it was found that KME mediates KMP impact on organizational performance. This result shows that KMP alone does not significantly affect organizational performance. The findings suggest that how well knowledge is been managed is largely associated with willingness of KW to share and use knowledge, how KW perceived the usefulness of knowledge and how well cultural values are translated into value to the organization. Nevertheless, KMP has greater contribution to the effectiveness of KM within public sectors organizations than other factors examined. This finding strengthens the call for the organizations to pay the attention to these resources such as technology, culture and knowledge conversion for effective KM (Gold, *et al.*, 2001) as well as other factors like knowledge acquisition and knowledge application (Van den Bosch *et al.*, 1999; Seleim & Khalil, 2007). The

results of this study shed some light on the inadequacy of examining just the direct relationship between KMP and organizational performance. It can be recommended that future research could explore in details on other areas through which KMP could influences organizational performance.

Third contribution is in term of the methodology that was used in developing the instrument to measure the relationship between organizational factors, KME and OP. The instrument was derived from existing literatures and tuned for the use of this study. As discussed in the Chapter 3, the referred conceptual models on almost same research area were conducted in other countries such as Greece (Theriou *et al.*, 2010), USA (Nikolaos *et al.*,(2010) and Slovenia and Croatia (Rasula *et al.*, 2012). and therefore, this study had contributed to the literature by testing the instruments in Malaysian contexts. The findings confirmed that the adapted instrument is valid and reliable, though in the attempt of improving the model fit, some of the items were deleted. It can be suggested that this instrument can be used in other future research or to be adapted in different contexts where the organizational factors attributes may be different from the country which the instrument was developed in testing the conceptual model.

Lastly, this study has adopted SEM two-step method for measurement and structural models testing. SEM allowed multivariate testing techniques which are consider as very useful approach. With one technique, it allows the researcher to conduct measurement properties measurement and key theoretical relationship testing as well as to do measurement error correction during the estimation process. Furthermore, with SEM, series of dependence relationship can be examined simultaneously. This

study had utilised all these methods to assess the proposed research model in order to improve the accuracy of the findings with the intention comparing the results with previous studies.

## **7.4 Implications**

### **7.4.1 Practical Implications**

In any organization, OP would be the main key areas in order to remain competitive. OP can be measured either from the financial on non-financial perspective. As the result of the study had shown that effective KM contributed to better OP. Organizations are required to pay attention on how they manage their organizational knowledge. Effective KM implementation is a necessity by ensuring that relevant KM initiatives are introduced and proper follow-up mechanism is in place to ensure that the plan is carried through throughout the organizations. As highlighted in MAMPU (2011) study, it was revealed that only 12% of its agency claimed to have KM strategy and 83% believe that their knowledge belong to their agencies only. It was also highlighted that Public Sectors in Malaysia were not fully applied and optimized KM due to lack of sharing culture and different understanding of its concept. Therefore with these findings, Malaysian Government can strongly support the organizational KM initiatives and aggressively execute their KM strategies in inculcating KM culture and strengthen the KM initiatives within their agencies in order to meet their objective in improving public sector's service delivery and decision making process through an informed knowledge environment. Factors such as KMP is an important element to ensure that knowledge is been managed properly and is accessible by people within the organization at anytime from anywhere. Organizations are also not to forget about other factors which also contributed to the

success of KM implementation. People within the organizations must understand the importance of managing knowledge and the need to manage and maintain it in an effective manner. OC is an important entity in KM and this factor should not be taken lightly. Based on the findings of this study, the evidence shows that the culture in Malaysian Public Sectors organizations is more skewed to collectivism culture. Collectivist people will strive to achieve higher set goals than individualists (Triandis, 1995). The study's findings consistent with Triandis (1995) argument that collectivists tend to think globally about themselves and togetherness they have with the community. This shows clearly that collaboration is a means for sharing outcomes and other non-material resources such as effort and time (Hui, 1988) in creating the learning environment (Hofstede, 1986). Public sectors should take this opportunity to create harmonious relationship in the working environment which could lead to required motivation within KW which eventually leads to higher achievement in knowledge sharing practices among them.

Another factor which is equally important is IT. Right IT tool will ease the process of managing organizational knowledge. Organizations may want to consider investing in getting the appropriate IT to automate some of KM initiatives which could comprise of online forum, expert directory, scenario capture, knowledge dictionary and knowledge repositories.

This study suggests organizations to understand and develop integrated approach in implementing organizational KM which to take into consideration KW, OC, KMP and IT dimensions. These dimensions are correlated and it complements each other towards effective KM to achieve OP. One may not work without the other as what

Tsoukas (2005, p.158) said “two sides of the same coin”, one may not exist without the other.

#### **7.4.2 Managerial Implications**

General observation shows that many organizations looking at KM as deploying and implementing some software applications without enough attention on the organizational characteristics in order to ensure successful KM initiatives. This study shows that organizational factors contributed to the effectiveness of knowledge management and it gives an impact on organizational performance. The study highlighted the importance of taking into consideration organizational factors in ensuring organizational KM initiatives succeed. The deliberate KM initiative which to be undertaken by the Malaysian Public Sectors, may involves change management, which involves the comprehensive intellectual capital of every organizations. The IC involves those which are classified as being those belonging to the “hard” as well as the “soft” components. In KM, the former (hard components) has always been those that has been emphasized whilst the soft component tend to be taken for granted, sometimes to the detriment of the KM initiative(s). As such, in order for organizations to have long-term, successful organizational knowledge usage for business/operations advantage, changes may need to take place in the organizational core processes such as strategy, process, culture and behavior (Grover & Davenport, 2001). This study shows that KW, OC, IT and KMP have close interrelationship. As such, Malaysian Public Sectors should take into consideration these factors in formulating their KM initiatives in order to improve service delivery and decision making through an informed knowledge environment.

## **7.5 Limitations of the Study**

Even though based on the results, this study provided strong evidence on the impact of organizational factors on the effectiveness of KM towards OP, but nevertheless, it should take into consideration the limitations of this study. Firstly, the single data collection technique through distribution of research questionnaire may experience potential response bias. The single method data collection may hinder the researcher to obtain further information from the organization. In the future, other researchers may want to consider triangulation method in order to obtain profound insights into area of concern of the research.

Secondly, based on the definition of KW in this study, the study had narrowed down the selection of the respondents to those who has minimum diploma academic qualification (KEMP, 2002). But generally, if we refer to the definition of KW, Drucker (1954) defined KW as a person with the knowledge which is crucial to the organization, whereby Helton (1998) and Kelly (1990) defined KW as a person who is doing non-repetitive and non-routine job. Some of these KW may have many years of working experience which are useful to the organization but they may not necessarily be a diploma qualification holder. KW possibly is a person who participated in compiling, processing, analysing, executing and delivering organizational deliverables. Future researchers may want to relook at the definition of KW so that the intended research would have broader range selection of respondents.

Thirdly, after conducted the analysis using SEM, the measurement scales for all constructs were reduced to three items. This was done to increase the fit indices of



the model. As a result of this action, it may reduce the accuracy of constructs measures. Even though, three items per construct is accepted (Hair *et al.*, 2010), but it was suggested that in doing CFA, model with less items per construct require cross-validation studies in order to re-examine the measurement model as well as to investigate its generalizability. However, due to the constraint of time and resources, this study had collected only single batch sample data and therefore, model re-estimation was not pursued. This problem may be overcome if further research to be conducted in the future.

Finally, within the scope of this study and based on the critical review on the organizational factors, this study had chosen only four factors which are KW, OC, KMP and IT. As discussed in Chapter 2 (Table 2.4), there were many other KM enablers which had been used in past studies such as leadership, organizational structure and strategies. To align with the scope of this study, only four enablers were chosen and focused on as discussed in the previous section. This is also can be considered as the limitation of this study which may be able to be addressed in future research.

## **7.6 Recommendations for Future Research**

As explained in previous section, the mentioned limitation can be viewed as opportunities to expand the study in different context and seen as a contribution to body of knowledge in KM and OP relationship. Future study could consider using triangulation method for data collection as compared to this study. A mixture of quantitative and qualitative approach may improve confidence in findings. Triangulation is seen as among rationales used for multi-method research. It will

assist the researcher to collect more accurate and richer data which enables the researcher to obtain more insights of the studied area in different context. For example, this study found that KMP is the most dominant factor towards effective KM. Future research may also conduct interview as part of qualitative study to get more information on how exactly knowledge is been managed and maintained within the organization. The data then will be interpreted accordingly. Both analyses would be able to provide more insights on the research area.

Secondly, future research may also consider broadening the selection of respondents by redefine the definition of KW. This study had used the definition by Malaysian Development Corporation (MDEC) where KW is an employee with minimum qualification of diploma holder. In retaining and improving organizational knowledge, the experiences and skills of employees are very important. Employees may not obtain the qualification required by the study but they may have been servicing the organizations for many years. These are valuable knowledge which should be tapped by the organization and shared with others.

Thirdly, even though three items per construct is accepted but Hair *et al.* (2010) proposed that is better to have more than three items in measuring constructs. Future study may consider conducting cross-validation studies to further re-examine the measurement model and its generalizability.

Lastly, future study may include other KM enablers as the organizational factors. Even though these enablers were used in past studies but it was done in other countries besides Malaysia. Adding other enablers may reveal new findings.

## 7.7 Summary

Many organizations have realised the importance KM. Effective KM lead to organization's competitiveness and increase OP. Therefore, this study has contributed to the existing body of knowledge in the area of KM and OP by combining few theories such as SECI model, TAM 2 & 3 and cultural dimension to develop the integrated theoretical model of effective KM. Besides that, this study has also added to literature empirical evidence in Malaysian Public Sectors contexts through questionnaires distribution to KW in 19 public sectors within KLVP, the fastest growing region in Malaysia and is the seat of Malaysian capital where most of the headquarters of the public sectors are located. The empirical results based on SEM analysis from 345 usable responses provided evidence that the proposed theoretical model is applicable in Malaysian context. KW, OC, KMP and IT are confirmed as the KM enablers or organizational factors which contributed to the effectiveness of KM. KW, OC and IT are found to be positively correlated and KME mediates the relationship between KMP and OP. This study has shed some lights in the area of KM. It is high time for the Malaysian Public Sectors to pay attention on the importance of managing organizational knowledge in order to be able to fulfill the committed service delivery through an informed knowledge environment. Each organization in the public sector has to have clear strategies to initiate and inculcate KM practices in order to move forward to centralized Malaysian Knowledge Hub. The role of KW is equally important. They should have shared understanding on the importance of KM as well as their involvement and participation in organizational KM initiatives. Lastly, KM implementation in Malaysian public sector is a journey and not a destination and therefore, identifying and managing the key aspects of KM implementation will facilitate overall organizational KM strategies.

## REFERENCES

- Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family*(67), pp. 1012–1028.
- Aguinis, Herman, Gottfredson, Ryan K., & Joo, Harry. (2013). Best-practice recommendations for defining, identifying, and handling outliers. *Organizational Research Methods*, 16(2), 270-301. doi: 10.1177/1094428112470848
- Alavi, M., & Tiwana, A. (2003). "Knowledge management: The information technology dimension," In *Handbook of Organizational Learning and Knowledge Management*, M. Easterby-Smith and M. A. Lyles (eds.), Blackwell Publishing, United Kingdom. pp. 104-121.
- Alavi, Maryam, & Leidner, Dorothy E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107-136.
- Allen, H.B. (1971). Principles of informant selection. *American Speech* (46), pp. 47-51.
- Alter, S. (2002). *Information systems: the foundation of e-business*. Upper Saddle River, NJ: Prentice Hall.
- Altman, D.G., & Bland, J.M. (1996). Detecting skewness from summary information.
- Ardichvili, V., Page, T., & Wentling. (2003). Motivation and Barriers to Participation in Virtual Knowledge-Sharing Communities of Practice. *Journal of Knowledge Management*, 7(1), pp. 64-77.
- Armbrrecht, R., Chapas, R., Chappelow, C., Farris, G., Friga, P., Hartz, . . . Whitwell, G. (2001). Knowledge management in research and development. *Research Technology Management*, pp. 28-48.
- Baraldi, Amanda N., & Enders, Craig K. (2010). An introduction to modern missing data analyses. *Journal of School Psychology*, 48(1), 5-37.

- Barney, Jay. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Basu, A, & Muylle, S. (2003). Online support for commerce processes by Web retailers. . *Decision Support Systems*, 34( 4), pp 379–395.
- Beauchamp, T.L., & Bowie, N.E. (2004). *Ethical Theory and Business*, Prentice Hall, Upper Saddle River, NJ.
- Becerra-Fernandez, I., Gonzalez, A.J., & Sabherwal, R. . (2004). *Knowledge management:Challenges, Solutions, and Technologies*.
- Bender, Silke, & Fish, Alan. (2000). The transfer of knowledge and the retention of expertise: The continuing need for global assignments. *Journal of Knowledge Management*, 4(2), 125-137.
- Bennett, D. A. (2001). How can I deal with missing data in my study? *Australian and New Zealand Journal of Public Health*. (25), pp. 464–469.
- Bernerd, H.R., Pelto, P.J., Werner, O., Boster, J., Romney, A.K., Johnson, A., . . . Kasakoff, A. (1986). The Construction Of Primary Data In Cultural Anthropology. *Current Anthropology*. (27), pp. 382-396.
- Bhatt, G.D. (2002). Management strategies for individual knowledge and organizational knowledge. *Journal of Knowledge Management*(6), pp. 31-39.
- Bhatt, G.D., Gupta, J.N.D., & Kitchens, F. (2005). An exploratory study of groupware use in the knowledge management process. *Journal of Enterprise Information Management*, 18(1), pp. 28-46.
- Bloor, G., & Dawson, P. (1994). Understanding professional culture in organizational context. *Organization Studies*, 15(2), pp. 275-295.
- Blumentritt, R., & Johnston, R. (1999). Towards a strategy for knowledge management. *Technology Analysis & Strategic Management*, vol. 11(no. 3), p. 287-300.

- Bollen, Kenneth, & Lennox, Richard. (1991). Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin*, 110(2), 305-314.
- Bollinger, Audrey S., & Smith, Robert D. (2001). Making organizational knowledge a strategic asset. *Journal of Knowledge Management*, 5(1), 8-18.
- Bristow, N. (2000). Creating a Knowledge Advantage: Making Knowledge Management Everybody's Job, *Strategy & Leadership*. 28(1).
- Broadbent, M. (1997). The emerging phenomenon of knowledge management. *The Australian Library Journal*(Feb), pp. 6-24.
- Bukowitz, W.R., & Williams, R.L. (1999). *The Knowledge Management Field Book*.
- Byrne, Barbara M. (2010). *Structural equation modelling with AMOS: Basic concepts, applications, and programming*. New York: Routledge.
- Campbell, D.T., & Fiske, D.W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-105
- Cantu', Francisco J., Bustani, Alberto, Molina, Arturo, & Moreira, Hector. (2009). A knowledge-based development model: The research chair strategy. *Journal of Knowledge Management*, 13(1), 154-170.
- Chang, S.-J., Witteloostuijin, A. V., & Eden, L. (2010). From the editors: common method variance in international business research. *Journal of International Business Studies*, 41, 178-184
- Carlsson, S. A., EL Sawy, O.A., Eriksson, I., & Raven, A. (1996). Gaining Competitive Advantage Through Shared Knowledge Creation: In Search of a New Design Theory for Strategic Information System. in *Proceedings of the Fourth European Conference on Information Systems*, Lisbon.
- Chen, M., Huang, M., & Cheng, Y. (2009). Measuring knowledge management performance using a competitive perspective: An empirical study. *Expert Systems with Applications*(36), pp. 8449–8459.
- Chua, A. (2004). Knowledge management systems architecture: A bridge between KM consultants and technologies. *International Journal of Information Management* (24), pp. 87-98.

- Churchill, Gilbert A. Jr. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16(1), 64-73.
- Coakes, Sheridan J, Steed, Lyndall, & Ong, Clara. (2010). *SPSS : analysis without anguish : version 17.0 for windows*. Milton Qld: John Wiley & Sons.
- Cohen, W.M., & Levinthal, D.A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35, pp. 128-152.
- Coltman, Tim, Devinney, Timothy M., Midgley, David F., & Venaik, Sunil. (2008). Formative versus reflective measurement models: Two applications of formative measurement *Journal of Business Research*, 61, 1250-1262.
- Conner, Kathleen R., & Prahalad, C. K. (1996). A Resource-based theory of the firm-knowledge versus opportunism. *Organization Science*, 7(5), 477-500.
- Conway, S.D. (2007). *The Think Factory – Managing Today’s Most Precious Resource*. John Wiley.
- Costello, A. B, & Osborne, J. W. (2005). Exploratory Factor Analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*. 10(7), pp. 1-9.
- Crampton, S.M., & Wagner, J.A. (1994). Perception inflation in microorganizational research: An investigation of prevalence and effect. *Journal of Applied Psychology*, 79, 67-76
- Crowley, B. (2000). Tacit knowledge and quality assurance: bridging the theory-practice divide. In T. K. Srikantaiah & M. E. D. Koenig (Eds.). *Knowledge management for the information professional Medford, NJ: Information Today.*, pp. (205-220).
- Curley, K.F., & Kivowitz, B. (2001). *The manager’s pocket guide to knowledge management*, Massachusetts: HRD Press.
- Daft, R.L. (2000). *Organization Theory and Design*. South-Western College Publishing, Thomson Learning. U.S.A.(7th ed.).

- Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management*, 9(3), pp. 101-115.
- Davenport, T.H., & McElroy, M.W. (2000). *Working Knowledge; How Organization Manage What They Know*, Harvard Business School Press, Boston, MA.
- Davenport, Thomas H. (1997). *Information ecology*. Oxford, UK: Oxford University Press.
- Davenport, Thomas H. (1999). *Human Capital: What it is and Why People Invest it*. Jossey-Bass: San Francisco, CA.
- Davenport, Thomas H. (2005). *Thinking for a Living: How to Get Better Performances and Results from Knowledge Workers*. Boston, MA: Harvard Business School Press.
- Davenport, Tomas H., & Prusak, Laurence. (1998). *Working Knowledge: How Organizations Manage What They Know*. Boston, MA: Harvard Business School Press.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13(3), pp. 319-339.
- De la Vega, A.F.R., & Stankosky, M. (2006). Knowledge Management And Innovation: What Must Governments Do To Increase Innovation? *Journal of Knowledge Management Practice*, vol. 7(no. 4.).
- de Vaus, David. (2002). *Analyzing Social Science Data*. London: Sage Publications.
- DeLong, D. W. (1997). Building the knowledge-based organization: How culture drives knowledge behaviors (working paper). Boston: Ernst & Young's Center for Business Innovation.
- DeLong, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *Academy of Management Executive*, 14(4), pp. 113-127.
- Diamantopoulos, Adamantios, & Sigauw, Judy A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, 17, 263-282.



- Doty, D.H., & Glick, W.H. (1998). Common method bias: Does common methods variance really bias result? *Organizational Research Method, 1*,374-406.
- Dougherty, V. (1999). Knowledge is about people, not databases. *Industrial and Commercial Training, 31*, 7(pp. 262–266).
- Drucker, P. (2000). Knowledge Work. *Executive Excellence*.
- Drucker, P. F. (1954). Landmarks of Tomorrow. A Report on the New ‘Post-Modern’ World. *Transaction Publisher London. ISBN 1-56000-622-6*.
- Drucker, P.F. (1993). *Managing for Results*. New York: HarperCollins Publishers.
- Duffy, J. (2000). 'Knowledge management: to be or not to be?'. *Information Management Journal, vol. 34*(no. 1), pp. 64-70.
- Duhon, B. (1998). 'It's all in our heads'. *Inform, vol. 12*(no. 8), pp. 8-13.
- Dyer, J.H., & Nobeoka, K. (2000). Creating and managing a high-performance knowledge-sharing network: the Toyota case. *Strategic Management Journal, 21*, pp. 345-367.
- Earl, M. (2001). Knowledge Management Strategies: Toward A Taxonomy. *Journal of Management Information Systems, 18*(1), pp. 215-233.
- Erhardt, N. (2003). Enablers and Barriers for Individuals’ Willingness and Ability to Share Knowledge: An Exploratory Study. Rutgers University, Piscataway, NJ.
- Fazli, S., & Alishahi, A. (2012). Investigating The Relationships Between Organizational Factors (Culture, Structure, Strategy) And Performance Through Knowledge Management. *American Journal of Scientific Research*(44), pp. 116-130.
- Ferraro, G.P. (1998). *The Cultural Dimensions of International Business*, Prentice-Hall, Englewood Cliffs, NJ.
- Filemon, A., & J., Uriarte. (2008). Introduction to Knowledge Management. *ASEAN Foundation, Jakarta, Indonesia*.

- Floyd, Frank J., & Widaman, Keith F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 286-299.
- Ford, D.P., & Chen, Y.E. (2003). Knowledge sharing in a multi-cultural setting : a case study. *Knowledge Management Research & Practice*, 1(1), pp. 11-27.
- Gargiulo, M., & Benassi, M. (2000). Trapped in your own net: network cohesion, structural holes, and the adaptation of social capital. *Organization Science*, 11, pp. 183-201.
- Gattiker, T.F, & Goodhue, D.L. (2004). Understanding the local-level costs and benefits of ERP through organizational information processing theory. *Information & Management*, 41, pp 431-443.
- Ghemawat, P. (1986). Sustainable advantage. *Harvard Business Review*(September-October), pp, 53-58.
- Gill, John, & Johnson, Phil. (1997). *Research Methods for Managers*, 2nd edition, London: Chapman.
- Gold, A. H., Malhotra, A., & Segars, A.H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), pp. 185-214.
- Gorelick, C., & Tantawy-Monsou, B. (2005). For performance through learning, knowledge management is the critical practice. *The Learning Organization*., 12(2), 125-139.
- Grant, Robert M. (1996a). Prospering in Dynamically-competitive Environments: Organizational Capability as Knowledge Integration. *Organization Science*, 7(4), 375-387.
- Grant, Robert M. (1996b). Toward a Knowledge-based Theory of the Firm. *Strategic Management Journal*, 17(Winter), 109-122.
- Gray, P., & Tehrani, S. (2003). Technology for disseminating knowledge. In: Holsapple C.W. (Ed.). *Handbook on knowledge management and knowledge directions*. Springer: Heidelberg. pp. 110-127.

- Gupta, Anil K., & Govindarajan, Vijay. (2000a). Knowledge Flows Within Multinational Corporations. *Strategic Management Journal*, 21(4), 473-496.
- Gupta, Anil K., & Govindarajan, Vijay. (2000b). Knowledge Managements Social Dimension: Lessons From Nucor Steel. *Sloan Management Review*, Fall 2000, 71-80.
- Hair, Joseph F. Jr., Black, William, C., Babin, Barry J., & Anderson, Rolph E. (2010). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Hair, Joseph F. Jr., Black, William C., Babin, Barry J., Anderson, Rolph E., & Tatham, Ronald L. (2006). *Multivariate Data Analysis* (6th ed.). Upper Saddle River, NJ: Pearson Education Inc.
- Halawi, L., Aronson, J., & McCarthy, R. (2005). Resource-Based View of Knowledge Management for Competitive Advantage. *The Electronic Journal of Knowledge Management*, vol. 3(no. 2), pp. 75-86.
- Hansen, M.T., Nohria, N., & Tierney, T. (1999). ``What's your strategy for managing knowledge?``. *Harvard Business Review*(March-April), pp. 106-116.
- Harrison, R.T., & Leitch, C.M. (2000). Learning and Organization in the Knowledge-Based Information Economy: Initial findings from a participatory action research case study. *Brit. J. Manag.*, 11, 103-119.
- Hasher, L., & Zacks, R. T. (1979). Automatic and effortful processes in memory. *Journal of Experimental Psychology: General*, 108(3), pp. 356-388.
- Heisig, Peter. (2009). Harmonisation of Knowledge Management - Comparing 160 KM Frameworks around the Globe. *Journal of Knowledge Management*, 13(4), 4-31.
- Hendriks, P. (1999). Why share knowledge? The influence of ICT on the motivation for knowledge sharing. *Knowledge and Process Management*, 6(2), pp. 91-100.
- Henry, G.T. (1990). *Practical Sampling*. London: Sage Publications. 21.

- Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research. *Educational and Psychological Measurement*, 66(3), pp. 393-416.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, Sage.
- Holton, E.H., & Burnett, M.B. (1997). Qualitative research methods. In R. A. Swanson, & E. F. Holton (Eds.), *Human resource development research handbook: Linking research and practice*. San Francisco: Berrett-Koehler Publishers.
- House, R.J., Hanges, P.J., Javidan, M., Dorfman, P., & Gupta, V. (2004). *Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies*, Sage Publications: Thousand Oaks, CA.
- Huber, George P. (1991). Organizational Learning: The Contributing Process and the Literatures. *Organization Science*, 2(1), 88-115.
- Hussey, Jill, & Hussey, Roger. (1997). *Business Research. A Practical Guide for Undergraduate and Postgraduate Students*, Palgrave: Basingstoke.
- Husted, K., & Michailova, S. (2002). Diagnosing and fighting knowledge sharing hostility. *Organizational Dynamics*, 31(1), 60-73.
- Ipe, M. (2003). Knowledge sharing in organizations: A conceptual framework. *Human Resource Development Review*, 2(4), pp. 337-359.
- Irmer, B., Bordia, P., & Abusah, D. (2002). Evaluation apprehension and perceived benefits in international and database knowledge sharing, *Academy of Management Proceedings (OCIS)*.
- Ives, W., Torrey, B., & Gordon, C. (2003). Knowledge transfer: transfer is human behavior, in Morey, C., Maybury, M. and Thuraisingham, B. (Eds), *Knowledge Management: Classic and Contemporary Works*, MIT Press, Cambridge, MA.
- Jarvis, Cheryl Burke, MacKenzie, Scott B., & Podsakoff, Philip M. (2003). A critical review of construct indicators and measurement model misspecification in marketing and consumer research. *Journal of Consumer Research*, 30, 199-218.

- Jones, M.C., Cline, M., & Ryan, S. (2006). Exploring knowledge sharing in ERP implementation: an organizational culture framework', *Decision Support Systems*, 41, pp. 434.
- Kaiser, K., & Guggenberger, G. (2007). Sorptive stabilization of organic matter by microporous goethite: sorption into small pores vs. surface complexation. *European Journal of Soil Science*, 58(1), pp. 45-59.
- Kalling, T. (2003). Knowledge management and the occasional links with performance. *Journal of Knowledge Management*, 7(3), 67-81.
- Kappes, S., & Thomas, B. (1993). A model for knowledge worker information support. *Knowledge Worker Information Management*, pp. 1-4.
- Kaser, P.A.W., & Miles, R.E. (2001). Knowledge activists: the cultivation of motivation and trust properties of knowledge sharing relationships, *Academy of Management Proceedings (ODC)*.
- Ketchen, D. J. Jr., & Hult, G. T. M. (2007 ). Bridging organization theory and supply chain management: The case of best value supply chains. *Journal of Operations Management*. *Journal of Operations Management* 25(2), pp 573–580.
- Kingston, J., & Macintosh, A. (2000). Knowledge Management through Multi-perspective Modelling: Representing and Distributing Organizational Memory. *Knowledge Based Systems*, 13, 121-131.
- Kline, Rex B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guilford Press.
- Koch, T., & Rowell, M. (1997). Pediatric ethics, issues & commentary. A pilot study on transplant eligibility criteria: valuing the stories in numbers. *Pediatric Nursing* 23(2 ), pp. 160–163, 166–168.
- Kogut, Bruce, & Zander, Udo. (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science*, 3(3), 383-397.
- Kokavcova, D., & Mala, D. (2009). Knowledge sharing – the main prerequisite of innovation. *Organizacijų vadyba: sisteminiai tyrimai*. (51), pg. 47-56.

- Lai, H., & Chu, T. H. (2000). "Knowledge Management: A Review of Theoretical Frameworks and Industrial Cases," In Proceedings of the 33rd Hawaii International Conference on System Sciences, IEEE.
- Lee, H., & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: an integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), pp. 179-228.
- Lee, K.C., Lee, S., & Kang, I.W. (2005). KMPI: measuring knowledge management performance'. *Information & Management*, 42(3), pp. 469-482.
- Lee, Y., Kozar, K.A., & Larsen, K.R.T. (2003). The Technology acceptance model: past, present, and future. *Communications of the AIS*, 12(50), pp. 752-780.
- Leedy, P., & Ormrod, J. (2001). *Practical Research: Planning and Design* (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall. Thousands Oaks: SAGE Publications.
- Leonard-Barton, D. (1995). *Wellsprings of knowledge: Building and sustaining the sources of innovation*. Boston: Harvard Business School Press.
- Liebowitz, J., & Megbolugbe, I. (2003). A set of frameworks to aid the project manager in conceptualizing and implementing knowledge management initiatives. *International Journal of Project Management*, 21(3), pp. 189–198.
- Lim, K., Ahmed, P., & Zairi, M. (1999). Management for quality through knowledge management. *Total Quality Management Journal*, 10(4/5), pp. 615-621.
- Little, Roderick J. A. . (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198-1202.
- Liu, H., Shah, S., & Jiang, W. (2004). On-line outlier detection and data cleaning, *Computers and Chemical Engineering*. (28), pp. 1635–1647.
- Lynn, G.S., Morone, J.G., & Paulson, A.S. (1996). Marketing and discontinuous innovation: The probe and learn process. *California Management Review*(38), pp. 8-37.

- MacKenzie, Scott B., Podsakoff, Philip M. , & Podsakoff, Nathan P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS Quarterly*, 35(2), 293-334.
- Maddouri, M., Elloumi, S., & Jaoua, A. (1998). An incremental learning system for imprecise and uncertain knowledge discover. *Journal of Information Science*(109), pp. 149 – 164.
- Malhotra, Y. (2003). Is Knowledge The Ultimate Competitive Advantage? An Interview of Dr. Yogesh Malhotra. *Bus. Manage. Asia*(September), 66-69.
- MAMPU, Malaysian Administrative Modernization and Management Planning Unit. (2011). Knowledge Management Blueprint.
- Manheim, J. B., & Rich, R. C. (1995). *Empirical Political Analysis*, 4th Ed. Longman, New York.
- Manning, M. (2006). *Quantitative Research Methods: Study Guide*, 2nd edn, Southern Cross University, Australia.
- Marques, D.P., & Simon, F.J.G. (2006). The Effect of Knowledge Management on Firm Performance. *Journal of Knowledge Management*, 10(3), pp. 143-156.
- Marr, B., & Schiuma, G. (2001). Measuring and managing intellectual capital and knowledge assets in new economy organisations', in Bourne, M. (Ed.). *Handbook of Performance Measurement, Gee, London*.
- Martin Jr., William E., & Bridgmon, Krista D. (2009). Essential elements of experimental and quasi-experimental research. In S. D. Lapan & M. T. Quartaroli (Eds.), *Nonexperimental quantitative research*. San Francisco: John Wiley & Sons.
- Martin, W.E. Jr., & Bridgmon, K.D. (2009). Essential Elements of Experimental and Quasi-Experimental Research, in SD Lapan and MT Quartaroli (ed.), *Research Essentials: An Introduction to Design and Practices*, Jossey-Bass, San Francisco.
- Marwick, A.D. (2001). Knowledge management technology. *IBM Systems Journal: Knowledge Management*, 40(4).

- McCampbell, A., Clare, L.M., & Gitters, S.H. (1999). Knowledge management: the new challenge for the 21st century. *Journal of Knowledge Management*, 3(3), pp. 172-179.
- McDermott, Richard, & O'Dell, Carla. (2001). Overcoming Cultural Barriers to Sharing Knowledge. *Journal of Knowledge Management*, 5(1), 76-85.
- McQueen, R. (1998). Four Views of Knowledge and Knowledge Management, in Proceedings of the Fourth Americas Conference on Information Systems. E. Hoadley and I. Benbasat (eds.), Baltimore, MD, pp. 609-611.
- McQuitty, Shaun. (2004). Statistical power and structural equation models in business research. *Journal of Business Research*, 57(2), pp. 175-183.
- Min, K. J., & Yoon, S.K. (2002). So, What Do You Know? *Far Eastern Economic Review*(165), pp. 34-35.
- Mohamed, M., Stankosky, M., & Murray, A. (2006). Knowledge management and information technology: can they work in perfect harmony? *Journal of Knowledge Management*, 10(3), pp. 103-116.
- Nelson, Jason M., & Canivez, Gary L. (2012). Examination of the structural, convergent, and incremental validity of the Reynolds Intellectual Assessment Scales (RIAS) with a clinical sample. *Psychological Assessment*, 24(1), 129–140. doi: 10.1037/a0024878
- Nelson, R. R., & Winter, S. G. (1982). An Evolutionary Theory of Economic Change. Cambridge: Harvard University Press. in Darroch, J.(2003b). Developing a measure of knowledge management behaviors and practices. *Journal of Knowledge Management*, 7(5), pp. 41-54.
- Nemati, H., & Barko, C. (2002). Key factors for achieving organizational data-mining success. *Industrial Management and Data Systems*, 103(4), pp. 282-292.
- Neuman, W.L. (2006). Social Research Methods: Qualitative and Quantitative Approaches, 5th ed., Sage, Allyn and Bacon, Boston.
- Nonaka, Ikujiro. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.



- Nonaka, Ikujiro. (1999). "The dynamic of knowledge creation", in Ruggles, R. and D. Holtshouse (Ed.), *The Knowledge Advantage: 14 Visionaries Define Market Place Success in the New Economy*. *Capstone Publishing*, pp. 64-87.
- Nonaka, Ikujiro. (2007). *Strategy as Distributed Phronesis: Knowledge Creation for the Common Good*. Proceedings of the International Productivity Conference, 2007, Bangkok, Thailand "Knowledge Management: From Brain to Business Proceedings".
- Nonaka, Ikujiro, & Konno, Noboru. (1998). The concept of "Ba": Building a foundation for knowledge creation. *California Management Review*, 40(3), 40-54.
- Nonaka, Ikujiro, & Takeuchi, Hirotaka. (1995). *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation*. *Oxford University Press, New York*.
- Nooteboom, B. (1999). Innovation, learning and industrial organization. *Cambridge Journal of Economics*, 23(2), pp. 127-150.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- O'dell, C., & Grayson, C. (1998). *If Only WeKnew What We Know: The Transfer of Internal Knowledge and Best Practice*. The Free Press, New York.
- Ordaz, C., Allez, M., Alcazar, F., Fernandez, P.M., & Cabrera, R. (2004). Internal diversification strategies and the process of knowledge creation. *Journal of Knowledge Management*, 8(1), pp. 77-93.
- Paper, D. (1998). BPR: creating the conditions for success. *Long Range Planning*, Vol. 31( No. 3), pp. 426-435.
- Parahoo, K. (2006). *Nursing Research: Principles, Process and Issues*, 2nd edn. Palgrave Macmillan, Houndsmill.
- Pemberton, J.D., & Stonehouse, G.H. (2000). Organisational learning and knowledge assets, an essential partnership, *The Learning Organization*. 7(4), pp. 184-194.

- Peng, C.-Y. J., Harwell, M., Liou, S., -M., & Ehman, L. H. (2006). Advances in missing data methods and implications for educational research. In S. Sawilowsky (Ed.), *Real data analysis*. Greenwich, CT: Information Age. pp. 31–78.
- Penrose, Edith T. (1959). *The Theory of the Growth of the Firm*. New York: John Wiley & Sons.
- Pett, Marjorie A., Lackey, Nancy R., & Sullivan, John J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research*. Thousand Oaks: Sage Publications Inc.
- Polanyi, M. (1966). *The Tacit Dimension*. Routledge & Kegan Paul, London.
- Polanyi, Michael. (2009). *The Tacit Dimension*. London: The University of Chicago Press.
- Porter, Michael E. (2004). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y., & Podsakoff, N.P. (2003). Common method biases in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- Probst, G., Buchel, B., & Raub, S. . (1998). Knowledge as a strategic resource in G.von Krogh, J. Roos & D. Kleine (eds.) *Knowing in forms: understanding, managing and measuring knowledge*. pp. 240-252.
- Quinn, J. B., Anderson, P., & Finkelstein, S. (1996). *Leveraging intellect*. Academy of Management Executive.
- Quintas, P., Lefrere, P., & Jones, G. (1997). Knowledge management: A strategic agenda. *Journal of Long Range Planning*(30), pp. 385-391.
- Rahman, S. , & Bullock, P. . (2005). Soft TQM, hard TQM and organisational performance relationships: an empirical investigation. *Omega*, Vol. 33 (No. 1), pp. 73-83.

- Ramanathan, Narayanan., Richardson, S., & Abdul Latif, Salleh. (2003). Knowledge management: A Malaysian study. *Malaysian Management Review*, 38(1), pp. 79–87.
- Rasula, J., Vuksic, B.V., & Stemberger, M.I. . (2012). The Impact of Knowledge Management on Organizational Performance. *Economic and Business Review*, 14(2), pp. 147 – 168.
- Reber, A. S. (1993). Implicit learning and tacit knowledge. *New York: Oxford University Press*.
- Ribiere, Vincent, & Sitar, Alesa Sasa. (2003). Critical Role of Leadership in Nurturing a Knowledge-supporting Culture. *Knowledge Management Research & Practice*, 1, 39–48.
- Roberts, K., & Taylor, B. (1997). *Nursing Research Processes: an Australian Perspective*, Nelson ITP, Melbourne.
- Roth, P. L. (1994). Missing data: A conceptual review for applied psychologists. *Personnel Psychology*. (47), pp. 537–570.
- Sabherwal, Rajiv, & Becerra-Fernandez, Irma. (2003). An empirical study of the effect of knowledge management processes at individual, group, and organizational levels. *Decision Sciences*, 34(2), 225-260.
- Sanchez, R., Seto, K., Simon, D., Soleki, W., Kraus, F., & Laumnan, G. (2005). *Urbanization and Global Environmental Change*. Science Plan. International Human Dimensions Program for Global Environmental Change. Bonn.
- Schafer, J.L. (1997). *The Analysis of Incomplete Multivariate Data*. Chapman & Hall.
- Schein, E. H. (1985). *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.
- Schulz, M., & Jobe, L.A. (2001). Codification and tacitness as knowledge management strategies: an empirical exploration. *Journal of High Technology Management Research*, 12(1), pp. 139-165.

- Schwab, Donald P. (2005). *Research Methods for Organizational Studies* (2nd ed.). New Jersey: Lawrence Erlbaum Associates
- Seleim, A., & Khalil, O. (2007). Knowledge management and organizational performance in the Egyptian software firms. *International Journal of Knowledge Management*, 3(4), pp. 37-66.
- Serenko, Alexander, Bontis, Nick Bontis, Booker, Lorne, Sadeddin, Khaled Sadeddin, & Hardie, Timothy. (2010). A Scientometric Analysis of Knowledge Management and Intellectual Capital Academic Literature (1994-2008). *Journal of Knowledge Management*, 14(1), 3-23.
- Sharratt, M., & Usoro, A. (2003). Understanding Knowledge-Sharing in Online Communities of Practice. *Electronic Journal on Knowledge Management*, 1(2), pp. 187-196.
- Skyrme, D., & Amidon, D. (1998). New measures of success. *Journal of Business Strategy*. 19(1), pp. 20-24.
- Spender, J. C. (1996). Making Knowledge the Basis of a Dynamic Theory of the Firm. *Strategic Management Journal*, 17, 45-62.
- Stewart, Thomas A. (1998). *The Wealth of Knowledge*.
- Sveiby, K.E. (1997). *The New Organisational Wealth: Managing and Measuring Knowledge-Based Assets*, San Francisco: Berret-Koehler Publishers.
- Swart, J., & Kinnie, N. (2003). Sharing knowledge in knowledge intensive firms. *Human Resource Management Journal*. 13(2): 60-75. DOI: 10.1111/j.1748-8583.2003.tb00091.x.
- Sweeney, G. (1996). Learning efficiency, technological change and economic progress. *International Journal of Technology Management*, 11(1).
- Syed-Ikhsan, S.O.S., & Rowland, F. (2004). Knowledge management in a public organisations in Malaysia: Do people really share? *Journal of Knowledge Management*, 8(2), pp. 95-111.

- Tabachnick, Barbara G., & Fidell, Linda S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson Education Inc.
- Teece, D.J. (1998). Capturing value from knowledge assets: The new economy, markets for knowhow and intangible assets. *California Management Review*, 40(3), pp. 55-79.
- Teece, David J., Pisano, Gary, & Shuen, Amy. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509-533.
- Theriou, N., Maditinos, D., & Theriou, G. (2010). "Knowledge Management Enabler Factors and Firm Performance: An empirical research of the Greek medium and large firms". International Conference on Applied Business and Economics, Technological Educational Institute of Kavala, Kavala, Greece. pp. 1-20.
- Thode, H.J. (2002). *Testing for normality*. New York: Marcel Dekker.
- Thompson, Steven K. (2002). *Sampling* (2nd ed.). New York: John Wiley & Sons Inc.
- Toften, K., & Olsen, S.O. (2003). Export market information use, organizational knowledge and firm performance: a conceptual framework. *International MarketingReview*, 20(1), pp. 95-110.
- Tomarken, Andrew J., & Waller, Niels G. (2005). Structural Equation Modelling: Strengths, Limitations, and Misconceptions. *Annual Review of Clinical Psychology*, 1, 31-65.
- Tracey, M., Mark, A. Vonderembse, & Lim, Jeon-Su. (1999). Manufacturing technology and strategy formulation: keys to enhancing competitiveness and improving performance. *Journal of Operations Management*, 17, 411 - 428.
- Treacy, M., & Wiersema, F. (1995). The discipline of market leaders: Choose your customers, narrow your focus, dominate your market. *Addison-Wesley Pub. Co. (Reading, Mass.)*(103), 199-789.
- Triandis, Harry C. (1995). Motivation and achievement in collectivist and individualist cultures. 9.

- Triandis, Harry C. (1996). The Psychological Measurement of Cultural Syndromes. *American Psychologist*, 51(4), 407-415.
- Tseng, S.M. (2010). The Correlation Between Organizational Culture and Knowledge Conversion on Corporate Performance. *Journal of Knowledge Management*, 14(2), pp. 269-284.
- Tyndale, P. (2002). A taxonomy of knowledge management software tools: origins and applications. *Evaluation and Program Planning*. (5), pp. 83-190.
- Urbaniak, G. C, & Plous, S. (2011). (2011). Research Randomizer (Version 3.0). Retrieved from <http://www.randomizer.org/>
- Venkatesh, V., & Davis, F.D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*(46), pp. 186-204.
- Wang, F., & Plaskoff, J. (2002). An intergraded development model for KM, in R.Bellaver and J. M. Lusa (eds.), *Knowledge Management: Strategy and Technology*. Norwood: Artech House.
- Wang, Jaw-Kai, Ashleigh, Melanie, & Meyer, Edgar. (2006). Knowledge Sharing and Team Trustworthiness: It's All About Social Ties! *Knowledge Management Research & Practice*, 4, 175–186.
- Wang, Wei-Tsong, & Belardo, Salvatore. (2009). The Role of Knowledge Management in Achieving Effective Crisis Management: A Case Study. *Journal of Information Science*, 35(6), 635–659.
- Ward, J., & Aurum, A. (2004). Knowledge management in software engineering – Describing the process , 15th Australian Software Engineering Conference (ASWEC 2004) Melbourne, Australia: IEEE Computer Society Press. pp. 137–146.
- Weill, P., & Broadbent, M. (1998). *Leveraging the New Infrastructure: How Market Leaders Capitalize on Information Technology*. Boston MA: Harvard Business School Press.

- Wide'n-Wulff, G., & Soumi, R. (2007). Utilization of information resources for business success: the knowledge sharing model. *Information Resources Management Journal*, 20(1), pp. 46–67.
- Wiig, K. (1995). Knowledge management foundations-thinking about thinking-how people and organizations create, represent, and use knowledge. Texas: *Schema Press Arlington*.
- Wiig, K., Hoog, R., & Spek, R. (1997). Supporting Knowledge Management: a selection of methods and techniques. *Expert Syst. Appl*, 13(1), pp. 15-27.
- Wilhelmij, P., & Schmidt, R. (2000). 'Where does knowledge management add value. *Journal of Intellectual Capital*, 1(4), pp. 366-380.
- Williams, G. J., Baxter, R. A., He, H. X., Hawkins, S., & Gu, L. (2002). A Comparative Study of RNN for Outlier Detection in Data Mining, IEEE International Conference on Data-mining (ICDM'02), Maebashi City, Japan, CSIRO Technical Report CMIS-02/102.
- Wong, K. (2005). Critical success factors for implementing knowledge management in small and medium enterprises. *Industrial Management & Data Systems*, 105(3), pp. 261-279.
- Yeh, Y., Lai, S., & Ho, C. (2006). Knowledge management enablers: a case study. *Industrial Management & Data Systems*, 106(6), pp. 793-810.
- Yi, Jialin. (2009). A Measure of Knowledge Sharing Behavior: Scale Development and Validation. *Knowledge Management Research & Practice*, 7, 65–81.
- Zack, M. (1998). An Architecture for Managing Explicated Knowledge. *Sloan Management Review*.
- Zack, M., McKeen, J. , & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. *Journal of Knowledge Management*, Vol. 13(No. 6), pp. 392-409.
- Zack, Michael H. (1999). Managing Codified Knowledge. *Sloan Management Review*, 40(4), 45-58.

Zaim, H., Ekrem, T., & Selim, Z. (2007). Performance of Knowledge Management Practices: a Casual Analysis. *Journal of Knowledge Management*, 11(6), pp. 54-67.

Zikmund, W.G. (2003). *Business Research Methods*, 7th edn, Thomson/South-Western, Mason, Ohio.