



**Knowledge Management (KM) in the
Maltese Pharmaceutical Sector: Linking
KM Enablers, KM Processes and
Organisational Effectiveness**

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**A study submitted in fulfilment of the requirements
for the degree of Doctor of Philosophy in Management
at the Faculty of Economics, Management
and Accountancy, University of Malta**

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Dedication

To my family

*Mum, Dad, Joseph, Anna & husband Nigel,
my beautiful nieces Nicole & Claire
& cousin, the late Abel Giglio*

Abstract

In today's knowledge economy, knowledge is recognised as the most valuable resource for an organisation, helping it sustain its competitive advantage. This is more so in knowledge intensive sectors such as the Maltese Pharmaceutical Sector where knowledge related activities are the core activities that add value to the operations of these organisations. Understanding the successes and failures of Knowledge Management (KM) initiatives has been difficult since previous attempts at investigating the relationship between KM enablers, KM processes and organisational effectiveness have been fragmented mainly due to the fact that such relationships have either been examined in isolation or studies have been limited to only a few KM enablers, leaving other important ones out.

In order to address this gap in the KM literature, this study adopted a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) to investigate the relationship between KM enablers, KM processes and organisational effectiveness. An integrative model encompassing a more complete array of KM enablers namely trust, collaboration, learning, centralisation, formalisation, KM strategy, intrinsic rewards, T-shaped skills, IT support and transformational leadership; four KM processes (knowledge creation, knowledge organisation, knowledge application and knowledge protection); and organisational effectiveness was investigated through the quantitative study which drew from a web-based questionnaire that was split into three parts separated by a two-week gap and distributed to 230 organisations in the Maltese Pharmaceutical Sector. The 205 responses (a response rate of 89.13%) obtained formed the basis of the empirical testing using Structural Equation Modeling (SEM). To complement the findings of the quantitative study and to explore further the perceptions and views of practitioners in the Maltese Pharmaceutical Sector about KM, a qualitative study was carried out using structured interviews. 20 participants were interviewed with the transcribed interview data analysed using a template analysis technique.

The integrative model developed through the quantitative study showed that KM enablers (excluding trust, collaboration & T-shaped skills) produced direct effects on KM processes. IT support and transformational leadership emerged as strong antecedents of the KM processes. Only knowledge creation and knowledge protection had a direct effect on organisational effectiveness and mediated the relationship between some KM enablers and organisational effectiveness. Besides complementing the findings of the quantitative study, the qualitative study concluded that KM is a fairly new concept for the Maltese Pharmaceutical Sector and it is still at its infancy stage. Even though there is a lack of a formal KM strategy, both codification strategies and personalisation strategies (essential elements of a KM strategy) exist and are undertaken. Whilst knowledge protection is high on the agenda of the participants, more effort must be directed towards the organisation and application of essential organisational knowledge. Finally, metrics intended to measure effects of initiatives geared at improving organisational effectiveness are lacking. It is also hoped that this research can stimulate future studies were data are collected and analysed at different points in time thus identifying any patterns in variable relationships over time and any possible feedback loop mechanisms. Applying this research to different knowledge intensive sectors such as the financial sector can also be an interesting avenue for future research.

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LIST OF ABBREVIATIONS AND ACRONYMS

AoM	Academy of Management
APQC	American Productivity and Quality Centre
AVE	Average Variance Explained
BAM	British Academy of Management
C	Centralisation
CF	Composite Reliability
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Intervals
CL	Collaboration
CMB	Common Method Bias
CMV	Common Method Variance
CT	Collaborative Trust
DBLP	Digital Bibliography and Library Project
DOKB	Distributed Organisational Knowledge Base
ECVI	Expected Cross Validation Index
EFA	Exploratory Factor Analysis
EURAM	European Academy of Management
F	Formalisation
FREC	Faculty Research Ethics Committee
HyDi	Hybrid Discovery
IC	Individualised Consideration
II	Idealised Influence

IIB	Idealised Influence (Behavioural)
IM	Inspirational Motivation
IMKA	Initiative for Managing Knowledge Assets
IS	Intellectual Stimulation
ISI	Institute for Scientific Information
IT	Information Technology
ITS	Information Technology Support
JSTOR	Journal Storage
KA	Knowledge Application
KBS	Knowledge Based System
KBV	Knowledge Based View
KC	Knowledge Creation
KIO	Knowledge Intensive Organisation
KM	Knowledge Management
KMCI	Knowledge Management Consortium International
KMO	Kaiser Meyer Olkin
KMS	Knowledge Management System
KO	Knowledge Organisation
KP	Knowledge Protection
MI	Modification Indices
MSV	Maximum Shared Variance
OE	Organisational Effectiveness
R	Intrinsic Rewards
RBV	Resource Based View
RMSEA	Root Mean Square Error of Approximation

ROE	Return on Equity
ROI	Return on Investment
S	KM Strategy
SEM	Structural Equation Modeling
SMC	Square Multiple Correlation
SME	Small-to-Medium Enterprise
SPSS	Statistical Package for Social Sciences
SRMR	Standardised Root Mean Square Residual
T	Trust
TSK	T-Shaped Skills
UREC	University Research Ethics Committee
US	United States
USAA	United Services Automobile Association
WIPO	World Intellectual Property Organisation

CHAPTER ONE – INTRODUCTION

1.1 Research Background

The twenty first century has seen the rise of the knowledge-based economy where intangible assets such as knowledge, intellectual property rights and know-how have gained relevance and importance when compared to the more traditional, economic resources such as land, natural resources, labour and capital (Mohammadi, Khanlari & Sohrabi, 2009). Knowledge is being more and more recognised as a valued asset in competitive environments and “is increasingly at the heart of modern enterprises” (Ho, Hsieh & Hung, 2014, p. 734). Therefore, in this turbulent and challenging era, organisations must make the best use of their knowledge-based activities in order to sustain their competitive advantage (Valaei, 2017; Valaei, Nikhashemi & Javan, 2017).

Donate and Guadamillas (2011) argue that the processes and practices that organisations adopt so as to be in a position to manage knowledge become “instrumental for attaining strategic objectives by harnessing complexity and making the best use of existing resources and capabilities” (p. 891). In this respect, Knowledge Management (hereafter KM) has been recognised as providing the key to organisations to attain organisational effectiveness (or related aspects such as organisational performance) by making the best use of their knowledge resources (Zack, McKeen & Singh, 2009).

While the academic literature is replete with studies contributing to the evaluation of the impact of KM on value creation (Andreeva & Kianto, 2012; Chuang, 2004; Darroch, 2005; Gold, Malhotra & Segars, 2001; Gosh & Scott,

2007; Heisig *et al.*, 2016; Liu, Chen & Tsai, 2005; Zack *et al.*, 2009), other researchers have voiced concerns on the lack of studies reporting the impact of KM on organisational performance (Garud & Kumaraswamy, 2005; Heisig *et al.*, 2016; Lucier & Torsiliera, 1997). Heisig *et al.* (2016) emphasise this worrying state of affairs by stating that:

“this issue is considered as the prime gap in the existing knowledge on KM...lack of a clear understanding of the performance implications of KM can potentially pose a threat to the legitimacy and continuity of the field as a whole” (p. 1170).

Besides the concerns above, many researchers in the KM field have stressed the importance of evaluating enablers and processes of KM to understand the successes and failures of any KM initiatives undertaken by an organisation (Lee, 2017; Lee & Steen, 2010; Nejatian *et al.*, 2013; Singh, 2018; Tanriverdi, 2005). However, previous attempts at analysing the relationship between KM enablers, KM processes and organisational effectiveness have been fragmented since they have either examined these relationships in isolation or limited their study to only a few KM enablers leaving other important ones out (Lee, Kim & Kim, 2012; Payal, Ahmed & Debnath, 2016; Shih & Tsai, 2016).

For instance, Gold *et al.* (2001) examined the direct effects of knowledge infrastructure capabilities (namely technology, structure and culture) on knowledge process capabilities (namely acquisition, conversion, application and protection) and organisational effectiveness but did not analyse the relationship between the knowledge infrastructure capabilities and the knowledge process capabilities. Lee and Choi (2003) did not include important enablers such as transformational leadership and KM strategy when analysing the relationship

between KM enablers, knowledge creation process, KM intermediate outcomes and organisational performance. Therefore, as claimed also by Ale *et al.* (2014) and Valaei *et al.* (2017), a more holistic approach to KM through an integrative model investigating the relationships between a more complete array of KM enablers and KM processes would contribute greatly to knowledge in the KM field.

Besides the above shortcomings, the literature on KM processes as mediating mechanisms between KM enablers and organisational effectiveness is lacking and have not been studied sufficiently (Haque & Anwar, 2012; Shih & Tsai, 2016; Ugwu, 2018; Zheng, Yang & McLean, 2010).

Following the above introduction, one can safely conclude that: there is a gap in the KM literature with regards to the effects of KM on organisational effectiveness (including performance); an integrative model describing the relationship between KM enablers and KM processes is lacking; the role of KM processes as mediating mechanisms between KM enablers and organisational effectiveness needs to be explored more.

This state of affairs in the KM field has provided the impetus for this study coupled with the fact that research on KM in the Maltese Pharmaceutical Sector is practically non-existent. In my career as a pharmacist, spanning over twenty years, and where I have occupied important managerial positions in different pharmaceutical areas such as procurement, wholesale dealing and distribution of medicinal products, I have witnessed, on several occasions, problems

associated with the leverage of knowledge. These problems were always to the detriment of the quality and effectiveness of the service to our patients. To mention a few, such problems include loss of tacit knowledge and experience due to inappropriate mentoring programs when an employee resigns; and inappropriate means of utilising explicit knowledge available in the organisations. These are crucial shortcomings more so when considering that the pharmaceutical sector is a knowledge intensive sector and that the vision for Malta, one of the smallest EU member states, is to become “a centre of excellence in a number of knowledge-based industries” (Camilleri, 2011, p. 6).

1.2 Aims and Objectives of this Research

Following the above introduction, the aims of this research are clearly twofold. First, it aims at studying the relationship between KM and organisational effectiveness in the Maltese Pharmaceutical Sector by investigating the relationships between KM enablers, KM processes and organisational effectiveness. Second, it aims at exploring the perceptions and views of practitioners in the Maltese Pharmaceutical Sector about KM. The main objectives of this research, therefore, are as follows:

1. To create an integrative KM model illustrating the relationships between KM enablers, KM processes and organisational effectiveness.
2. To investigate whether KM processes act as mediators in the relationship between KM enablers and organisational effectiveness.

3. To explore the perceptions and views of practitioners in the Maltese Pharmaceutical Sector about KM.
4. To provide suggestions to managers in the Maltese Pharmaceutical Sector on how to promote, improve and make the best use of KM initiatives in their organisations.

1.3 Research Design and Research Questions

In order to achieve the objectives set by this research, a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) was adopted. The relationships between KM enablers, KM processes and organisational effectiveness were investigated through two studies; a quantitative study that developed an empirically tested, integrative KM model and a complementary qualitative study that also investigated the views and perceptions of the participants on KM. Data for the quantitative study was collected by means of a web-based questionnaire. Data for the qualitative study was collected by means of structured interviews. In line with other researchers in the field of mixed methods research designs (Creswell, 2014; Creswell & Plano Clark, 2007; Tashakkori & Creswell, 2007), separate research questions were drawn for the quantitative study and the qualitative study.

For the quantitative study, the following three research questions were investigated:

- 1. To what extent do KM enablers predict KM processes?*
- 2. To what extent do KM processes predict organisational effectiveness?*
- 3. Is the relationship between KM enablers and organisational effectiveness mediated by KM processes?*

As for the qualitative study, the following five research questions were explored:

- 1. What is the uptake level of KM initiatives in the Maltese Pharmaceutical Sector? Is there a focused KM strategy as part of the organisational business strategy?*
- 2. What is the status of KM enablers in the Maltese Pharmaceutical Sector? Are they perceived important in promoting KM initiatives?*
- 3. Is the Maltese Pharmaceutical Sector making the most of its knowledge assets? Are these knowledge assets being adequately protected?*
- 4. Are the effects of initiatives geared towards improving organisational effectiveness being measured?*
- 5. Is KM perceived to have a future role in the Maltese Pharmaceutical Sector?*

1.4 Defining KM Enablers, KM Processes and Organisational Effectiveness

Ho (2009) defines KM enablers as “critical factors that put KM concepts into practice in order to achieve KM effectiveness” (p. 101). KM enablers are influencing factors that can facilitate KM activities and processes (Allameh *et al.*, 2011; Chan & Chau, 2005). Payal *et al.* (2016) view KM enablers as “preconditions that are necessary for KM initiatives to flourish” (p. 55). KM enablers include factors such as IT support, organisational strategy, organisational structure, organisational culture and leadership.

KM processes are considered as core processes that facilitate KM and thus help an organisation to produce valuable knowledge and to leverage knowledge assets (Maier & Remus, 2002; Payal *et al.*, 2016; Pinho, Rego & Cunha, 2012; Singh, 2018). Examples of KM processes include knowledge creation, knowledge application, knowledge sharing and knowledge protection.

Daft (1995) defines organisational effectiveness as “the degree to which an organization realizes its goals” (p. 98). Researchers argue that financial measures such as return on investment (ROI) or return on equity (ROE) are not enough to measure the performance of an organisation in today’s complex and competitive environments because these are subject to external fluctuations and may not reflect the internal successful dynamics generated through a knowledge-driven culture (Gold *et al.*, 2001; Novak, 2017; Wu & Liu, 2010).

Gauging other aspects linked to organisational effectiveness, which are independent of financial yardsticks, such as an improvement in the ability to innovate, improved effort coordination, and a more rapid commercialisation of new products (Chiu & Chen, 2016; Gold *et al.*, 2001; Shih & Tsai, 2016;) is more desirable. Zheng *et al.* (2010) corroborate this by considering organisational effectiveness as encompassing the “organizational members’ perceptions of the degree of the overall success, market share, profitability, growth rate, and innovativeness of the organization in comparison with key competitors” (p. 764).

1.5 The Research Context – The Maltese Pharmaceutical Sector

The pharmaceutical sector is an important business sector for the Maltese economy. This notion increases the importance of investigating how KM can improve organisational effectiveness in this sector. The Maltese Pharmaceutical Sector exported €243 million worth of pharmaceutical products in 2015 making up approximately 7% of total exports for Malta (NSO News Release, 2017). In 2017, the Maltese Pharmaceutical Sector exported €288 million worth of pharmaceutical products making up approximately 9% of total exports for Malta (NSO News Release, 2018). The year 2016 was a record year for the Maltese Pharmaceutical Sector with €882 million worth of pharmaceutical products exported making up approximately 22% of the total exports of Malta for that period (NSO News Release, 2018). The government, acknowledging the importance of the pharmaceutical sector for Malta, offers

different types of incentives to investors in this sector including investment allowances, research and development incentives, and access to other potential funding opportunities under the relevant and applicable EU funding programs.

The Maltese Pharmaceutical Sector encompasses all the activities related to the procurement, distribution and administration of medicinal products in Malta (Figure 1.1). These activities include regulatory and policy making; dispensing and hospital/clinical services; wholesale dealing and distribution services; importation, manufacturing and repackaging services.

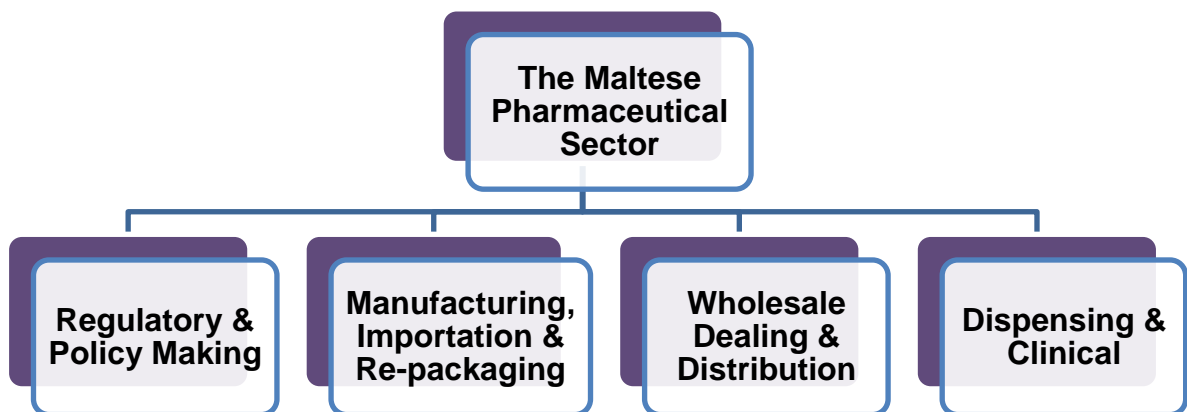


Figure 1.1: The structure of the Pharmaceutical Sector in Malta (Source: Author)

The Maltese Pharmaceutical Sector is indeed a knowledge intensive sector. Following Bettencourt *et al.* (2002), Millar, Lockett and Mahon (2016) define Knowledge Intensive Organisations (KIOs) as “organisations whose primary value-added activities consist of the accumulation, creation or dissemination of knowledge for the purpose of developing a customized service” (p. 846). Being

a typically knowledge intensive sector, the pharmaceutical sector is therefore uniquely positioned to benefit from KM initiatives that could help organisations to remain competitive and become more effective by overcoming the challenges faced in making the best possible use of their knowledge assets. Mehralian, Nazari and Ghasemzadeh (2018) agree with this view when they state that the pharmaceutical sector “is research-intensive and has to be highly innovative, as the required knowledge to operate in this sector is more complicated than those of other sectors and research-intensive environments” (p. 803).

Besides the challenge mentioned above, the Maltese Pharmaceutical Sector is also subject to pressures of a regulatory nature which pose an extra burden on the resources of organisations within this sector. For e.g., the requirements for the new medicine verification system laid down by the falsified medicines directive 2011/62/EU and subsequent Commission Delegated Regulation (EU) 2016/161 (European Commission, 2018) which come into force during February 2019, will provide an added challenge for the competitiveness of organisations in the Maltese Pharmaceutical Sector. Another problem faced by organisations in the Maltese Pharmaceutical Sector and which is intrinsic to knowledge-intensive organisations is recruiting and retaining knowledge workers. Besides recruiting problems posed by Malta’s small size and insularity “knowledge workers, particularly professionals have higher mobility by virtue of their professional qualifications and as such their retention presents a particular challenge for leaders of knowledge-intensive firms” (Millar, Chen & Waller, 2017, p. 266).

The literature has highlighted studies that show the importance of KM for the pharmaceutical sector. Lilleoere and Hansen (2011) remarked that the KM process of knowledge sharing in the pharmaceutical industry is “believed to enhance the creation of knowledge, potentially enabling new innovative products to be developed at greater speed” (p. 54). KM has also been attributed with helping in the creation of innovation (Rathore, Bansal & Hans, 2013; Závodská & Šramová, 2014) and of strengthening intellectual capital (Mehralian *et al.*, 2018) in this sector.

1.6 Summary of the Findings of this Study

This study concluded that the KM enablers learning, formalisation, KM strategy, intrinsic rewards, IT support and transformational leadership produced positive direct effects on the KM processes with IT support and two dimensions of transformational leadership (inspirational motivation and intellectual stimulation) producing a positive effect on organisational effectiveness. Centralisation was the only KM enabler to have a direct negative effect on KM processes. The combination of the KM enablers trust and collaboration did not have any influence on KM processes and organisational effectiveness whilst the KM enabler T-shaped skills was dropped due to poor factor loadings. The KM processes of knowledge creation and knowledge protection produced direct effects on organisational effectiveness and mediated the relationship between some KM enablers and organisational effectiveness.

This study also concluded that KM is a fairly new concept for the Maltese Pharmaceutical Sector and it is still at its infancy stage. However, albeit such findings, both codification strategies and personalisation strategies, both essential elements of a KM strategy exist but these are not under the umbrella of KM or part of an official KM strategy. Metrics intended to measure effects of initiatives targeting organisational effectiveness were lacking. Finally, this study also concluded that there is enthusiasm for KM for the foreseeable future and there is eagerness to see more KM initiatives officially introduced in the Maltese Pharmaceutical Sector.

This study also produced five theoretical contributions to the field of KM and nine managerial implications as detailed in section 6.3 and 6.4 respectively. It also proposed five specific avenues for further research as detailed in section 6.6.

1.7 Structure of this Study

This study is divided into six chapters. In this introduction (*Chapter One*), I have set the scene for this study by discussing the current state of affairs and highlighting the main shortcomings in the KM field. Following this, I have outlined the aims, objectives and research questions for this study. I have then outlined the research methodology, described the research context which in this case is the Maltese Pharmaceutical Sector and described briefly the findings of this research. In *Chapter Two* I provide a review of the literature pertinent to the study of KM. I start off this chapter with an introduction on KM where I

discuss generations of KM, the multidisciplinary nature of KM and conclude by providing a definition of KM. A discussion on explicit vs tacit knowledge and on the objectivist vs the practice-based view on knowledge leads to an illustration and comparison of the prominent KM life cycles from where I discern the KM processes to be studied. Finally, I explore the current theoretical underpinnings related to the relationships between KM enablers, KM processes and organisational effectiveness and come up with the theoretical model which I illustrate at the end of this chapter.

In *Chapter Three*, I describe the methodology of the study including the philosophical stance and research strategies adopted as well as the research methods used in order to answer the research questions for both the quantitative and qualitative studies. In *Chapter Four*, I report the findings obtained for the quantitative study by analysing the proposed integrative KM model through Structural Equation Modeling (SEM). I then proceed to report the findings of the template analysis employed for the qualitative study. In *Chapter Five*, I present a combined discussion of the findings of the quantitative study and the qualitative study in line with a concurrent (convergent parallel) mixed methods approach (QUAN + QUAL). This is done by converging the findings of both studies, comparing these findings to the existing literature, and then discussing their relevance for the KM field. Topics for discussion in this chapter include the KM uptake by the Maltese Pharmaceutical Sector and the role of KM strategy; the relationship between KM enablers and KM processes, KM processes and organisational effectiveness and the mediating role of KM processes; a discussion on metrics used to gauge initiatives geared at

improving organisational effectiveness; and finally, the perceived future role of KM in the Maltese Pharmaceutical Sector. Finally, in *Chapter Six*, I present the conclusions of the study, discuss the theoretical contributions, managerial implications and study limitations and suggest avenues for further study. I conclude this chapter with a short resume and my final thoughts.

1.8 Summary

In this chapter I have set the background for my study by illustrating the current state of affairs in the KM field and identifying the gaps that I wish to address through this study. I have also established the aims and objectives of this study, described the research questions, research methodology and the research context. A brief account of the findings of this research followed. Finally, I have also outlined briefly the chapters making up this study starting off by the next chapter which deals with the literature review.

**CHAPTER TWO – LITERATURE
REVIEW**

2.1 Introduction

This literature review chapter is divided into two parts. The first part serves as an introduction to KM and sets the scene for the study including definitions and generations of KM. The second part elaborates on the essential components of KM and that are directly relevant to the research questions. It emphasises which aspects of the KM processes are examined and the relationships between KM enablers and KM processes, KM processes and organisational effectiveness and the mediating role of KM processes in the relationship between KM enablers and organisational effectiveness. Finally, it concludes by describing the theoretical framework being proposed for this research.

2.1.1 The Literature Review

As argued by Boote and Beile (2005), “a researcher cannot perform significant research without first understanding the literature in the field” (p. 3). Therefore, it is important to take a serious approach to the literature review as it is of cardinal importance to a successful research project. The scope of this literature review is to help me garner an understanding of previous research in the field of KM related to the research questions proposed in this study. By providing a critical assessment through referencing and discussing previous researchers’ work in the field, the literature review will help me put this research in context and emphasise the areas where this research will be providing a contribution to knowledge by addressing identified gaps in the KM literature (Saunders *et. al.*, 2016). Pautasso (2013) suggests that to carry out a thorough

review of the literature, one must use “different keywords and database sources; (e.g., DBLP, Google Scholar, ISI Proceedings, JSTOR Search, Medline, Scopus, Web of Science); look at who has cited past relevant papers and book chapters” (p. 1).

In this research, I adopted this approach by reviewing different sources of literature such as published journals, books, government data and conference proceedings. I developed keyword searches and reviewed the literature by means of generic internet search engines such as Google, Bing and Yahoo and by means of HyDi (Hybrid Discovery), the University of Malta’s library search gateway which provides access to full text online databases such as Emerald, JSTOR, ProQuest, Science Direct, and other information sources. A review of books and dissertations at the University of Malta was also carried out. Once this process was carried out, important references cited in journals and articles selected by the review process were followed. Once the search processes were completed, the literature obtained was analysed and synthesised in order to assess its relevance to this research. This was done by summarising the content of the literature and categorising it accordingly. The references were also written down in order to mitigate the risk of plagiarism.

2.2 History and Evolution of KM

KM grew as a discipline in the 1970’s, 1980’s and 1990’s and is still growing today. It owes its development to the various works of academics and pioneers such as Drucker (1964), Sveiby and Lloyd (1987), Senge (1990) and Nonaka

and Takeuchi (1995). Table 2.1 below summarises the time-line of KM from the 1970's to date, including important contributors to KM and events that marked the rise of this discipline.

1970's	<p>1975 - As one of the first organisations to explicitly adopt knowledge-focused management practice, Chaparral Steel bases their internal organisational structure and corporate strategy to rely directly on explicit management of knowledge securing technical and market leadership without information technology assistance.</p>
1980's	<p>1981 – Arthur D. Little starts the Applied Artificial Intelligence Centre to build practical knowledge-based systems (KBS) for commercial and Government clients. 1983 – United Services Automobile Association (USAA) develops the first version of a KBS to transfer expert knowledge to practitioners as part of their deliberate effort to manage knowledge. 1986 – The 'Management of Knowledge: Perspectives of a new opportunity' concept is introduced in a keynote address at a European management conference sponsored by the International Labour Organisation of the United Nations. 1987 – The first book relating to KM is published in Europe (Sveiby & Lloyd, 1987). 1989 – A survey of Fortune 50 CEOs' perspectives on KM is undertaken in which all agree that knowledge is their organisation's most important asset – but no one knows how to manage it. 1989 – Sloan Management Review publishes its first KM related article (Stata, 1989). 1989 – Several management consulting firms start internal efforts to manage knowledge (Price Waterhouse integrates KM into strategy). A few small and specialised consulting firms offer KM specific servers to clients. 1989 – The International Knowledge Management Network is started in Europe.</p>
1990's	<p>1990 – The Initiative for Managing Knowledge Assets (IMKA) is started by a consortium of several US companies to provide a technological base for KM. 1990 – In Europe the first book on the learning organisation is published (Garratt, 1990). In the US, the first books relating to KM are published (Savage, 1990; Senge, 1990). 1991 – The first Japanese book relating to KM is published in the US (Sakaiya, 1991). Fortune and Harvard Business Review run their first articles on KM (Nonaka, 1991). 1993 – In Europe, an important KM article is published (Steels, 1993) and the first book explicitly dedicated to KM is published (Wiig, 1993). 1994 – The International Knowledge Management Network expands its scope to include the Internet and publishes a KM survey of 80 Dutch companies (Spijkervet & van der Spek, 1994). 1994 – Knowledge Management Network and FAST Company magazine are founded in the US. 1995 – The European ESPRIT program includes explicit requests for KM related projects. 1995 – The American Productivity and Quality Centre (APQC) & Arthur Andersen conduct the Knowledge Imperatives Symposium with over 300 attendees. Other KM conferences and seminars are held in the US & Europe. APQC also initiates a multiclient Knowledge Management Consortium Benchmarking Study with 20 sponsors. 1995 – The KM Forum is started on the Internet and KM Focus is broadened to include research on intellectual work (Suchman, 1995). 1996 – Over one dozen large consulting organisations and many smaller ones offer KM services to clients. Many companies are starting KM efforts, some with internal resources only and others with assistance by outside organisations. 1996 – The European Knowledge Management Association is started. 1997 – Journal of Knowledge Management was established, dedicated solely to KM.</p>
2000 to present	<p>2000-2003 – KM courses/programs in universities with KM text. 2003 to present – KM degrees offered by professional institutions such as KMCI (Knowledge Management Consortium International) and PhD students completing KM dissertations. Also, scholarly academies such as Academy of Management (AoM), British Academy of Management (BAM) & European Academy of Management (EURAM) started contributing to the KM field.</p>

Table 2.1: Highlights of KM development from 1970's to date (Sources: Wiig, 1997, p. 6-8; Dalkir, 2011, p. 19).

2.2.1 Generations of KM

When discussing the evolution of KM, three generations are normally distinguished namely 1st generation KM, 2nd generation KM and 3rd generation KM (see Figure 2.1 below). Each are discussed in turn below.

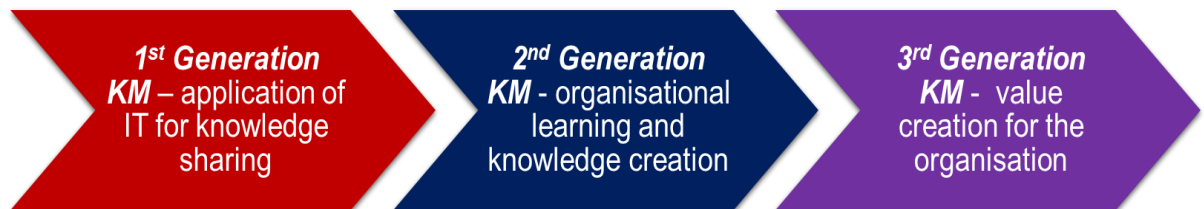


Figure 2.1: Generations of KM (Source: Author)

In first generation KM (1980's), the emphasis was on the technology aspect of KM, an IT driven KM focusing on knowledge sharing (supply-side KM) of 'best practices' and 'lessons learned' for decision support (Koenig, 2002, McElroy, 1999; Snowden, 2002). Vorakulpipat and Rezgui (2008) lend support to this view of first generation KM when they argue that knowledge sharing "can be considered as the first generation knowledge management and is described as 'supply-side KM' as people can acquire supplied knowledge through knowledge sharing systems" (p. 21).

In the 1990's a second generation KM (demand-side KM) evolved where the emphasis was on the people aspect of KM with human and cultural factors playing an important role, and focus shifting on knowledge creation (Koenig, 2002; McElroy, 1999). Pentland (1995) and Nonaka, Toyama and Konno (2000) argue that knowledge creation is an organisational, social and collaborative dynamic process that involves the interaction between tacit and explicit knowledge. This can be achieved through organisational learning (Senge, 1990), communities of practice (Wenger, McDermott and Snyder, 2002) and tacit /explicit knowledge conversion as argued by Snowden (2002) and also by Nonaka and Takeuchi (1995) in the SECI model (Socialisation, Externalisation, Internalisation, Combination).

Finally, third generation KM now focuses on KM initiatives geared at creating value for the organisation. Rezgui, Hopfe and Vorakulpipat (2010) epitomise this by stating that third generation KM "is perceived as a framework for designing an organization's goals, structures, and processes so that the organization can use what it knows to learn and create value for its customers and community" (p. 225).

2.3 What is KM?

On reviewing the KM literature, it is very difficult to find a universally accepted definition of KM. This is due to the multidisciplinary nature of KM where people contributing to the KM field come from different disciplines (Edvardsson, 2006)

such as human resources management, philosophy, accounting, information technology and performance management (see Figure 2.2 below).



Figure 2.2: The multidisciplinary nature of KM showing contributions to the discipline by other fields (Source: Ragab & Arisha, 2013, p. 874)

This multidisciplinary nature of KM is reflected in a recent review of the KM literature, carried out by Ragab and Arisha (2013) that classifies KM into five broad areas of research (see Figure 2.3 below).

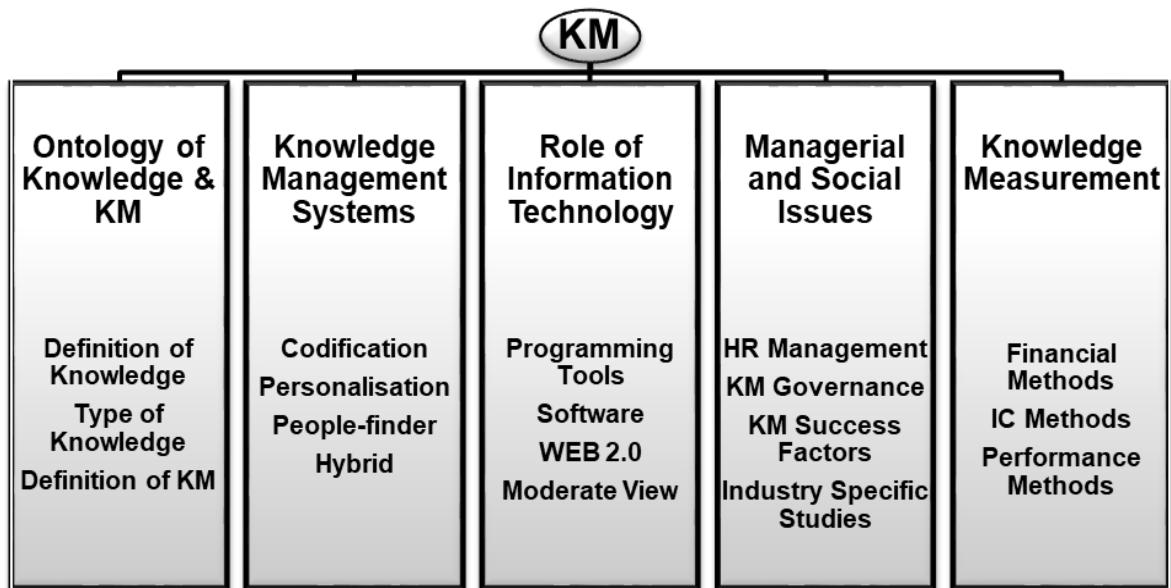


Figure 2.3: Classification of KM research areas from literature (Source: Ragab & Arisha, 2013, p. 892)

The first research area is ontology of knowledge. Here KM borrows from the philosophy domain and involves studies on definitions, types and characteristics of knowledge and KM. The second and third areas of research both borrow from the computer science/information technology (IT) domain. Studies on designing a Knowledge Management System (KMS) defined as “a managerial, technical and organisational system structured to support the implementation of KM within an organisation” (Ragab & Arisha, 2013, p. 877) revolve around three aspects namely codification, personalisation, people-finder and hybrid approaches whilst research on the role of IT for KM involves designing and implementing IT based solutions (e.g. programming tools, software, WEB 2.0) for KM.

The fourth research area borrows from the management science and sociology domains since it involves studying the role played by management and social issues in the success of KM. Of particular interest in this field are the roles played by KM processes such as knowledge sharing and knowledge creation and the social aspects tied with the success of such processes. Finally, the fifth and final research area borrows from the accounts and performance management domains and involves the measurement of knowledge. KM measurement is the most difficult activity since the “development of metrics is made complex by the intangible nature of the knowledge asset” (Kankanhalli & Tan, 2005, p. 20).

2.3.1 Defining KM

Given the multidisciplinary nature of KM, different researchers have taken different views of KM and thus proposed different definitions from various perspectives. Davenport and Prusak (1998) view KM from a knowledge asset perspective when they claim that KM is associated with the exploitation and development of the knowledge assets (explicit and tacit) of an organisation, aligned with the company’s objectives. Stankosky (2008) views KM from an intellectual assets perspective by claiming that KM is focused on the leveraging of intellectual assets by an organisation to enhance its organisational performance. Corso, Giacobbe and Martini (2009) and LaMonica (2001) focus on the people aspect since they look at KM as the process of opening communication channels and fostering knowledge flow in the firm through teamwork so that it can be used, enhanced and built upon to leverage the

performance of individuals and consequently the whole firm. Wong *et al.* (2015) combine the knowledge resources and knowledge processes view by claiming that KM involves the management of an organisation's knowledge resources and knowledge processes, with the objective of creating value through knowledge usage that will give competitive advantages. Dalkir (2011) takes a more holistic view by claiming that KM is focused on coordinating people, processes and technology to promote the creation, sharing and application of knowledge in order to add value through reuse and innovation

Reviewing the diverse KM definitions above, it can be concluded that there is common ground to believe that it involves the *best use of an organisation's knowledge resources to improve organisational performance and effectiveness.*

Thus, it can be asserted that:

KM focuses on organising people, processes and technology in order to get the most out of an organisation's knowledge resources. By making the best possible use of their knowledge resources, organisations can enhance their organisational performance and effectiveness.

The knowledge resources of an organisation are usually divided into human capital, knowledge and information capital and intellectual property. Human capital includes the human resources within an organisation i.e. employees and staff. Employees are important knowledge assets as most of the tacit knowledge that adds value to an organisation (e.g. skills, ideas and abilities) resides in them. Even though external to an organisation, suppliers and

customers are also considered as human capital since they provide valuable knowledge to the organisation (Tan & Wong, 2015; Wong *et al.*, 2015).

Knowledge and information capital refers to the quantity and quality of knowledge owned by a company (Tan & Wong, 2015; Wong *et al.*, 2015). This type of knowledge is often stored in various forms and categories/taxonomies in the organisation's repository system, either manually (e.g. manual files) or digitally (on hard drives in computer servers).

Intellectual property can be considered as an intellectual asset that is the property of an organisation or company and that is legally protected from outside use or implementation without consent (WIPO, 2004). Intellectual property can take the form of technology, service or knowledge and creates wealth for an organisation by fostering competitiveness and encouraging research and development activities that produce more quality knowledge and technologies within the organisation (Tan & Wong, 2015).

As can be seen from the above, knowledge takes centre stage as the most valuable resource for the organisation. The KM literature mainly distinguishes between two forms of knowledge namely explicit and tacit knowledge (Nonaka & Takeuchi 1995). This distinction is important to KM because it is tied to two competing perspectives on knowledge which give rise to fundamental differences on how knowledge should be managed. These two competing perspectives are the objectivist (tied to explicit knowledge) perspective and the practice based (tied to tacit knowledge) perspective (Burrell & Morgan, 1979;

Hislop, 2013; Schultze & Stabell, 2004). As Atherton (2003) puts it “there is, in other words, a debate around notions of knowledge in the business, with some conceptualizing knowledge as an identifiable input or output, and others considering it a process of learning by knowing in practice” (p. 1380). To explain better these distinctions, a short description of tacit and explicit knowledge will be followed by a critique on these two competing perspectives, highlighting the differences between them and the implications involved when adopting either perspective for KM.

2.4 Tacit vs Explicit Knowledge

The discourse about tacit and explicit knowledge derives from the works of the twentieth century philosopher Michael Polanyi (1958, 1966, 1983), most notably his phrase “we can know more than we can tell” (Polanyi, 1966, p. 4). Building on interpretations of Polanyi’s work, Nonaka and Takeuchi (1995) conceptualise the famous SECI Model. This model illustrates the knowledge transformation between tacit and explicit forms via the four processes of socialisation, externalisation, combination, and internalisation (SECI).

Berthoin Antal *et al.* (2001) clearly distinguish between tacit and explicit knowledge by defining tacit knowledge as “what is known by individuals or groups and transmitted by action and observation” (p. 924) and explicit knowledge as “codified and can be transmitted in formal and systematic language” (p. 924). Many academics in the KM literature agree with these definitions of tacit and explicit knowledge. Nonaka, Toyama and Konno (2001)

argue that explicit knowledge can be expressed in formal and systemic language and can be shared by codification (e.g. manuals, standard operating procedures) and therefore can be stored. Magnier-Watanabe and Benton (2017) claim that explicit knowledge is “objective and rational knowledge and can be expressed with words or numbers; texts, equations, specifications, and manuals” (p. 326).

Gherardi (2006) argues that tacit knowledge is “taken for granted, action based, context specific, experience based, difficult to express” (p. 100). Wagner and Sternberg (1985), Davenport and Prusak (1998), Stenmark (2001) and Kupers (2005) argue that tacit knowledge is highly personal. Wagner and Sternberg (1985) and Nonaka and Takeuchi (1995) argue that tacit knowledge is obtained from experience. Nonaka *et al.* (2001) argue that tacit knowledge is rooted in actions, procedures, routines, commitments, ideals, values and emotions. Selamat and Choudrie (2004) argue that tacit knowledge resides in the individuals’ minds and is transparent. Magnier-Watanabe and Benton (2017) claim that tacit knowledge is “cognitive knowledge that is highly individual and difficult to express with language or numbers; for example, beliefs, points of view, technical skills, and know-how” (p. 326)

Some academics argue that tacit and explicit knowledge are linked to the data, information, knowledge and wisdom conundrum. Baskarada and Koronios (2013) consider Data as consisting of physical signs with no meaning since data resides outside of human mind. On the other hand, Information has meaning because it “emerges through the cognitive processing of data”

(Baskarada & Koronios, 2013, p. 13). Baskarada & Koronios (2013) consider Knowledge as a “person’s beliefs which have been socially judged to be true” (p. 13) and Wisdom as “person’s normative judgement which have been socially judged to be desirable” (p. 13). Academics such as Alavi and Leidner (2001), Ye (2016) and Zeleny (2006) argue that tacit and explicit knowledge exist along a continuum between data and wisdom with data being more explicit in nature and wisdom more tacit.

2.5 The Objectivist Perspective on Knowledge

Two of the fundamental assumptions of the objectivist perspective are that knowledge in organisations can be considered as objective in nature and hence this knowledge can be codified (explicit knowledge) and therefore separated from organisational members (Hislop, 2013; Hislop, Bosua & Helms, 2018). Thus, from an objectivist perspective, knowledge is considered as having the following four characteristics:

First, knowledge from an objectivist point of view embraces positivism. Positivistic philosophy was introduced by the 19th century philosopher Comte and assumes that all knowledge can be derived from observations and measurements of the world around us that follows patterns of cause and effect (Hislop *et al.*, 2018). Nonaka and Peltokorpi (2006) agree and argue that the positivist ontology is “based on the view that there are objective facts about the world that do not depend on interpretation or even the presence of any person.” (p. 75).

Second, building on positivism, knowledge is considered as an object or an entity that is separate from the individual. Cook and Brown (1999), in their epistemology of possession, argued that knowledge is considered as an entity or a commodity that people 'possess' and therefore can be considered as an "objectifiable transferrable commodity" (Hartmann & Dorée, 2015, p. 342). This knowledge is codifiable and can be found in tangible forms such as, for example, documents, manuals, standard operating procedures and electronic databases (explicit knowledge). King and Marks (2008) argue that information technology based KMS are specifically designed so as an individual's knowledge is captured and made explicit. In fact, "many KMSs are designed to capture individuals' knowledge so that the broader organisation can benefit from its dissemination" (p. 131).

Third, objective (explicit) knowledge is considered more important than subjective (tacit) knowledge (Marabelli & Newell, 2014). Exponents of the objectivist perspective regard explicit knowledge as the equivalent to objective knowledge and therefore it is preferred since it is easier to express. Tacit knowledge is regarded as personalised, individualistic knowledge that is more informal, less rigorous and therefore highly difficult to express due to its subjective nature (Hislop *et al.*, 2018).

Finally, knowledge is considered as a primary product of mental processes. Knowledge is considered as a codifiable, cognitive entity deriving from mental processes of an individual or the collective (Hislop *et al.*, 2018). Cook and

Brown (1999) agree with this since as shown earlier, they define this as the epistemology of possession, that is knowledge as “something that is held in the head” (p. 384).

2.5.1 Implications of the Objectivist Approach to KM

The goal of an objectivist approach to KM is that any initiatives target the conversion of tacit (subjective) knowledge to explicit (codifiable) knowledge (Hislop *et al.*, 2018). One way of explicating tacit knowledge is through storytelling or narrative knowing (Bhardwaj & Monin, 2006; Kupers 2005; Snowden, 2002; Snowden, 2005). Roth (2003) and Kupers (2005) argue that storytelling is an ideal approach to managing the knowledge existing within firms since stories allow an individual to transmit embodied emotional knowledge. Through storytelling, an individual is allowed “to explicate thoughts, use metaphors and convey body language concurrently. The combination of such approaches is far more information-rich than a message sent through email” (Venkitachalam & Busch, 2012, p. 361).

Another way of converting tacit to explicit knowledge is through entering tacit know-how into a knowledge repository (Bush & Tiwana, 2005). This codified knowledge is collected in a central knowledge repository for easy access and retrieval, and then, this stored knowledge is structured and categorised. It is also recognised that Information Technology (IT) plays a pivotal role in facilitating these processes since it enhances the accessibility of this centralised knowledge by other employees within the organisation (Cha, Pingry

& Thatcher, 2008; Gilbert, Morabito & Stohr, 2010; Taskin & Van Bunn, 2015) thus reducing knowledge hoarding and promoting knowledge sharing within the organisation.

King and Marks (2008) acknowledge the important role that IT plays in centralising and categorising codified (explicit) knowledge for the benefit of the whole organisation. In fact, they argue that IT based KM initiatives must focus on developing systems “designed to capture individuals’ knowledge so that the broader organisation can benefit from its dissemination” (p. 131). Durcikova and Gray (2009), in agreement with King and Marks (2008), emphasise further the importance of systemising and indexing knowledge in central repositories by stating that organisations should hire knowledge experts who “filter employees’ contributions, rejecting those that are redundant, incorrect, ineffective, outdated, or otherwise unhelpful” (p. 82). In this way, this centralised knowledge repository will contain knowledge that will help employees to tackle problems by providing answers to questions and solutions to problems.

2.6 The Practice-Based Perspective on Knowledge

From a practice-based perspective, knowledge is viewed as being embedded in work practices and therefore is inseparable from work activities (Hislop *et al.*, 2018) and thus is practice based (Gherardi, 2000; Marshall, 2014; Orlikowski, 2002; Orr *et al.*, 2016). Cook and Brown (1999) and Black, Carlile and Repenning (2004) argue that there is interaction and mutual production of

practice and knowledge hence this perspective is referred to as 'epistemology of practice'. Ripamonti and Scarlatti (2011) support this description of the practice-based perspective on knowledge and argue further that practice-based knowledge is "action-oriented and implicit" (p. 185), and therefore "this type of knowledge is acquired by experience in a specific context" (p.185). The practice-based perspective differs from the objectivist perspective as follows:

First, knowledge is considered as rooted in practice. Whilst the objectivist perspective looks at knowledge as an entity or object that can be separated from people and hence codified, writers belonging to the practice-based perspective on knowledge see knowledge as inseparable from human activity (Corradi, Gherardi & Verzelloni, 2010; Gherardi, 2006; Hislop *et al.*, 2018; Orlikowski, 2002). In line with this view on knowledge, Nicolini (2011) argues that "knowledge is inherently tied to the pursuit of an activity" (p. 604) and that this knowledge develops "as actors engage with the organisational world in practice" (p. 604). Guzman (2013) agrees with Nicolini's (2011) view by stating that "the separation of knowledge and practice is purely for analytical reasons, since practice and knowledge are two sides of the same coin." (p. 440).

Second, knowledge is considered as being multifaceted. The works of Polanyi (1969) seem to have given rise to the argument whether tacit and explicit knowledge are separate types of knowledge (objectivist perspective) or not (practice-based perspective). Polanyi (1969) in his work on knowledge stated that "the idea of a strictly explicit knowledge is indeed self-contradictory; deprived of their tacit co-efficient, all spoken words, all formulae, all maps and

graphs are strictly meaningless.” (p. 195). With his words, Polanyi (1969) wanted to justify that there is no purely tacit or explicit knowledge, but all knowledge contains a mix of both (Brown & Duguid, 2001; Guzman, 2013; Hislop *et al.*, 2018; Tsoukas, 2003).

This is contrary to the interpretation given to Polanyi’s (1969) work by writers favouring the objectivist perspective on knowledge who use it to justify the idea that tacit and explicit knowledge are two separate and distinctive types of knowledge. Rosenkopf (2008) and Turner and Rindova (2012) argue that both explicit and tacit knowledge are important and suggest that explicit-oriented practices seem more suitable for supporting routines that aid in the exploitation of knowledge within an organisation. Conversely, tacit-oriented practices seem more suitable for supporting routines that aid exploration of knowledge in dynamic contexts.

Third, knowledge is considered as being embodied in the individual. Exponents of the practice-based perspective argue that it is impossible to make all knowledge explicit since there will always be a part that remains tacit and with the individual such as the experience gained from everyday work practices (Gherardi & Rodeschini, 2016; Strati, 2007; Yakhlef, 2010). The embodiment of knowledge is highlighted by Tsoukas (1996) who argues that no matter how explicit the rules or procedures that we adopt in everyday life to guide our actions, there will always be the need to make judgement when an ambiguous or uncertain situation arises. Ripamonti and Scarlatti (2011) came to the same conclusions as Tsoukas (1996) since they argued that it is not always possible

to standardise work practices due to the variable scenarios that workers are sometimes exposed to where they will need to adopt “continuous learning to cope with ever changing circumstances.” (p. 193).

Finally, knowledge is considered as having both social and cultural aspects. Practice-based exponents consider knowledge as subjective in nature and therefore open to different interpretations. Knowledge reflects the cultural values of whoever is creating it and hence cannot be considered as being unbiased or neutral (Hong, Heikkinen & Blomqvist, 2010; Rivera & Cox, 2016; Weir & Hutchings, 2005). Knowledge from the objectivist perspective contrasts this view since the crux of the argument brought forward by practitioners in the objectivist field is that knowledge is truth and objective in nature and hence does not suffer from social or cultural influences.

Polanyi (1969) argues that the social aspect of knowledge applies both to the production of knowledge (sense giving) and also to the interpretation of knowledge (sense ready). Boland and Tenkasi (1995) build on Polanyi's research and define the production of knowledge as 'perspective making' and the interpretation of knowledge as 'perspective taking'. Boland and Tenkasi (1995) define perspective making as “the process whereby a community of knowing develops and strengthens its own knowledge domain and practices” (p. 356) and perspective taking as a process in which “diverse individuals are able to appreciate and synergistically utilize their distinctive knowledge” (p. 358).

2.6.1 Implications of the Practice-Based Approach to KM

The fundamental aspects of a practice-based approach to KM involve: an understanding and appreciation of the tacit (subjective) aspect of knowledge; the ability of the individual within the organisation to interact socially with others and to actively engage in practice; and for management to adopt an active role in facilitating these processes of social interaction between the workers within the organisation. Therefore, the role of management here is not to directly manage knowledge but to proactively facilitate exchange between workers in an organisation (Bolisani & Scarso, 2000; Goodall & Roberts, 2003; Tsoukas, 1996). This can be achieved as follows:

First, by fostering a culture of knowledge sharing amongst employees within the organisation. This can be done by establishing, for example, a reward or appraisal system for employees that share knowledge. Management should also work hand in hand with the Human Resources Unit within an organisation to help and foster the design of jobs and roles that promote interpersonal communications and collective problem solving (Hislop, 2013; Hislop *et al.*, 2018).

Second, by providing the means and the impetus for the development of organisational communities of practice where employees can share individual successes (best practices) and lessons learned (failures).

Third, by helping in the setup of electronic or face to face fora which are an ideal means for employees to socially interact between them and discuss the day to day issues they are faced with in their workplace.

Fourth, by encouraging the building of mentoring systems where experienced workers are paired with novice workers and designing adequate job roles for workers in the organisation.

Finally, by promoting within the workforce a culture of loyalty towards the organisation. In this way, tacit knowledge residing within the experienced workers is not lost as there will be less chance that these workers seek employment with other organisations.

2.7 KM Life Cycle Models

Having discussed the objectivist and practiced based perspectives on knowledge and their implications for managing explicit and tacit knowledge, it is also important to understand how knowledge is processed during its lifecycle within an organisation. This allows for the identification of the key KM processes operating within an organisation. Table 2.2 below shows some of the KM life cycle models encountered in the KM literature. For the purpose of this study, seven major KM life cycle models (shown in italics in Table 2.2) will be discussed following the chronological order of appearance of the models in the literature.

Name of KM Life Cycle Model	Processes Mentioned
Huber (1991)	Acquisition, distribution, interpretation, organisational memory
<i>Wiig (1993)</i>	<i>Build, hold, pool, use/apply</i>
<i>Meyer and Zack (1996)</i>	<i>Acquisition, refinement, store/retrieve, distribution, presentation</i>
Nickols (1996)	Acquisition, organisation, specialisation, store/access, retrieve/distribution, conservation, disposal
Skyrme (1998)	Identify, create, collect/codify, knowledge database, diffuse/use
<i>Bukowitz and Williams (2000)</i>	<i>Get, use, learn, contribute, assess, build/sustain, divest</i>
Alavi and Leidner (2001)	Creation, storage/retrieval, transfer, application
Holsapple and Joshi (2002)	Acquiring, selecting, internalising, using
Birkinshaw and Sheehan (2002)	Creation, mobilisation, diffusion and commoditisation
Lee and Hong (2002)	Capture, development, sharing, utilisation
<i>McElroy (2003)</i>	<i>Individual and group learning, knowledge claim formulation, information acquisition, knowledge claim validation, knowledge broadcasting, searching, teaching, sharing</i>
O'Dell, Grayson and Essaides (2003)	Organising, sharing, adapting, using, creating, defining, collecting
Rollet (2003)	Planning, creating, integrating, organising, transferring, maintaining, assessing
Awad and Ghaziri (2004)	Capturing, organising, refining, transferring
Beccerra-Fernandez, Gonzalez and Sabherwal (2004)	Discovery, capture, sharing, application
<i>Dalkir (2005)</i>	<i>Knowledge capture and/or creation, knowledge acquisition and application, knowledge sharing and dissemination</i>
<i>Heisig (2009)</i>	<i>Use, identify, create, acquire, share, store</i>
Sagsan (2006, 2009)	Knowledge creation, knowledge sharing, knowledge structuring, knowledge using, knowledge auditing
Evans and Ali (2013)	Identify, organise and store, share, apply, evaluate and learn, create
<i>Evans, Dalkir and Bidian (2014)</i>	<i>Identify/create, store, use, learn, improve</i>

Table 2.2: The main KM life cycle models (Source: Shongwe, 2016, p. 142)

The models chosen for discussion are the Wiig (1993) model, Meyer and Zack (1996) model, Bukowitz and Williams (2000) model, McElroy (2003) model, and more recent integrative models by Dalkir (2005), Heisig (2009) and Evans, Dalkir and Bidian (2014). These models were chosen since they are comprehensive; include detailed descriptions of the KM processes illustrated; are reviewed in the KM literature; have a high scholarly adoption and are

frequently referred to by practitioners in the KM field (Anand & Singh, 2011; Dalkir, 2011; De Barros Campos, 2008; Firestone & McElroy, 2005; Kayani & Zia, 2012; Mohajan, 2016; Peters, Maruster & Jorna, 2010; Sary, Chantarasombat & Siristhi, 2011; Shongwe, 2016).

2.7.1 The Wiig (1993) KM Life Cycle Model

In order for an organisation to be successful, Wiig (1993) states that the following three conditions must be present: first the organisation must have a business portfolio, that is, it must offer products and services to a customer base; second, the organisation must have the resources to fulfil its business obligations, that is, the people, capital and facilities; and finally, the organisation must have the ability to act (Dalkir, 2011).

Wiig (1993) considers knowledge to be the driving force of any organisation. Wiig (1993) places a lot of emphasis on high quality knowledge and expertise within an organisation and thus gives importance to working smarter. According to Wiig (1993), working smarter “involves making use of all the best knowledge we have available” (p. 31). The Wiig KM (1993) life cycle model (Figure 2.4) focuses on the building and use of knowledge both at an individual and organisational level. The cycle consists of four main steps namely building, holding, pooling and using knowledge.

The “Build” phase covers a wide range of activities that an organisation can perform to build its knowledge base. The five major activities involved in building knowledge are: “Obtain/acquire” knowledge where either individuals are encouraged to experiment with current knowledge and come up with innovations that can improve their work practices, or knowledge is garnered from outside the organisation (e.g. through hiring experts); “Analyse” knowledge where a thorough analysis of the knowledge obtained from the previous stage occurs; “Synthesise/Reconstruct” knowledge where new knowledge obtained is compared with the knowledge already at hand so as it can be ascertained whether it is valid or not; “Codify/Model” knowledge involves codification of knowledge into a knowledge repository; and finally “Organise” knowledge which encompasses the systems adopted by an organisation to organise its knowledge in a clear way usually via established frameworks.

The “Hold” phase involves three activities namely: “Remember” knowledge where the individual internalises knowledge; “Accumulate/Embed” knowledge refers to the process where the organisation creates knowledge repositories, usually via local computers or on servers and hence stored knowledge becomes ‘organisational memory’; and finally, “Archive” knowledge where knowledge that is no longer in frequent use is stored for any future retrieval.

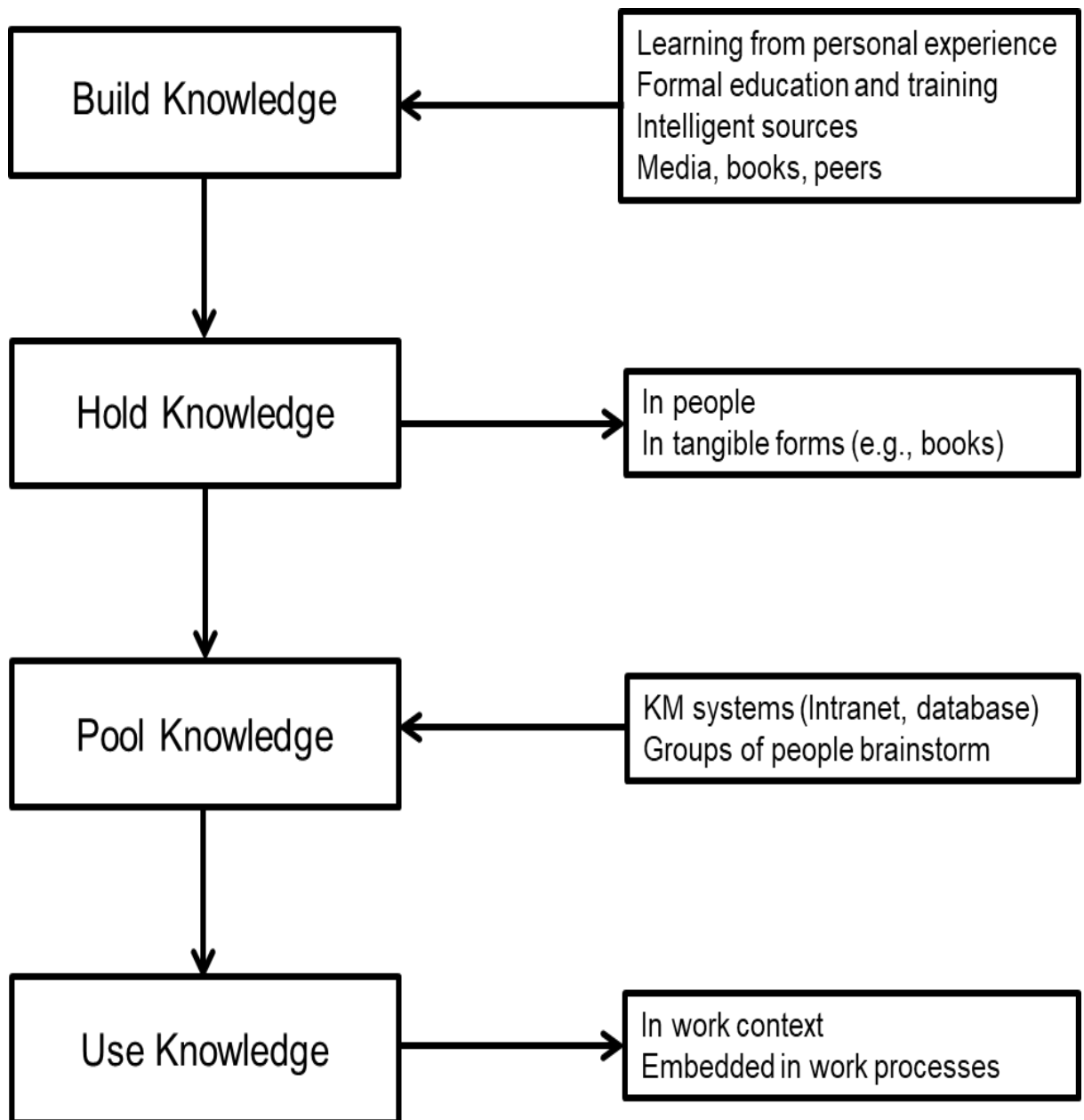


Figure 2.4: The Wiig (1993) KM life cycle model (Source: Dalkir, 2011, p. 47)

The “Pool” phase involves: “Coordinate” knowledge where workers in an organisation collaborate together by forming networks and teams so as they can work with particular knowledge content; “Assemble” knowledge where the various identified knowledge sources are assembled into a library/repository so as any subsequent access and retrieval is facilitated; and finally, “Access/Retrieve” knowledge where individuals within the organisation retrieve and access organisational knowledge stored in the organisation’s knowledge repositories.

Finally, the “Use” phase involves ways that one can use and apply the knowledge garnered by an organisation. These include: “Perform tasks” where knowledge workers perform routine tasks (by accessing compiled knowledge automatically/unconsciously) and difficult tasks (using knowledge consciously to solve unanticipated situations) (Dalkir, 2011); “Survey and describe” where the knowledge worker uses knowledge to survey and describe problems and hence forecast any expected consequences; “Select” where appropriate tools to handle problems are selected; “Observe and analyse” where specialised knowledge garnered by the individual is used to judge whether a problem can be settled in-house or whether external expertise is required; “Synthesise and evaluate” where alternative solutions/approaches are created by utilising and evaluating the knowledge available; and finally, “Decide and implement” where knowledge is used to decide on which alternative or solution to adopt and implement.

Although the phases are shown as occurring in a sequential way and as independent from each other, some of the functions illustrated can be performed in parallel. For example, built knowledge can be used/applied immediately in current work practices by an employee and the pooling exercise is then carried out later.

One of the major strengths of the Wiig (1993) KM life cycle lies in the great emphasis it places on the utilisation of knowledge held by the organisation (organisational memory) in order to create value. Dalkir (2011) confirms this by stating that “organisational memory is put into use in order to generate value for individuals, groups and the organisation itself.” (p. 50). Wiig (1993) also goes into great detail in emphasising the added value and the utility to the business of knowledge and to describe the constraints that may hinder the organisation from utilising to the full the knowledge available.

The Wiig (1993) KM life cycle model fails to acknowledge the importance of processes associated with the improvement of knowledge such as the refine, assess and divest processes.

2.7.2 The Meyer and Zack (1996) KM Life Cycle Model

The Meyer and Zack (1996) KM life cycle (illustrated in Figure 2.5 below) is based on “research and knowledge about the design of information products” (Zack, 1999, p. 46). Zack (1999) describes the model as consisting of a knowledge repository for codifiable (explicit) knowledge and refineries of

knowledge for the acquisition, refinement, management and distribution of knowledge, all supported by Information Technology and management which facilitate and manage these processes and the building of the knowledge repository. Zack (1999) refers to the knowledge being accumulated as 'knowledge units' and defines a knowledge unit as "a formally defined, atomic packet of knowledge content that can be labelled, indexed, stored, retrieved and manipulated." (p. 48).

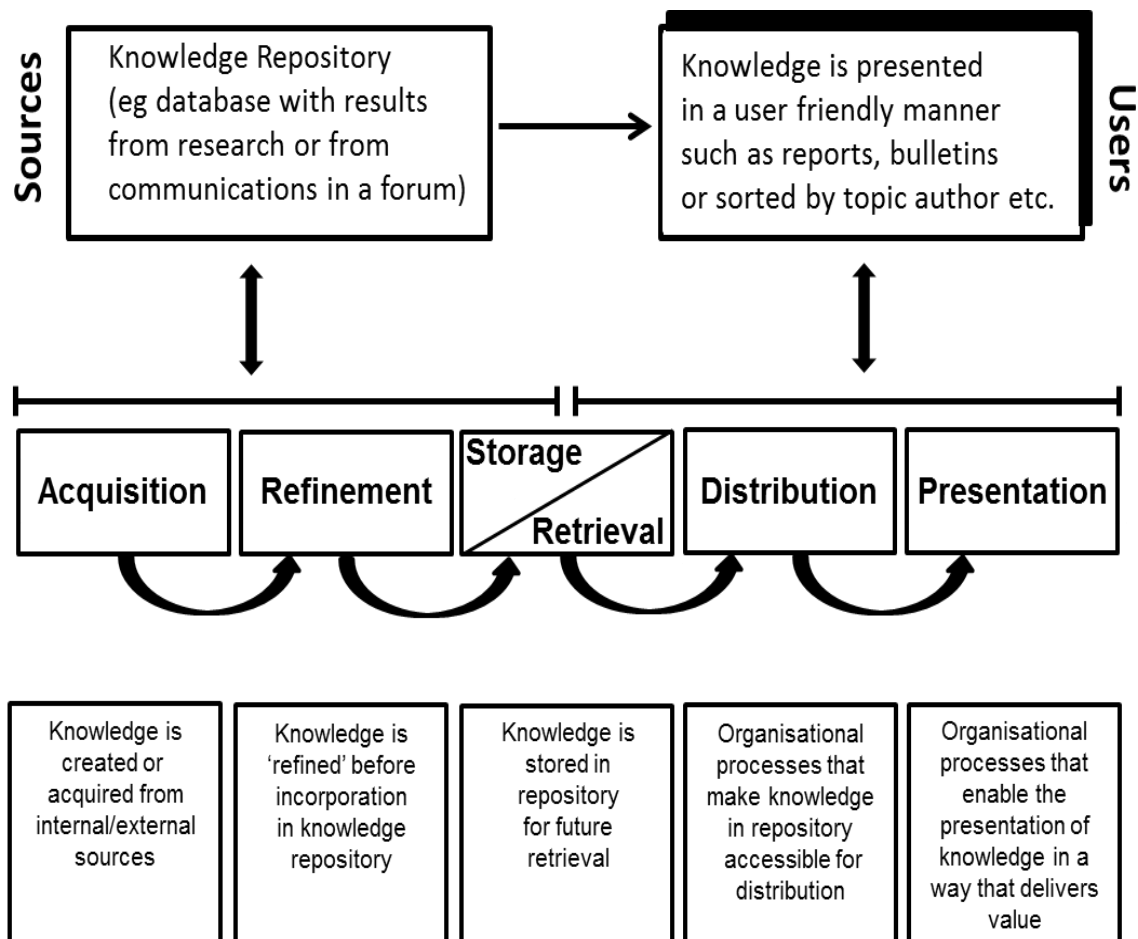


Figure 2.5: The Meyer and Zack (1996) KM life cycle model (Source: Zack, 1999, p. 48)

The five refinery steps shown in the model above namely, acquisition, refinement, storage and retrieval, distribution and presentation are discussed below:

The “Acquisition” stage is the first stage of the cycle and deals with creation and acquisition of knowledge. Possible sources of knowledge could be surveys or posts and comments in forums. Dalkir (2011) emphasises the notion of high quality sources by stating that “source data must be of the highest quality, otherwise the intellectual products produced downstream will be inferior.” (p. 35).

As Zack (1999) comments, the “Refinement” stage involves organisational knowledge being subjected to “value adding processes (refining) such as cleansing, labelling.....” (p. 49). Dalkir (2011) corroborates with Zack (1999) by describing this process as one which “adds value by creating more readily usable knowledge objects and by storing the content more flexibly for future use.” (p. 37).

The “Storage/Retrieval” stage serve as a link between the “Acquisition” and “Refinement” stages (through storage) and as a link between the “Distribution” and “Presentation” stages (through retrieval). Zack (1999) refers to this step as one which “bridges upstream repository creation and downstream knowledge distribution” (p. 49). Knowledge at this stage may be stored in both physical (e.g. printed material) and digital formats (e.g. databases).

The “Distribution” stage is an important step since it involves making the knowledge gathered by the previous stages readily available and accessible. Zack (1999) describes this step as one that “comprises the mechanisms an organisation uses to make repository content accessible.” (p. 49).

Finally, Zack (1999) describes the “Presentation” stage as one that offers “interactive selection of knowledge units” (p. 52) and a platform for “discussions threaded by topic, author and date” (p. 54).

One of the strengths of the Meyer and Zack (1996) KM life cycle is the introduction of the “refinement” stage, an important step in the knowledge cycle which is commonly neglected. The Meyer and Zack (1996) KM life cycle can also be considered as robust enough since it covers the main elements involved in the knowledge cycle of an organisation. Dalkir (2011) corroborates this by stating that the strength of the Meyer and Zack (1996) KM life cycle “derives primarily from its comprehensive information processing paradigm that is almost completely adaptable to knowledge based content.” (p. 38).

A criticism levelled at the Meyer and Zack (1996) KM life cycle is that besides being quite complex and more suited for larger organisations, it places emphasis on the explicit aspect by focusing on the distribution of knowledge primarily through technological means thus ignoring the tacit aspect of KM (Mohajan, 2016).

2.7.3 The McElroy (2003) KM Life Cycle Model

This model consists of two main units namely the “Knowledge Processing Environment” (shown in red) and the “Business Process Environment” (shown in blue). These are linked together via a series of feedback loops, beliefs and claims to an organisational knowledge repository described in the model as the “Distributed Organisational Knowledge Base (DOKB)”. The DOKB is made up of both subjective (tacit) knowledge and objective (explicit) knowledge. McElroy (2011) refers to these sources of knowledge as “containers” of knowledge “made up of agents (individuals and groups) and artifacts (documents, books, computer systems, etc.)” (p. 18). The different components of the model, illustrated in Figure 2.6, will be described below.

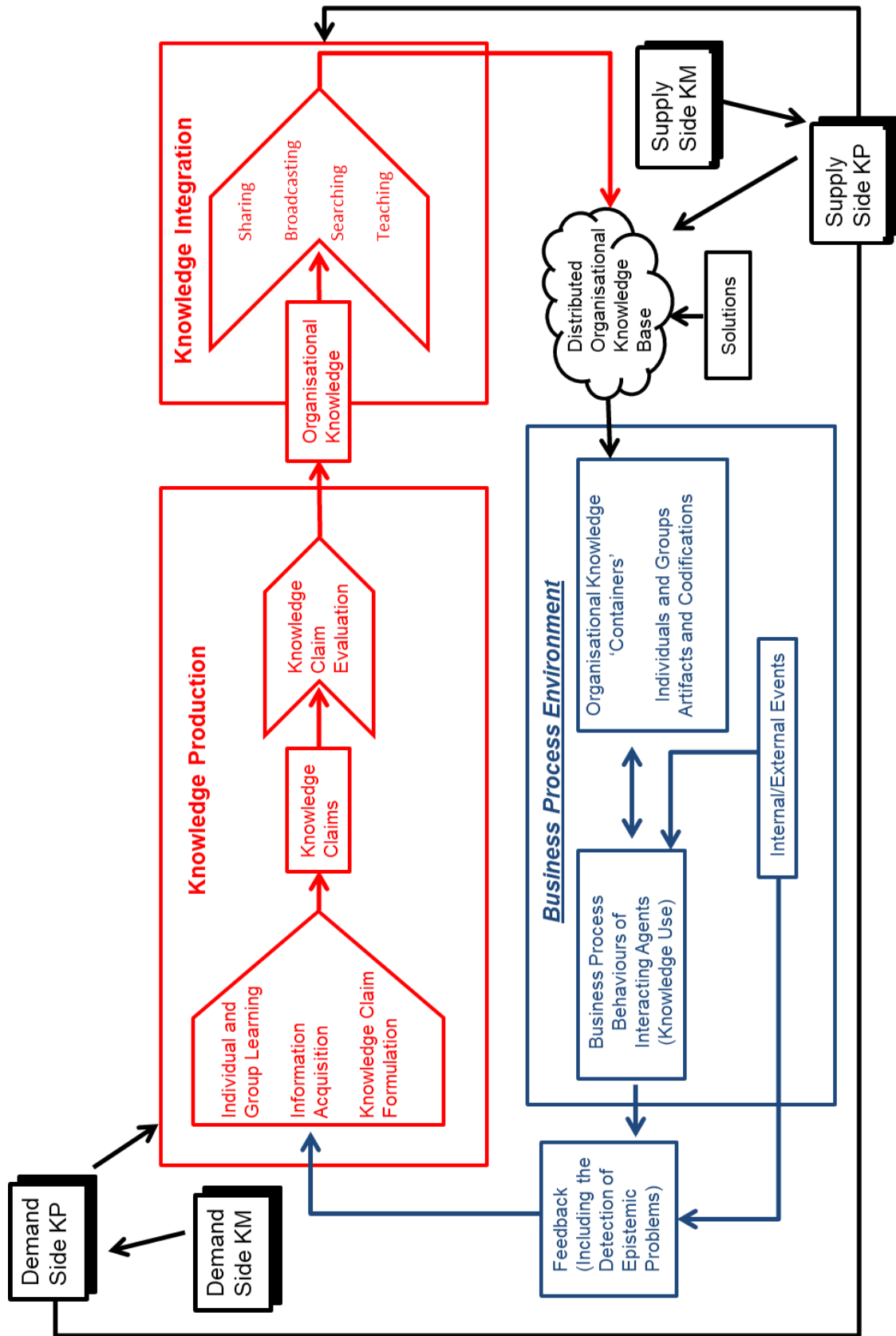


Figure 2.6: The McElroy (2003) KM life cycle model (Source: Firestone & McElroy, 2003, p. 303)

The “Business Process Environment” is the workplace environment where workers use knowledge every day to carry out their duties in the organisation. This knowledge use gives rise to two outcomes; either the knowledge satisfies one’s expectations (match) or it fails to do so (mismatch). If there is a “match”, then that knowledge will reinforce previous knowledge thus leading to its reuse. If there is a “mismatch”, then an adjustment in the processes used (e.g. work practices) occurs and this leads to feedback via **single loop learning** to the DOKB from where the original tacit and explicit knowledge originates (Argyris & Schön, 1978). If continuous mismatches keep occurring due to failure in the single loop learning processes feeding back knowledge to the DOKB, doubt or rejection of existing knowledge results (problem detection), triggering knowledge processing efforts in the knowledge processing environment to create and integrate new knowledge. This process is triggered from the business process environment and occurs via **double loop learning** (Argyris & Schön, 1978).

The “Knowledge Processing Environment” is responsible for the creation of new knowledge and the assimilation by the organisation, via organisational learning of this new knowledge. Individuals and groups respond to problem claims by acquiring information from the current content stored in the DOKB (information acquisition) and through individual and group learning. This results in the formulation of a new knowledge claim (knowledge claim formulation process). These new beliefs and claims also help to change the DOKB’s content and to determine its growth. These new knowledge claims are evaluated via the knowledge claim evaluation process. The outcome of such an evaluation

results in “surviving knowledge claims” that result in new organisational knowledge and “rejected knowledge claims” which can be categorised as falsified or undecided knowledge claims. This whole process is the “Knowledge Production Process” (McElroy, 2011). The outcomes of these knowledge claims i.e. their content and value are integrated into the DOKB of the organisation via a process known as “Knowledge Integration” and fed again into the business process environment from where the cycle starts again and is repeated endlessly.

The McElroy (2003) KM life cycle acknowledges the importance of both tacit (subjective) and explicit (objective) knowledge and makes the distinction between “Supply Side KM” (initiatives focused on the production of knowledge) and “Demand Side KM” (initiatives focused on the integration of knowledge).

Another important aspect of this model is the introduction of the “knowledge validation step”. By introducing the concept of knowledge validation by individuals and groups and the consequent feedback from these claims into the organisation’s knowledge base, it distinguishes KM from traditional data management. The cycle in fact focuses on “processes to identify knowledge content that is of value to the organisation and its employees.” (Dalkir, 2011, p. 45).

The McElroy (2003) KM life cycle is often criticised for being complex and for placing too much focus on the KM activities without providing any guidance on how to implement KM systems in organisations. It also fails to acknowledge the

importance of processes associated with the improvement of knowledge such as the refine, assess and divest processes.

2.7.4 The Bukowitz and Williams (2000) KM Life Cycle Model

The processes illustrated by Bukowitz and Williams (2000) in their KM life cycle model (Figure 2.7) can be grouped as “tactical” or “strategic” processes.

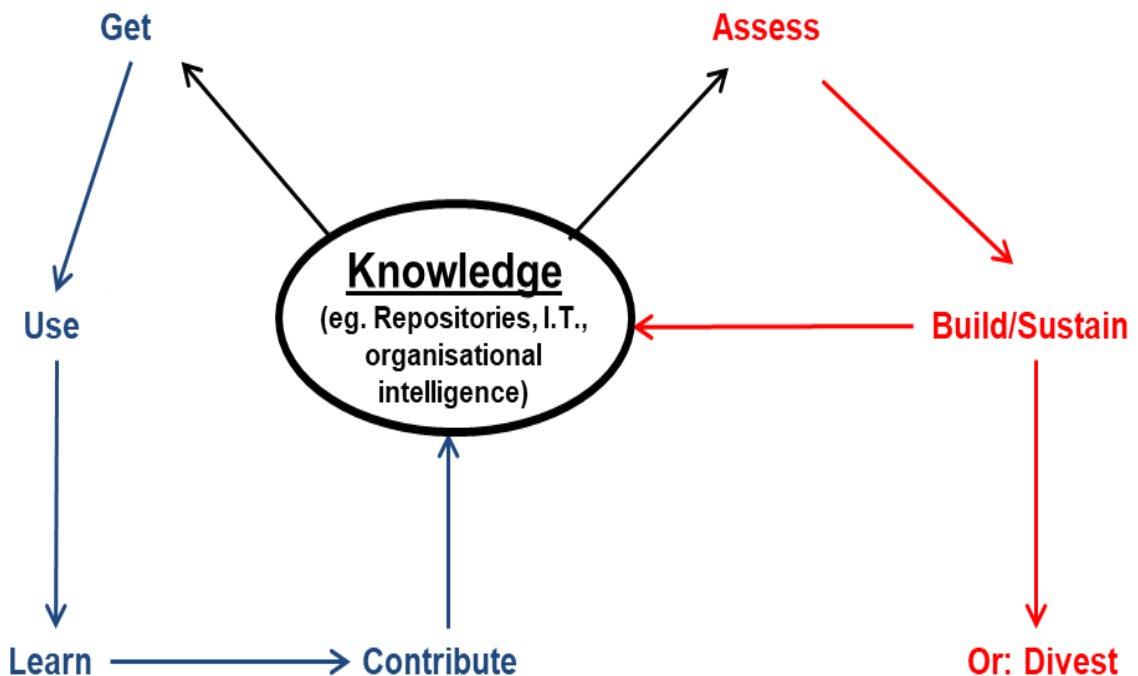


Figure 2.7: The Bukowitz and Williams (2000) KM life cycle model (Source: Dalkir, 2011, p. 39)

Tactical processes (shown in blue) include the “Get”, “Use”, “Learn” and “Contribute” stages. These are triggered by market demands and opportunities, including also the lost opportunities. Strategic processes (shown in red), include “Assess”, “Build/Sustain” and “Divest” stages and are triggered by changes in the external environment of the organisation (macro

environment). Bukowitz and Williams (2000) describe this model of the KM cycle as one that outlines “how organisations generate, maintain and deploy a strategically correct stock of knowledge to create value.” (p. 8)

The “Get” stage is the first stage of the Bukowitz and Williams (2000) cycle and deals with acquisition of knowledge. Bukowitz and Williams (2000) acknowledge that it is not just a matter of dealing with codified (explicit) knowledge such as physical documentation or electronic documentation but also a matter of utilising subjective (tacit) knowledge such as what is done when helping to “train users with new knowledge repository technologies (information literacy)” (Dalkir, 2011, p. 39).

The “Use” stage deals with how knowledge is used within the organisation. The focus by Bukowitz and Williams (2000) in this stage is primarily on the individual with the focus of knowledge use for innovation.

Learning in an organisation can occur both from individual successes (best practices) and from failures (lessons learned). Bukowitz and Williams (2000) introduce the “Learn” stage in their cycle after the “Get” and “Use” stages to emphasise the importance of learning from knowledge obtained in these previous stages. Otherwise, this knowledge would end up stored in a repository without adding any value to the organisation.

The “Contribute” stage deals with sharing of knowledge. It is important to get employees to share knowledge that has value to the organisation such as best practices and lessons learned as this avoids repeat of mistakes and increases efficiency within the organisation.

The “Assess” stage deals with the evaluation and assessment of knowledge more at a group and organisational level than at an individual level. It is important for an organisation to carry out a holistic assessment of all its knowledge assets.

The “Build/Sustain” stage involves building and maintaining the knowledge base of the organisation so as it can handle challenges and opportunities and thus remain competitive.

Finally, as the name implies, the “Divest” stage deals with the mechanism that helps the organisation to remove knowledge that is no longer of any use and hence keeping it would result in a waste of resources. Management should carry out cost benefit analysis since sometimes divesting knowledge outside an organisation can be useful.

The main strength of the Bukowitz and Williams (2000) KM life cycle is the inclusion of two important stages namely the learning stage and the divest stage. The inclusion of the learn stage is important since “individuals learn from their experiences and organizations create an organizational memory” (Evans *et al.*, 2014, p. 89). In the divest stage e.g. outsourcing a particular function of

an organisation, the emphasis is on avoiding duplication of warehousing or backup efforts and thus a competitive advantage can be maintained. The Bukowitz and Williams (2000) KM life cycle model does not cover the processes of validation and refinement of knowledge. However, when compared with the Meyer and Zack (1996) model, the Bukowitz and Williams (2000) model is more comprehensive since it discusses and incorporates in its stages the notion of both tacit and explicit knowledge.

2.7.5 The Dalkir (2005) Integrated KM Life Cycle Model

Dalkir (2005) analysed the processes of the four models mentioned previously namely Wiig (1993), Meyer and Zack (1996), Bukowitz and Williams (2000) and McElroy (2003) and then created an integrated life cycle model by simplifying and combining phases where possible thus removing knowledge processes that have the same function but are given different labels. The integrated life cycle model proposed by Dalkir (2005) contains three main phases: knowledge capture and /or creation phase, knowledge sharing and dissemination phase and knowledge acquisition and application phase (see Figure 2.8 below).

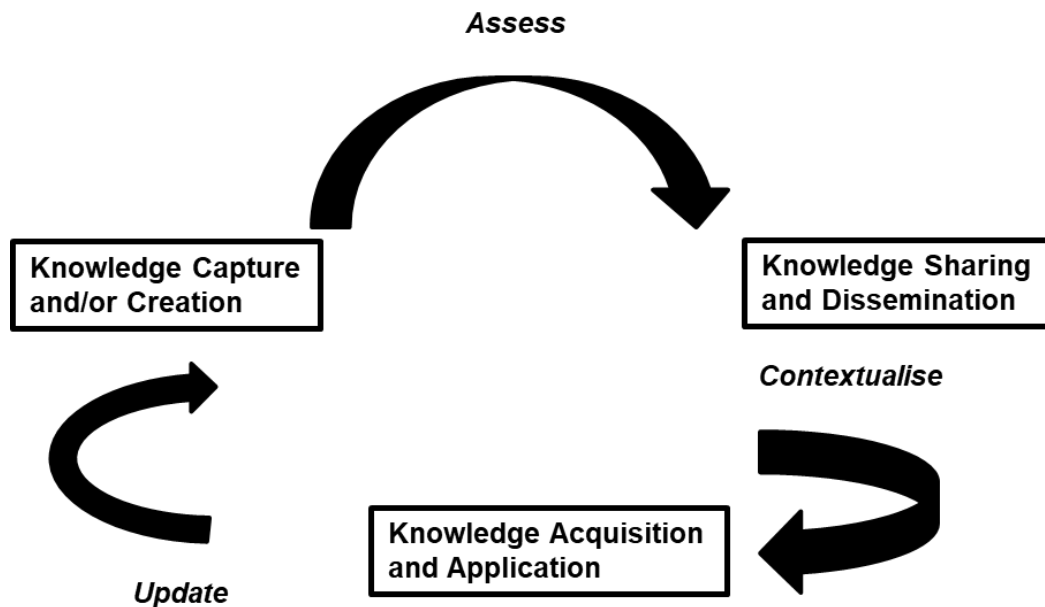


Figure 2.8: The Dalkir (2005) integrated KM life cycle model (Source: Dalkir, 2011, p. 54)

In the cycle described by Dalkir (2005), tacit knowledge is created whilst explicit knowledge is captured. Prior to sharing and dissemination, created/captured knowledge is assessed for relevance and suitability. Sharing of knowledge usually occurs between people (e.g. during meetings) whilst dissemination involves technological means (e.g. through an IT network from a knowledge repository). The sharing/dissemination process is optimised through contextualisation of knowledge i.e. making such knowledge easier to understand by the end user by for example, explaining through manuals or annotations how to best use this knowledge. Finally, this knowledge is applied to workplace situations by employees who will also validate usefulness and update knowledge through best practices and lessons learned thus contributing new knowledge to the next cycle.

The main advantages and contributions of the Dalkir (2005) cycle is validation and analysis of the earlier life cycle models and the creation of a simplified model built on the contributions of the earlier life cycles that highlights the important knowledge processes within the organisation.

2.7.6 The Heisig (2009) Integrated KM Life Cycle Model

Heisig (2009) developed an integrated KM life cycle model by carrying out a content analysis of 160 KM frameworks that were identified from literature, conferences, internet search and also through an empirical approach by carrying out a survey with KM professionals. After a thorough analysis of 165 identified KM activities and removal of synonymous terms, Heisig (2009) proposed six knowledge activities namely use, identify, create, acquire, share and store. “These basic KM activities could help to overcome subtle conceptual differences between different KM Frameworks and serve as common basic understanding.” (Heisig, 2009, p. 9).

As stated by Evans *et al.* (2014), the main advantage of the Heisig (2009) model is “the breath of analysis....Heisig was the first researcher to solicit and involve users (organisations and KM practitioners) in the identification of KM frameworks and activities associated with KM” (p. 91).

A criticism levelled at the Heisig (2009) model is that the identified activities were not placed in a sequence/cycle as done by other academics proposing KM life cycles. .

2.7.7 The Evans *et al.* (2014) Integrated KM Life Cycle Model

Evans *et al.* (2014) created their KM life cycle model by integrating the models discussed so far in this literature review together with previous work in the field carried out by Evans and Ali (2013). The proposed seven phases of the model are identify, store, share, use, learn, improve and create (see Figure 2.9 below).

The need for knowledge (e.g. organisational decision making) prompts the searcher to either *identify* whether such knowledge is available within the organisation or whether such knowledge needs to be *created*. There may also be the case where the searcher will require both the identified knowledge assets and also to create new knowledge assets (hence phases shown interrelated in Figure 2.9). The identify stage involves tapping both the explicit knowledge of the organisation (e.g. knowledge repositories, manuals, standard operating procedures) as well as held tacit knowledge (e.g. through meetings/brainstorming sessions with the knowledgeable worker/expert). Similarly, creation of new knowledge involves “expert interviewing, prototyping, information and workflow analysis, and competence and process mapping” (Evans *et al.*, 2014, p. 92).

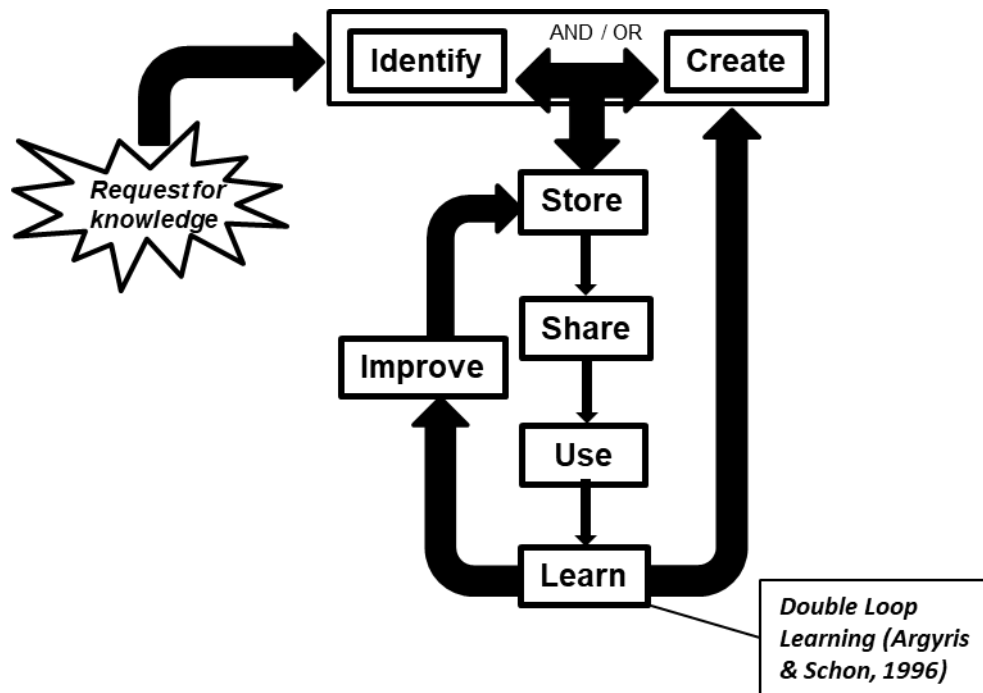


Figure 2.9: The Evans *et al.* (2014) integrated KM life cycle model (Source: Evans *et al.*, 2014, p. 92)

Following the identify and create phases, valuable knowledge is *stored* in the knowledge repositories of the organisation in a way that is easily accessible for future reference and sharing by classifying and archiving the knowledge, and by optimising search/retrieval methods. Sharing of stored knowledge can occur by using communication/collaboration technologies and by mentoring, coaching and storytelling for tacit knowledge (Evans *et al.*, 2014). The final three stages of the model namely *use*, *learn* and *improve* occur when the shared knowledge is put to use throughout the organisation “to solve problems, make decisions, improve efficiency, or promote innovative thinking” (Evans *et al.*, 2014, p. 93). In this way, this ‘used’ knowledge serves as the basis for creating new knowledge and refining existing knowledge through the process of learning e.g. through best practices and lessons learned. Finally, in the improve stage, the

knowledge assets are further refined and “new value is either identified or created from them and additions or updates are made to keep them current in the organizational memory and applicable to the organizational context.” (Evans *et al.*, 2014, p. 94).

The advantages of the Evans *et al.* (2014) integrated KM life cycle model is that by reviewing the previous life cycle models and also incorporating the findings by Heisig (2009), a holistic view is provided. By including the learn and improve phases, the value creation scope of the KM life cycle is put into perspective since, after all, the importance of processing knowledge through the organisation is to help individuals to learn how to operate in a more effective and efficient way.

2.7.8 Comparing the Seven KM Life Cycle Models

Important KM processes identified	Synonyms for the important KM processes utilised by KM life cycle models						
	Wiig (1993)	Meyer & Zack (1996)	Bukowitz & Williams (2000)	McElroy (2003)	Dalkir (2005)	Heisig (2009)	Evans <i>et al.</i> (2014)
<i>Knowledge Acquisition/Creation</i>	Build	Acquisition	Get	Claim	Create/Capture/Contextualise	Identify/Acquire/Create	Identify/Create
<i>Knowledge Sharing</i>	Pool	Distribution	Contribute	Integration	Share/Disseminate	Share	Share
<i>Knowledge Storage</i>	Hold	Storage/Retrieval	Build/Sustain	--	Assess	Store	Store
<i>Knowledge Application</i>	Apply	Presentation/Use	Contribute	Integration	Apply/Use	Use	Use
<i>Knowledge Maintenance</i>	--	Refinement	Assess/Divest	--	Update	--	Improve

Table 2.3: A comparison of the seven KM life cycle models (Source: Author)

Table 2.3 above compares the seven KM life cycle models discussed in this literature review. All the KM life cycle models acknowledge the importance of the processes of knowledge acquisition/creation, knowledge sharing and knowledge application since these processes are included in all the models reviewed. Knowledge storage is also an important process since by storing valuable knowledge in repositories making part of the organisational memory of an organisation, valuable knowledge can be made available to all employees through efficient search and retrieval methods. Only the McElroy (2003) model does not include knowledge storage as part of the KM life cycle. Compared to the Wiig (1993) and the McElroy (2003) models, the Meyer and Zack (1996), Bukowitz and Williams (2000), Dalkir (2005), Heisig (2009) and Evans *et al.* (2014) models all introduce processes associated with the maintenance of knowledge (such as refine, assess, divest, update and improve) and hence are considered as more complete models. The process of knowledge maintenance is important so as organisational knowledge is kept up to date and relevant for the organisation in today's knowledge based economy.

Further to the comparative analysis carried above and literature on knowledge intensive firms (Andreeva & Kianto, 2011), this study will be considering knowledge acquisition/creation, knowledge sharing, knowledge storage, knowledge application and knowledge maintenance as the key knowledge processes within an organisation. To assess these processes in the quantitative study, the empirically tested constructs for the KM processes of knowledge creation (covers knowledge acquisition/creation and knowledge sharing) by Lee and Choi (2003), knowledge organisation (covers knowledge

storage and knowledge maintenance) by Han and Zhong (2006) and knowledge application by Gold *et al.* (2001) will be adopted. This study will also include the construct for the KM process of knowledge protection proposed by Gold *et al.* (2001) since knowledge protection is also deemed an important process due to the sensitive knowledge that is processed by knowledge intensive organisations such as those within the Pharmaceutical Sector (Bolisani, Paiola & Scarso, 2013; Payal *et al.*, 2016). These four KM processes and relevant constructs will be discussed in section 2.8 below.

2.8 KM Processes

As already discussed in the previous section on KM life cycles, there seems to be a lack of a common taxonomy describing KM processes and this is reflected in the selection of KM processes adopted by different studies encountered in the KM literature. Thus, Coombs and Hull (1998) pinpointed the processes of knowledge generation, transfer, and use. Bhatt (2001) considered knowledge creation, validation, application, and distribution. Gold *et al.* (2001) worked on knowledge acquisition, knowledge conversion, knowledge application and knowledge protection. Han and Zhong (2006) chose knowledge creation, knowledge organisation, knowledge transfer and knowledge application. Sun (2010) focused on the processes of acquisition, creation, utilisation, and sharing.

Allameh, Zare and Davoodi (2011) proposed knowledge creation, capture, organisation, storage, dissemination, and application. Tan and Wong (2015) and Anwar and Ghafoor (2017) took a more holistic approach. Tan and Wong (2015) identified knowledge acquisition, knowledge creation and generation, knowledge utilisation and application, knowledge storing and updating, knowledge sharing and transferring, and knowledge protection whereas Anwar and Ghafoor (2017) identified knowledge creation, knowledge acquisition, knowledge refinement, knowledge storage, knowledge transfer, knowledge sharing and knowledge reuse. As already outlined in section 2.7 above, this study is based on research work carried out by Gold *et al.* (2001), Lee and Choi (2003) and Han and Zhong (2006). The KM processes are grouped under four broad dimensions namely knowledge creation, knowledge organisation, knowledge application and knowledge protection.

2.8.1 Knowledge Creation

The construct of Knowledge Creation developed by Lee and Choi (2003) is based on seminal work by Nonaka and Takeuchi (1995) and their famous Socialisation, Externalisation, Combination, and Internalisation (SECI) model. This model is widely accepted in the KM community as universally valid in conception and application (von Krogh, Ichijo & Nonaka, 2000; Weir & Hutchings, 2005); is widely referenced (Berraies, Chafer & Ben Yahia, 2014; Han & Zhong, 2006; Scharmer, 2000; Shahzad *et al.*, 2016; Shih & Chou, 2012); and covers knowledge creation in a broad way and knowledge transfer/sharing (von Krogh, Nonaka & Aben, 2001; Lee & Choi, 2003).

Nonaka and Takeuchi (1995) consider knowledge creation as a continuous process involving an interaction between the two forms of knowledge namely explicit and tacit knowledge. Such interaction spirals across the whole organisation involving sharing of knowledge at individual, group and organisational level. Nonaka and Voelpel (2006) describes explicit knowledge as “knowledge that can be uttered, formulated into sentences, captured in drawings” (p. 1182) whilst tacit knowledge as “knowledge tied to the senses, movement skills, physical experiences, intuition, or implicit rules of thumb” (p. 1182).

In the SECI model, the knowledge creation process occurs across four modes of knowledge conversion. Socialisation (S) converts tacit knowledge into new forms of tacit knowledge at the individual level through social interactions such as a master-apprentice relationship. Externalisation (E) involves the conversion of tacit knowledge to explicit knowledge through a codification process and knowledge moves from individual to group level. Combination (C) converts explicit knowledge into more complex explicit knowledge such as when developing organisational wide rules and explicit knowledge moves from the group level to organisational level. Internalisation (I) converts explicit knowledge to tacit knowledge when the individual assimilates explicit organisational knowledge, puts it into practice in the day to day work, and thus creates new tacit knowledge.

2.8.2 Knowledge Organisation

The construct of Knowledge Organisation developed by Han and Zhong (2006) covers the major activities of storage, maintenance and retrieval which, as claimed by Han and Wang (2012) “are important aspects of KM capability, which are helpful to make knowledge resource structural” (p. 2489). The process of structuring and organising knowledge is much more relevant in knowledge intensive, complex organisations such as those operating in the pharmaceutical sector, since these organisations handle large amounts of essential knowledge in their “organizational memory systems” (Han & Wang, 2012, p. 2489).

The organisation of knowledge involves codifying, storing, classifying, categorising, filtering, updating and refining knowledge (Han & Zhong, 2006; Lee, 2017; Rollett, 2003; Shannak, 2009; Tyndale, 2001; Tan & Wong, 2015). Tan and Wong (2015) argue that “organising and classifying knowledge adds value by establishing an appropriate structure and increasing the efficiency and effectiveness of retrieving knowledge” (p. 818). When employees contribute their knowledge to the repository of an organisation, that knowledge becomes available to all and is retained even when that employee leaves the organisation. It is also important that an organisation establishes processes for filtering, reviewing and updating knowledge so that redundant and obsolete knowledge is removed, and knowledge is always kept up to date (Davenport & Klahr, 1998; Han & Zhong, 2006; Khanal & Poudel, 2017; Tan & Wong, 2015).

2.8.3 Knowledge Application and Knowledge Protection

The constructs for Knowledge Application and Knowledge Protection developed by Gold *et al.* (2001) are widely used and accepted not only in the KM literature but also in other areas of management, such as learning organisations and are also used by large corporations such as multinationals (Dang, Le-Hoai & Kim, 2018; Giampaoli, Ciambotti & Bontis, 2017; Lin 2007; Lin & Lee, 2005; Singh & Rao, 2016). Also, as claimed by Lin (2007), the work done by Gold *et al.* (2001) stresses “the ability to use prior knowledge to recognize the value of new information, assimilate it, apply it, and protect it to create new knowledge and capabilities” (p. 644). Gold *et al.* (2001) state that knowledge application processes allow knowledge to be used “to adjust strategic direction, solve new problems and improve efficiency” (p. 195). Davenport and Klahr (1998) have associated reductions of costs and improvements in innovation performance with a more efficient knowledge application by organisations. Knowledge application can help employees to solve daily problems and tasks by adopting best practices and apply lessons learned from previous experiences and mistakes (Datta, 2007; O’Dell & Grayson, 1998; Khamal & Poudel, 2017; Tan & Wong 2015).

Knowledge protection processes concern the capabilities that an organisation possesses in order to protect its organisational knowledge from illegal or inappropriate use or theft (Payal *et al.*, 2016). In order to maintain its competitive advantage, an organisation needs to protect its knowledge (Liebeskind, 1996; Nonaka & Takeuchi, 1995). An organisation can protect its

knowledge by legal means such as intellectual property rights, patents etc.; through technological means by investing in a high-level Information Technology (IT) system and by implementing rules of conduct for its employees regarding knowledge protection (Ahmad, Bosua & Scheepers, 2014; Gold *et al.*, 2001; Hislop *et al.*, 2018; Lin, 2007; Xu & Tan, 2010).

2.9 Linking KM Enablers and KM Processes

In the KM literature, KM enablers are normally classified based upon a socio-technical perspective of the organisation (Hong, Lee & Suh, 2017; Lin 2007; Lin & Lee, 2006; Moffett, Mcadam & Parkinson, 2003; Oyefolahan & Dominic, 2013). A socio-technical perspective “adopts a holistic approach which highlights the interweaving of social and technical factors in the way people work” (Pan & Scarbrough, 1998, p. 57). Previous studies in the KM field have highlighted numerous enablers including aspects of organisational culture, organisational structure, human resources management (HRM) and transformational leadership from a social perspective and IT support from a technical perspective (Choi, Kang & Lee, 2008; Handzic, 2011; Hong *et al.*, 2017; Lee & Choi, 2003). KM strategy is also being considered in this study since it is involved with both the social (people) and technical (IT) perspectives through either codification (IT oriented) strategies or personalisation (people oriented) strategies (Shahzad *et al.*, 2016; Venkitachalam & Ambrosini, 2017; Venkitachalam & Willmott, 2015). Lin (2011) corroborates this argument by referring to KM strategy as dealing with systems and processes within the organisation that are involved in the transfer of knowledge that includes

technology (technical), know-how, expertise, and skills (all social), between two or more individuals.

Based on this discourse, the variables considered in this study are trust, collaboration and learning (organisational culture), centralisation and formalisation (organisational structure), transformational leadership, intrinsic rewards (HRM), KM strategy and IT support. These enablers are discussed independently below.

2.9.1 Trust, Collaboration and Learning (Organisational Culture)

In the KM literature, organisational culture is considered as an important enabler of KM (Al-Hakim & Hassan, 2012; Ho *et al.*, 2014;; Nejatian *et al.*, 2013; Paterek, 2016; Santos, Goldman & de Souza, 2015; Tan & Wong 2015; Wong & Aspinwall, 2005; Zheng *et al.*, 2010). Ho *et al.*, (2014) argue that the culture of an organisation “influences the outcomes of KM processes due to social interactions among individuals” (p. 738). Thus, fostering an environment where the individuals within an organisation care for each other, results in a greater willingness to share knowledge enhancing the KM processes of the organisation. Lee and Choi (2003) argue that trust, collaboration and learning are key components of a culture that fosters relationships through care and are considered by the KM literature as the main attributes of culture that foster KM.

Lee and Choi (2003) define trust as “maintaining reciprocal faith in each other in terms of intention and behaviour” (p. 190). In organisations where there is a high level of trust between employees and also between employees and management, there is more participation in knowledge circulation activities within the organisation (Ho *et al.*, 2014). Davenport and Prusak (1998) argue that trust is fundamental for knowledge exchange and facilitates knowledge sharing activities. Sankowska (2013) states that trust creates an “atmosphere of safety and positive expectation stimulating creative behaviors” (p. 89) in organisations. Previous studies show that trust exerts a positive influence on KM processes such as knowledge creation, sharing, transfer and application (Berraies *et al.*, 2014; Chen & Huang, 2007; Dunk & Jeng, 2013; Moghavvemi *et al.*, 2018; Rahman *et al.*, 2018; Tan, 2016; Wee & Chua, 2013) and on knowledge circulation process (Ho *et al.*, 2014).

Collaboration “is the degree to which people in the group actively support and help one another in their work” (Hurley & Hult, 1998, p.47). Zucker *et al.* (1996) in a study carried out in the biotechnology industry confirmed that a collaborative culture fosters openness between organisational members thus reducing the fear related with exchanging knowledge and therefore enhancing the knowledge creation capabilities of the organisation. Nejatian *et al.* (2013) argue that collaboration between organisational members “helps people obtain a shared understanding about organisation’s external and internal environments using supportive and reflective communication” (p. 109). Noh, Kim and Jang (2016) concluded that collaboration has a positive effect on knowledge creation and knowledge sharing. Lee (2017) concluded that

collaboration affects positively the KM processes of knowledge creation, sharing and application in hospital organisations.

In the KM literature, learning can be defined as “acquisition of new knowledge by people who are able and willing to apply that knowledge in making decisions or influencing others” (Nejatian *et al.*, 2013, p.110). Lee and Choi (2003) argue that for successful KM, an organisation must provide its employees with continuous learning tools such as mentoring programs and both formal and informal means of training and education. Zheng *et al.* (2010) emphasise the importance that for effective KM, an organisation must transform into a learning organisation by providing the appropriate learning tools for its employees and nurture a learning culture that becomes deep rooted in the organisation.

López, Peón and Ordás (2004) emphasise the importance of learning for KM by stating that “learning processes define the quality of knowledge distributed across the organisation as well as the effectiveness with which knowledge is put to use” (p. 94). Ho *et al.* (2014) state that learning “encourages employees to accept changes, continue learning, pursue innovation, and become KM enablers” (p. 738). Previous studies show that learning exerts a positive influence on KM processes. For e.g., Lee *et al.* (2012) found that learning is positively related to knowledge process capability. Ho *et al.* (2014) found that learning has a positive impact on knowledge circulation process. Dunk and Jeng (2013), Berraies *et al.* (2014) and Hong *et al.* (2017) found that learning is positively related to the knowledge creation process. Noh *et al.* (2016)

concluded that learning has a positive effect on knowledge creation and knowledge sharing.

2.9.2 Centralisation and Formalisation (Organisational Structure)

Organisational structure is recognised in the KM literature as an important factor that can either hinder or facilitate KM processes (Al Shamsi & Ajmal, 2018; Caruana, Morris & Vella, 1998; Chen & Huang, 2007; Gold *et al.*, 2001; Hopper, 1990; Nonaka & Takeuchi, 1995; Lee & Choi, 2003; Paterek, 2016; Santos *et al.*, 2015). Centralisation and formalisation are recognised in the literature as being powerful factors that influence knowledge processes within the organisation (Allameh *et al.*, 2011; Lee & Lee, 2007; Ling & Shan, 2010; Razi & Karim, 2010).

In a centralised organisation, the decision-making power is focused at the top levels of that organisation (Caruana *et al.*, 1998). Therefore, centralised organisations tend to suffocate knowledge creation since employees have to share ideas and knowledge by going through complex and time-consuming communications channels (Lee & Choi, 2003). On the contrary, in a decentralised organisation, employees are more autonomous and powered to experiment and to freely express their ideas thus encouraging them to “appropriately use KM to complete assigned tasks, thus improving the rate and effectiveness of the circulation flow of knowledge within the organisation” (Ho *et al.*, 2014, p. 739). Previous studies in the KM literature posited a negative relationship between centralisation and KM processes. Lee and Lee (2007)

found a negative relationship between centralisation and KM processes. Lee and Choi (2003) and Shih and Chou (2012) concluded that centralisation has a negative relationship with the knowledge creation process. Zamahani and Asfshari (2016) found a negative relationship between centralisation and implementation of KM. Marjan & Hamideh (2017) found a negative relationship between centralisation and the processes of knowledge creation, maintenance and transfer. Alshurah *et al.* (2018) found a negative relationship between centralisation and knowledge sharing.

Formalisation can be defined as “the degree to which decisions and working relationships are governed by formal rules, standard policies & procedures” (Lee & Choi, 2003, p. 192). Nonaka and Takeuchi (1995) argue that in order to enhance the interaction between employees that leads to knowledge sharing, an organisation must adopt a more flexible, less formalised approach to organisational rules and work procedures. Chen and Huang (2007) agree with this view since they state that in organisations that exhibit low levels of formalisation, “social interactions among organisational members are more frequent and intensive for implementing the tasks” (p. 106). Previous studies in the KM literature posited a negative relationship between formalisation and KM processes. Chen and Huang (2007) concluded that less formalisation favours social interaction which in turn is positively related to knowledge sharing and application. Lee and Choi (2003) and Berraies *et al.* (2014) concluded that formalisation has a negative relationship with the knowledge creation process. Zamahani and Asfshari (2016) found a negative relationship between formalisation and implementation of KM. Marjan and Hamideh (2017) found a

negative relationship between formalisation and the processes of knowledge creation, maintenance and transfer.

2.9.3 KM Strategy (Organisational Strategy)

Daft (1995) refers to organisational strategy as “a plan for interacting with the competitive environments to achieve organizational goals” (p. 49). Thus, for an organisation to have effective KM, its knowledge strategies must be in line and also support the strategic direction of that organisation (Greiner, Böhmman & Krcmar, 2007; Shahzad *et al.*, 2016; Venkitachalam & Ambrosini, 2017). In the KM literature, researchers argue that to implement an effective KM program, an organisation must possess an adequate KM strategy (Oluikpe, 2012; Kim *et al.*, 2014). Lee and Choi (2010) state that a KM strategy “is required to facilitate KM initiatives, as it determines the manner in which knowledge resources and capabilities should be utilized” (p. 434). Bosua and Venkitachalam (2013) refer to KM strategy as providing a “roadmap to guide organisations towards more effective KM by managing workgroup knowledge processes, extending knowledge capabilities and recommending solutions to KM problems” (p. 333-334). Venkitachalam and Willmott (2015) view knowledge strategies as a means of “aligning an organization’s knowledge (i.e., tacit and codified know how and expertise) with its knowledge of its competitive landscape” (p. 344).

Researchers argue that the scope of KM strategies is in fact to focus on improving the KM processes such as knowledge creation and transfer, knowledge codification/organisation and knowledge reuse (Bettiol, Di Maria &

Grandinetti, 2012; Bosua & Venkitachalam, 2013; Denford & Chan, 2011; Jasimuddin, Klein & Connell, 2005; Kumar & Ganesh, 2011). From the literature, Choi and Lee (2002) found that KM strategy has a positive relationship with the knowledge creation process dimensions of socialisation and combination. Erwee, Skadiang and Roxas (2012) found a positive relationship between KM strategies and KM processes. Shahzad *et al.* (2016) found a positive relationship between KM strategy and knowledge creation. Singh (2018) concluded that KM strategy has a positive effect on knowledge sharing.

2.9.4 Transformational Leadership

The concept of transformational leadership was first discussed by Burns (1978) and later on developed into a leadership theory by Bass (1985). Burns (1978) referred to transformational leaders as those who “motivate their followers to perform beyond expectation by raising the followers’ confidence levels and by providing support for developing high levels of performance” (Chi, Lan & Dorjgotov, 2012, p.1016). As per previous research in this field (Avolio, Bass & Jung 1999; Bass 1985; Bass & Avolio, 1995; Chi *et al.*, 2012; Shao & Webber 2006; Shih, Chiang & Chen, 2012, Ugwu, 2018), transformational leadership is being considered as having four dimensions known as the four I’s namely idealised influence, inspirational motivation, intellectual stimulation and individualised consideration.

Idealised influence comprising the attributed component which is reflected in the leader's ability to foster pride, trust and strong, positive emotional bonds with followers as well as the behavioural component which is reflected in the capacity of such leader to use his/her charisma to promote a sense of purpose and of collective values, actions and mission throughout the entire organisation (Horwitz *et al.* 2008; Shih *et al.*, 2012; van Knippenberg & Sitkin, 2013).

Inspirational motivation refers to the leader's ability to communicate to members of his/her organisation both a vision that is inspiring and appealing as well as a set of goals seen as achievable (Horwitz *et al.* 2008; Shih *et al.*, 2012). Shih *et al.* (2012) define intellectual stimulation as "the leader's ability to challenge assumptions, take risks, and solicit followers' ideas" (p. 1059). As the word implies, the leader 'stimulates' followers to be creative when solving problems and not to be afraid to pursue new paths and ideas when handling issues at work (Horwitz *et al.*, 2008; van Knippenberg & Sitkin, 2013). Individualised consideration refers to the ability of leaders to recognise that followers have differing needs from each other. It also refers to the ability of leaders to serve as mentors or coaches to their followers as well as to listen to followers' concerns (Shih *et al.*, 2012; van Knippenberg & Sitkin, 2013).

Positive relationships have been reported between transformational leadership and KM processes. Politis (2001) showed a positive relationship between knowledge acquisition and transformational leadership. Crawford (2005) found that transformational leadership was positively related with three KM processes (knowledge acquisition, creation and application). Analoui, Doloriert and

Sambrook (2012) in a study carried out on UK ICT organisations found a positive relationship between transformational leadership and KM activity. Noruzy *et al.* (2013) found a positive relationship between transformational leadership and four KM processes (knowledge acquisition, transfer, integration and conversion). Birasnav (2014) in a study of service firms in Bahrain found a positive relationship between transformational leadership and the three KM processes (knowledge acquisition, transfer and application).

Gelard, Boroumand and Mohammadi (2014) found a positive relationship between transformational leadership and four KM processes (knowledge creation, retention, transfer and utilisation). Hayat *et al.* (2015) found a positive relationship between transformational leadership and four KM processes (knowledge creation, sharing, storage and application). Ullah, Hamid and Shahzad (2016) and Al-Husseini and Dosa (2016) found a positive relationship between transformational leadership and knowledge sharing. Finally, Kishokumar (2017) found a positive relationship between transformational leadership and KM practices (knowledge creation, sharing, acquisition/capture).

2.9.5 Intrinsic Rewards (Human Resources Management)

Several researchers suggest that human resources management (HRM) plays an important role in the success of any KM initiative (AlShamsi & Ajmal, 2018; Al-Hakim & Hassan, 2012; Edvardsson, 2008; Gloet, 2006; Shih & Chiang, 2005). Chen and Huang (2009) argue that HRM practices such as staffing, training, rewards, performance appraisal and participation play a key role in KM

adoption by an organisation since such practices enhance employee motivation and commitment to KM. This study will be focusing on rewards, particularly intrinsic rewards.

Choi *et al.* (2008) argue that rewards are important since they can “motivate employees to concentrate their efforts in achieving common organisational goals” (p. 5). The literature distinguishes between two types of rewards namely extrinsic and intrinsic rewards. Extrinsic rewards generally involve monetary rewards such as bonuses and promotions. On the other hand, intrinsic rewards involve praise and recognition by fellow employees and management.

In the KM literature, researchers suggest that intrinsic rewards play a more critical role for KM processes such as knowledge sharing than extrinsic rewards (Bartol & Srivastava, 2002; Bock *et al.* 2005; Thomas-Hunt, Odden & Neal, 2003). Previous studies in the KM field (AlShamsi and Ajmal, 2018; Choi *et al.* 2008; Razmerita, Kirchner and Nielsen, 2016; Tan, 2016; Whitterspoon *et al.*, 2013) have shown that intrinsic rewards have a positive relationship with the KM process of knowledge sharing. Al-Tit (2016) found a positive relationship with the KM processes of knowledge creation, sharing and utilisation. Rahman *et al.* (2018) found a positive relationship between intrinsic rewards and knowledge transfer.

2.9.6 T-Shaped Skills (People)

People are at the core of every organisation. It is the employees that are ultimately responsible for leveraging knowledge through an organisation by creating, sharing and applying knowledge. In the KM literature, employee T-shaped skills are most often associated with core capabilities and thus acquiring employees with these skills allows an organisation to increase knowledge and competence (Iansiti, 1993; Johannessen, Olsen & Olaisen, 1999; Lee & Choi, 2003; Lee & Lee, 2007; Nejatian *et al.*, 2013).

T-shaped skills are employee skills that have both deep factors - represented by the vertical stroke of the 'T' and broad factors – represented by the horizontal top stroke of the 'T' (Abubakar *et al.*, 2017; Iansiti, 1993; Madhavan & Grover, 1998). This definition is clearly explained by Hafeez-Baig and Gururajan (2012) when they state that employees with T-shaped skills “not only have a deep knowledge of a particular discipline (eg. financial auditing)” (p.138) but such employees also possess knowledge “about how their discipline interacts with other disciplines (e.g. Risk analysis, investment analysis & derivatives)” (p. 138). Lee and Choi (2003) argue that T-shaped skills “are extremely valuable for creating knowledge because they can integrate diverse knowledge assets” (p. 193). Tsai and Huang (2008) argue that for New Product Development (NPD), teams possessing T-shaped skills “are better able to correctly interpret extensive new knowledge and further apply it effectively to a new product and process” (p. 86). Soon, Fisher and Zainol (2014) found a positive relationship between T-shaped skills and the KM process of knowledge

creation. Luhn *et al.* (2017) found a positive relationship between T-shaped skills and KM processes.

2.9.7 Information Technology (IT) Support

IT is a very important KM enabler as it is considered to have a fundamental role in the successful implementation of any KM initiatives (Al-Hakim & Hassan, 2012; AlShamsi & Ajmal, 2018; Bhatt, 2001; Bontis, Keow & Richardson, 2000; Chong & Choi, 2005; Kotorov & Hsu, 2001; Lee & Choi, 2003; Moffett, Mcadam & Parkinson, 2003; Vaccaro, Parente & Veloso, 2010). IT supports and maintains the KM processes by assisting in new knowledge creation and making knowledge transfer between employees more efficient (Hong *et al.*, 2017; Mohamed, Stankosky & Murray, 2006; Vaccaro *et al.*, 2010). It also supports knowledge storage, knowledge application and knowledge protection (Gold *et al.*, 2001; Lee, 2017; Tan & Wong 2015).

IT support for KM refers to the level of hardware, software and personnel support that an organisation dedicates to the different KM processes (Tippins & Sohi, 2003). Lee and Choi (2003) state that IT support assists the knowledge creation process by facilitating “rapid collection, storage and exchange of knowledge on a scale not practicable in the past” (p. 193). Martin (1988) states that IT support occurs through objects that aid in the “acquisition, processing, storage, dissemination, and use” (p. 24) of information. Previous studies in the KM field have shown that IT support has a positive relationship with various KM processes (Mageswari, Sivasubramanian & Dath, 2017; Lee & Lee, 2007; Lee

et al., 2012; Lopez, Peon & Ordas, 2009; Shih & Tsai, 2016; Sibbald, Wathen & Kothari, 2016; Tan & Wong, 2015).

2.10 Linking KM Processes with Organisational Effectiveness

From the KM literature, it can be concluded that the study of the relationship between KM processes and organisational effectiveness is still lacking since there are very few empirical studies investigating this relationship. Noruzy *et al.* (2013) found out that KM processes effect performance through innovation. Zheng *et al.* (2010) found out that KM processes (knowledge generation, sharing & utilisation) are all significantly related to organisational effectiveness. More recently, Abu Bakar *et al.* (2016) concluded that KM processes (knowledge creation, storage, transfer and application) are related with growth performance (measuring company turnover & employee growth). Shahzad *et al.* (2016) concluded that the KM process of knowledge creation is related to organisational performance (measuring successfulness, market share, growth, profitability and innovativeness). Patalas-Maliszewska and Klos (2017) concluded that the KM processes of knowledge acquisition, creation, accumulation, sharing and transfer are related to organisational effectiveness.

2.11 Mediating Role of KM Processes

The KM literature posits that KM processes play a mediating role in the relationship between the KM enablers and organisational effectiveness (Haque & Anwar, 2012; Moon & Lee, 2014; Tan & Nasurdin, 2011; Zheng *et al.*, 2010).

Zheng *et al.* (2010) state that the influence of organisational factors such as structure and strategy on organisational effectiveness “may be channeled through their interface with knowledge management” (p. 765). Tan and Nasurdin (2011) found that KM processes mediate the relationship between training and innovation. Haque and Anwar (2012) concluded that knowledge application mediates the relationship between management support, IT infrastructure and organisational performance. Moon and Lee (2014) investigated knowledge sharing processes and found that they mediate the relationship between learning and KM effectiveness. Al-Tit (2016) concluded that the KM processes of knowledge creation, sharing and utilisation mediate the relationship between HRM and organisational performance. Singh (2018) concluded that the KM process of knowledge sharing mediates the relationship between KM strategy and organisational performance.

2.12 Theoretical Framework Underpinning This Research

In order to explain the relationship between KM enablers and organisational effectiveness through the intervening role of KM processes as activities that help leveraging knowledge for improved effectiveness this research adopts the Knowledge Based View (KBV) of the firm and Systems Theory.

The KBV of the firm builds upon and extends the Resource Based View (RBV) which posits that to gain a sustained competitive advantage, firms must use resources that are rare, valuable, imperfectly imitable and non-substitutable (Barney, 1991). Such firm resources are controlled by the firm and include

attributes of the firm, its organisational processes, knowledge and all other assets and capabilities. These resources allow the firm to create and implement strategies that help in improving its effectiveness and efficiency (Barney, 1991). On the other hand, the KBV of the firm posits that knowledge is the principal strategic asset of the firm (Grant, 1996b). The KBV of the firm identifies “the primary role of the firm as integrating the specialist knowledge resident in individuals into goods and services” (Grant, 1996b, p. 120). What this means is that contrary to external knowledge that can be easily replicated by competitors, the leverage of internal knowledge resources that are specific to the firm can contribute to the effectiveness of that firm.

The KBV of the firm is reflected in the role of KM processes in leveraging knowledge to enhance effectiveness. Indeed, Grant (1996a) states that firms produce goods and services by transforming inputs into outputs through the function of essential organisational activities such as acquiring, creating, storing and deploying knowledge. Hsu and Sabherwal (2011) corroborate this view by stating that the important role played by the KM processes in leveraging and managing knowledge resources to promote innovation and firm performance is best described by the KBV of the firm. Thus, we can confidently state that a relationship exists between the KM processes and Organisational Effectiveness.

The KM model being proposed also includes the KM enablers. Previous studies have identified the role played by KM enablers in building an effective infrastructure for KM (Abubakar *et al.*, 2017; Ho, 2009; Payal *et al.*, 2016;

Singh, 2018; Whelan & Carcary, 2011). Lee and Choi (2003) describe KM enablers as factors that provide the necessary organisational infrastructure that allows for an increase in the efficiency of knowledge processes. Hence, the proposed KM model presents KM processes as mediating the relationship between KM enablers and organisational effectiveness. To best explain such an integrative model for KM, this research is thus also adopting a Systems Thinking model since Systems Thinking theory views problems in their entirety and is ideal at describing the complex and dynamic nature of the interaction between the various components making up such a KM model in a systematic way (Lee & Choi, 2003; Rubenstein-Montano *et al.*, 2001; Shahzad *et al.*, 2016). System Thinking “breaks a larger system into smaller parts, and then studies the interdependence, interrelatedness and effects of different parts on each other to identify the completion process of a whole” (Shahzad *et al.*, 2016, p. 163).

For the scope of this research model, the relationship between the three components follows an Input → Process → Output representation (Hackerman and Morris, 1978). In this case this translates to KM enablers (input) affecting Organisational Effectiveness (output) through KM processes (process). Such an Input → Process → Output (IPO) model is the dominant framework in KM studies on KM enablers, KM processes and Organisational Effectiveness or performance and has been adopted successfully by previous KM researchers (Ho *et al.*, 2014; Koohang, Paliszkievicz & Goluchowski, 2017; Lee & Choi, 2003; Lee *et al.*, 2012; Mageswari *et al.*, 2017; Noh *et al.*, 2016; Patalas-Maliszewska *et al.*, 2017; Shahzad *et al.*, 2016; Shih & Tsai, 2016).

On the basis of the plausible explanations above and the literature review carried out in this chapter, the theoretical research model is shown in Figure 2.10. The choice of the KM enablers and KM processes together with their relationships is also based on the literature review. Thus, this study is therefore hypothesising that the KM enablers: Trust, collaboration, learning, KM strategy, dimensions of transformational leadership, T-shaped skills, intrinsic rewards and IT support have a *positive direct effect* on KM processes whereas the KM enablers: Centralisation and formalisation have a *negative direct effect* on KM processes. It is also hypothesising that the KM processes: Knowledge creation, knowledge organisation, knowledge application and knowledge protection have a *positive direct effect* on organisational effectiveness and act as *mediators* in the relationship between the KM enablers and KM processes.

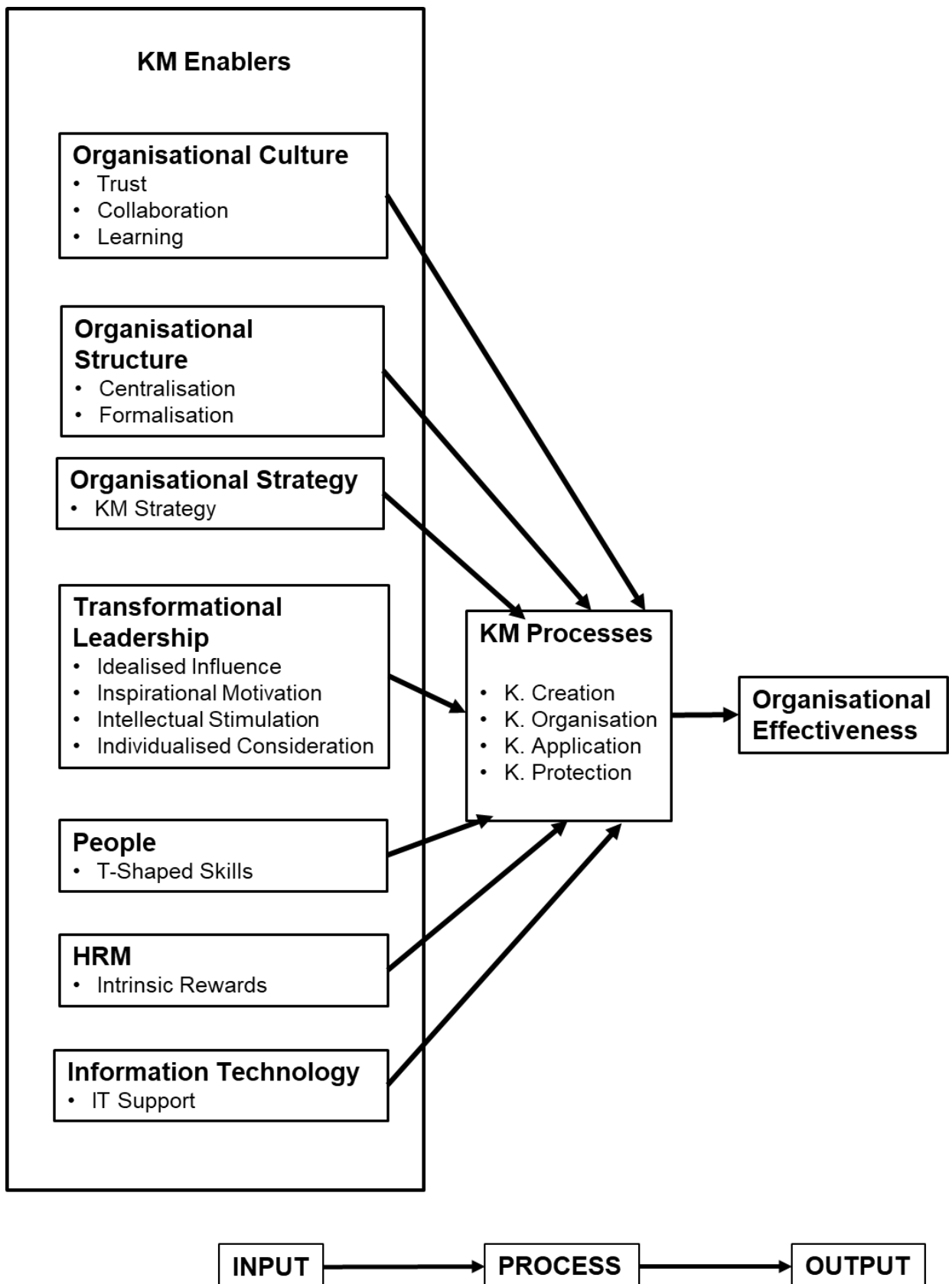


Figure 2.10: Proposed theoretical research model (Source: Author)

2.13 Conclusion

From this literature review chapter, the following conclusions can be drawn:

First, KM has developed through three generations starting from an IT focus on knowledge sharing to a people focus favouring knowledge creation and then combining the two to focus on creating value for the organisation; second, KM has been defined as involving people, processes and technology with the scope of leveraging the knowledge resources of an organisation in order to improve performance and effectiveness of the organisation; third, from a discussion of knowledge, it was concluded that both explicit (through the objectivist perspective) and tacit knowledge (through the practice based perspective) are important for the success of organisations and attempts should be made by management to leverage both as much as possible; fourth, seven KM life cycle models were analysed and four KM processes namely knowledge creation, knowledge organisation, knowledge application and knowledge protection were identified for the integrative KM model to be studied by this research; fifth, the literature review suggests that KM enablers are linked to KM processes and exert either a positive or negative effect on them; KM processes are linked positively to organisational effectiveness; and KM processes act as mediators in the relationship between KM enablers and KM processes; and finally an Input-Process-Output theoretical framework for this research was proposed building on the Knowledge Based View of the firm and Systems Theory.

In the next chapter, I will be discussing the methodology associated with this study. This methodology chapter, divided into three sections, includes an illustration of the research design adopted for this study, a detailed account of the quantitative study and a detailed account of the qualitative study.

CHAPTER THREE – METHODOLOGY

3.1 Introduction

This chapter starts off by reminding the reader the research questions for this study. The next section outlines the research design (comprising the philosophical stance adopted, choice of methodology, the research strategy adopted and time considerations of the study) and then closes by describing the ethical considerations involved. Given that this study adopts a mixed methods design, the next two sections then describe in detail the quantitative and qualitative methods respectively.

3.2 The Research Questions for this Study

For the quantitative study, the following three research questions will be investigated:

- 1. To what extent do KM enablers predict KM processes?*
- 2. To what extent do KM processes predict organisational effectiveness?*
- 3. Is the relationship between KM enablers and organisational effectiveness mediated by KM processes?*

As for the qualitative study, the following five research questions will be explored:

1. *What is the uptake level of KM initiatives in the Maltese Pharmaceutical Sector? Is there a focused KM strategy as part of the organisational business strategy?*
2. *What is the status of KM enablers in the Maltese Pharmaceutical Sector? Are they perceived important in promoting KM initiatives?*
3. *Is the Maltese Pharmaceutical Sector making the most of its knowledge assets? Are these knowledge assets being adequately protected?*
4. *Are the effects of initiatives geared towards improving organisational effectiveness being measured?*
5. *Is KM perceived to have a future role in the Maltese Pharmaceutical Sector?*

3.3 Research Design

Saunders, Lewis and Thornhill (2016) define research as “a process that people undertake in a systematic way in order to find out things, thereby increasing their knowledge” (p. 5). Therefore, carrying out research involves a research design that allows an organised investigation/analysis of a particular question or problem, the result of which will serve to contribute to the current existing body of knowledge in relation to that question or problem. Creswell (2014) highlights three important components that must be considered when designing a research approach or methodology. These are the philosophical view (worldview), research strategy (design) and the research methods i.e. the techniques and procedures used for data collection and analysis. The interactions of these three components are shown in Figure 3.1 below:

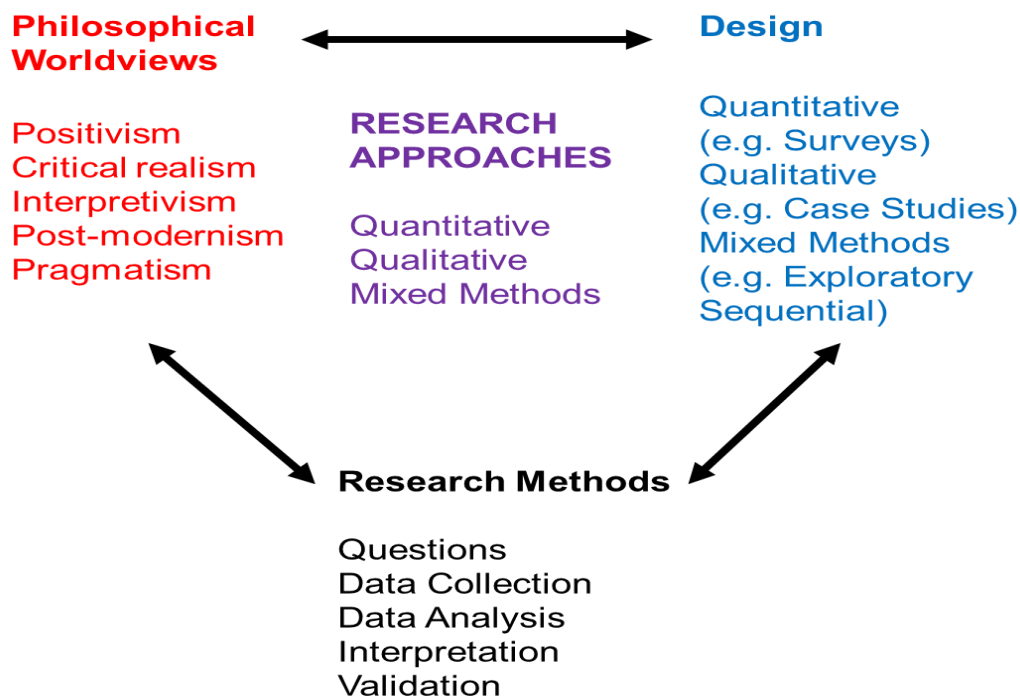


Figure 3.1: A framework for research (Source: Creswell, 2014, p. 5)

3.3.1 Research Methodology

Research methodologies can be divided into mono methods and multiple methods. Mono methods are subdivided into quantitative methodologies and qualitative methodologies. Multiple methods give rise to multi-method quantitative and qualitative methodologies and mixed methods (Harrison, 2013). Mixed methods can be subdivided into simple mixed method approaches (double phase) or complex mixed methods approaches (multi-phase). The three main methodologies used in research are therefore quantitative, qualitative and mixed methods.

Quantitative methodologies are associated with a positivistic approach where, using a deductive approach, data collected is used to empirically test a theory or a set of hypotheses (Blaikie, 2010). Kumar (2005) describes the quantitative methodological approach as being a planned and structured approach, where all the research processes are established prior to beginning the actual data collection. Johnson and Christensen (2008) argue that quantitative research should have the following characteristics: “the confirmatory part of the research cycle is emphasised; behaviour is seen to be predictable and regular; common aims of research are to explain and predict.” (p. 34). It is important that the findings obtained are reliable, valid and generalisable (Nightingale, 2012).

Qualitative methodologies are associated with an interpretivist philosophy (Denzin and Lincoln, 2011). This is because the realities and shared meanings expressed by the participants in relation to the phenomena being studied are ‘socially constructed’ i.e. they depend on the interpretations given by the participants to the events occurring around them. Hence the researcher has to make sense and ‘interpret’ these meanings. Due to its social nature (depending mainly on social interactions), qualitative data is more complex, varied and elastic than quantitative data (Saunders *et al.*, 2016).

Quantitative and qualitative methodologies can either be mono method where a single data collection and data analysis technique are adopted or multi method where more than one data collection technique or data analysis technique are adopted (Saunders *et al.*, 2016).

Mixed methods research has developed over the last twenty years or so during the late 80's and early 90's mainly through its use in works of sociology, management and health sciences (Brewer & Hunter, 2006; Creswell, 2011; Creswell, 2014; Maxwell & Loomis, 2003; Subedi, 2016; Tashakkori & Teddlie, 1998). The term mixed methods evolved from formerly being known as for e.g., multimethod and mixed methodology (Bryman, 2006; Creswell, 2014; Tashakkori & Teddlie, 2010). Tashakkori and Teddlie (2003) define mixed methods as “a type of research design in which QUAL and QUAN approaches are used in types of questions, research methods, data collection and analysis procedures and inferences” (p. 711). As Subedi (2016) puts it, “many researchers select mixed methods in order to search out the opportunity for a greater assortment of divergent views” (p. 571).

Creswell and Plano Clark (2007) state that the main premise of a mixed methods approach is “that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone.” (p. 7). Also, by adopting a mix of both quantitative and qualitative methods, one will be minimising the limitations of these methods if used individually. The best way to answer the research questions being proposed for this study is by adopting a mixed methods approach. In this way, an integrative KM model for the Maltese Pharmaceutical Sector can be developed through the quantitative study and insights and perceptions on KM from practitioners in the Maltese Pharmaceutical Sector can be garnered through the qualitative study. The findings of both the quantitative and qualitative study can then be converged and the combined discussion of these

findings can help in providing managerial recommendations and best practices for the Maltese Pharmaceutical Sector with regards to KM.

3.3.2 Philosophical Perspective for this Study

This study adopts a pragmatic approach to research since such an approach places emphasis on the research questions, meaning that one position may be more ideal to answer those particular research questions than another. Saunders *et al.* (2016) lend weight to this argument by stating that:

if a research problem does not suggest unambiguously that one particular type of knowledge or method should be adopted, this only confirms the pragmatist's view that it is perfectly possible to work with different types of knowledge and methods (p. 143).

Since I am adopting a pragmatic stance, the best methodological approach would be a mixed methods approach since this allows me to choose the best mix of research methods available to answer in the best possible way the research questions proposed (Johnson & Onwuegbuzie, 2004). As claimed by Patton (2002):

my pragmatic stance aims to supersede one-sided paradigm allegiance by increasing the concrete and practical methodological options available to researchers and evaluators. Such pragmatism means judging the quality of a study by its intended purposes, available resources, procedures followed, and results obtained, all within a particular context and for a specific audience (p. 71-2).

3.3.3 Research Strategy (Design)

When adopting a mixed methods research methodology, a number of research strategies (designs) can be adopted. Creswell and Plano Clark (2007, 2011),

Harrison and Reilly (2011) and Harrison (2013) describe the main simple mixed methods design types. These are summarised in Table 3.1 below.

Design Type	Variants	Timing	Weighting	Mixing	Notation
Convergent	Parallel database	Concurrent: quantitative and qualitative at the same time	Usually equal	Merging the data during the interpretation or analysis	QUAN + QUAL
Embedded	Embedded Experimental	Concurrent or sequential	Unequal	Embed one type of data within a larger design using other type of data	QUAN (qual) or QUAL (quan)
	Embedded Correlation				
	Embedded methodology				
Explanatory	Follow-up explanations	Sequential: quantitative followed by qualitative	Usually quantitative	Connect the data between the two phases	QUAN → qual
Exploratory	Instrument development Theory development	Sequential: qualitative followed by quantitative	Usually qualitative	Connect the data between the two phases	QUAL → quan

Table 3.1: Major mixed methods design types (Source: Harrison, 2013, p. 2156.)

As already stated in the introductory chapter, this study will adopt a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL). As the name implies, in convergent designs, both the qualitative and quantitative data are gathered simultaneously but then they are analysed separately. The resulting databases are then merged together (Creswell & Plano Clarke, 2011; Harrison, 2013). In this way, the strengths of both data sets are brought together as the quantitative results can be corroborated with the qualitative findings (Creswell *et al.*, 2003). Harrison (2013) recommends that convergent designs be utilised:

when researchers have limited time for collecting data and must collect both types of data in one visit to the field, when researchers feel that there is equal value for collecting and analyzing both quantitative and qualitative data to understand the problem, or when researchers have skills in both quantitative and qualitative methods of research and can manage extensive data collection and analysis activities (p. 2159).

A sequential exploratory mixed methods design was immediately discarded for this study since as claimed by Bishop (2015), such designs are used to “develop a novel theory about a poorly understood phenomenon” (p. 13) through the dominant qualitative (QUAL) study and then follow this up with a quantitative (quan) study to “test hypotheses derived from the new theory” (p. 13). This was not the case with my research since I am not interested in testing new theory but in investigating known variables as part of an established theoretical framework garnered from previous studies discussed in the literature review.

On the other hand, a sequential explanatory mixed methods design was considered at first since as claimed by Bishop (2015), in such designs, “the qualitative component is employed to try to explain or contextualize the earlier quantitative results” (p. 14). However, in sequential explanatory mixed methods designs, whilst the qualitative data helps to contextualize the quantitative findings, it does not help to generate explanations of the non-significant quantitative results (Bishop, 2015). Hence this research design was also discarded in favour of a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) since even though both dominant quantitative (QUAN) and qualitative (QUAL) methods will be addressing the same phenomenon (in my case KM in the Maltese Pharmaceutical Sector) this will be done through a different set of research questions thus providing complementary insights that when converged together provided a more comprehensive understanding of the phenomenon at hand (Bishop, 2015).

The stages of the concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) are illustrated and summarised in Figure 3.2 below. The quantitative study involves quantitative data collection through a cross sectional, web-based survey. Data are then validated and analysed through Factor Analysis and Structural Equation Modeling thus producing the empirically tested integrative KM model. The qualitative study involves purposeful selection of participants and the development of the interview protocol and questions. After conducting the structured interviews, text data is generated through the transcribing process. The qualitative data analysis is done using template analysis where codes and themes developed are grouped under similar categories. Both sets of results (QUAN + QUAL) are then combined in a discussion which will relate the qualitative with the quantitative findings. Implications derived from the discussion together with suggestions for future research will conclude.

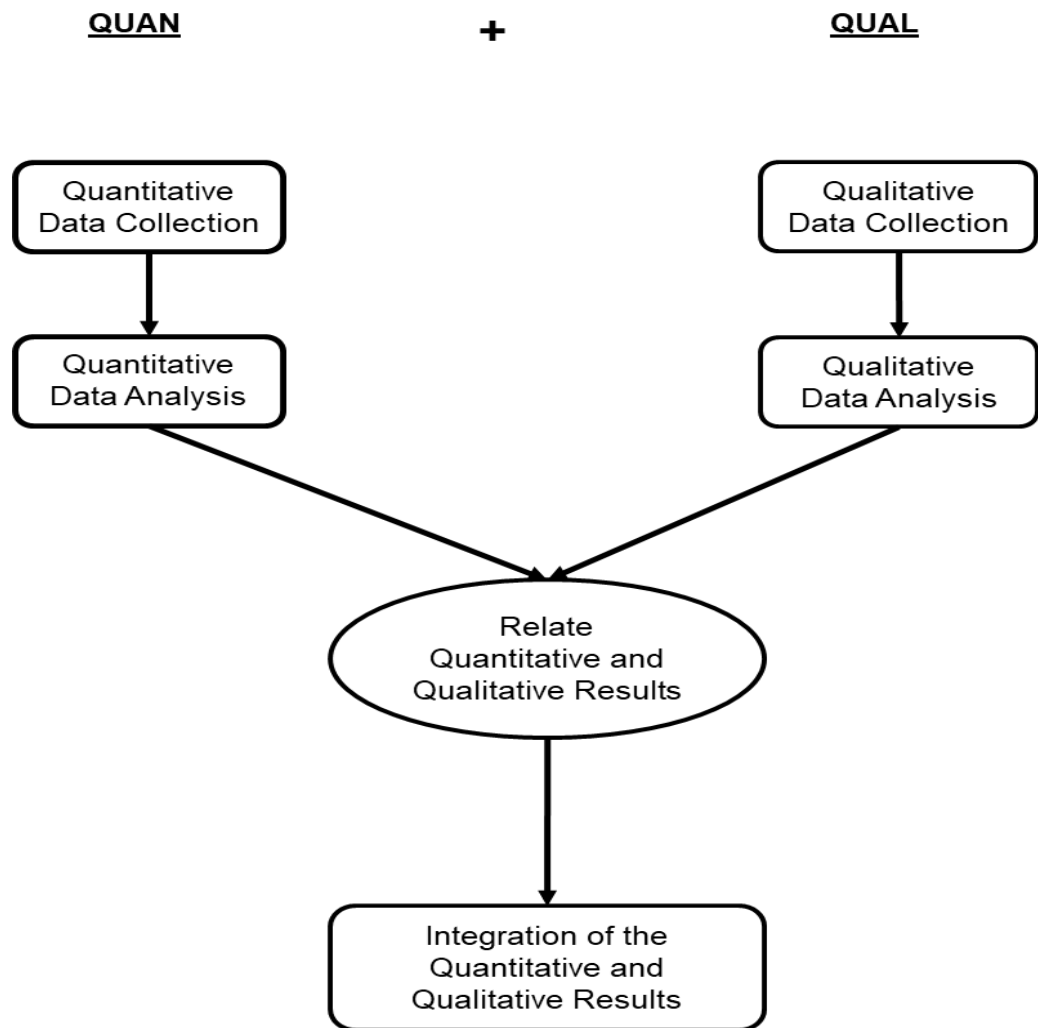


Figure 3.2: A concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) (Source: Author)

3.3.4 Time Considerations

Time considerations for research can either be cross sectional or longitudinal. In the cross-sectional design, the research is like a ‘snapshot’ taken at a particular time whilst the longitudinal design is more like a ‘diary’ which spans a given period of time and allows a researcher to study how the phenomenon under investigation changes and develops over time (Saunders *et al.*, 2016). From the research questions proposed, the scope of this concurrent

(convergent parallel) mixed methods research (QUAN + QUAL) was to investigate KM in the Maltese Pharmaceutical Sector by developing an integrative KM model and garnering perceptions of practitioners in the field about KM at a particular time. Therefore, this research adopted a cross-sectional design.

3.3.5 Ethical Considerations of this Research

Prior to carrying out any research involving human subjects, the University of Malta has set up a number of requirements that every researcher has to abide by. To handle ethical considerations, this University has set up two committees, one at faculty level – the Faculty Research Ethics Committee (FREC) and the other at Senate level namely the University Research Ethics Committee (UREC). The University of Malta:

acknowledges and accepts its responsibility for protecting the rights and welfare of human research subjects and acknowledges that it bears full responsibility for the performance of all research involving human subjects and for complying with laws and regulations that relate to such research. (UREC, 2016).

All researchers have to seek approval from FREC/UREC prior to carrying out any research involving human subjects. This research is no exception and prior to carrying out the online web based survey (quantitative study) and structured interviews (qualitative study), I obtained clearance from both FREC and UREC by submitting the necessary UREC Proposal Form together with a copy of the survey and interview questions, and the relevant covering letters and consent forms intended to be distributed to the study participants (see approval and

relevant documents in Appendix A). The invitation for the web based survey was distributed to the pharmacists/pharmacy technicians through the Pharmacy Council, which is the official body that regulates the pharmacy profession in Malta.

On opening the email invitations for the three-part web-based survey devised for the quantitative study, the participant is greeted with an introductory page that explains clearly that anonymity and confidentiality are guaranteed and that the data collected will be used solely by the researcher for the purpose of this study. The participant is also informed that filling in and submitting the questionnaire constitutes giving consent for participation in the study and that the participant is free to withdraw from the study at any time without any prejudice.

For the structured interviews devised for the qualitative study, the consent form presented to the participants stated clearly that the outcome of the study will be used for university research purposes only. It also informed the participant that: their real name will not be used in the study; participation is voluntary and they are free to quit from the study at any point and for whatever reason in which case all records and information collected will be destroyed; there will be no deception in the data collection process; the interview will be audio recorded; and that the recording will be destroyed two to three years after the interview takes place to give the researcher time to complete the study.

Prior to starting the actual interview session, it was made sure that each participant was given adequate time to read through and understand the ethical issues presented in the consent form. Then, each participant was asked if any further clarifications were required.

3.4 Research Method for The Quantitative Study

In this section, I discuss in detail the research method for the quantitative study. I start off by reminding the reader the research questions for this study. I then delve into the data collection technique, sampling, data screening process and the reliability and validity assessment carried out through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). After describing briefly the data analysis techniques adopted, I close this section by highlighting the limitations of this study.

3.4.1 Research Questions for the Quantitative Study

This study attempts to answer the following three research questions:

- 1. To what extent do KM Enablers (namely Trust, Collaboration, Learning, Centralisation, Formalisation, KM Strategy, Intrinsic Rewards, T-Shaped Skills, IT Support and dimensions of Transformational Leadership) predict KM processes (i.e. Knowledge Creation, Knowledge Organisation, Knowledge Application and Knowledge Protection)?*

2. *To what extent do KM Processes predict Organisational Effectiveness?*

3. *Is the relationship between KM Enablers and Organisational Effectiveness mediated by KM Processes?*

3.4.2 The Different Stages of the Quantitative Study

There are three different stages involved in this quantitative study. The stages are as follows:

1. survey design – an extensive literature review was carried out in order to garner an understanding of the current research in the field and hence be in a position to develop the research hypotheses. The literature review was crucial in determining the constructs to be adopted in the web questionnaire. Once the hypothetical model was established, the online questionnaire was devised and this was piloted with University of Malta researchers in the management field. Any feedback received on the constructs and general structure of the questionnaire were reviewed and the necessary changes implemented.
2. Validity and reliability analysis – after distributing the online questionnaire to the key informants (pharmacists/pharmacy technicians) in the various organisations within the Maltese Pharmaceutical Sector, the respondent data was subjected to validity and reliability analysis including Exploratory Factor Analysis (EFA) in order to clean the data

prior to doing the Confirmatory Factor Analysis (CFA) and also to discard any variables that exhibited low factor loading. A hypothetical Structural Equation Modeling (SEM) model together with relevant hypotheses to be tested were developed.

3. The hypothesised SEM Model and proposed hypotheses were tested through SEM and an empirically tested integrative model for KM enablers, KM processes and organisational effectiveness in the Maltese Pharmaceutical Sector was developed together with the confirmed hypotheses.

A flowchart illustrating the 3 stages of the quantitative study is presented in Figure 3.3 below.

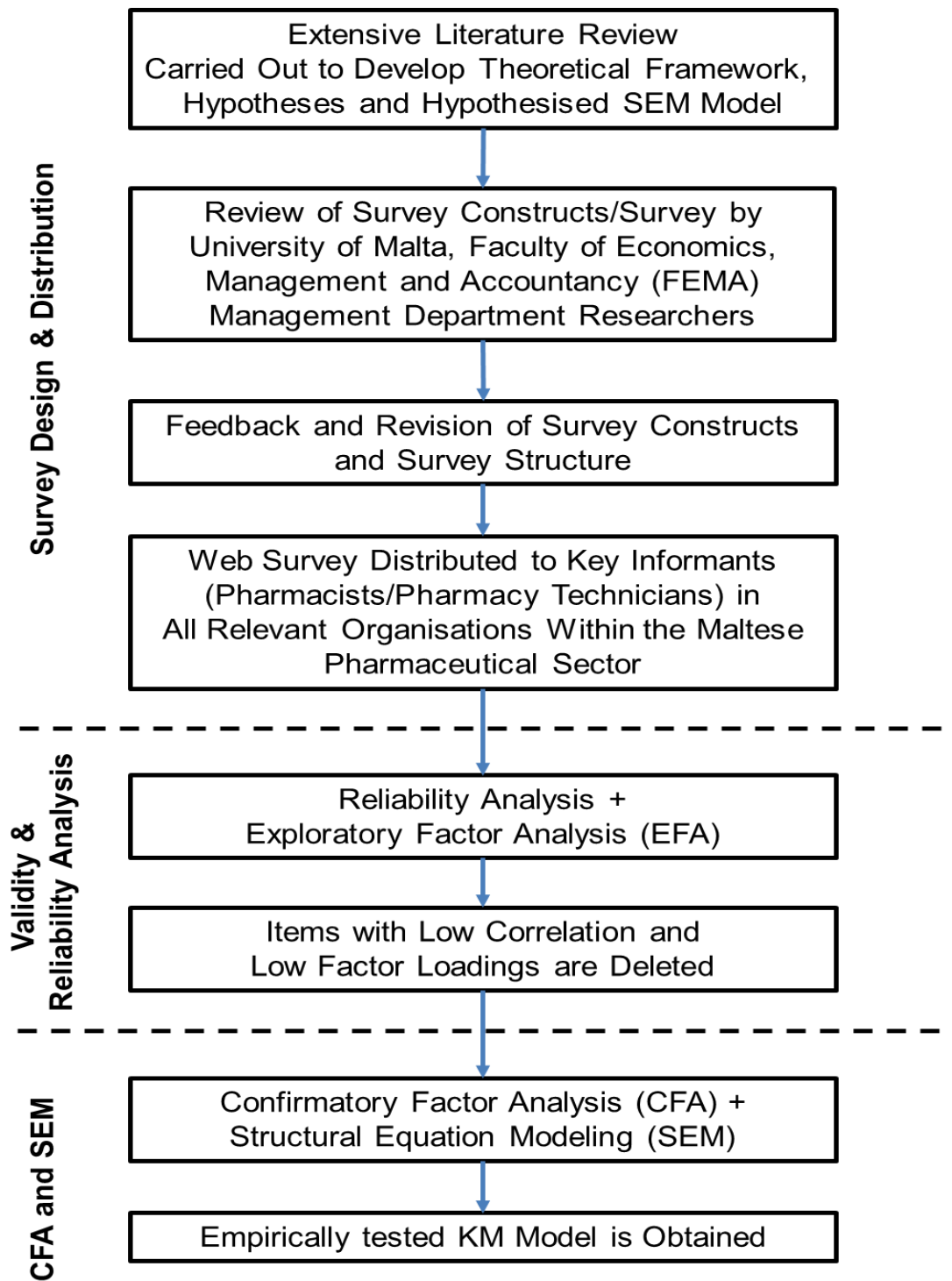


Figure 3.3: Stages of the quantitative study (Source: Author)

3.4.3 Data Collection Instrument – Web-based Questionnaire

Questionnaires are divided into two main categories namely self-completed (done by respondents) or interviewer-completed (recorded by interviewer). Self-completed questionnaires include internet questionnaires (web-based or mobile), postal (by mail) and delivery and collection questionnaires. Interviewer-completed include telephone or face to face interviews (Saunders *et al.*, 2016) The option of doing interviewer-completed questionnaires for this quantitative study was immediately discarded since it would have been overly time consuming to carry out with a sample of 230 participants. So, the option of self-completed questionnaires was chosen. It was decided to carry out web-based questionnaires over the other types of self-completed questionnaires since, in my case, they offer the following advantages:

1. *Low cost* – the costs of web based questionnaires are low when compared to posted/delivery and collection questionnaires (Smith *et al.*, 2007). Web-based survey providers such as SurveyMonkey ® offer subscription level for a small annual fee that allows you free reign on the number of questions you can design.
2. *Faster* – the distribution and collection processes are greatly sped up since they are done in real time. Also, if, for e.g., you have a wrong contact email, you will know immediately as the error report is in real time.

3. *Convenient* – web-based questionnaires are more convenient for respondents since they can access the hyperlink from their smartphones/tablets and can thus respond at their pace. Respondents can start completing the questionnaire, stop and then continue the completion at a later stage.
4. *Flexibility* – the flexibility in design offered by web-based questionnaires allows a researcher to eliminate errors from multiple responses, include skip patterns and logic that greatly eliminate bias, and modify the survey easily without having to reprint everything (Pealer *et al.*, 2001; Smith *et al.*, 2007; Wolford *et al.*, 2008)
5. *Immediate availability of data* – the responses entered are immediately stored in electronic format and this data can then be uploaded directly into statistical packages such as SPSS thus speeding up the analysis process and greatly reducing errors from coding of data.

In my case, the use of web-based questionnaires posed only one disadvantage when compared to the other types of self-completed questionnaires. Due to the heavy use of internet for advertising purposes, the web invitation may be deleted by mistake by the respondent or classified as 'spam' by email software and thus, the hyperlink is not accessed, limiting response rate (Andrews, Nonnecke & Preece, 2003; Hudson & Bruckman, 2004; Wright, 2005). However, this limitation was mitigated by making use of the Malta Pharmacy Council email system for distribution of the link and sending several reminders.

Table 3.2 below shows the various sources from where the constructs used for the KM enablers, the KM processes and organisational effectiveness were adopted. The table also shows the operational definitions of the different constructs adopted, the number of items per construct and the reliability measures (Cronbach α or Composite Reliability) of the different constructs adopted in this quantitative study.

Construct (Code)	Operational Definitions	Source	No. of Items	Reliability Measures
KM Enablers				
Trust (T)	Degree of reciprocal faith in others' intentions, behaviours, and skills towards organisational goals	Lee and Choi, 2003, p. 222	6	0.89
Collaboration (CL)	Degree of active support and help in organisation	Lee and Choi, 2003, p. 222	5	0.88
Learning (L)	Degree of opportunity, variety, satisfaction, and encouragement for learning and development in organisation	Lee and Choi, 2003, p. 222	5	0.90
Centralisation (C)	The extent to which decision-making power is concentrated at the top levels of the organisation	Caruana <i>et al.</i> , 1998, p. 18	5	0.78
Formalisation (F)	The existence of formal rules and regulations and the organisation's efforts to enforce those rules	Caruana <i>et al.</i> , 1998, p. 19	5	0.71
KM Strategy (S)	Degree of which knowledge vision, goals and guidelines clearly and effectively direct the knowledge management activities in organisations	Lee and Choi, 2010, p. 444	5	0.97
T-Shaped Skills (TSK)	Degree of understanding his or her own and others' task areas	Lee and Choi, 2003, p. 222	5	0.83
Intrinsic Rewards (R)	Rewards that cannot be measured by monetary value such as pride and public recognition	Choi <i>et al.</i> , 2008, p. 13	4	0.93
IT Support (ITS)	Enablers represented by computer based hardware, software and support personnel that are responsible for increases in information production and dissemination	Tippins and Sohi, 2003, p. 749	5	0.81
Idealised Influence (II)	The capacity of such leader to use his/her charisma to promote a sense of purpose and of collective values, actions and mission throughout the entire organisation; The leader's ability to foster pride, trust and strong, positive emotional bonds with followers	Shih <i>et al.</i> , 2012	8	0.94
Inspirational Motivation (IM)	Leader's ability to articulate future prospects and shaping a common vision among organisational members	Shih <i>et al.</i> , 2012, p. 1059	4	0.91

Intellectual Stimulation (IS)	Ability of leaders to challenge followers' assumptions and encourage workers to consider problems from multiple perspectives	Shih <i>et al.</i> , 2012, p. 1060	4	0.93
Individualised Consideration (IC)	Ability of leaders to attend to followers' needs and listen to their concerns	Shih <i>et al.</i> , 2012, p. 1060	4	0.92
KM Processes				
Knowledge Creation (KC)	Degree of socialisation, externalisation, combination and internalisation	Lee and Choi, 2003, p. 222	19	0.92
Knowledge Organisation (KO)	Storage, maintenance and retrieval of organisational memory	Han and Zhong, 2006	10	0.91
Knowledge Application (KA)	Involves processes oriented towards the actual use of knowledge	Gold <i>et al.</i> , 2001, p. 191	9	N/A*
Knowledge Protection (KP)	Involves processes designed to protect the knowledge within an organisation from illegal or inappropriate use or theft	Gold <i>et al.</i> , 2001, p. 192	7	N/A*
Organisational Effectiveness				
Organisational Effectiveness (OE)	Degree of improvement over time in its capabilities for creating an increase in effectiveness	Gold <i>et al.</i> , 2001, p. 196	11	N/A*

* reliability measures not listed in source but these constructs come from seminal work in the KM field by Gold *et al.* (2001) with almost 4000 citations and have been empirically tested and validated by other studies (e.g. Mills & Smith, 2011 reporting reliability measures of 0.96, 0.95 & 0.95 for KA, KP & OE respectively)

Table 3.2: Sources of constructs used in the survey together with their operational definitions, number of items per construct and the reliability measures (Source: Author)

KM Enablers

Part one of the survey contains the items pertaining to the 13 KM enablers: Trust (T), Collaboration (CL), Learning (L), Centralisation (C), Formalisation (F), KM Strategy (S), Intrinsic Rewards (R), T-Shaped Skills (TSK), IT Support (ITS), Idealised Influence (II), Inspirational Motivation (IM), Intellectual Stimulation (IS), and Individualised Consideration (IC). Respondents rated the items on a Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. All the constructs used for the KM enablers have strong reliability measures i.e. greater than 0.7 (Gaskin, 2016) have been empirically tested and validated by other studies in the KM, IT management and organisational studies fields and

come from cited articles in lead journals or conferences. A full account of the constructs used for all the KM enablers is available in Appendix B.

Trust, Collaboration and Learning

The constructs for trust, collaboration and learning were taken from Lee and Choi (2003). Trust (T) consists of six items (e.g. “My organisation members are generally trustworthy”), collaboration (CL) consists of five items (e.g. “My organisation members are supportive”) and learning (L) consists of five items (e.g. “My organisation encourages people to attend seminars, symposia and so on”).

Centralisation and Formalisation

The constructs for centralisation and formalisation were taken from Caruana *et al.* (1998). Centralisation (C) consists of five items (e.g. “In my experience with this organisation, even quite small matters have to be referred to someone higher up for a final answer”) and formalisation also consists of five items (e.g. “When rules and procedure exist in my organisation, they are typically written”).

KM Strategy

The construct for KM strategy (S) was taken from Lee and Choi (2010). KM strategy (S) consists of five items (e.g. “My organisation has effective planning for knowledge management”).

Idealised Influence, Inspirational Motivation, Intellectual Stimulation and Individualised Consideration

The constructs for idealised influence, inspirational motivation, intellectual stimulation and individualised consideration, all dimensions of transformational leadership, were taken from Shih *et al.* (2012). The construct for Idealised influence consists of eight items (e.g. “The leadership of my organisation emphasises the importance of having a collective sense of mission; The leadership of my organisation displays a sense of power and confidence”). The construct of inspirational motivation (IM) consists of four items (e.g. “The leadership of my organisation articulates a compelling vision of the future”). The construct of intellectual stimulation (IS) consists of four items (e.g. “The leadership of my organisation gets me to look at problems from many different angles”) and the construct of individualised consideration (IC) also consists of four items (e.g. “The leadership of my organisation treats me as an individual rather than just as a member of a group”).

T-Shaped Skills

The construct for T-Shaped skills (TSK) was taken from Lee and Choi (2003). T-Shaped skills consists of five items (e.g. “Employees within my organisation are specialists in their own part”).

Intrinsic Rewards

The construct for intrinsic rewards (R) was taken from Choi *et al.* (2008). Intrinsic rewards consists of four items (e.g. “The more I share my own knowledge, the more my reputation would be enhanced within my organisation”).

IT Support

The construct for IT support (ITS) was taken from Tippins and Sohi (2003). IT support consists of five items (e.g. “My organisation creates customised software applications when the need arises”).

KM Processes

Part two of the survey measured the KM processes namely Knowledge Creation (KC), Knowledge Organisation (KO), Knowledge Application (KA), and Knowledge Protection (KP). Respondents rated the items on a Likert scale ranging from 1 = entirely disagree to 7 = entirely agree. The constructs of Knowledge Creation (KC) and Knowledge Organisation (KO) have strong reliability measures i.e. greater than 0.7 (Gaskin, 2016), have been empirically tested and validated by other studies in the KM field and come from cited articles in lead journals or conferences. The reliability measures for the constructs of Knowledge Application (KA) and Knowledge Protection (KP) are not listed but these constructs come from seminal work in the KM field by Gold

et al. (2001) with almost 4000 citations and have been empirically tested and validated by other studies (e.g. Mills & Smith, 2011 reporting reliability measures of 0.96 & 0.95 for KA & KP respectively). A full account of the constructs used for all the KM processes is available in Appendix B.

Knowledge Creation

The construct for knowledge creation (KC) was taken from Lee and Choi (2003). Knowledge creation consists of nineteen items, five items each for socialisation (e.g. “My organisation prioritises creating a work environment that allows peers to understand the expertise involved in their duties through practice and demonstrations by a master/mentor”), for externalisation (e.g. “My organisation emphasises exchanging various ideas and dialogues”) and combination (e.g. “My organisation emphasises transmitting newly created concepts”) and four items for internalisation (e.g. “My organisation emphasises the use of liaising activities between members of different functional teams and departments”).

Knowledge Organisation

Knowledge organisation (KO) items were taken from Han and Zhong (2006). Knowledge organisation consists of ten items (e.g. “My organisation uses technologies such as databases to store knowledge such as reports, marketing materials etc.”).

Knowledge Application and Protection

The knowledge application (KA) and knowledge protection (KP) items were taken from Gold *et al.* (2001). Knowledge application consists of nine items (e.g. “My organisation has processes for applying knowledge learned from experience”) whilst knowledge protection consists of seven items (e.g. “My organisation has processes to protect knowledge from theft from outside the organisation”).

Organisational Effectiveness and Demographics

Finally, part three of the survey measured organisational effectiveness through a four-point Likert-type scale ranging from 1=strongly disagree to 4=strongly agree. Part three of the survey concluded by requesting demographic information about the participating organisations and the respondents.

Organisational Effectiveness

The eleven items for organisational effectiveness (e.g. “Over the past two years, my organisation has improved its ability to adapt quickly to unanticipated changes”) were taken from Gold *et al.* (2001). Even though the reliability measure for the construct of Organisational Effectiveness (OE) was not listed, this construct comes from seminal work in the KM field by Gold *et al.* (2001) with almost 4000 citations and has been empirically tested and validated by other studies (e.g. Mills & Smith, 2011 reporting a reliability measure of 0.95 for

OE). This study also chose to adopt these items since as argued by Gold *et al.* (2001), baseline financial figures such as return on investment or equity “may be significantly confounded by many uncontrollable business, economic and environmental factors” (p. 196) whilst these items are “less confounded contributions of performance” (p. 196). Kim and Hancer (2010) are in agreement with Gold *et al.* (2001) when they state that “these items measure intellectual capital and tangible and intangible benefits suitably.... These measures provide insight into value-added aspects of organizational effectiveness” (p. 177).

Demographic Information

The demographic information requested about the participating organisations was the pharmaceutical activity carried out by that particular organisation and the size of the organisation. With regards to the respondents, demographic information about the respondents’ age, gender, number of years employed in the pharmaceutical sector and number of years employed with current organisation were requested.

3.4.4 Population and Sampling

This study targeted all those organisations within the Maltese Pharmaceutical Sector (N = 230) that employed a minimum of 5 employees. The criterion was imposed to ensure that the entity examined had the qualities and necessary attributes of an organisation in terms of structures, functions and roles. Upon

contacting the Pharmacy Council in Malta, the latter forwarded an invitation containing a weblink to an online questionnaire to a key informant (a pharmacist or pharmacy technician in middle management) in every organisation who acted as the rater on behalf of that specific organisation. Given that part of the assessment involved one's rating of the leadership qualities in that organisation, it was ensured that the key informant was neither the owner nor a person occupying an uppermost senior position in the organisation to reduce potential self-rating bias. The questionnaire was split into three parts, each separated by a two-week gap. Weekly reminders were sent to the participants to try and maximise the number of responses. Over a two month period, 216 organisations responded to the online questionnaire but the responses of 5 had to be discarded since they were incomplete, resulting in 211 complete surveys. The responses of the latter formed the basis for the data screening process.

3.4.5 Data Screening Process

Four important issues for consideration when screening data are, missing data, outliers, normality (skewness and kurtosis) and unengaged responses. Missing data and outliers were not an issue: the data set comprises the responses of those who completed the whole questionnaire while outliers do not exist for Likert scales - as Gaskin (2016) puts it, "answering at an extreme (1 to 5) is not really representative outlier behaviour". As for normality:

- (i) the *skewness* across variables ranged from -1.00 to 0.07, highlighting a tendency for negative skewness but all scores were within the ± 2.00 threshold.
- (ii) the *kurtosis* scores across variables ranged from -1.29 to 1.31, with all scores well within the ± 2.00 threshold (George & Mallery, 2010).
- (iii) The standard deviation generated across responses (standard deviation for all responses per participant) found that six respondents had a standard deviation of less than 0.5, implying that these respondents were not quite engaged in the questionnaire. These responses were therefore eliminated, resulting in a data set of size 205 (a response rate of 89.13%) . The latter formed the basis of the remaining statistical analysis conducted in this study using structural equation modeling (SEM).

3.4.6 Reliability and Validity of Construct Measures Through Factor Analysis

T-shaped skills – This factor was deleted due to poor factor loadings.

Idealised influence – The items associated with the elements attributed to leaders by followers converged with the items of the individualised consideration factor and were eventually discarded, retaining those items associated with elements associated with the behaviour of leaders. Similar

problems were encountered in other studies such as in the case of Lee *et al.* (2011). The construct was therefore renamed Idealised Influence (Behavioural) (IIB).

Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) was conducted to examine the factor structure of the reflective latent measures (i.e. not formative measures such as categorical variables or demographics). These include the twelve KM enablers (trust, collaboration, learning, centralisation, formalisation, KM strategy, idealised influence (behavioural), inspirational motivation, intellectual stimulation, individualised consideration, intrinsic rewards and IT support); the four mediators (knowledge creation, knowledge organisation, knowledge application and knowledge protection) and the outcome (organisational effectiveness). Exploratory Factor Analysis (EFA) was conducted prior to Confirmatory Factor Analysis (CFA) since it prepares the variables for cleaner Structure Equation Modeling (SEM) and helps to spot problematic variables much more easily than CFA (Gaskin, 2016). Maximum Likelihood extraction was chosen since it is the algorithm used in AMOS for CFA and the PROMAX rotation method was used since this non-orthogonal (oblique) rotation method allows factors to correlate.

The Kaiser Meyer Olkin (KMO) measure of sampling adequacy was good (KMO = 0.925) and the Bartlett Test of Sphericity was statistically significant ($\chi^2(3003) = 159756.232, p < 0.001$) confirming that the observed correlation matrix differed

significantly from the identity matrix, thereby justifying EFA. The communalities in extraction column ranged from 0.66 to 0.91, and hence there were no communalities below 0.30 (Hair *et al.*, 2014).

Maximum Likelihood extraction with PROMAX rotation revealed that there were 16 (not 17) factors with eigenvalues greater than one and these explained 78.74% of the variability. Observed variables that produced an unstable factor structure or factor loadings less than 0.60 in the Pattern Matrix were discarded. Table 3.3 below shows both the variables that were retained and also those variables that were eventually discarded.

Construct (Code)	Variables retained (as coded in the research)	Variables retained (as coded in source literature)	Variables discarded (as coded in the research)	Variables discarded (as coded in source literature)
KM Enablers				
Trust (T)	T:1,3,4,6	TRU: 1,3,4,6	T: 2,5	TRU: 2,5
Collaboration (CL)	CL:1,2,3	COL: 1,2,3	CL: 4,5	COL: 4,5
Learning (L)	L:1,2,3,4,5	LEA: 1,2,3,4,5	NONE	NONE
Centralisation (C)	C:2,3,4,5	CENT: 2,3,4,5	C: 1	CENT: 1
Formalisation (F)	F:1,3,5	FORM: 2,4,6	F: 2,4	FORM: 3,5
KM Strategy (S)	S:1,2,3,4,5	K_STRA: 1,2,3,4,5	NONE	NONE
Intrinsic Rewards (R)	R:1,2,3,4	IR: 1,2,3,4	NONE	NONE
IT Support (ITS)	ITS:1,2,3,4	ITOBJECT: 1,2,3,4	ITS:5	ITOBJECT: 5
Idealised Influence (Behavioural) (IIB)	IIB:1,2,3,4	1,2,3,4	NONE	NONE
Inspirational Motivation (IM)	IM:1,2,3,4	9,10,11,12	NONE	NONE
Intellectual Stimulation (IS)	IS:1,2,3,4	13,14,15,16	NONE	NONE
Individualised Consideration (IC)	IC:1,2,3,4	17,18,19,20	NONE	NONE
KM Processes				
Knowledge Creation (KC)	KC:4,6,9,15,16, 17,18,19	KCS: 4 KCE: 1,4 KCC: 5 KCI: 1,2,3,4	KC: 1,2,3,5,7,8,10,11 ,12,13,14	KCS: 1,2,3,5; KCE: 2,3,5; KCC: 1,2,3,4; KCI: NONE

Knowledge Organisation (KO)	KO:5,6,7,8,9	KO: 1,2,9,10,7	KO: 1,2,3,4,10	KO: 5,6,4,3,8
Knowledge Application (KA)	KA:5,6,7,8,9	AP: 6,7,8,11,12	KA: 1,2,3,4	AP: 1,2,4,5
Knowledge Protection (KP)	KP:1,2,3,4,6	PP: 1,3,4,6,9	KP: 5,7	PP: 8,10
Organisational Effectiveness				
Organisational Effectiveness (OE)	OE:3,4,5,6,7,8,9	KE: 4,6,7,8,9,10,11	OE: 1,2,7,10,11	KE: 2,3,13,14

Table 3.3: Summary of the retained and discarded variables (Source: Author)

Factor															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
T1	KC4	OE3	KO5	KP1	L1	KA5	IM1	S1	IC1	ITS1	IIB1	C2	R1	IS1	F1
0.85	0.78	0.58	0.73	0.89	0.77	0.81	0.92	0.84	0.83	0.81	0.90	0.86	0.78	0.78	0.84
<i>0.82</i>	<i>0.80</i>	<i>0.71</i>	<i>0.84</i>	<i>0.85</i>	<i>0.77</i>	<i>0.90</i>	<i>0.83</i>	<i>0.96</i>	<i>0.90</i>	<i>0.70</i>	<i>0.82</i>	<i>0.80</i>	<i>0.85</i>	<i>0.85</i>	<i>0.89</i>
T3	KC6	OE4	KO6	KP2	L2	KA6	IM2	S2	IC2	ITS2	IIB2	C3	R2	IS2	F3
0.75	0.77	0.75	0.73	0.90	0.75	0.87	0.86	0.88	0.97	0.89	0.85	0.79	0.83	0.74	0.84
<i>0.84</i>	<i>0.84</i>	<i>0.79</i>	<i>0.92</i>	<i>0.92</i>	<i>0.82</i>	<i>0.91</i>	<i>0.87</i>	<i>0.97</i>	<i>0.85</i>	<i>0.66</i>	<i>0.93</i>	<i>0.61</i>	<i>0.92</i>	<i>0.80</i>	<i>0.73</i>
T4	KC9	OE5	KO7	KP3	L3	KA7	IM3	S3	IC3	ITS3	IIB3	C4	R3	IS3	F5
0.78	0.66	0.80	0.93	0.88	0.84	0.86	0.82	0.91	0.89	0.81	0.87	0.89	0.88	0.89	0.83
<i>0.81</i>	<i>0.80</i>	<i>0.73</i>	<i>0.66</i>	<i>0.88</i>	<i>0.77</i>	<i>0.94</i>	<i>0.87</i>	<i>0.94</i>	<i>0.90</i>	<i>0.80</i>	<i>0.80</i>	<i>0.91</i>	<i>0.73</i>	<i>0.92</i>	<i>0.83</i>
T6	KC15	OE6	KO8	KP4	L4	KA8	IM4	S4	IC4	ITS4	IIB4	C5	R4	IS4	
0.84	0.67	0.88	0.80	0.88	0.85	0.80	0.76	0.80	0.70	0.72	0.66	0.82	0.82	0.63	
<i>0.78</i>	<i>0.82</i>	<i>0.85</i>	<i>0.84</i>	<i>0.69</i>	<i>0.80</i>	<i>0.93</i>	<i>0.83</i>	<i>0.78</i>	<i>0.92</i>	<i>0.84</i>	<i>0.77</i>	<i>0.62</i>	<i>0.62</i>	<i>0.85</i>	
CL1	KC16	OE7	KO9	KP6	L5	KA9		S5							
0.65	0.91	0.81	0.88	0.62	0.61	0.84		0.85							
<i>0.68</i>	<i>0.86</i>	<i>0.67</i>	<i>0.83</i>	<i>0.80</i>	<i>0.89</i>	<i>0.90</i>		<i>0.77</i>							
CL2	KC17	OE8													
0.88	0.80	0.81													
<i>0.80</i>	<i>0.83</i>	<i>0.85</i>													
CL3	KC18	OE9													
0.91	0.82	0.77													
<i>0.80</i>	<i>0.93</i>	<i>0.82</i>													
	KC19														
	0.88														
	<i>0.89</i>														
Eigenvalue															
Percentage variance explained															
Cronbach alpha															
30.69	4.29	3.35	2.75	2.53	2.37	2.11	2.04	2.01	1.69	1.64	1.39	1.34	1.12	1.09	1.01
39.35	5.51	4.29	3.52	3.24	3.04	2.71	2.62	2.58	2.17	2.10	1.78	1.72	1.44	1.39	1.29
0.92	0.95	0.91	0.91	0.92	0.91	0.96	0.91	0.95	0.95	0.84	0.90	0.88	0.86	0.92	0.86

^a Pattern Matrix Factor Loadings with Maximum likelihood estimation and Promax rotation (rotation converged in 9 iterations).

^b standardized regression weights.

Note: items for each construct are listed in the same order presented in Table 3.3

Table 3.4: Factor loadings: EFA^a and CFA^b(in italics) (Source: Author)

Table 3.4 above shows the pattern matrix loadings for the revised EFA model. None of the variables retained produced an unstable factor structure, cross-loadings greater than 0.25 or factor loadings below 0.60.

The only exception occurred for Trust and Collaboration items since they loaded on the same factor. However, combining them as '*collaborative trust*' (CT) seemed logical since, as Fawcett, Jones and Fawcett (2012) argued, "Trust is at the heart of collaborative innovative capability. Without the foundation of trust, collaborative alliances can neither be built nor sustained" (p. 163). To examine model fit of collaborative trust, CFA was used. The latter revealed a roughly decent fit for this seven item measure ($\chi^2(14)=106.370$, $p < 0.001$; GFI = 0.844, CFI = 0.912, NFI = 0.900, RMSEA = 0.180) but when two error terms were covaried (CL1 with CL2 and CL2 with CL3), an excellent fit was obtained ($\chi^2(12)=12.386$, $p = 0.415$; GFI = 0.982, CFI = 1.000, RMSEA = 0.013), resulting in a significant improvement in model fit ($\Delta\chi^2(6)=93.984$, $p < 0.001$). Cronbach alpha equalled 0.92.

Confirmatory Factor Analysis (CFA)

A CFA model incorporating 16 reflective latent measures was built and used to assess cursory model fit and validity (Gaskin, 2016). Apart from the chi-squared statistic and its degrees of freedom and p-value (ideally, χ^2 would not be significant, but this test assumes multivariate normality and is sensitive to sample size), the following model fit indices recommended by Kline (2016) were also used: the comparative fit index (CFI), the root mean square error of

approximation (RMSEA) and the standardised root mean square residual (SRMR). The following cut-off values were adopted: CFI, ≥ 0.9 = acceptable, ≥ 0.95 = good/superior; RMSEA: ≤ 0.08 acceptable, ≤ 0.06 good; SRMR: ≤ 0.08 acceptable, ≤ 0.05 good (Hu & Bentler, 1999; Byrne, 2001). In spite of a significant chi-squared statistic ($\chi^2(2713) = 4134.84$, $p < 0.001$), the other fit indices suggested that the CFA model was acceptable (CFI = 0.903, RMSEA = 0.051, SRMR = 0.050) and no factor loadings were below 0.60 (see Table 3.5).

Factors	Diagnostics				Factors																
	CR	AVE	MSV	Max R(H)	KC	CT	F	C	L	S	R	ITS	OE	IM	IS	IC	KA	KP	IIB	KO	
KC	0.95	0.72	0.60	0.96	0.85																
CT	0.92	0.63	0.34	0.97	0.56	0.79															
F	0.86	0.67	0.21	0.98	0.44	0.46	0.82														
C	0.88	0.64	0.09	0.98	-0.29	-0.12	0.80														
L	0.91	0.66	0.51	0.98	0.67	0.46	0.36	0.81													
S	0.95	0.79	0.51	0.99	0.68	0.56	0.44	0.71	0.89												
R	0.86	0.62	0.31	0.99	0.49	0.56	0.32	0.45	0.45	0.79											
ITS	0.84	0.57	0.29	0.99	0.42	0.18	0.20	0.48	0.47	0.19	0.75										
OE	0.91	0.60	0.44	0.99	0.66	0.51	0.36	0.58	0.62	0.45	0.52	0.78									
IM	0.91	0.72	0.42	0.99	0.56	0.51	0.28	0.42	0.51	0.43	0.40	0.57	0.85								
IS	0.92	0.73	0.55	0.99	0.65	0.59	0.30	0.54	0.68	0.44	0.38	0.65	0.60	0.86							
IC	0.94	0.79	0.55	0.99	0.70	0.58	0.35	0.66	0.69	0.51	0.31	0.61	0.52	0.74	0.89						
KA	0.96	0.84	0.60	0.99	0.77	0.52	0.36	-0.24	0.59	0.45	0.47	0.63	0.51	0.66	0.59	0.92					
KP	0.92	0.69	0.44	1.00	0.58	0.40	0.40	-0.19	0.53	0.39	0.53	0.59	0.39	0.45	0.45	0.59	0.83				
IIB	0.90	0.70	0.42	1.00	0.63	0.52	0.35	-0.09	0.48	0.35	0.32	0.50	0.65	0.57	0.57	0.57	0.46	0.83			
KO	0.91	0.68	0.53	1.00	0.67	0.42	0.31	-0.20	0.55	0.35	0.52	0.54	0.43	0.56	0.49	0.73	0.66	0.51	0.82		

Note: The square root of AVE value for each construct is printed along the diagonal, while the correlation coefficient between each pair of constructs is presented as the off-diagonal element; CT = collaborative trust.

Table 3.5: Validity diagnostics (Source: Author)

Table 3.5 shows that there were no validity concerns (Hancock & Mueller, 2001; Hair *et al.*, 2014) since the *composite reliability (CR)* statistics were all greater than 0.7 and the maximal reliability scores were greater than 0.8; *convergent validity* since the average variance extracted (AVE) statistics were all greater than 0.5; and *discriminant validity* since the maximum shared variance (MSV) was smaller than AVE, and the square root of the AVE was greater than any interfactor correlations.

3.4.7 The Hypothesised SEM Model

The hypothesised model has structural paths from each of the 11 KM enablers to each of the four KM processes and in turn structural paths from the KM processes to organisational effectiveness.

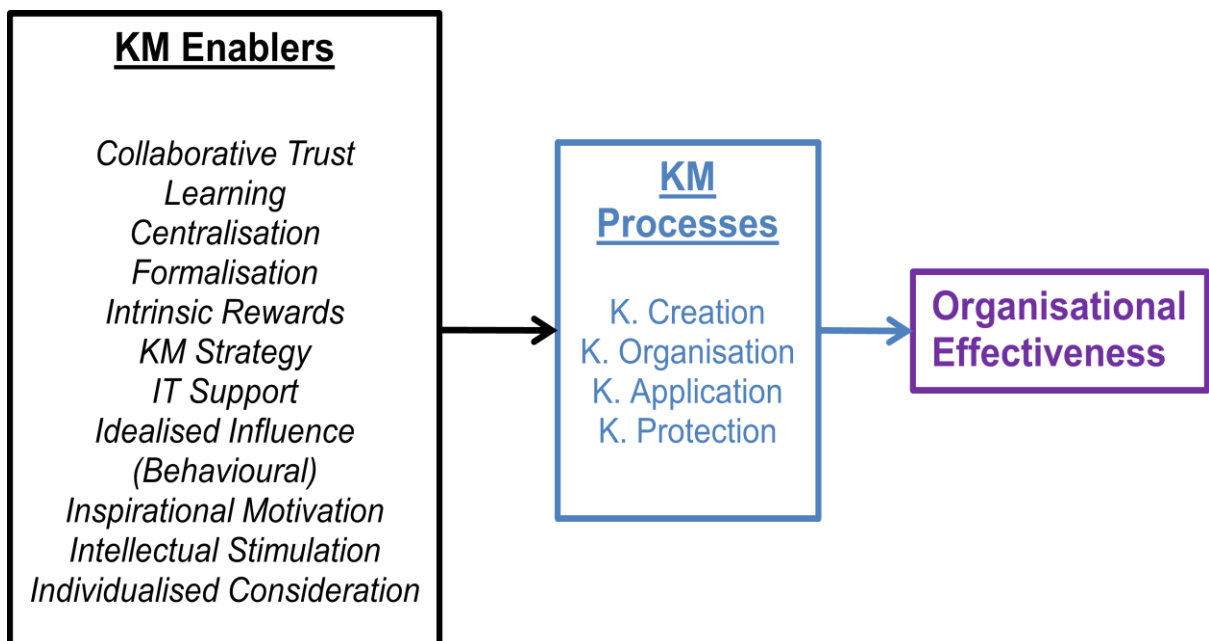


Figure 3.4: The hypothesised SEM model (Source: Author)

The hypotheses to be tested via this model are listed in Table 3.6 below. The hypotheses include fifteen direct effect hypotheses and eleven indirect effect hypotheses.

Direct Effects
<i>H1: Collaborative trust has a positive direct effect on KM processes namely knowledge creation (H1a), knowledge organisation (H1b), knowledge application (H1c) & knowledge protection (H1d)</i>
<i>H2: Learning has a positive direct effect on KM processes namely knowledge creation (H2a), knowledge organisation (H2b), knowledge application (H2c) & knowledge protection (H2d)</i>
<i>H3: Centralisation has a negative direct effect on KM processes namely knowledge creation (H3a), knowledge organisation (H3b), knowledge application (H3c) & knowledge protection (H3d)</i>
<i>H4: Formalisation has a negative direct effect on KM processes namely knowledge creation (H4a), knowledge organisation (H4b), knowledge application (H4c) & knowledge protection (H4d)</i>
<i>H5: Intrinsic rewards have a positive direct effect on KM processes namely knowledge creation (H5a), knowledge organisation (H5b), knowledge application (H5c) & knowledge protection (H5d)</i>
<i>H6: KM strategy has a positive direct effect on KM processes namely knowledge creation (H6a), knowledge organisation (H6b), knowledge application (H6c) & knowledge protection (H6d)</i>
<i>H7: IT support has a positive direct effect on KM processes namely knowledge creation (H7a), knowledge organisation (H7b), knowledge application (H7c) & knowledge protection (H7d)</i>
<i>H8: Idealised influence (behavioural) has a positive direct effect on KM processes namely knowledge creation (H8a), knowledge organisation (H8b), knowledge application (H8c) & knowledge protection (H8d)</i>
<i>H9: Inspirational motivation has a positive direct effect on KM processes namely knowledge creation (H9a), knowledge organisation (H9b), knowledge application (H9c) & knowledge protection (H9d)</i>
<i>H10: Intellectual stimulation has a positive direct effect on KM processes namely knowledge creation (H10a), knowledge organisation (H10b), knowledge application (H10c) & knowledge protection (H10d)</i>
<i>H11: Individualised consideration has a positive direct effect on KM processes namely knowledge creation (H11a), knowledge organisation (H11b), knowledge application (H11c) & knowledge protection (H11d)</i>
<i>H12: Knowledge creation has a positive direct effect on organisational effectiveness</i>
<i>H13: Knowledge organisation has a positive direct effect on organisational effectiveness</i>
<i>H14: Knowledge application has a positive direct effect on organisational effectiveness</i>
<i>H15: Knowledge protection has a positive direct effect on organisational effectiveness</i>
Indirect (Mediated) Effects
<i>H16: Collaborative Trust affects organisational effectiveness positively and indirectly through knowledge creation (H16a), knowledge organisation (H16b), knowledge application (H16c) and knowledge protection (H16d)</i>
<i>H17: Learning affects organisational effectiveness positively and indirectly through knowledge creation</i>

<i>(H17a), knowledge organisation (H17b), knowledge application (H17c) and knowledge protection (H17d)</i>
<i>H18: Centralisation affects organisational effectiveness negatively and indirectly through knowledge creation (H18a), knowledge organisation (H18b), knowledge application (H18c) and knowledge protection (H18d)</i>
<i>H19: Formalisation affects organisational effectiveness negatively and indirectly through knowledge creation (H19a), knowledge organisation (H19b), knowledge application (H19c) and knowledge protection (H19d)</i>
<i>H20: Intrinsic rewards affect organisational effectiveness positively and indirectly through knowledge creation (H20a), knowledge organisation (H20b), knowledge application (H20c) and knowledge protection (H20d)</i>
<i>H21: KM Strategy affects organisational effectiveness positively and indirectly through knowledge creation (H21a), knowledge organisation (H21b), knowledge application (H21c) and knowledge protection (H21d)</i>
<i>H22: IT support affects organisational effectiveness positively and indirectly through Knowledge creation (H22a), knowledge organisation (H22b), knowledge application (H22c) and knowledge protection (H22d)</i>
<i>H23: Idealised influence (behavioural) affects organisational effectiveness positively and indirectly through knowledge creation (H23a), knowledge organisation (H23b), knowledge application (H23c) and knowledge protection (H23d)</i>
<i>H24: Inspirational motivation affects organisational effectiveness positively and indirectly through knowledge creation (H24a), knowledge organisation (H24b), knowledge application (H24c) and knowledge protection (H24d)</i>
<i>H25: Intellectual stimulation affects organisational effectiveness positively and indirectly through knowledge creation (H25a), knowledge organisation (H25b), knowledge application (H25c) and knowledge protection (H25d)</i>
<i>H26: Individualised consideration affects organisational effectiveness positively and indirectly through knowledge creation (H26a), knowledge organisation (H26b), knowledge application (H26c) and knowledge protection (H26d)</i>

Table 3.6: The hypotheses to be tested by this SEM model (Source: Author)

3.4.8 Data Analysis Techniques

The statistical package used for the quantitative study was SPSS V22. To test for direct effects (Hypotheses 1-15), Structural Equation Modeling (SEM) was used. In order to investigate whether the KM processes individually mediate the relationship between KM enablers and organisational effectiveness (Hypotheses 16-26), the ‘user-defined A x B estimand mediation’ in AMOS

(Gaskin, 2016) was used, with bias-corrected bootstrapping (2000 samples) and 90% confidence intervals, from which indirect effects were interpreted.

3.4.9 Capitalisation on Chance and Common Method Bias (CMB) Limitations

The main limitation of the quantitative study is that it uses the same data set to carry out Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). It can be argued that this method leads to capitalisation on chance. However, since the population of interest consisted of 230 organisations, and the sample size was 205, it was not possible to split the dataset into two (one to conduct EFA and the other for CFA).

Another associated limitation is the issue of common method variance (CMV) or bias. Common method bias (CMB) is still not fully accepted by researchers and often criticism levelled at it is that it adds little to no value to research. It has been argued that a lot of effort is spent on testing and correcting common method bias. In fact, common method bias “has been viewed as everything from a hobgoblin to a ghost” (Richardson, Simmering & Starman, 2009, p.762). Researchers such as Podsakoff *et al.* (2003) argue that common method variance or bias “is often a problem and researchers need to do whatever they can to control for it” (p. 900). Others such as Spector (2006) have described common method variance or bias as an “urban legend” that is “both an exaggeration and oversimplification of the true state of affairs” (p. 230).

Owing to this current debate on common method bias and the lack of empirical evidence on the efficacy of ex-post (post hoc) remedies (Richardson *et al.*, 2009), this research has in fact adopted a number of preliminary or ex-ante remedies as suggested by Podsakoff *et al.* (2003), Chang, Van Witteloostuijn and Eden (2010) and Podsakoff, MacKenzie and Podsakoff (2012), to mitigate as much as possible common method bias. These ex-ante remedies include:

1. *Temporal separation for data collection* – since it was not possible for me to collect data on the variables from different sources, it was decided to use temporal separation to collect the data as suggested by Chang *et al.* (2010). In fact, the questionnaire was divided into three parts, part 1- the KM enablers, part 2 - the KM processes and part 3 - Organisational Effectiveness and Demographics and these were distributed with a two-week time gap between them.
2. *Design and Administration of questionnaire* – The questionnaire was accompanied by an introductory page that highlighted to the respondents the fact that confidentiality and anonymity are guaranteed and to choose the response that best describes their belief to that statement. Moreover, no open-ended questions were included and the constructs chosen were taken from empirically tested studies in the literature. Also, the questionnaire was vetted by two academics from the Department of Management, University of Malta, to check for ambiguity and to confirm that the questionnaire was clear and easy to comprehend. As argued by Podsakoff *et al.* (2003), such measures “should reduce people’s

evaluation apprehension and make them less likely to edit their responses to be more socially desirable, lenient, acquiescent and consistent with how the researcher wants them to respond” (p. 888).

3. *Using measurement scales with different scale points* - As argued by Podsakoff *et al.* (2012), “method bias can result from common scale properties (i.e., scale type, number of scale points, anchor labels, polarity, etc.) shared by the items used to measure different constructs” (p. 550). To minimise this kind of bias, different scale points were used for the three parts of the questionnaire. A five-point Likert scale was used for part 1 – KM enablers; a seven-point Likert scale was used for part 2 – KM processes (the mediators); and a four-point Likert scale was used for part 3 – Organisational Effectiveness (the outcome).

4. *Randomising the question order* – The software used to design the questionnaire, namely SurveyMonkey ®, allows to randomise the question order for each respondent. By adopting this measure, the respondent cannot “easily combine related items to cognitively “create” the correlation needed to produce a CMV-biased pattern of responses” (Chang *et al.*, 2010, p. 180).

3.5 Research Method for The Qualitative Study

In this section, I will describe in detail the research method for the qualitative study carried out as part of the concurrent (convergent parallel) mixed methods research design (QUAN + QUAL). I will start off by presenting the research questions for this qualitative study. Next, I will describe in detail the sampling criteria, interview guide, interview procedure and the data analysis technique. I will conclude by describing insider research bias which is the main limitation of this qualitative study.

3.5.1 Research Questions for the Qualitative Study

In line with the rationale of the study, the following research questions were explored by the qualitative study:

- 1. What is the uptake level of KM initiatives in the Maltese Pharmaceutical Sector? Is there a focused KM strategy as part of the organisational business strategy?*
- 2. What is the status of KM enablers in the Maltese Pharmaceutical Sector? Are they perceived important in promoting KM initiatives?*
- 3. Is the Maltese Pharmaceutical Sector making the most of its knowledge assets? Are these knowledge assets being adequately protected?*

4. *Are the effects of initiatives geared towards improving organisational effectiveness being measured?*

5. *Is KM perceived to have a future role in the Maltese Pharmaceutical Sector?*

3.5.2 The Different Stages of the Qualitative Study

There are three stages involved in the qualitative study namely the interview design and execution, the transcribing process and the template analysis. These stages will be discussed in more detail below:

1. *Interview design and execution* – The interview questions and interview guide were prepared to follow a structured interview approach. The interview questions and guide were then piloted with two respondents that participated in the quantitative study. After taking on board suggestions from the pilot study, necessary amendments were done to the interview questions and guide. The interviewees were then selected from the quantitative survey respondents using purposive sampling and a series of face to face interviews were carried out. Each interview session was recorded using digital audio recording.

2. *Transcribing process* – The interview transcripts were done individually by me. This helped me to familiarise myself with the transcribed text. After this initial transcript process was completed, the transcripts together with the digital audio recordings were passed on to a second transcriber for cross checking. After making the required modifications, the final transcripts were passed on to the participants for their evaluation and any corrections they deemed necessary to the transcribed replies were made prior to the data analysis stage.

3. *Template analysis* – the data was analysed using template analysis procedures which involved coding of data and development of themes into a final template which served as a basis for the presentation of the results of the qualitative study.

A flowchart illustrating the 3 stages of the qualitative study is presented in Figure 3.5.

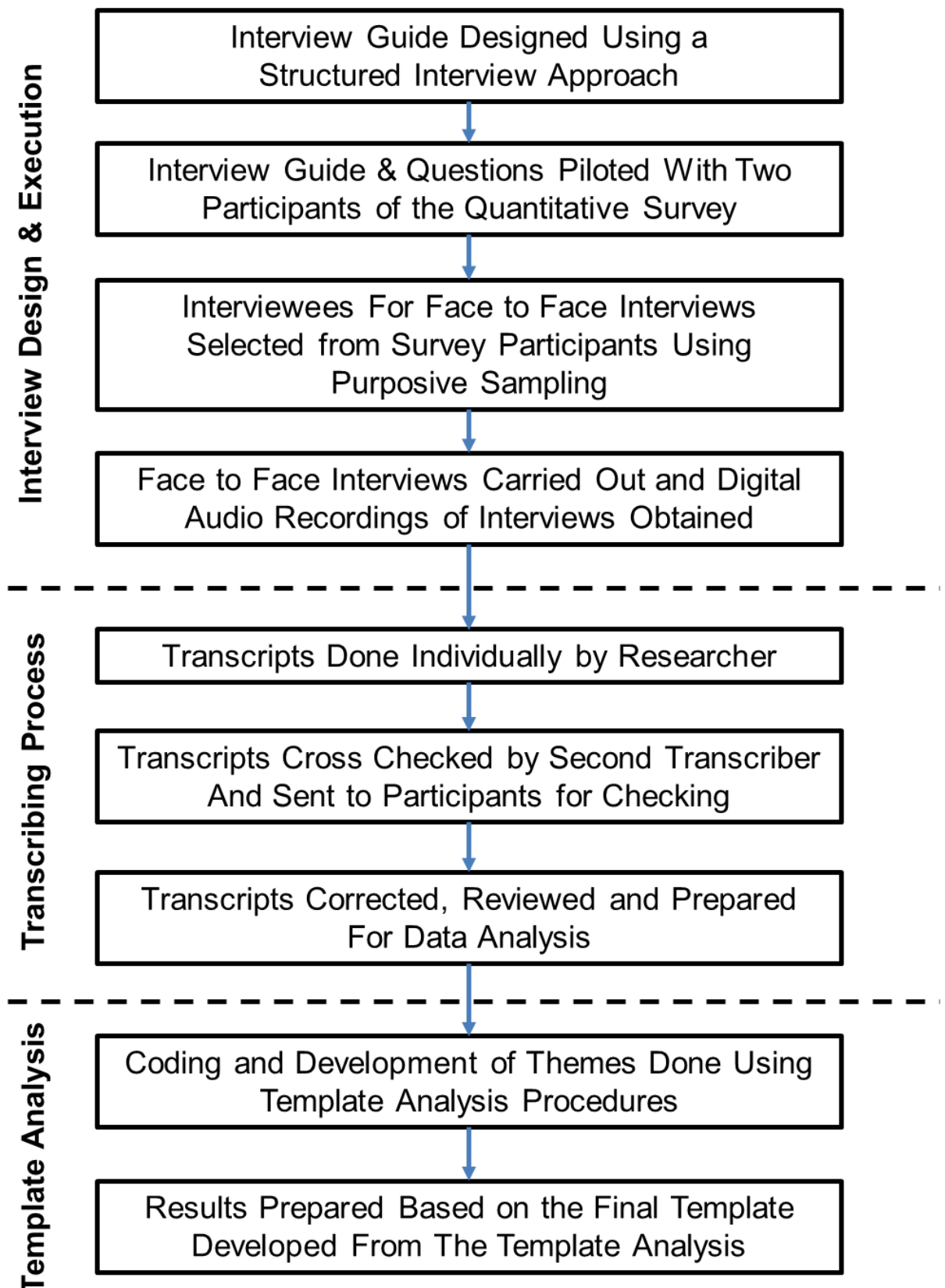


Figure 3.5: Summary of the different stages involved in this qualitative study (Source: Author)

3.5.3 Sampling Criteria – Choosing the Participants for the Study

In order to select participants who had the necessary expertise, experiences and perspectives required to answer the research questions proposed by this qualitative study, a nonprobability sampling technique was adopted (McIntosh & Morse, 2015; Teddlie & Yu, 2007). Nonprobability sampling techniques, also known as purposive, purposeful or qualitative sampling (Teddlie & Yu, 2007) have the advantage of being faster, easier and cheaper than probability sampling and allow for in depth exploration of specific issues highlighted by the research questions. From the six types of purposive sampling procedures namely typical case sampling, extreme or deviant case sampling, intensity sampling, maximum variation sampling, reputational case sampling and homogeneous sampling (Teddlie & Yu, 2007), homogeneous sampling was adopted since all the participants had similar occupational backgrounds and all were employed in the Pharmaceutical Sector. Since I adopted a purposive sampling technique for the selection of the interview participants, these were required to satisfy two eligibility criteria prior to being considered for this study. These criteria were as follows:

1. *The participants of the qualitative study had to be selected from the respondents of the quantitative study* – this is due to the fact that the scope of this qualitative study as part of a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) was to investigate further the relationships between KM enablers, KM

processes and organisational effectiveness by exploring the views and perceptions of the participants on KM.

2. *The participants had to be employed for at least two years with their current organisation* – this is considered a long enough exposure period for employees to gain the required experience about the business model and modus operandi of their organisation.

Interviewee	Alias	Age	Gender	No. of Years Working in the Pharmaceutical Sector	No. of Years Working with Current Organisation	Interview Session duration (mins)
1	No. 1	45	female	24	16	40
2	No. 2	42	male	20	20	53
3	No. 3	47	male	25	3	41
4	No. 4	46	male	24	14	44
5	No. 5	44	male	22	22	65
6	No. 6	39	female	11	2	32
7	No. 7	47	female	25	3	54
8	No. 8	34	female	9	6	38
9	No. 9	44	male	22	15	35
10	No. 10	46	male	24	15	32
11	No. 11	46	male	24	24	45
12	No. 12	50	male	8	2	53
13	No. 13	44	male	22	3	45
14	No. 14	48	female	26	3	42
15	No. 15	42	male	20	3	45
16	No. 16	39	female	16	13	43
17	No. 17	36	female	10	10	40
18	No. 18	43	male	20	5	41
19	No. 19	45	male	20	5	35
20	No. 20	43	female	24	14	34
Average		43.5		19.8	9.9	42.85
Standard Deviation		3.99		5.80	7.28	8.34

Table 3.7: Characteristics of the interview participants and interview duration (Source: Author)

Following guidelines by Kvale (2007), 20 participants, who satisfied the eligibility criteria above, were selected to take part in the structured interviews. The characteristics of the participants are summarised in Table 3.7 above. The participants were 8 females and 12 males, and the age range was from 34 to 50 years with an average age of 43.5 years (SD = 3.99 years). The number of years working in the pharmaceutical sector ranged from 8 to 26 years with an average of 19.8 years (SD = 5.80 years). The number of years employed with their current organisation ranged from 2 to 24 years with an average of 9.9 years (SD = 7.28 years).

3.5.4 Data Collection Instrument - The Structured Interview Guide

A common means of data collection within the qualitative field is the research interview. As stated by Saunders *et al.*, (2016), a research interview is:

a purposeful conversation between two or more people...essentially it is about asking purposeful questions and carefully listening to the answers to be able to explore these further (p. 388).

Research interviews can be divided into three categories namely structured interviews, unstructured interviews and semi-structured interviews.

Structured interviews use a pre-determined and standardised set of questions where all the participants are asked the same set of questions in the same order. In structured interviews, the interviewer and the interviewee have very little freedom, and the flexibility of the interviewer to prompt and interrupt the interviewee to elaborate is very restricted (Adhabi & Anozie, 2017; Alshenqeeti, 2014; Stuckey, 2013). In fact, structured interviews are mostly suited for

researchers who need to keep the interview tightly focused on the target topic since they know exactly the kind of information they wish to seek (Bryman, 2008; Dörnyei, 2007).

Unstructured interviews are the exact opposite of structured interviews in that the control exerted by the interviewer is only limited to the selection of the general theme/topic to be explored and discussed with the interviewee. The interviewee is given “the opportunity to talk freely about events, behaviour and beliefs in the topic area” (Saunders *et al.*, 2016, p. 391). In fact, unstructured interviews are also known as intensive, naturalistic, autobiographical, narrative, informant and non-directive (Arksey & Knight, 2012; Holland & Ramazanoglu, 1994; Saunders *et al.*, 2016) and are non-standardised. Since unstructured interviews generate a large amount of qualitative data, considerable time is required to analyse correctly this data.

In semi-structured interviews, the interviewer prepares a set of themes and key questions that will be covered during the interview session usually in the format of an interview guide which will contain extra comments to help open up the discussion. The order in which the questions are asked may vary from interview to interview and some questions may also be omitted whilst the interviewer may feel the need to ask additional questions to probe further a particular topic. As Arksey and Knight (2012) put it:

interviewers are free to follow up ideas, probe responses and ask for clarification or further elaboration...informants can answer the questions in terms of what they see important....there is scope for them to choose what to say about a particular topic and how much (p. 7).

For the scope of this research, the data collection method chosen for this qualitative study is the structured interview. A structured interview guide was developed to serve as the principal tool for data collection.

Owing to the deductive nature of the study where, as a means to complement the quantitative study, I wish to investigate the relationships between KM enablers, KM processes and organisational effectiveness by exploring the views and perceptions of the participants, structured interviews are suitable as a data collection tool since as already stated above, I know exactly the type of information I wish to elicit. Face-to-face interviews were chosen to administer the structured interview questions over written question and answer, online and phone interviews since on asking the participants, they all wanted to be interviewed by means of face to face interviews.

Face to face interviews have the following advantages: the physical presence of the interviewer in face-to-face interviews allows for both verbal and non-verbal communication; it allows the interviewer to act and clarify questions if he/she sees that the participant is confused or not understanding a particular question; it also allows the interviewer to offer a break or support if he/she discerns any discomfort during the interview session (McIntosh & Morse, 2015). On the other hand, face to face interviews have the following disadvantages: the physical presence of the interviewer may affect the participant and makes him/her feel uncomfortable in answering particularly sensitive questions (McIntosh & Morse, 2015).

To ascertain rigour, the construction of the interview questions and interview guide followed various recommendations from the literature (Arksey & Knight, 2012; McIntosh & Morse, 2015; Saunders *et al.*, 2016). When constructing the interview questions, it was made sure that: the vocabulary used was clear and understandable; prejudicial language, imprecision and ambiguity were avoided; leading questions, double barrelled questions, assumptive questions, hypothetical questions and personal/sensitive questions were avoided (Arksey & Knight, 2012). When structuring the interview guide, the questions followed an orderly sequence (e.g. 'ice breaker'/easy questions at the beginning) and were coherent. The main questions followed a logical order and probing questions were introduced where required. As Arksey and Knight (2012) put it, "devising the appropriate probes and prompts with which to press the interviewee is at least as important as developing the core questions" (p. 97-98).

The interview guide was divided into five sections in line with the research questions as illustrated by Table 3.8 below.

Research Question	Interview Guide Section Title	No. of questions in each section	Scope
<i>1. What is the uptake level of KM initiatives in the Maltese Pharmaceutical Sector? Is there a focused KM strategy as part of the organisational business strategy?</i>	Uptake of KM initiatives and focused KM Strategy	4	Eliciting whether the participants knew about KM and whether KM was ingrained in their organisation; Whether they had a formal KM strategy as part of the business strategy of their organisation
<i>2. What is the status of KM enablers in the Maltese Pharmaceutical Sector? Are they perceived important in promoting KM initiatives?</i>	KM Enablers	9	Garnering the feelings and perceptions of the participants about the status and importance of KM enablers within their organisations
<i>3. Is the Maltese Pharmaceutical Sector making the most of its knowledge assets? Are these knowledge assets being adequately protected?</i>	Utilisation and Protection of Knowledge Assets	3	Assessing the level of organisation, utilisation and protection of knowledge within organisations in the pharmaceutical sector
<i>4. Are the effects of initiatives geared towards improving organisational effectiveness being measured?</i>	Measuring Organisational Effectiveness	1	Discovering whether organisations in the pharmaceutical sector employ metrics to gauge how effective knowledge initiatives are at improving the overall organisational effectiveness
<i>5. Is KM perceived to have a future role in the Maltese Pharmaceutical Sector?</i>	Future Role of KM	1	Assessing the beliefs of the participants as to whether they see a future for KM in their organisations

Table 3.8: Structure of Interview Guide (Source: Author)

The interview guide was marked with some bold fonts to help the interviewer identify venues for further probing that served to aliment further the discussion. There were also some notes in italics at the beginning of each section that served as a guide for the interviewer regarding the objectives of the questions in that section. The interview guide and interview questionnaire are listed in Appendix B.

3.5.5 The Interview Procedure

After finalising the preliminary interview guide and interview questions, these were piloted with two employees who satisfied the criteria mentioned above (sub-section 3.5.3) for the participants of this qualitative study. As recommended by Chadwick, Bahr and Albrecht (1984) and by McIntosh and Morse (2015), the pilot respondents were asked: to confirm whether the language used in the interview guide/questions was meaningful to them; to confirm whether in their opinion, the interview questions/guide followed a logical order; whether there were any problems with the questions such as double meaning; to describe the purpose of each question so as to ascertain whether the questions elicited the expected responses; and whether the interview guide motivated them to participate in the study. After completion of the pilot studies, the suggestions of the pilot respondents were taken on board. These included a reduction in length of some of the questions, minor changes to the layout of the interview guide and flow of the questions, minor adjustment in the order of the question related to research question two and inserting more probes where these were required.

The next phase involved the recruitment of the participants. All the participants were personally invited by me to participate in the study. There were no difficulties in recruiting the participants since they all knew me well and in fact they gladly consented to take part in this qualitative study. I then proceeded to inform the participants that:

1. Their real name will not be used in the study and confidentiality was fully guaranteed.
2. Participation is voluntary and they are free to quit from the study at any point and for whatever reason. In case they withdrew, all records and information collected will be destroyed.
3. There will be no deception in the data collection process.
4. The interview will be digital audio recorded and take approximately not more than 1.5 hours.
5. The recording will be destroyed 2 to 3 years after the interview takes place.

The participants were then briefed about the research aims and purpose of the study. A short briefing about the theoretical background of the study was also disclosed to the participants and then the participants were given time to ask questions and make any necessary clarifications. Prior to each interview session, a consent form detailing the ethical obligations above was signed between the participants and me (the researcher). As highlighted by Arksey and Knight (2012), trust and rapport are essential ingredients for a successful interview session. Therefore, prior to each interview session, it was made sure

that the participant was comfortable and the interview per se took place at a venue selected by the participant so as he/she was in familiar surroundings. Since the interview was of a professional nature, I made sure to dress in a way that would present me as professional and competent. During the interview sessions, it was made sure that the choice of language for delivering the interview questions was appropriate and I listened attentively to the responses of the participants making eye contact and avoiding mannerism that expressed a sense of urgency or impatience. At the end of each interview session, the participant was thanked for sharing his/her valuable insights and informed that the transcript of the interview session will be forwarded to him/her for checking.

The interview sessions took around six weeks in all to complete. Each interview lasted an average of 43 minutes ($SD=8.3$) in terms of recorded time. The shortest session took 32 minutes to complete whilst the longest session lasted 65 minutes (refer to Table 3.7 above). The transcription process began after all the interview sessions were completed. Each individual interview was transcribed by me thus helping me to familiarise with the text. As recommended by McLellan, MacQueen and Neidig (2003), when the transcription process was over, all the 20 transcripts and related digital audio recordings were passed to a second transcriber who cross-checked the transcripts as a means of proof reading. Any changes were discussed, agreed upon and the required modifications done. Once the transcripts were finalised, these were sent to the respective participants for checking. The participants were asked to go through and evaluate the replies in order to ascertain that they agreed with what was written. Any discrepancies highlighted by the

participants were reviewed and corrected accordingly. These corrected transcripts represented the final transcripts that were utilised for the data analysis described below (see samples in Appendix C).

3.5.6 The Data Analysis Procedure

A common technique used for analysing data from interviews is template analysis (King, 2012). Template analysis differs from other forms of thematic analysis since instead of coding all data (e.g. transcripts) before searching for themes, in template analysis “a researcher only codes a proportion of the data items before developing an initial list of codes and themes, known as a coding template” (Saunders *et al.*, 2016, p. 587). Template analysis allows flexibility in the coding structure, format and style of the template produced (Brooks *et al.*, 2015). It allows the use of ‘a priori’ themes and after developing the initial template and as data analysis progresses, allows the creation of different iterations of this template by modifying and re-applying the initial template until all themes are exhausted and a final template is obtained (King, 2012). This qualitative study adopted this approach where template analysis was primarily used to organise data and extract themes according to their relevance to the research questions described above. The process as described by King (2012) is illustrated below.

I enlisted the help of another coder to collaborate in this exercise. Since the person that had been involved in the transcript cross-checking was already familiar with the text, this person was chosen as the coder for this exercise.

The data analysis began with the development of an initial template. This was built initially using 'a priori' themes based on the research questions and interview guide.

- 1. Uptake level of Knowledge Management (KM) and focused KM Strategy**
 1. Understanding of the term KM
 2. Official KM initiatives undertaken by the organisation
 3. Initiatives related to KM done but not described as official KM initiatives
 4. KM strategy as part of the business strategy

- 2. Status and perceived importance of KM enablers in the Maltese Pharmaceutical Sector**
 1. IT support
 2. Learning
 1. Mentoring/internal training
 2. External training
 3. Trust and Collaboration
 4. Formalisation and Centralisation
 5. Intrinsic Rewards
 1. Official vs unofficial use of intrinsic rewards by HR
 6. People skills
 7. Transformational Leadership
 1. Characteristics of Leaders (charismatic; inspirational; considerate)

- 3. Utilisation and protection of organisation's knowledge assets**
 1. Best possible utilisation of knowledge assets
 2. Knowledge Organisation - knowledge assets kept updated and accessible
 3. Protecting knowledge assets

- 4. Measuring initiatives geared at improving organisational effectiveness**
 1. Measurement of outcomes of initiatives geared at improving effectiveness

- 5. Perceived future role of Knowledge Management**
 1. Future role for KM in the Pharmaceutical Sector?

Figure 3.6: Initial template for the structured interviews showing 'a priori' themes (Source: Author)

The coders agreed on a template (Figure 3.6) which contain twenty-five ‘a priori’ themes, five of which are higher level themes (shown in bold in Figure 3.6) derived directly from the research questions. Once this was done, four transcripts were then chosen randomly and re-read carefully by each coder separately. Percentage Agreement was adopted as the technique to measure reliability since it is simple to calculate, widely used, can be used when two coders are involved, and the coding task is easy (Feng, 2014; Feng, 2015; Nili, Tate & Barros, 2017; Zhao, Liu & Deng, 2013). Owing to the structured nature of the interviews, the coding exercise was not difficult and did not present any particular problems. In fact, the inter-coder ratings were 80% or higher (refer to Table 3.9 below) with a range between 75% and 90% considered as ideal (Bajpai, Bajpai & Chaturvedi, 2015; Stemler, 2004).

Random Transcript No.	Coder	Total No. of Codes	Codes in Agreement Between Coders	Inter-Coder Agreement - ICA (Calculated as: No. of Agreements /Total No. of Codes x 100)
1	Coder 1	12	11	91.67%
	Coder 2	13	11	84.61%
2	Coder 1	15	12	80%
	Coder 2	14	12	85.71%
3	Coder 1	14	13	92.86%
	Coder 2	15	13	86.67%
4	Coder 1	15	13	86.67%
	Coder 2	16	13	81.25%

Table 3.9: Inter-coder ratings (Source: Author)

In order to iron out divergences between the interpretations of the two coders, a short meeting was set after each coding session where each emerging template was discussed. After five revisions, thirteen themes (shown in italics in Figure 3.7) were developed, agreed upon and added to the initial template resulting in the final template shown in Figure 3.7. The remaining transcripts (16) were then coded on the basis of this final template.

Torrance (2012) states that a good means of validating the interview results is by carrying out “respondent validation” (p. 114). This type of validation involves two stages. The first stage involves handing back the transcripts to the participants. This has already been done and described in the previous subsection. The second stage is carried out after performing the template analysis and involves holding a brief meeting with the participants to ensure that “the emerging account is recognized as a fair and reasonable reflection of the situation as they understand it” (Torrance, 2012, p. 114). To fulfil this requirement, the researcher selected some participants at random and held a brief discussion with them which lasted between 20 – 30 minutes.

1. Uptake level of KM and focused KM strategy

1. Understanding of the term KM
 1. *Explicit knowledge within the organisation*
 2. *Tacit knowledge within people*
 3. *KM processes*
 4. *Linking People, IT, KM processes and organisational effectiveness*
2. Official KM initiatives undertaken by the organisation
3. Initiatives related to KM done but not described as official KM initiatives
4. KM strategy as part of the business strategy

2. Status and perceived importance of KM enablers in the Maltese Pharmaceutical Sector

1. IT support
 1. *Adequate hardware support*
 2. *Tailor made software packages*
 3. *Timely and adequate IT personnel support*
2. Learning
 1. *Mentoring/internal training*
 2. *External training*
3. Trust and Collaboration
 1. *Relationships between employees, management and organisations*
 2. *Trust and collaboration going hand in hand*
4. Formalisation and Centralisation
 1. *Importance of rules and regulations for the pharmaceutical sector*
 2. *Balance between decentralisation and centralisation of authority*
5. Intrinsic Rewards
 1. *Double-edged sword?*
 2. *Official vs unofficial use of intrinsic rewards by HR*
6. People skills
 1. *Matching skills with tasks assigned to employees*
7. Transformational Leadership
 1. *Characteristics of leaders (charismatic; inspirational; considerate)*

3. Utilisation and protection of organisation's knowledge assets

1. *Best possible utilisation of knowledge assets*
2. *Knowledge organisation - knowledge assets kept updated and accessible*
3. *Protecting knowledge assets*

4. Measuring initiatives geared at improving organisational effectiveness

1. *Measurement of outcomes of initiatives geared at improving effectiveness*

5. Perceived future role of KM

1. *Future role for KM in the Pharmaceutical Sector?*

Figure 3.7: Final template for the structured interview data (Source: Author)

3.5.7 Advantages and Disadvantages of Insider Research

Based on research by Loxley and Seery (2008), Greene (2014) defines insider research as “research undertaken by members of the same group, who share characteristics (cultural, biological, occupational, etc.)” (p. 2). The fact that I have over twenty years working experience in the various fields within the Maltese Pharmaceutical Sector and I am currently working with an organisation in the Maltese Pharmaceutical Sector makes me an insider researcher. Being an insider researcher has its advantages, but also its disadvantages which have to be taken into consideration and mitigated.

The main advantages of being an insider researcher are associated with prior knowledge of the sector being investigated and the nature of the interaction with the participants. The fact that an insider researcher has previous knowledge of the sector being studied prevents problems of orientation in the research setting that is suffered by external researchers. This helped me “to project a more truthful, authentic understanding of the culture under study” (Merriam *et al.*, 2001, p. 411). The familiarity that I have with the group being studied provides for a more natural interaction between the participants and myself (Greene, 2014). In fact, there were no difficulties in recruiting the participants since they all gladly consented to take part in this qualitative study and welcomed the opportunity to be interviewed by someone coming from the same work background as themselves as they would find it easier to ‘discuss openly’ during the interview session.

The main disadvantages associated with insider research are subjectivity and bias. With regards to subjectivity, Greene (2014) argues that the familiarity of the insider researcher with the sector being investigated may lead to “a loss of ‘objectivity’ and there is thus the increased risk of the researcher making assumptions based on their prior knowledge and/or experience” (p. 4). Insider bias refer to “the process whereby the researcher’s personal beliefs, experiences, and values influence the study methodology, design, and/or results” (Greene, 2014, p. 4). What this means is the close proximity of the insider researcher to the sector being investigated may lead to bias which effects the quality and provocative nature of the questions being asked to the participants (Merriam *et al.*, 2001).

I took a number of steps during the design and execution of the interviews in order to mitigate the subjectivity and bias associated with insider research. These steps include:

1. The interview questions were piloted with two employees who satisfied the selection criteria for the interviews to ascertain whether the questions elicited the expected responses and whether the interview guide motivated them to participate in the study.
2. Probing questions were introduced during the interview session. This was done in order to provoke the participants to respond in detail in order to eliminate the possibility that they may be holding back due to knowing me personally.

3. All transcripts and related digital audio recordings were passed to a second transcriber for cross-checking thus eliminating subjectivity during the transcription process.
4. The finalised transcripts were sent to all the participants to ascertain that they agreed with what was written and any discrepancies highlighted were reviewed and corrected.
5. During template analysis I enlisted the help of another rater to collaborate in this exercise.
6. Finally, after performing the template analysis, a brief meeting with some of the participants, selected at random, was held to ensure that the findings reflected the participants' true views.

3.6 Conclusion

In this chapter, I have illustrated the research methodology for this study and provided a detailed discussion of the methods used for the quantitative and qualitative studies. This discussion included the techniques for data collection and data analysis adopted for both the quantitative and qualitative studies. In the next chapter I will exhibit the results obtained from the quantitative study and the qualitative study respectively.

CHAPTER FOUR – RESULTS

4.1 Introduction

Following the previous chapter where the research questions and the methodology adopted were clearly outlined, this chapter will present the key results of this study. This chapter will be organised into two main sections – the findings of the quantitative study followed by the findings of the qualitative study.

4.2 Section One – Results for The Quantitative Study

This section starts off by illustrating the demographical results. Model assessment and testing of direct and indirect (mediation) effects through Structural Equation Modeling follows.

4.2.1 Demographics

Figure 4.1 compares the population (N=230) and sample (n=205) distributions across various pharmaceutical activities. Figure 4.2 shows organisation size categories for the participating organisations (N=205). The organisation size parameters are based on EU definitions (European Commission, 2015).

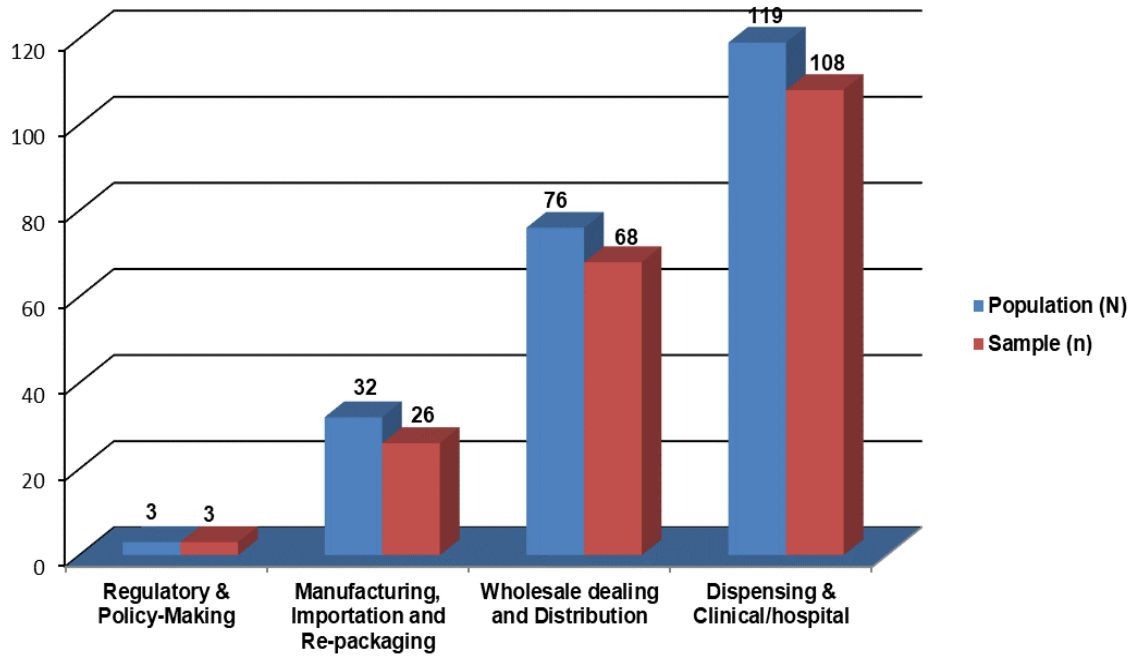


Figure 4.1: A comparison of the population (N=230) and sample (n=205) distributions across various pharmaceutical activities (Source: Author)

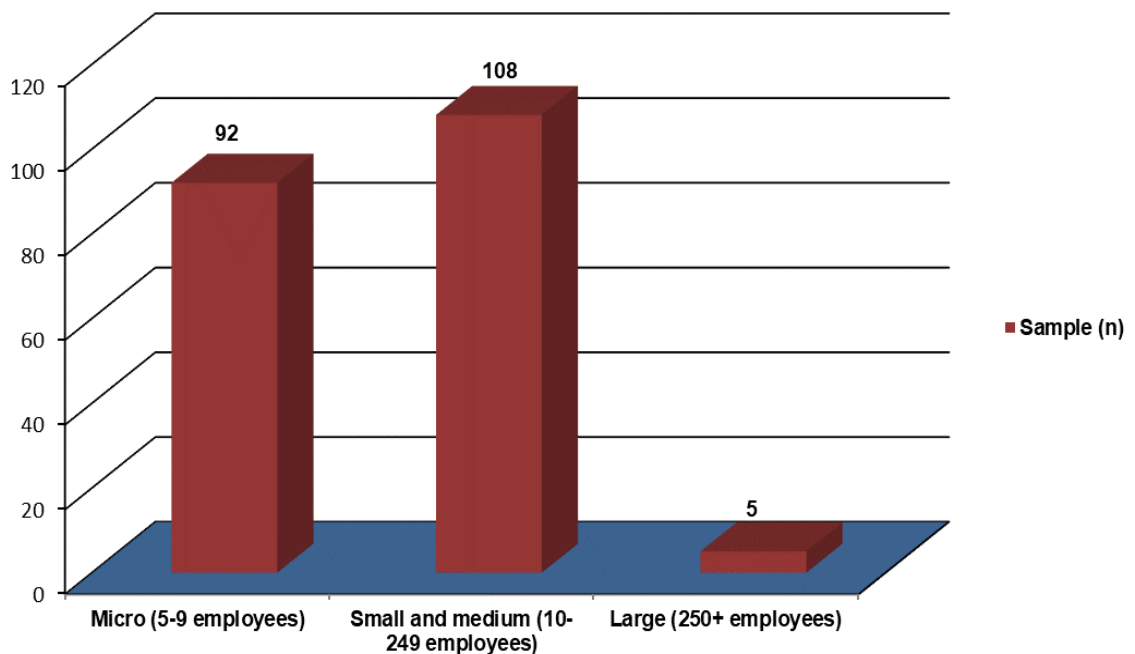


Figure 4.2: Organisation size categories for the participating organisations (n=205) (Source: Author)

Chi-square tests revealed that the population and sample distributions of the organisations did not differ significantly from each other with respect to the type of pharmaceutical activity ($\chi^2(3) = 0.753, p = 0.861$). With regards to the respondent characteristics (pharmacists/pharmacy technicians), the majority were female (52.7%); had over 15 years of experience in the Maltese Pharmaceutical Sector (54.7%); and had been with their current organisation for three or more years (79.1%). The single largest age group was in the 42 – 49 year age bracket (30.2%).

4.2.2 Model Assessment

An SEM model (Model 1) with composite variables was constructed with structural paths from each of the eleven KM enablers namely Collaborative Trust (CT), Learning (L), Centralism (C), Formalisation (F), Intrinsic Rewards (R), KM Strategy (S), IT Support (ITS), Idealised Influence (Behavioural) (IIB), Inspirational Motivation (IM), Intellectual Stimulation (IS) and Individualised Consideration (IC) to the four KM processes namely Knowledge Creation (KC), Knowledge Organisation (KO), Knowledge Application (KA) and Knowledge Protection (KP) and in turn structural paths from the four KM processes to Organisational Effectiveness (OE) - the endogeneous variable.

Table 4.1 below shows the SEM model improvement, respecification and comparison statistics. The goodness of fit statistics for the original hypothesised model (Model 1) were overall not adequate since the chi-squared statistic was significant and the RMSEA was not within acceptable limits ($\chi^2(17)$

= 196.586, $p < 0.001$; GFI = 0.883, CFI = 0.924, RMSEA = 0.228). Only the CFI was acceptable. The Expected Cross Validation Index (ECVI) value for this initially hypothesised model was 2.297. After reviewing Modification Indices (MIs), the error terms of KC and KA were covaried since their covariance had the largest MI (41.062) and the expected parameter change was 0.251. The new model (Model 2a) resulted in an improved fit ($\chi^2(16) = 150.738$, $p < 0.001$; GFI = 0.917, CFI = 0.943, RMSEA = 0.203); the chi-squared difference was statistically significant ($\Delta\chi^2 = 45.848$, $\Delta df = 1$, $p < 0.001$) and the ECVI decreased to 2.082, indicating an improved fit.

Model	Amendment	MI	Par. Change	Goodness of fit Indices						
				χ^2 *	df	p-value	CFI	RMSEA	SRMR	ECVI**
1				196.586 ^a	17	<0.001	0.924	0.228	0.040	2.297
<i>Join error terms</i>										
2a	KC and KA	41.062	0.251	150.738 ^b	16	<0.001	0.943	0.203	0.039	2.082
2b	KP and KO	40.039	0.406	106.099 ^c	15	<0.001	0.961	0.173	0.034	1.873
2c	KA and KO	13.109	0.160	90.921 ^d	14	<0.001	0.967	0.164	0.031	1.808
2d	KC and KO	12.215	0.131	73.580 ^e	13	<0.001	0.974	0.151	0.029	1.733
2e	KP and KA	9.209	-0.034	68.077 ^f	12	<0.001	0.976	0.151	0.028	1.716
2f	KP and KC	5.615	0.087	59.251 ^g	11	<0.001	0.980	0.147	0.028	1.683
<i>Join paths</i>										
2g	IM to OE	12.513	0.113	38.527 ^h	10	<0.001	0.988	0.118	0.018	1.591
2h	IS to OE	6.124	0.067	22.905 ⁱ	9	<0.001	0.994	0.087	0.012	1.524
2i	ITS to OE	6.701	0.066	11.342 ^j	8	0.183	0.999	0.045	0.009	1.477
3	<i>Parsimony</i>			38.619 ^j	29	0.109	0.996	0.040	0.027	1.238

* different letters signify statistically significant differences ($p < 0.001$) based on the chi-squared difference test

** Expected cross validation index (ECVI) can take any value, it assumes a comparison of models and the one with smallest index exhibits greatest potential for replication and best fit to the data (Byrne, 2001)

Table 4.1: SEM model improvement, respecification and comparison (Source: Author)

In Model 2b, the error terms of KP and KO were covaried (MI = 40.039; Par. Change = 0.406), resulting in a significantly improved model ($\chi^2(15) = 106.099$, $p < 0.001$; GFI = 0.945, CFI = 0.961, RMSEA = 0.173) based on a chi-squared significance test ($\Delta\chi^2 = 44.639$, $\Delta df = 1$, $p < 0.001$) while the ECVI reduced to 1.873. In Model 2c, the error terms of KA and KO were covaried (MI = 13.109; Par. Change = 0.160), resulting in a significantly improved model ($\chi^2(14) = 90.921$, $p < 0.001$; GFI = 0.951, CFI = 0.967, RMSEA = 0.164) based on a chi-squared significance test ($\Delta\chi^2 = 15.178$, $\Delta df = 1$, $p < 0.001$) while the ECVI reduced to 1.808. In model 2d, the error terms of KC and KO were covaried (MI = 12.215; Par. Change = 0.131), resulting in a significantly improved model ($\chi^2(13) = 73.580$, $p < 0.001$; GFI = 0.962, CFI = 0.974, RMSEA = 0.151) based on a chi-squared significance test ($\Delta\chi^2 = 17.341$, $\Delta df = 1$, $p < 0.001$) while the ECVI reduced to 1.733. In model 2e, the error terms of KP and KA were covaried (MI = 9.209; Par. Change = -0.034), resulting in a significantly improved model ($\chi^2(12) = 68.077$, $p < 0.001$; GFI = 0.965, CFI = 0.976, RMSEA = 0.151) based on a chi-squared significance test ($\Delta\chi^2 = 5.503$, $\Delta df = 1$, $p < 0.05$) while the ECVI reduced to 1.716. In model 2f, the error terms of KP and KC were covaried (MI = 5.615; Par. Change = 0.087), resulting in a significantly improved model ($\chi^2(11) = 59.251$, $p < 0.001$; GFI = 0.971, CFI = 0.980, RMSEA = 0.147) based on a chi-squared significance test ($\Delta\chi^2 = 8.826$, $\Delta df = 1$, $p < 0.01$) while the ECVI reduced to 1.683. No further covarying of error terms was possible.

Post-hoc analysis was then conducted using modification indices related to structural parameters (i.e. using MIs of regression weights). In model 2g, the causal structure was respecified by joining the path from IM to OE as this had the largest MI of 12.513 and an associated parameter change of 0.113, resulting in an improved fit ($\chi^2(10) = 38.527$, $p < 0.001$; GFI = 0.980, CFI = 0.988, RMSEA = 0.118) based on a chi-squared significance test ($\Delta\chi^2 = 20.724$, $\Delta df = 1$, $p < 0.001$) while the ECVI reduced to 1.591. In model 2h, the path from IS to OE was freely estimated (MI = 6.124; Par. Change = 0.067), resulting in an improved fit ($\chi^2(9) = 22.905$, $p < 0.001$; GFI = 0.988, CFI = 0.994, RMSEA = 0.087) based on a chi-squared significance test ($\Delta\chi^2 = 15.622$, $\Delta df = 1$, $p < 0.001$) while the ECVI reduced to 1.524. Finally, in model 2i, the causal structure was respecified by joining the path from ITS to OE (MI = 6.701; Par. Change = 0.066), resulting in an excellent fit of the data as revealed by all the goodness-of-fit indices ($\chi^2(8) = 11.342$, $p = 0.183$; GFI = 0.994, CFI = 0.999, RMSEA = 0.045), a superior fit based on a chi-squared significance test ($\Delta\chi^2 = 11.563$, $\Delta df = 1$, $p < 0.05$) and lowest ECVI (1.477). No further improvement was possible since there were no MIs associated with structural paths present in the AMOS output (Byrne, 2001). Therefore, Model 2i represented the best fit to the data thus far in the analysis. The parameter estimates for Model 2i revealed 26 initially hypothesised paths that were nonsignificant ($p > 0.10$) and hence irrelevant to the model. A parsimonious model (Model 3) was estimated with these 26 structural paths eliminated and despite a slight erosion in model fit which is expected with deletion of parameters, there was no significant difference based on a chi-squared significance test between Model 2i and Model 3 ($\Delta\chi^2 = 27.277$, $\Delta df = 21$, $p = 0.162$), a crucial aspect of any

parsimonious model (Byrne, 2001). The drop in the ECVI value (1.238) signalled that this final parsimonious model (Model 3) represents the best fit to the data overall.

4.2.3 Direct Effects

The analysis of direct effects answers research questions 1 and 2 namely *to what extent do KM enablers predict KM processes?* and *to what extent do KM processes predict organisational effectiveness?* respectively.

Table 4.2 below exhibits the un/standardised regression weights, the critical ratios, p-values, and Square Multiple Correlations (SMCs) for the parsimonious model.

Squared Multiple Correlations (SMCs) reveal that:

- i) 67.5% of the variance in KC is mainly accounted for by ITS, IIB, F, L, IC, IS and C*;
- ii) 60.1% of the variance in KA was accounted for by ITS, IS, IIB, S, and R*;
- iii) 51.5% of the variance in KO was accounted for by ITS, IS, IIB, and L;
- iv) 44.9% of the variance in KP is mainly accounted for by ITS, IIB, F, and R;
- v) 64.7% of the variance in OE is mainly accounted for by ITS, IS, IM, KC, and KP.

Composite variables marked with an asterisk are significant at $p < 0.10$ while the others are significant at least at $p < 0.05$.

Paths	Unstandardised		Std. estimate	C.R.	p-value	SMC
	Estimate	S.E.				
ITS→KC	0.208	0.075	0.134	2.768	0.006	<u>KC</u> 0.675
F→KC	0.139	0.055	0.102	2.532	0.011	
C→KC	-0.089	0.052	-0.064	-1.699	0.089	
L→KC	0.270	0.085	0.184	3.175	0.001	
IC→KC	0.251	0.083	0.204	3.034	0.002	
IIB→KC	0.428	0.084	0.273	5.116	<0.001	
IS→KC	0.239	0.103	0.151	2.324	0.02	
ITS→KA	0.338	0.084	0.209	4.007	<0.001	<u>KA</u> 0.601
S→KA	0.266	0.077	0.211	3.471	<0.001	
IS→KA	0.443	0.106	0.268	4.176	<0.001	
IIB→KA	0.369	0.095	0.224	3.886	<0.001	
R→KA	0.127	0.074	0.076	1.703	0.089	
ITS→KO	0.595	0.104	0.328	5.695	<0.001	<u>KO</u> 0.515
L→KO	0.257	0.099	0.149	2.601	0.009	
IS→KO	0.399	0.112	0.216	3.577	<0.001	
IIB→KO	0.460	0.114	0.250	4.051	<0.001	
ITS →KP	0.619	0.092	0.385	6.730	<0.001	<u>KP</u> 0.449
F→KP	0.162	0.075	0.115	2.154	0.031	
R→KP	0.223	0.088	0.135	2.545	0.011	
IIB→KP	0.404	0.098	0.247	4.106	<0.001	
KC→OE	0.087	0.025	0.225	3.502	<0.001	<u>OE</u> 0.647
KP→OE	0.051	0.021	0.137	2.456	0.014	
IM→OE	0.095	0.039	0.139	2.422	0.015	
IS→OE	0.176	0.038	0.287	4.573	<0.001	
ITS→OE	0.111	0.032	0.185	3.510	<0.001	

Table 4.2: Parameter estimates (AMOS) from parsimonious model (Model 3) (Source: Author)

Therefore, Table 4.2 reveals that: Learning (L) has a positive direct effect on Knowledge Creation (KC) and Knowledge Organisation (KO); Centralisation (C) has a negative direct effect on Knowledge Creation (KC); Formalisation (F) has a positive direct effect on Knowledge Creation (KC) and Knowledge Protection (KP); Intrinsic Rewards (R) have a positive direct effect on Knowledge Application (KA) and Knowledge Protection (KP); KM Strategy (S) has a

positive direct effect on Knowledge Application (KA); IT Support (ITS) has a positive direct effect on Knowledge Creation (KC), Knowledge Organisation (KO), Knowledge Application (KA) and Knowledge Protection (KP); Idealised Influence (Behavioural) (IIB) has a positive direct effect on Knowledge Creation (KC), Knowledge Organisation (KO), Knowledge Application (KA) and Knowledge Protection (KP); Intellectual Stimulation (IS) has a positive direct effect on Knowledge Creation (KC), Knowledge Organisation (KO) and Knowledge Application (KA); Individualised Consideration (IC) has a positive direct effect on Knowledge Creation (KC); Knowledge Creation (KC) has a positive direct effect on Organisational Effectiveness (OE); Knowledge Protection (KP) has a positive direct effect on Organisational Effectiveness (OE). This provides empirical evidence that twenty from the forty-eight initially hypothesised direct effects were supported (H2a, H2b, H3a, H5c, H5d, H6c, H7a, H7b, H7c, H7d, H8a, H8b, H8c, H8d, H10a, H10b, H10c, H11a, H12, H15). The remaining twenty-eight hypotheses were not supported including two hypotheses belonging to Formalisation (H4a & H4d) which produced positive rather than negative direct effects. Figure 4.3 below illustrates these findings.

Post-hoc analysis resulted in the following relationships that were not initially hypothesised; IT Support (ITS) has a positive direct effect on Organisational Effectiveness (OE); Intellectual Stimulation (IS) has a positive direct effect on Organisational Effectiveness (OE); and Inspirational Motivation (IM) has a positive direct effect on Organisational Effectiveness (OE).

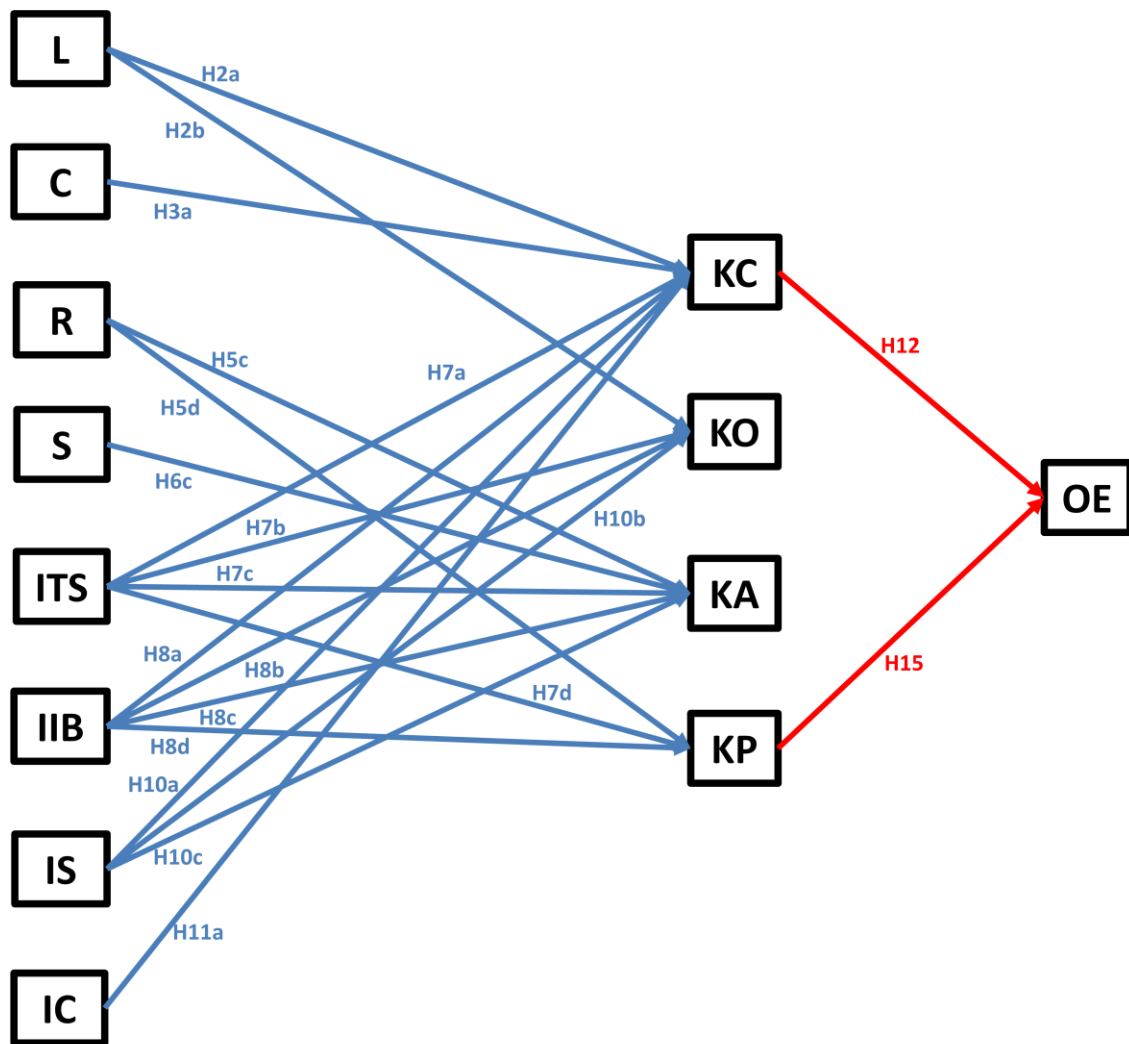


Figure 4.3: The supported hypothesised direct effects (Source: Author)

(L – Learning; C – Centralisation; R – Intrinsic Rewards; S – KM Strategy; ITS – IT Support; IIB – Idealised Influence (Behavioural); IS – Intellectual Stimulation; IC – Individualised Consideration; KC – Knowledge Creation; KO – Knowledge Organisation; KA – Knowledge Application; KP – Knowledge Protection; OE – Organisational Effectiveness)

4.2.4 Mediation (Indirect Effects)

Analysis of mediation (indirect) effects answers research question 3 namely *is the relationship between KM enablers and organisational effectiveness mediated by KM processes?*

Prior to mediation analysis, global tests must be met. First is the global test of good model fit so that one can have confidence in p-values. In my case, I have already provided evidence that the final SEM model (model 3) had a very good fit based on goodness of fit indices (χ^2 , GFI, CFI, RMSEA) as shown by Table 4.1 above. Second is the global test of variance explained; in my case, R^2 for the mediators and the dependent variable ranged from 44.9% to 67.5% (see Table 4.2 above) and since they exceeded 10%, the relationships I am testing do explain sufficient variance in the mediators and the dependent variable.

From Table 4.2 above, it was evident that only Knowledge Creation (KC) and Knowledge Protection (KP) could mediate the relationships between the KM enablers and Organisational Effectiveness (OE). Table 4.3 below provides a summary of indirect effects analysis for 11 paths, using the 'user defined A x B estimand mediation' in AMOS (Gaskin, 2016), with bias-corrected bootstrap (2000 samples) and 90% Confidence Intervals (CIs). According to Hayes (2013):

bootstrap confidence intervals are the better approach to inference when the original data are available for analysis. No assumptions about the shape of the sampling distribution of $a_i b_i$ are made, and bootstrap confidence intervals tend to be more powerful than competing methods (p. 139).

Hypothesis	Estimate ^a	Bias corrected 90% CI		p-value
		Lower	Upper	
L→KC→OE	0.024	0.007	0.046	0.005
C→KC→OE	-0.008	-0.020	-0.001	0.062
F→KC→OE	0.012	0.002	0.028	0.041
ITS→KC→OE	0.018	0.007	0.037	0.008
IIB→KC→OE	0.037	0.023	0.060	<0.001
IS→KC→OE	0.021	0.006	0.046	0.026
IC→KC→OE	0.022	0.009	0.046	0.002
F→KP→OE	0.008	0.001	0.022	0.046
R→KP→OE	0.011	0.002	0.026	0.037
ITS→KP→OE	0.032	0.008	0.059	0.023
IIB→KP→OE	0.021	0.007	0.040	0.014

^a Standardised regression weight indirect effect

Table 4.3: Summary of indirect effects analysis (Source : Author)

Table 4.3 above reveals that: Learning (L) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); Centralisation (C) affects Organisational Effectiveness (OE) negatively and indirectly through Knowledge Creation (KC); Formalisation (F) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); IT Support (ITS) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); Idealised Influence (Behavioural) (IIB) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); Intellectual Stimulation (IS) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); Individualised Consideration (IC) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Creation (KC); Formalisation (F) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Protection (KP); Intrinsic Rewards (R) affect Organisational Effectiveness (OE) positively and indirectly through Knowledge Protection (KP);

IT Support (ITS) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Protection (KP); Idealised Influence (Behavioural) (IIB) affects Organisational Effectiveness (OE) positively and indirectly through Knowledge Protection (KP). This provides empirical evidence that nine from the forty-four initially hypothesised indirect effects were fully supported (H17a, H18a, H20d, H22a, H22d, H23a, H23d, H25a, H26a). The remaining thirty-five hypotheses were not supported including two hypotheses belonging to Formalisation (H19a & H19d) which produced positive rather than negative indirect effects. Figures 4.4 and 4.5 below illustrate these findings.

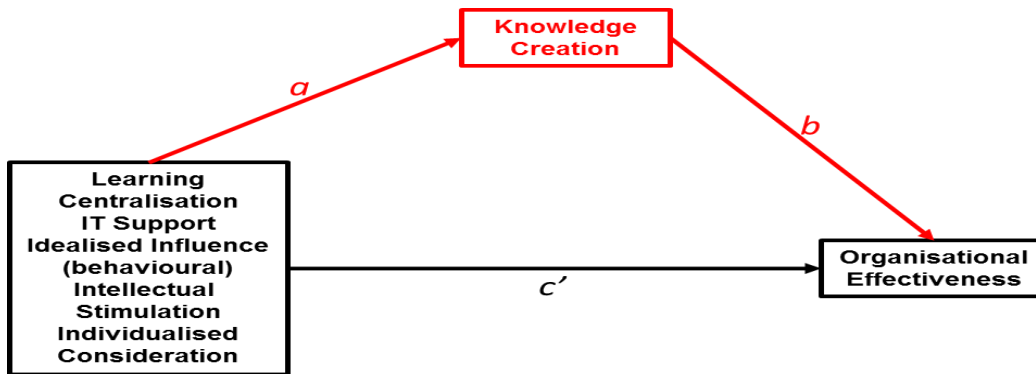


Figure 4.4: Resulting mediation model between KM enablers and organisational effectiveness with knowledge creation as mediator (Source: Author)

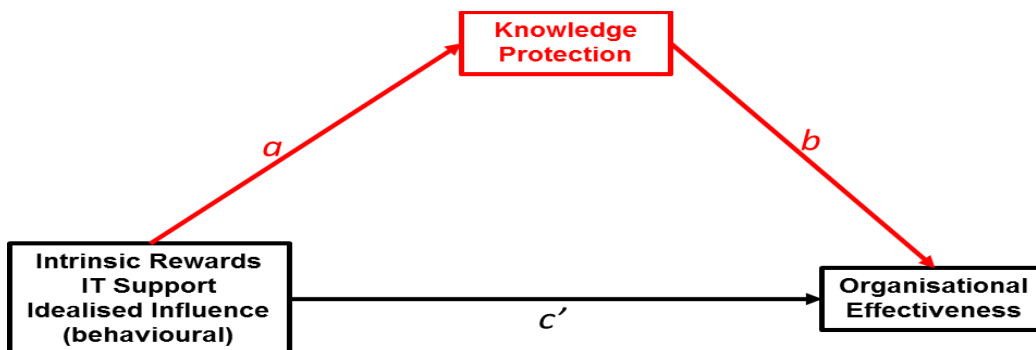


Figure 4.5: Resulting mediation model between KM enablers and organisational effectiveness with knowledge protection as mediator (Source: Author)

4.3 Section Two - Results for The Qualitative Study

This section presents a detailed account of the interview results for the qualitative study. The results will be presented in sub-sections following the order of the research questions and organised in themes based on the final template purposely prepared for this study during the template analysis exercise (Figure 3.7 in the Methodology chapter). Symon and Cassell (2012) recommend that “direct quotes from the participants is essential” (p. 446) when presenting interview results. This strategy is employed throughout this section making use of both short and extensive quotes taken from the participant interviews to highlight the themes developed and to give “readers a flavour of the original text” (Symon & Cassell, 2012, p. 447). The excerpts chosen were those felt to be the most adequate at clearly describing the findings in relation to the research questions posed. When quoting text from participant transcripts, the alias (participant number) is shown in brackets at the end of the quotation. The themes developed from the coding exercise are shown in italics for ease of reference. The ‘a priori’ themes are shown in normal text and underlined.

4.3.1 Uptake Level of KM and Focused KM Strategy

RQ1: What is the uptake level of KM initiatives in the Maltese Pharmaceutical Sector? Is there a focused KM strategy as part of the organisational business strategy?

This research question was primarily intended to establish the uptake level of KM in the Maltese Pharmaceutical Sector and hence obtain a better understanding of the adoption level of KM initiatives. It was also intended to establish whether there is a focused KM strategy as part of the organisational business strategy. Initially, participants were asked about their understanding of the term KM.

Understanding of the term KM

Although all the participants managed to come up with what in their opinion KM was, some of the participants bluntly confessed that they had never heard of the term KM:

Personally, I have never heard of the term Knowledge Management! If I had to answer however, I would tend to describe it as the knowledge held within the organisation and what to do with that knowledge basically. (No. 10)

Going through the participants' responses, the following themes were highlighted during the interview sessions: Explicit knowledge within the organisation; Tacit knowledge within people; KM processes; Linking people, IT, KM processes and organisational effectiveness. These are described below.

Explicit knowledge within the organisation

Some participants claimed that KM was about making the best use of the explicit (codified) knowledge within the organisation by using IT to organise knowledge in knowledge repositories such as databases:

The knowledge of the particular department, mostly databases, technical records - knowledge which should be updated from time to time. (No. 1)

Knowledge, being what it is, needs to be managed in a structural way. To make the best use of knowledge assets, an organisation has to manage, organise and classify knowledge. (No. 7)

Tacit knowledge within people

The absolute majority of the participants (15) were consistent in their claim that KM is all about managing the tacit knowledge within employees so as not to lose this valuable asset if the employee decides to leave the organisation:

Organisations gather information and know how on how to move forward and evolve. Knowledge stored in people is collected so as there is continuity or otherwise, if you lose one employee, the organisation suffers a blow. Experience gained is lost. (No. 4)

Everyone has a lot of knowledge residing in him. In a knowledge intensive and ever changing environment such as the pharma sector, it is important to find means to manage this knowledge. How to tackle communication of knowledge. What is the knowledge available and how can it be transmitted? (No. 15)

KM processes

Participants emphasised the importance of KM processes when they described KM as either knowledge sharing, knowledge capture/acquisition and knowledge dissemination:

Knowledge management is composed of two words, knowledge and management. So my understanding is how you make the best use of knowledge to obtain results and improve the organisation work flow. In this way knowledge obtained from teams, different departments and other organisations is shared so as to improve the workflow. If knowledge is not shared, the organisation will not succeed. (No. 5)

Knowledge management involves the collection of knowledge that regards the organisation. It involves capturing of knowledge, storage of knowledge and communication of that knowledge to other stakeholders. (No. 14)

The more experience you gain, the more knowledge you have to share. It may be sharing with new recruits, or personnel from other departments. There is a lot of knowledge that people accumulate during the years that can be shared within the organisation. (No. 17)

Linking People, IT, KM processes and organisational effectiveness

Whilst the participants managed to mention different facades of KM in their interpretation of the meaning of KM, only one participant (No. 2) managed to make the link between people, technology, KM processes and organisational effectiveness:

Knowledge is power and it is one of the pillars of modern organisations. The more knowledge you have, the better the leverage you have to move forward as an organisation. So, KM for me are all the methods that one uses to make the most efficient use of knowledge in order to help the organisation to move forward. This involves knowledge at both organisational and people level, processes etc. (No. 2)

Official KM initiatives undertaken by the organisation

Interviewees were explicitly asked about any KM initiatives currently being undertaken by their organisation. As expected, most of the participants (16) were hesitant at first but then they either replied that no 'official' KM initiatives were undertaken by their organisation or if any 'initiatives' were taken, these were certainly not proposed as KM initiatives by their organisation:

No. There are initiatives which in my opinion are linked to KM but not described as KM. (No. 2)

No. I don't think that they are termed as KM initiatives. We have training that is done through IT. I feel that in a small country like Malta it is difficult to carry out KM initiatives. Foreign companies are better equipped for this. Locally we are lacking! You need to have a certified KM system. One must also consider the expenses involved in embarking on KM initiatives. (No. 9)

No. From my perspective, I feel that we have initiatives ingrained in our organisational processes but these are not termed as KM initiatives. (No. 14)

Initiatives related to KM done but not described as official KM initiatives

At this point of the interview, the interviewer decided to introduce to the participants a simple definition of KM. Whilst giving time to the interviewees to go through the definition, the interviewer described to the participants how KM involves people, processes and technology that favour knowledge creation, knowledge organisation, knowledge application and knowledge protection within an organisation and how improving such processes in turn helps an organisation to achieve distinctive competencies which can increase that organisation's effectiveness. Armed with the knowledge of this definition, the participants were then able to identify initiatives taken by their organisation that although related to KM, were not described as such by the organisation. Such initiatives included IT initiatives related to knowledge repositories, initiatives related to KM processes and initiatives aimed at tapping the tacit knowledge of the employees:

After reading definition, knowledge application and knowledge organisation come to mind. We have recently started doing interface meetings between technical directors where we do brainstorming sessions to share our knowledge. (No. 4)

My department is concerned with the management of the NHS Medicines Formulary. This contains a collection of knowledge of all medicines procured by the government. Thus, this knowledge is managed in a formulary form. It is organised in categories e.g. patient conditions, prescriber criteria etc. It is also indexed. We are using new IT systems to help us index and categorise our knowledge. (No. 7)

I feel that knowledge creation and knowledge protection are important. I feel that training is the key for knowledge creation. What we are currently doing falls 'loosely' under a KM strategy. (No. 9)

Yes, because what we do involves people, processes and technology. Also, the KM processes are involved and the goal is to achieve effectiveness. So, I feel that after reading this definition, initiatives taken fall under KM but they are not termed KM. (No. 16)

Yes – between people when dealing with external stakeholders and internally we keep in copy so as we make sure that such knowledge is not lost. We also use IT to build knowledge databases. Sometimes you do not realise that you are creating knowledge. For e.g. when we acquire knowledge from suppliers, we assimilate it and share it, therefore we are creating new knowledge. (No. 18)

KM strategy as part of the business strategy

To continue the argument above and wrap up RQ1, participants were asked whether a focused KM strategy was part of the business strategy of their organisation. To this question, the participants replied with a blunt ‘No’:

No. There are no specific KM policies ingrained in our business strategy. (No. 2)

No. It does not incorporate a sound KM strategy. It is a pity because there are knowledgeable people and their knowledge is lost. (No. 5)

No. We do not have this – something which I would like to be involved in. Unfortunately, in the public sector, we tend more to be reactive than proactive e.g. falsified medicines directive which will put stress on IT and HR. It would definitely help to align KM/ knowledge strategies with business strategies. (No. 13)

No. As a business strategy, I don't feel KM is given priority. We focus more on the kind of products and technologies we are going into. KM comes along as a side-line. (No. 20)

4.3.2 Status and Perceived Importance of KM Enablers in the Maltese Pharmaceutical Sector

RQ2: What is the status of KM enablers in the Maltese Pharmaceutical Sector? Are they perceived important in promoting KM initiatives?

In order for the qualitative study to relate with the quantitative study as dictated by a concurrent mixed methods research strategy (QUAN + QUAL), the KM enablers chosen below are the same as the ones analysed in the quantitative study. The participants were asked to articulate on the status of KM enablers in their organisations and also their perceptions of the roles that such KM enablers play in promoting KM initiatives.

IT support

On discussing with participants IT support in their organisation, three themes cropped up. These were: *adequate hardware support, tailor made software packages and timely and adequate IT personnel support*. Whilst all the participants were happy with the hardware support provided, they had some reservations with regards to IT personnel support. They were not happy with the software support mostly the provision of tailor made software packages specifically customised for their day to day work requirements and intelligent support systems (IT systems that help in the decision making process by gathering and analysing data and suggesting proposed actions). The participants' comments on these three themes are grouped collectively below:

I think it can be improved. Basic databases are done and maintained by the employees themselves. There are no formal packages just spreadsheets. These databases are not integrated. With regards to personnel support, this is very lacking since we don't have a formal IT department. I would like to see people or small department allocated to our IT needs. (No. 1)

Reaction time of IT support staff is ok. IT level of the organisation has greatly improved in the last years. I feel that IT is still a bit lacking from software side with regards to tailor made packages. There is lack of tailor made software to cater for our needs. There is the requirement of competent people who filter IT initiatives which are important for the organisation. However, overall, IT has improved and is satisfactory. (No. 5)

This can improve because we do not have a dedicated IT department. We are lacking in network connectivity. With regards to software, we are 'crying' for a new IT system that is more custom made. Sometimes I feel we are at 'the stone age' on this. We do not have a homogenous IT system across all departments which would give us the required visibility. (No. 10)

With regards to hardware and personnel support, I feel that it is adequate. However, I feel that we still require IT support in terms of software packages that are tailor made for our needs. We need to work more on this. (No. 12)

IT support vis a vis software is still in its infancy stage. We have no intelligent support systems to help us. Otherwise, vis a vis hardware and personnel support I feel it is ok. (No. 14)

We lack software which can help us share knowledge. (No. 15)

I feel that we can do more here. When we need support, they do support us on a day to day basis but with regards to software, it takes long to provide us with systems that are tailor made for our needs. (No. 20)

Learning

An important enabler discussed was learning. Aspects of mentoring/internal training and external training were discussed with the interviewees. The majority (13) agreed that some form of mentoring was done but expressed some concerns on this, namely that sometimes work pressure places mentoring of new recruits on the back burner. Also, some participants wanted to see a more structured training program in place since most of the mentoring is done 'out of goodwill' without any formal strategy. Some participants also advocated

'job rotation' to expose employees to different work scenarios. With regards to external training, although most of the participants (13) acknowledged that this was offered, they complained that most of the training offered was not tailor made for their needs and that training abroad was rarely offered:

Training effort is done but the trainer is not properly trained. Top management must be more familiar about procedures and more formal training should be done. There is sometimes resistance for mentoring due to work pressure. People try to mentor new employees. However, there is place for improvement in training. (No. 2)

With regards to internal training, we have a minimum six-month induction training where new recruit is shadowed/mentored by an experienced colleague e.g. in my department, after six months, the individual does a report which is discussed with line manager to identify gaps. If all is ok, the employee goes live and then report is made by line manager on how it went and this is discussed. If employee needs more training, an extra period of three months training is done. (No. 4)

With regards to internal training, this is dependent on the will of the employee to show/mentor new recruits. We do not have a structured internal training program. Regarding external training, although this is provided, I would appreciate a more tailor made and targeted external training programme which caters for our needs. (No. 10)

Internal training is done but we still lack the required personnel to do it properly. Also, work pressure does not let us do appropriate training. In a nutshell, we have sections where we have appropriate training whilst there is work to do in other sections. I feel that top management sometimes assumes that new recruits have the necessary skills for a particular section and obviously, this is not the case. With regards to external training, we are lacking. I have never seen any employee being sent abroad for training!! As I was saying previously there is some external training but we need to tap more. Also, in Malta, there is a bit of a problem because external training in pharmaceutical supplies and store operations is limited – we have to send them to our suppliers which can cause conflict of interest. There is no independent organisation that provides such training. (No. 12)

External training is important and we tap that. E.g. CDRT training courses. However, I would like to see more of these external courses offered which are more tailor made for the Pharmaceutical sector. Mentoring is very important. Since we are a very information dense and knowledge intensive environment, we have different types of workers. These people have roles that overlap and hence we expose them to the work environment, making clear to them these roles and when to seek higher authority or professional advice. I think we need to formalise more this type of training. We need to structure more our training regime. It must not be left to the manager of a section to do it on a voluntary basis. (No. 13)

Yes, both mentoring and external training are available. I feel that we should introduce rotation in the first few years of employment since this exposes employees to the different jobs available widening their skill base and improving their tacit knowledge. Exposing employees directly to different work scenarios will help them appreciate the complexities of working in the Pharmaceutical sector and prepare them better for work. To be more effective, you have to have a global view of the work scenario. (No. 15)

Trust and Collaboration

When asked about trust and collaboration, all the participants agreed that lack of trust/collaboration is a big barrier to any KM initiatives. An interesting discussion developed centered around the main themes of trust involving relationships between employees, management and the organisation and that trust and collaboration go hand in hand.

Relationships between employees, management and organisations

The participants argued that there are different levels of trust that include trust between employees, trust between employees and management, and trust between different organisations. Most of the participants (16) agreed that the most difficult to get is trust between different departments and at inter-organisational level. Participants were also keen to point out that it is important that management instils a culture of trust in the organisation so as employees feel trusted by that organisation. Lack of trust could lead to knowledge hoarding and to difficult work collaborations:

Without trust between different departments there will not be collaboration so person does everything himself creating bottlenecks. It will reduce the organisational efficiency. Organisations must have procedures that instil trust in employees so as employee feels trusted and feels part of the organisation. Organisation must instil trust in employee. Organisation must trust employee and vice versa. Unfortunately, we are in a stage where employee does not

trust organisation. When someone shows initiative, he is shunned by organisation and this reduces trust. So, employee is not happy and does not collaborate. (No. 5)

I found a lot of lack of trust – no sharing of knowledge was done. Everyone was hoarding his knowledge. This had to change and we gradually started introducing this culture change. After initial resistance, we are now progressing and trust and collaboration have increased. I believe a lot in the importance of trust and collaboration. (No. 7)

Internally, we do not have trust problems. However, I feel an element of mistrust from company to company which is to a certain extent understandable due to local scenario. We experienced this in part of our operations where trust and collaboration were a stumbling block. Once we gained external trust, our operations became more effective. (No. 9)

I feel that from top management, sometimes knowledge is retained from going down and reaching us due to lack of trust. Sometimes certain discussions are left at management level when these should involve all staff and this is done because of lack of trust from top management in the employees. (No. 11)

Trust is the 'oil of the engine'. There must be mutual trust between top management, employees and vice versa. Also between employees themselves. Cultivation of trust is important or else the organisational structure will collapse dismally. (No. 13)

If you do not have trust, or for some reason you lose trust in your employees then you have a problem! Our work involves a lot of interdepartmental and inter-organisational relationships. Trust is important on small things and hence more so as you go up in the level of decisions. I feel that the Maltese culture/mentality affects these issues too. (No. 18)

With regards to collaboration, you may be obliged to do it. Trust is different. It may be more problematic because there may also be political issues for lack of trust. I see this lack of trust more when it comes to relationships between employees and top management. Between us employees on a one to one basis we have trust. (No. 20)

Trust and collaboration go hand in hand

Continuing the discourse started above, the interviewees believed that trust and collaboration go hand in hand or as described by one of the interviewees “are intimately linked” (No. 15). Whilst the participants pointed out that you could collaborate without trust, “such collaboration will be much more difficult” (No. 12):

Collaboration without trust can occur but with trust the flow of processes and the general work practices improve. With trust and collaboration working in harmony, the organisation will be more efficient. I worked and collaborated with knowledgeable people that I did not trust. (No. 5)

Trust is based on relationships and therefore it depends on the individual. Trust and collaboration go hand in hand. If there is no trust, collaboration is severely limited. I feel that trust is important but unfortunately it boils down to the individual and here in Malta, being a small island, we tend to have a lack of trust in each other. Also, politics in Malta play an important role in fostering a culture of lack of trust. (No. 11)

Even though you can collaborate with a person you do not trust, such collaboration will be much more difficult. Internal trust is a must. (No. 12)

Trust and collaboration are distinct but at the same time they are intimately linked. The more trust you have, the better the collaboration. (No. 15)

Trust is at the core of every collaborative effort! When you work on a project where everyone trusts each other, it will be a big success. Once there is no trust, project will not be a success because there will be no collaboration and projects require collaboration and teamwork. (No. 17)

Obviously if I trust you I collaborate more but not necessarily you need trust to collaborate. (No. 20)

Formalisation and Centralisation

On discussing formalisation and centralisation, both aspects of organisational structure, the discussion focused on two themes namely the importance of rules and regulations for the pharmaceutical sector and the importance of balance between decentralisation and centralisation of authority in the organisation.

Importance of rules and regulations for the pharmaceutical sector

All the participants agreed that formalisation – having set rules, regulations and procedures and striving to follow them is vital to success in the pharmaceutical sector. This is so because the pharmaceutical sector is a highly regularised

sector with numerous rules and regulations tied to upholding quality when dealing with pharmaceuticals:

Formalisation is important in the pharmaceutical sector to provide a better service. It is also good because it helps to follow policies. There must be policies and guidelines to help the organisation. (No. 7)

Due to the highly regulated field we operate in, we have to be formalised! Once people get used to rules and regulations, formalisation helps effectiveness. (No. 9)

Due to the nature of the pharmaceutical sector i.e. a highly regulated sector with complex procedures, a formalised organisation would not just help, but is essential. (No. 10)

The pharmaceutical sector is very much heavily regulated. Also, organisational processes such as procurement and quality control are heavily regulated. We are 'drowning' in regulations! So, formalisation would help accountability and increase in effectiveness. (No. 14)

Formalisation must be there and this is dictated by the regulatory requirements of the pharmaceutical sector. We can only have leeway on small issues for e.g. logistics. Anything that involves quality must be formalised. (No. 18)

Balance between Decentralisation and Centralisation of authority

Contrary to their opinion on formalisation, all the participants did not agree with having a centralised organisation but believed that a balance between centralisation and decentralisation is a must for a healthy organisation. Participants claimed that policy, strategy and vision of the organisation must be handled by centralised authority whereas day to day operations, professional decisions and micromanagement in general should be decentralised so as not to stifle creativity and efficiency:

I feel this is an old-fashioned type of structure. Top management provides direction but then decentralises decisions on employees. I feel centralisation stifles efficiency. (No. 2)

I think that there must be stratification in decision making. Not all decisions must be taken at the top level but on the other hand one cannot decentralise all decision-making process to lower level. There must be balance. (No. 4)

Centralisation to a certain extent is important because if people start making decisions hap hazard at all levels you lose control! But I think even if centralisation is there, micro management should be decentralised because it will slow the business momentum and you lose effectiveness. (No. 6)

Yes – decentralisation of lower level decisions is important. However, vision of organisation must be promoted by top management. Someone must steer the boat! It is important to have a centralised unit together with lower decisions taken in a decentralised way. (No. 8)

We are quite decentralised here. Top management has the vision and the decision making is cascaded down to lower level managers. I feel this helps effectiveness and creation. In large companies, centralisation is important to move forward and to propose the vision. Also, the regulatory nature of the pharmaceutical sector imposes a level of centralisation. (No. 9)

Centralisation is important since if you have a multi-million budget there needs to be central authority! Then you can decentralise niches within the organisation to get a mix of centralised/decentralised. The bigger the organisation, the more important is centralisation. You can have decentralisation of niche activities. (No. 12)

With regards to centralisation, I feel that decentralisation of certain organisational decisions would help us. I feel that a good decentralised system would help professionals to make better decisions in the interest of our patients. I feel that centralisation can demotivate health care professionals who are capable of taking certain decisions without the need of central authority. (No. 14)

We have a mix of centralisation/decentralisation and I feel that it is ideal since the top management proposes the business strategy whilst certain lower level decisions and professional decisions can be taken by lower management. I feel that this works well in our situation. (No. 18)

Intrinsic Rewards

On the aspect of intrinsic rewards, the participants agreed that such rewards would promote KM by incentivising employees to share their knowledge. On the issue of official vs unofficial introduction of intrinsic rewards by HR of their organisation, the majority of the participants (18) responded that these were not officially in place and due to the subjective nature of intrinsic rewards, they had

reservations on their introduction as an official policy, stating that this could act as a *double-edged sword* where praising someone officially might cause division amongst employees due to envy. One of the participants (No. 15) recounted this from personal experience:

It can be a double-edged sword. If people feel that the person deserves it they will work wholeheartedly with him/her. If not, differences and trust issues start cropping up. (No. 6)

Yes, I feel this will work as an incentive for e.g. placing someone as a project leader. However, you must use caution with this because it may cause divisions among staff. (No. 7)

It depends on the individual. It can work on a person but does not affect another person. As an initiative per se, it is not wrong but I feel that it depends on the individual because people might prefer extrinsic rewards. (No. 8)

I feel it is human nature to like being praised and recognised. Therefore, it would help in our situation to be acknowledged and praised. Appraisal is essential for sharing of knowledge. (No. 10)

Yes, I feel that this is a very important aspect. The fact that you are appreciated helps employees to work better. I feel that all managers should embrace this. A job well done must be praised. Even considering a person as the expert of the team is important and he/she should be given the merit of working on that particular project. This is in our hands. (No. 11)

Yes, undoubtedly. We have a lot of professionals that crave recognition. We are not recognising our experts and I feel that rewarding by means of recognition is important. I feel that if this issue is not tackled, people may get alienated and this will affect performance. Why should people only speak to you to tell you what should have been done better and never praising an employee when he shares his knowledge or performs well on a project? (No. 13)

I feel very strongly about intrinsic rewards and I find that we are very lacking. I feel that officially however, such initiatives may be a double-edged sword! From a personal experience, I can tell you that the envy I was exposed to after being praised publicly was terrible. So, I feel that intrinsic rewards must be done on a spontaneous, genuine basis and not on an official basis. (No. 15)

People skills

The participants were explicitly asked whether they considered that their organisation adopts a policy of *matching employee skills with the tasks*

assigned to the employees. Surprisingly, the majority of the participants (14) thought that their organisation was not making its utmost to match the skills of the employees with the tasks assigned to them. The participants cited lack of skill profiling by their Human Resources department, recruiting people 'just to fill the vacancy' without proper screening at interview stage and a lack of a properly defined skill requirement structure as reasons for this:

This is a problem. Skills and tasks do not equate with each other e.g. pharmacist doing basic procurement, wasting his skills e.g. someone ideal for a clinical setup is placed in an administrative setup. (No. 2)

Traditionally our HR department is not specialised enough to deal with this – it is just doing purely administrative work e.g. attendances, leave etc. It is complex to perform skill/task matching because you require continuous evaluation of personnel. We are not geared for this - we only have staff mobility across departments. (No. 3)

We have this problem which we are currently addressing. We had staff doing jobs which did not require that amount of experience and this staff could be used for other initiatives in the organisation. We are in fact working on this. (No. 4)

In our organisation, the majority of the time people with skills are placed in roles that don't match their skills. We just fill the vacancy! We don't try to match skills with roles. This is lacking. It is a pity because a lot of knowledge is lost. (No. 5)

Since we do not have a clear structure we do not know exactly what skills are needed for a particular job. So there can be a mismatch between the skills of an individual and the job he is doing. There must be a more defined skill requirement structure. (No. 8)

Certificates sometimes do not represent how much you are capable at a professional level. You must gauge the lacunas of an employee so as you can help him garner those skills. I therefore think that employees are sometimes not adequately skilled to perform tasks required of them. I also feel that matching of skills depends on the size of the organisation and knowledge pool of employees available. (No. 13)

There needs to be a skill profiling exercise. If every department together with HR carry out a skill profiling exercise, one can identify skills of an individual and then will be in a better position to match skills with jobs. Also, one can target training to improve skills required of the job assigned. (No. 14)

A lot of people are doing what they are doing because they were placed there and not because they were skilled to do so! (No. 15)

Transformational Leadership

On asking about the characteristics of their leaders, most of the participants confirmed that their top management was charismatic, inspirational and considerate. Only a few participants (5) considered their top management as not considerate. However, having said this, it is interesting to note that these participants acknowledged the fact that the pressures of work could be responsible for this lack of consideration and that it was important to help top management as much as possible:

Yes. I feel that top leadership is charismatic by providing a vision and inspires us to perform. With regards to being considerate top leadership tries to see to our individual needs. So, yes, our leadership ticks the 3 boxes. (No. 1)

My personal experience is that top management is charismatic, inspirational and considerate. I feel that there is vision and consideration by making compromises so as people can be comfortable at their place of work. (No.3)

Top management ticks the three characteristics. Top management needs our support because it has a lot on its plate. I feel that the pressures faced by top management sometimes make them less considerate towards the needs of the employees. (No. 12)

I feel that top management is considerate. Also, there is a vision and tries to pass it on and impetus to work alone. So, I feel that top management is also charismatic and inspirational. I feel that top management has a lot of pressure which can maybe distract the focus from these three characteristics. (No. 14)

I feel top management ticks all the boxes. Obviously, no one is perfect but our top management does the outmost to be charismatic, inspirational and considerate taking into consideration the daily pressure they are subject to. (No. 15)

4.3.3 Utilisation and Protection of the Organisation's Knowledge Assets

RQ3: Is the Maltese Pharmaceutical Sector making the most of its knowledge assets? Are these knowledge assets being adequately protected?

The aim of this research question is to shed more light on the organisation and utilisation of knowledge by organisations in the pharmaceutical sector and to gauge whether such organisations acknowledge that knowledge is a valuable asset that requires the adequate level of protection.

Best possible use of knowledge assets

The participants were not convinced that their organisations were making the best possible use of their knowledge assets. They wanted to see an improvement on this, mostly by tapping more the knowledge within people and improving knowledge sharing/dissemination which are very important for knowledge creation:

No I don't think so. Knowledge organisation is lacking and this limits the leveraging power of the organisation vis a vis knowledge. The organisation is not managing its knowledge in the best possible way. Also, I feel that as an organisation, we place more emphasis on explicit knowledge rather than on tacit knowledge. (No. 2)

No. Definitely not! We can improve vis a vis knowledge on our customers and inter-unit knowledge which is not shared. (No. 6)

No. We need to improve mostly our inter-organisational and inter-departmental links. We are trying to upgrade systems to EU standards and sharing knowledge with other EU countries. (No. 7)

No, far from it! The knowledge residing within the individual is not tapped. Creating transferable knowledge that then can be passed on to other employees is not done. (No. 9)

You always must keep in mind that you can improve things. You cannot sit on your laurels! I would like to see more projects that disseminate knowledge. But these require HR. In a clinical setup, we have worked to improve multidisciplinary teams to help disseminate knowledge. (No. 13)

From 1 – 10, I would give it a 6. There is room for improvement; we feel the gap and lack of knowledge or organised knowledge that would help us in our daily operations. (No. 20)

Knowledge resources kept updated and accessible

Although some interviewees (8) were satisfied with the way their organisation handled accessibility to knowledge and updating its knowledge resources, the majority (12) wanted to see an improvement on this. Many participants (12) suggested that the enrolment of a knowledge officer would be of an asset to their organisation as there would finally be someone dedicated to the upkeep of the organisation's knowledge resources. This is more so in the pharmaceutical sector, where organisations handle vast amounts of knowledge:

No because redundant knowledge is not removed. We can improve on this maybe by employing a data keeper. Also, sometimes I feel that a lot of knowledge is in 'silos' in the different departments and is not accessible to all. (No. 1)

No, definitely not! Redundant knowledge is mixed with current knowledge with the risk that people might use the redundant knowledge by mistake! (No. 2)

No. This is not done. Recently we had to send a notification to customers. We also had 'dead' people in database, people who stopped practicing their profession and new professionals not included in database. The problem is there isn't a person who is responsible for updating knowledge. Everyone updates at his own whim. (No. 6)

I don't feel there is enough impetus. I feel that our IT system can be improved and I would also like to see the organisation recruit someone who is responsible for documentation. (No. 13)

Keeping up to date our knowledge resources is a mammoth task that would require more than one officer. Also, upgrading the IT system to be able to generate more intelligent reports would also help. In our ever-changing market, our knowledge can be easily made redundant. (No. 14)

Protecting knowledge assets

With regards to knowledge protection, the participants were satisfied with the level of knowledge protection provided by their organisation mostly through a robust IT system. The only reserve that some participants had was that they would like their organisation to emphasise more promotion of knowledge protection amongst employees:

It needs to be made clearer across the board since I feel that some employees don't get the message – sometimes it feels that this is more done on a personal basis. (No. 1)

I feel there is room for improvement regarding awareness of the importance of knowledge protection mostly from a manual aspect. (No. 2)

Yes, I am very satisfied with knowledge protection. (No. 4)

I feel that we have an adequate level of knowledge protection. (No. 10)

Yes. I feel there is knowledge protection and the organisation is very much aware about this. Maybe, the only problem is that this may not be across the board and that there are areas of improvement. (No. 14)

Yes. Knowledge protection is at the top of the organisation's concerns so it has in place an excellent knowledge protection setup. We have different levels of access and a strong IT protection backbone. The vast majority of our knowledge is IT supported. (No. 17)

4.3.4 Measuring Effects of Initiatives Geared at Improving Effectiveness

RQ4: Are the effects of initiatives geared towards improving organisational effectiveness being measured?

It is useless to introduce initiatives to improve organisational effectiveness and then the organisation does not have in place the means to measure the outcomes of these initiatives. The scope of this research question is therefore clear – to ask the participants whether performance metrics are in place in order to help gauge the effects of new initiatives taken by the organisation.

Measurement of outcomes of initiatives taken to improve effectiveness

Whilst the participants agreed that such performance metrics are essential for an organisation to gauge initiatives geared towards improving the effectiveness of the organisation, when asked whether performance metrics are in place at their organisation, half of the interviewees (10) responded that they have some form of metrics in place:

We have two things, KPIs and individual management review which is done every year. Achievements are discussed and also targets not achieved. We then have the end of year business strategy and annual business report with successes and failures. (No. 4)

Yes, we have metrics which can measure all our processes. Also, I feel that metrics are a mainstay for every organisation. (No. 10)

Metrics are very important. If you invest money on new initiatives and you do not have metrics to gauge the value of that initiative, then you have a problem! It can damage your business acumen and lose opportunities for investment as you lose other initiatives. (No. 18)

Yes, so as we can close the loop and we can gauge the measures we took regarding effectiveness. Since our sector is demanding, I feel that metrics play a more important role. (No. 20)

The other half of the interviewees confirmed that they do not have any form of metrics in place and that they would like to see them introduced by their organisation:

No. The organisation lacks these metrics and I feel that they would be of great help for the organisation if introduced. (No. 1)

Bluntly placing it – no, we don't have. It is only done when problems arise and we try to identify problem. We are not pro-active and we do not validate processes or initiatives that the organisation takes. Also, the flow needs to be measured because one department can cause bottleneck in another. So, metrics would identify this. We are reactive but we need to be more pro-active! (No. 5)

Metrics are important....I feel that we do not have adequate metrics which show a clear measure of the output of the organisation. I feel that they are superficial and do not measure clearly the effectiveness of the organisation. I feel we need specific people with specific training on metrics. Otherwise, we won't know if a new initiative is giving the desired outcome. (No. 8)

No, we don't have! What we do is statistics which does not reflect organisational effectiveness. Although we have identified metrics we are still implementing them. (No. 11)

4.3.5 Perceived Future Role of KM

RQ5: Is KM perceived to have a future role in the Maltese Pharmaceutical Sector?

This final research question is intended to assess whether the participants feel that KM has a future role in the pharmaceutical sector.

Future role for KM in the Pharmaceutical Sector?

All the participants enthusiastically replied that they felt KM has a future and that they wished their organisations invested more in KM in the next five years.

The participants wished that top management was made more aware of KM so

as KM strategies could be synched with the business strategy of their organisation:

There is need to identify areas of KM that impact finances and organisational performance. Once these are identified, it will have an impact. Once you start talking to people about KM and they don't know about it, it will be difficult to have success in implementing KM initiatives – level of awareness of KM must be increased. (No. 3)

I hope that there is a future for KM. I am convinced there is but I hope it is implemented in our organisation. (No. 5)

I feel that in the pharmaceutical sector, it is a 'must' that KM is given importance! It would help effectiveness by linking knowledge and also help us reduce costs by being more efficient. (No. 10)

I hope so! I feel we are still at infancy even so with a privatisation exercise at the door. But I wish that this privatisation exercise pushes these type of KM initiatives for the better of the organisation. (No. 11)

KM is the future! I don't have a crystal ball but the world is moving towards a knowledge world. I feel we need to prepare better to embrace KM initiatives for e.g. by improving training. We must embrace challenges and e.g. not be afraid to use IT. (No. 13)

It depends on top management strategy to include KM in the business strategy. So I cannot tell. I feel that KM is still at its infancy stage in Malta. I feel there is a future for KM systems because we are knowledge intensive. It all depends on how much the organisation is willing to capture and make use of this new management style. (No. 14)

Without KM the organisation would die in today's knowledge world! We are a knowledge intensive organisation where people have knowledge. An organisation which does not have an effective KM is doomed to fail! (No. 15)

I feel that in our scenario KM initiatives are a must! Our environment is so fast moving that initiatives to retain knowledge and share knowledge and make best use of knowledge are a must. So in my opinion, knowledge initiatives will increase in the next 5 years. (No. 17)

4.4 Summary

This chapter described in detail the results obtained for the quantitative and qualitative studies. For the quantitative study, the proposed hypotheses and research model were tested, and a number of the proposed hypotheses were supported (Table 4.4). IT support and transformational leadership emerged as strong antecedents of KM processes whereas knowledge creation and knowledge protection were the two KM processes that had a direct effect on organisational effectiveness and also mediated the relationship between the KM enablers and organisational effectiveness. Through post hoc analysis, intellectual stimulation and inspirational motivation, both dimensions of transformational leadership, together with IT support, were found to have a positive effect on organisational effectiveness.

Research Question 1: To what Extent do KM Enablers Predict KM processes?		
H1a, H1b, H1c & H1d	Collaborative trust has a positive direct effect on KM processes namely knowledge creation, knowledge organisation, knowledge application & knowledge protection respectively	Not supported
H2a	<i>Learning has a positive direct effect on knowledge creation</i>	<i>Supported</i>
H2b	<i>Learning has a positive direct effect on knowledge organisation</i>	<i>Supported</i>
H2c & H2d	Learning has a positive direct effect on knowledge application & knowledge protection respectively	Not supported
H3a	<i>Centralisation has a negative direct effect on knowledge creation</i>	<i>Supported</i>
H3b, H3c, H3d	Centralisation has a negative direct effect on knowledge organisation, knowledge application & knowledge protection respectively	Not supported
H4a, H4b, H4c & H4d	Formalisation has a negative direct effect on knowledge creation, knowledge organisation, knowledge application & knowledge protection respectively	Not supported
H5a & H5b	Intrinsic rewards have a positive direct effect on knowledge creation & knowledge organisation respectively	Not supported
H5c	<i>Intrinsic rewards have a positive direct effect on knowledge application</i>	<i>Supported</i>
H5d	<i>Intrinsic rewards have a positive direct effect on knowledge protection</i>	<i>Supported</i>
H6a & H6b	KM strategy has a positive direct effect on knowledge creation and knowledge organisation respectively	Not supported
H6c	<i>KM strategy has a positive direct effect on knowledge application</i>	<i>Supported</i>
H6d	KM strategy has a positive direct effect on knowledge protection	Not supported
H7a	<i>IT support has a positive direct effect on knowledge creation</i>	<i>Supported</i>
H7b	<i>IT support has a positive direct effect on knowledge organisation</i>	<i>Supported</i>
H7c	<i>IT support has a positive direct effect on knowledge application</i>	<i>Supported</i>

H7d	<i>IT support has a positive direct effect on knowledge protection</i>	<i>Supported</i>
H8a	<i>Idealised influence (behavioural) has a positive direct effect on knowledge creation</i>	<i>Supported</i>
H8b	<i>Idealised influence (behavioural) has a positive direct effect on knowledge organisation</i>	<i>Supported</i>
H8c	<i>Idealised influence (behavioural) has a positive direct effect on knowledge application</i>	<i>Supported</i>
H8d	<i>Idealised influence (behavioural) has a positive direct effect on knowledge protection</i>	<i>Supported</i>
H9a, H9b, H9c & H9d	Inspirational motivation has a positive direct effect on knowledge creation, knowledge organisation, knowledge application & knowledge protection respectively	Not supported
H10a	<i>Intellectual stimulation has a positive direct effect on knowledge creation</i>	<i>Supported</i>
H10b	<i>Intellectual stimulation has a positive direct effect on knowledge organisation</i>	<i>Supported</i>
H10c	<i>Intellectual stimulation has a positive direct effect on knowledge application</i>	<i>Supported</i>
H10d	Intellectual stimulation has a positive direct effect on knowledge protection	Not supported
H11a	<i>Individualised consideration has a positive direct effect on knowledge creation</i>	<i>Supported</i>
H11b, H11c, H11d	Individualised consideration has a positive direct effect on knowledge organisation, knowledge application & knowledge protection respectively	Not supported
Research Question 2: To What Extent do KM Processes Predict Organisational Effectiveness?		
H12	<i>Knowledge creation has a positive direct effect on organisational effectiveness</i>	<i>Supported</i>
H13	Knowledge organisation has a positive direct effect on organisational effectiveness	Not supported
H14	Knowledge application has a positive direct effect on organisational effectiveness	Not supported
H15	<i>Knowledge protection has a positive direct effect on organisational effectiveness</i>	<i>Supported</i>
Research Question 3: Is the relationship between KM Enablers and Organisational Effectiveness mediated by KM Processes?		
H16a, H16b, H16c & H16d	Collaborative trust affects organisational effectiveness positively and indirectly through knowledge creation, knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H17a	<i>Learning affects organisational effectiveness positively and indirectly through knowledge creation</i>	<i>Supported</i>
H17b, H17c & H17d	Learning affects organisational effectiveness positively and indirectly through knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H18a	<i>Centralisation affects organisational effectiveness negatively and indirectly through knowledge creation</i>	<i>Supported</i>
H18b, H18c & H18d	Centralisation affects organisational effectiveness negatively and indirectly through knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H19a, H19b, H19c & H19d	Formalisation affects organisational effectiveness negatively and indirectly through knowledge creation, knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H20a, H20b & H20c	Intrinsic rewards affect organisational effectiveness positively and indirectly through knowledge creation, knowledge organisation and knowledge application respectively	Not supported
H20d	<i>Intrinsic rewards affect organisational effectiveness positively and indirectly through knowledge protection</i>	<i>Supported</i>
H21a, H21b, H21c & H21d	KM strategy affects organisational effectiveness positively and indirectly through knowledge creation, knowledge organisation,	Not supported

	knowledge application and knowledge protection respectively	
H22a	<i>IT support affects organisational effectiveness positively and indirectly through knowledge creation</i>	<i>Supported</i>
H22b & H22c	IT support affects organisational effectiveness positively and indirectly through knowledge organisation and knowledge application respectively	Not supported
H22d	<i>IT support affects organisational effectiveness positively and indirectly through knowledge protection</i>	<i>Supported</i>
H23a	<i>Idealised influence (behavioural) affects organisational effectiveness positively and indirectly through knowledge creation</i>	<i>Supported</i>
H23b & H23c	Idealised influence (behavioural) affects organisational effectiveness positively and indirectly through knowledge organisation and knowledge application respectively	Not supported
H23d	<i>Idealised influence (behavioural) affects organisational effectiveness positively and indirectly through knowledge protection</i>	<i>Supported</i>
H24a, H24b, H24c & H24d	Inspirational motivation affects organisational effectiveness positively and indirectly through knowledge creation, knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H25a	<i>Intellectual stimulation affects organisational effectiveness positively and indirectly through knowledge creation</i>	<i>Supported</i>
H25b, H25c & H25d	Intellectual stimulation affects organisational effectiveness positively and indirectly through knowledge organisation, knowledge application and knowledge protection respectively	Not supported
H26a	<i>Individualised consideration affects organisational effectiveness positively and indirectly through knowledge creation</i>	<i>Supported</i>
H26b, H26c & H26d	Individualised consideration affects organisational effectiveness positively and indirectly through knowledge organisation, knowledge application and knowledge protection respectively	Not supported
Relationships that were not initially hypothesised but found through Post Hoc Analysis		
<i>IT Support has a positive effect on organisational effectiveness</i>		
<i>Intellectual stimulation has a positive effect on organisational effectiveness</i>		
<i>Inspirational motivation has a positive effect on organisational effectiveness</i>		

Table 4.4: Summary of hypotheses (supported and not supported) and post-hoc findings for the quantitative study (Source: Author)

For the qualitative study, in response to research question 1, the findings showed that KM is a fairly new concept for the Maltese Pharmaceutical Sector and it is still at its infancy stage. Even though there is a lack of a formal KM strategy both codification strategies and personalisation strategies, both essential elements of a KM strategy exist but these are not under the umbrella of KM initiatives or part of an official KM strategy. Secondly, in addressing research question 2, the findings related to KM enablers were found to relate to the findings of the quantitative study. Thirdly, concerning research question 3,

knowledge protection is high on the agenda of Maltese Pharmaceutical organisations but there is work to be done regarding organisation and application of essential organisational knowledge. Fourthly, in answering research question 4 related to metrics, it was concluded that such metrics intended to measure effects of initiatives on organisational effectiveness are lacking. Finally, in response to research question 5, it was concluded that there is enthusiasm for KM for the foreseeable future with the participants eager to see KM become part of their business strategy.

In the next chapter, a discussion of the combined findings of the quantitative and qualitative studies will be carried out in line with the adopted concurrent (convergent parallel) mixed methods research strategy (QUAN + QUAL).

CHAPTER FIVE – DISCUSSION

5.1 Introduction

This chapter presents a combined discussion of the findings of the quantitative and qualitative studies. The discussion revolves around the empirically tested integrative KM model developed from the quantitative study and the template analysis carried out in the qualitative study. This chapter starts off with a discussion of the findings related to KM uptake by the Maltese Pharmaceutical Sector and the role of KM strategy. A general discussion on the relationship between KM enablers and KM processes is then followed by a discussion on the findings related to the relationship between KM processes and organisational effectiveness and the mediating role played by the KM processes in the relationship between KM enablers and organisational effectiveness. A short discussion on metrics used to gauge initiatives geared at improving organisational effectiveness follows. A discussion on the perceived future role of KM in the Maltese Pharmaceutical Sector concludes this chapter.

5.2 Uptake level of KM and Focused KM Strategy

Before discussing the results of the questions related to this section, one must keep in perspective that this study is the first of its kind to address KM in the Maltese Pharmaceutical Sector. Therefore, the main scope of this question was to gauge, through the qualitative study, the know-how on the various facades attributed to KM in organisations. The discussion progressed through the following themes: understanding of the term KM; official/unofficial KM initiatives undertaken by the organisation; and alignment of any KM strategy

present with the competitive/business strategy of the organisation. The responses garnered from this research question provide for an interesting discussion.

The qualitative study revealed that KM in the Maltese Pharmaceutical Sector is still at the infancy stage since although the participants mentioned different facades of KM namely initiatives for capturing tacit or explicit knowledge and identification of KM processes such as knowledge sharing, knowledge capture/acquisition and knowledge dissemination, the participants could not identify the link between these aspects and also confirmed that there was no 'official' KM strategy or 'official' KM initiatives in place in their organisations. Albeit these findings, it is interesting to note that the participants confirmed that 'unofficial' KM initiatives are in place since there are numerous codification knowledge strategies (e.g. organise and store knowledge in knowledge repositories/databases for easy retrieval) and personalisation knowledge strategies (e.g. shadowing/mentoring initiatives; external training) undertaken by their organisations. These strategies are essential components of a KM strategy (Choi & Lee, 2002; Lin, 2011; Shahzad *et al.*, 2016; Venkitachalam & Ambrosini, 2017; Venkitachalam & Willmott, 2015).

What these findings indicate is that KM is being undertaken in some form but not as part of a focused KM strategy that is aligned with the business/competitive strategy of the organisation. Alignment of the knowledge strategy with the business/competitive strategy of an organisation is vital for an organisation to create a sustained competitive advantage and increased

effectiveness (Bagnoli & Vedovato, 2014; Halawi, McCarthy & Aronson, 2006; McKeen, Zack & Singh, 2006; Shahzad *et al.*, 2016; Smith, 2004; Venkitachalam & Ambrosini, 2017). These findings, elaborated from the qualitative study might explain why, from the quantitative study, KM strategy was found to have *only* a positive direct effect on knowledge application as a KM process. Although this finding is in line with the findings of other researchers that acknowledge that KM strategies strengthen and support the KM processes of an organisation (Bettiol *et al.*, 2012; Bosua & Venkitachalam, 2013; Shahzad *et al.*, 2016; Singh, 2018), it is expected that a focused KM strategy should be a strong antecedent for all the KM processes within an organisation and not only knowledge application. The lack of a formal KM strategy can also stem from the fact that SMEs are weaker at adopting and maintaining formal KM strategies than larger firms (Beijerse, 2000; Edvardsson, 2006; Grandinetti, 2016; McAdam & Reid, 2001).

5.3 Relationship between KM Enablers and KM Processes

Besides testing for relationships between KM enablers and KM processes through the quantitative study, I also discussed these KM enablers with the participants of the qualitative study. This allowed for assessment of the perception that the participants have of how their top management views the role that such enablers play in promoting KM initiatives and the importance given to these KM enablers. In this way, the findings of the qualitative study were related to the findings of the quantitative study as dictated by a concurrent (convergent parallel) mixed methods research strategy (QUAN + QUAL). The

KM enablers discussed therefore were IT support, learning, trust and collaboration, formalisation and centralisation, intrinsic rewards, people skills and dimensions of transformational leadership.

5.3.1 IT Support

IT support plays a fundamental role in any KM initiatives undertaken by organisations. From the quantitative study it was concluded that IT support exerted direct positive effects on all four KM processes, supporting the main body of literature that posits a relationship between IT support and KM processes (Al Hakim & Hassan, 2012; AlShamsi & Ajmal, 2018; Hong *et al.*, 2017; Lee, 2017; Lee *et al.*, 2012; Lopez *et al.*, 2009; Nagendra & Morappakkam, 2016; Vaccaro *et al.*, 2010). IT support also exerted a direct positive effect on organisational effectiveness, thereby supporting the finding by Kim and Hancer (2010).

The findings derived from the qualitative study relate and support those obtained from the quantitative study. Discussion with the participants of the qualitative study focused on three themes namely adequate hardware support, timely and adequate IT personnel support and tailor-made software packages.

The participants acknowledged the importance of IT support for KM initiatives and were satisfied by the level of IT support provided by their organisations. The participants further suggested that their organisations would benefit from the introduction of more tailor-made software that is customised for their day to

day work requirements and some participants would appreciate a more responsive IT personnel support.

5.3.2 Learning

With regards to learning, the findings of the quantitative study showed a positive direct effect on knowledge creation consistent with most studies on KM (Berraies *et al.*, 2014; Dunk & Jeng, 2013; Ho *et al.*, 2014; Hong *et al.*, 2017; Lee & Choi, 2003; Noh *et al.*, 2016). The quantitative study also established that learning exerts a positive direct effect on knowledge organisation, thereby contributing to the scarce body of research on KM enablers and KM processes.

The views expressed by the participants in the qualitative study relate to and strengthen the findings of the quantitative study. All the participants interviewed acknowledged the importance of learning for knowledge creation where mentoring/internal training and external training were discussed. Whilst all the participants agreed that both mentoring/internal training and external training were offered by their organisations, thereby strengthening knowledge creation, some expressed concerns that due to work pressure, mentoring of new recruits sometimes was placed on the back burner and they also wanted to see more structured internal mentoring programs in place. With regards to external training, the concerns expressed were that most of the training offered was not tailor made for their needs and that training abroad was rarely offered. This is an important concern since through external training, new knowledge is acquired by the organisation from external sources and the importance of this

for the Maltese scenario is more evident since Malta is a small EU island country with limited internal resources and geographical restrictions especially for procurement of medicines.

5.3.3 Trust and Collaboration

The quantitative study showed that the combination of trust and collaboration did not have any influence on KM processes and organisational effectiveness. Whilst these findings tend to deviate from most studies on the individual effect of trust and collaboration on KM processes (Lee, 2017; Moghavvemi *et al.*, 2018; Noh *et al.*, 2016; Rahman *et al.*, 2018; Tan, 2016), the findings of this study are consistent with Hung *et al.* (2005), who in a study on adopting a KM system for the pharmaceutical industry, came to a similar conclusion to this study; an organisational culture encouraging teamwork, trust and an open culture was not conducive to company competitiveness.

Trust and collaboration were also discussed with the participants of the qualitative study. The discussion with the participants centered around the intimate relationship between trust and collaboration; trust relationships between employees, management and organisations. With regards to the relationship between trust and collaboration, the participants felt that these are intimately linked, lending support to the decision taken to combine the trust and collaboration items in the quantitative study since they loaded on the same factor.

All the participants felt that a lack of trust/collaboration would be a big barrier to any KM initiatives and suggested that top management works more on instilling a culture of trust that cascades down through the levels of the organisation. As highlighted in the results section of the qualitative study, different levels of trust identified include trust between employees, trust between employees and management, and trust between different organisations. Most of the participants agreed that the most difficult to get is trust between employees and management and trust between different departments and at inter-organisational level. The latter finding is consistent with Zuckér *et al.* (1996) who noted that the development of trust in collaboration structures is more likely to develop within organisational boundaries and therefore the collaboration of individuals within the same unit or team is more likely to generate trust.

5.3.4 Formalisation and Centralisation

The conclusions drawn from the qualitative study on the KM enablers formalisation and centralisation relates to and supports the findings derived from the quantitative study where formalisation produced a positive effect on knowledge creation and knowledge protection whereas centralisation produced a negative effect on knowledge creation. The discussion through the qualitative study focused on two themes namely the importance of rules and regulations for the pharmaceutical sector and the importance of balance between decentralisation and centralisation of authority in the organisation. With regards to formalisation, the participants argued that keeping in mind the knowledge intensive, highly regulated nature of the pharmaceutical sector, formalisation

would be supportive, since having set rules and standard operating procedures were part of the requirements, sometimes even by law, for operating in the pharmaceutical sector. This argument contradicts those who reported that formalisation has a negative effect on knowledge sharing (Nonaka & Takeuchi, 1995), knowledge creation, maintenance, transfer (Marjan & Hamideh, 2017) and the implementation of tasks (Chen & Huang, 2007) but is in line with the literature findings from knowledge intensive and complex service and production oriented organisations (AlShamsi & Ajmal, 2018; Ho *et al.*, 2014; Wahba, 2015).

With regards to centralisation, relating to the findings of the quantitative study, the participants of the qualitative study acknowledged that a highly centralised organisation would stifle communication channels and is therefore of detriment to knowledge creation. The participants claimed that a mix of centralisation/decentralisation would be ideal were certain decision making (e.g. day to day operations; professional decisions; micromanagement) would be decentralised onto middle management whereas other high-level decisions (e.g. policy; strategy; vision of the organisation) would remain under the competence of centralised top management. This argument is also in line with the main KM literature findings (Alshurah *et al.*, 2018; Ho *et al.*, 2014; Lee & Choi, 2003; Marjan & Hamideh, 2017).

5.3.5 Intrinsic Rewards

The findings of the quantitative study, consistent with the KM literature (AlShamsi & Ajmal, 2018; Bartol & Srivastava, 2002; Bock *et al.*, 2005; Choi *et al.*, 2008; Palo & Charles, 2015; Rahman *et al.*, 2018; Razmerita *et al.*, 2016; Tan, 2016; Whitterspoon *et al.*, 2013), provide support on the importance of intrinsic rewards, such as recognition, to KM processes. The quantitative study provides empirical evidence that intrinsic rewards have a positive effect on both knowledge application and knowledge protection. The findings of the qualitative study relate with and support the findings of the quantitative study and hence are also consistent with the KM literature (AlShamsi & Ajmal, 2018; Choi *et al.*, 2008; Palo & Charles, 2015; Rahman *et al.*, 2018; Razmerita *et al.*, 2016; Tan, 2016; Whitterspoon *et al.*, 2013) since the participants of the qualitative study expressed the view that intrinsic rewards have a positive effect on KM processes mainly by incentivising employees to share their knowledge.

An interesting discussion developed which centered around the issue of official vs unofficial introduction of intrinsic rewards by HR. Whilst the majority of the participants confirmed that no official initiatives related to intrinsic rewards were in place in their organisations, praise and recognition were done on an unofficial basis by top management. They had reservations on adopting such initiatives officially due to a 'double-edged sword effect' where praising someone officially might cause discern amongst employees within the same organisation.

5.3.6 People Skills

Whilst instances in the literature posited that T-shaped skills influence KM processes such as knowledge creation (Hafeez-Baig & Gururajan, 2012; Luhn *et al.*, 2017; Madhavan & Grover, 1998; Soon, Fisher & Zainol, 2014) other KM researchers concluded that T-shaped skills do not influence the KM processes (Berraies *et al.*, 2014; Lee & Choi, 2003) since, as argued by Lee and Choi (2003), management must be geared towards creating an environment that is conducive for such skills to grow so people with T-shaped skills are encouraged to share and create new knowledge. The conclusions drawn from the qualitative study support the view expressed by Lee and Choi (2003) since participants claimed that their organisations were not doing their utmost to match the skills of the employees with the tasks assigned to them and to create the right environment for skilled people to flourish, thereby limiting their contribution to sharing and creating knowledge. Therefore, as Bos-Nehles, Bondarouk and Nijenhuis (2017) rightly claim, “rather than being the instigators of innovations, managers might better see themselves as responsible for creating the environment and conditions in which innovative work behaviour can flourish” (p. 395).

5.3.7 Transformational Leadership

An interesting finding from the quantitative study relates to the four I's of transformational leadership. A number of studies (Lee *et al.*, 2011; Wu, Neubert & Yi, 2007) have highlighted problems with regards to Bass and

Avolio's (1995) five scales and this study is no exception. The dimension associated with the elements attributed to the leader by followers (idealised influence attributed) converged with individualised consideration, as in the case of Lee *et al.* (2011) and was eventually discarded whilst only the behavioural dimension of idealised influence was retained. A possible explanation for this is that followers associate more strongly with the leader's behaviour such as having a collective sense of mission and strong sense of purpose. In fact, this study concluded that idealised influence (behavioural) was a strong antecedent to KM processes as it had a direct positive effect on all four KM processes.

The quantitative study also concluded that intellectual stimulation has a direct positive effect on knowledge creation, knowledge organisation and knowledge application and individualised consideration has a direct positive effect on knowledge creation. Although inspirational motivation was not found to have any effect on the KM processes, post-hoc analysis revealed that inspirational motivation has a positive effect on organisational effectiveness together with intellectual stimulation. These findings highlight the fact that transformational leadership plays a pivotal role in enhancing KM processes and organisational effectiveness in the pharmaceutical sector; thereby supporting and extending the findings reported by other studies in the hospitality (Erkutlu, 2008), banking (Kishokumar, 2017; Lee *et al.*, 2011) and education (Al-Husseini & Dosa, 2016; Hayat *et al.*, 2015; Ugwu, 2018) sectors.

The qualitative study results on transformational leadership generally related to and supported the findings of the quantitative study since the participants of the qualitative study confirmed that their top management was charismatic, inspirational and considerate and that these traits in their leaders were essential to drive any KM initiatives forward. It was interesting to note that the five participants who had some reservations about how considerate their leadership was, acknowledged the fact that the pressures of work could be responsible for this lack of consideration and that it was important to help top management as much as possible to carry out the vision and direction portrayed for the organisation.

5.4 Relationship between KM Processes and Organisational Effectiveness

The quantitative study also investigated the effect of the four separate KM processes (knowledge creation, knowledge organisation, knowledge application and knowledge protection) on organisational effectiveness. This study reported positive direct effects of knowledge creation and knowledge protection on organisational effectiveness; this is in line with other researchers on KM processes (e.g. Chiu & Chen, 2016; Mills & Smith, 2011; Patalas-Maliszewska & Klos, 2017; Shih & Tsai, 2016; Ugwu, 2018; Zheng *et al.*, 2010). However, in this study, knowledge application did not produce a significant effect on organisational effectiveness, thereby not supporting the positive relationship reported by Mills and Smith (2011) and Haque and Anwar (2012). A plausible explanation for this can be extrapolated from Costa and Monteiro (2016), who,

in an analysis of KM processes effecting innovation, posit that in order to exert a positive effect on innovation, the process of knowledge application “may depend on other processes such as acquisition, sharing and codification” (p. 388). On a similar note, Cegarra-Navarro, Soto-Acosta and Wensley (2016) argue that “the existence of certain work environment characteristics might facilitate and encourage knowledge application” (p. 1548).

The participants of the qualitative study, in general, were not convinced that their organisation was making the best possible use of its knowledge assets. The participants of the qualitative study pointed out that, being knowledge intensive, the pharmaceutical sector handles vast amounts of knowledge. They therefore wanted to see an improvement in knowledge organisation mainly through better handling of knowledge accessibility and a more efficient way of keeping knowledge resources up to date which would subsequently improve knowledge utilisation/application. Such goals could possibly be achieved with the engagement of a knowledge officer dedicated to the upkeep of the organisation’s knowledge resources (e.g. by codifying, filtering, updating knowledge resources, recording lessons learned). These findings seem to be consistent with the findings of the quantitative study where knowledge organisation and knowledge application were not found to exert any effect on organisational effectiveness.

Participants in the qualitative study acknowledged the importance of knowledge protection for the pharmaceutical sector. The participants were satisfied with the level of knowledge protection provided by their organisations mainly through

secure IT systems. They also confirmed that the culture of protecting knowledge is promoted within their organisations and there is awareness of the importance of knowledge as the main organisational asset and thus the need to protect this asset from theft. Such findings relate with the findings from the quantitative study where knowledge protection was found to have a direct positive effect on organisational effectiveness.

5.5 Mediating Role of KM Processes

With regards to mediation analysis, the quantitative study has shown that two KM processes (knowledge creation and knowledge protection) mediate the relationship between various KM enablers and organisational effectiveness. Knowledge creation mediates the relationship between six KM enablers (IT support; learning; centralisation; idealised influence (behavioural); intellectual stimulation; individualised consideration) and organisational effectiveness. Knowledge protection mediates the relationship between three KM enablers (IT support; idealised influence (behavioural); intrinsic rewards) and organisational effectiveness.

Similar findings were reported in the KM field (e.g. Al-Tit, 2016; Moon & Lee, 2014; Naghavi, Dastaviz & Jamshidy, 2014; Singh, 2018; Zheng *et al.*, 2010). However, Haque and Anwar (2012) also reported that knowledge application mediated the relationship between KM enablers (namely management support and IT infrastructure) and organisational performance, a finding not supported by this thesis. A plausible explanation for this can be extrapolated from the

literature. Costa and Monteiro (2016) in an analysis of KM processes effecting innovation, posit that in order to exert a positive effect on innovation, the process of knowledge application “may depend on other processes such as acquisition, sharing and codification” (p. 388). On a similar note, Cegarra-Navarro, Soto-Acosta and Wensley (2016) argue that “the existence of certain work environment characteristics might facilitate and encourage knowledge application” (p. 1548).

5.6 Measuring Outcomes of Initiatives Geared at Improving Effectiveness

Hanley (2014) argues that “the only true sustainable measure of value for a knowledge management (KM) solution is business impact – that is, how the solution helps to grow revenue, increase profit, ‘advance the mission’, satisfy customers, or improve business operations” (p. 154). Previous studies in the pharmaceutical field have acknowledged the importance of measuring initiatives targeted at improving the effectiveness of organisations. Hung *et al.* (2005) underline the importance of benchmarking initiatives such as strategies involving budgets and HR systems whilst Rathore *et al.* (2017) states that such metrics (e.g. knowledge stock, flow and utilisation indicators; financial figures) are “a reference for supporting appropriate decision making” (p. 252-253). Others refer to patent-based performance metrics (Nesta & Saviotti, 2005), evaluating the intellectual capital (human, structural and relational capital) holistically (Mehralian *et al.*, 2013) or a balanced scorecard approach which adopts a combination of measures from a financial performance perspective,

customer knowledge perspective, internal business processes perspective and learning and growth perspective (Mehralian *et al.*, 2018).

The conclusions drawn from the qualitative study clearly show that locally such metrics are lacking since half of the participants confirmed that they do not have any form of metrics in place and that they would like to see them introduced by their organisation. The other half that confirmed that metrics are in place came from larger organisations and confirmed that these metrics are limited to simple metrics based mostly on reporting simple financial metrics and daily basic statistics.

5.7 Perceived Future Role of KM

The aim of the concluding question of the qualitative study was to garner the perceptions of the participants regarding the future role of KM in the Pharmaceutical Sector and more specifically in their organisations. Such perceptions could not be gauged through the quantitative study. The participants, replying with a certain level of enthusiasm, were receptive to the idea of a more prominent future role for KM in their organisations. They acknowledged the fact that in today's globalised and competitive knowledge intensive world, KM would play a cardinal role for the continued success of their organisations. The participants in fact hoped that in the next five-year period they would see a greater awareness of the importance of KM being acknowledged at the highest echelons of their organisations and that future decisions taken would lean towards inclusion of a more focused and robust KM

strategy in their business strategy that would promote the undertaking of more KM initiatives by their organisations.

5.8 Conclusion

In this chapter I have discussed the combined findings of the quantitative study and qualitative study. In a nutshell, from the discussion above, the following conclusions can be drawn; first, it has been established that KM is a fairly new concept for the Maltese Pharmaceutical Sector and it is still at its infancy stage. The lack of a formal KM strategy and the fact that the participants were not familiar with the term KM proves this. However, albeit such findings, this does not mean that current practices do not tally with KM initiatives. In fact, both codification strategies and personalisation strategies, both essential elements of a KM strategy exist but these are not under the umbrella of KM or part of an official KM strategy; second, from a discussion on the findings related to the relationship between KM enablers and KM processes, it was concluded that IT support and transformational leadership are the strongest KM enablers.

Third, with regards to the relationship between KM processes and organisational effectiveness, it was concluded that knowledge creation and knowledge protection have a direct positive effect on organisational effectiveness and also act as mediators in the relationship between KM enablers and organisational effectiveness; fourth, from a discussion on metrics intended to measure the effects of initiatives geared at improving organisational effectiveness, it was concluded that these are lacking and effort should be

made by top management to introduce more metrics; and finally, it was concluded that there is enthusiasm for KM for the foreseeable future and there is eagerness to see more KM initiatives officially introduced by the organisations.

In the next chapter, which serves as an epilogue, I will highlight the major findings of this study. I will also present the theoretical contributions to knowledge in the KM field, the managerial implications and the limitations of this study. I will then conclude by providing some avenues for further research.

CHAPTER SIX – CONCLUSION

6.1 Introduction

This concluding chapter starts off by providing a summary of the major findings of this study. It then proceeds to highlight the theoretical contributions to knowledge in the KM field and the managerial implications. It concludes by describing the limitations of this study and then provides interesting avenues for further research.

6.2 Purpose of the Study and Major Findings

This study addressed a gap in the KM literature by developing an integrative model that analysed the relationships between KM enablers, KM processes and organisational effectiveness taking the Maltese Pharmaceutical Sector as its research context. This study is also the first to investigate KM in the Maltese Pharmaceutical Sector. A combination of web-based questionnaire survey and structured interviews in a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL) was employed for this study.

In a nutshell, this study concluded that the KM enablers learning, formalisation, KM strategy, intrinsic rewards, IT support and transformational leadership produced positive direct effects on the KM processes with IT support and two dimensions of transformational leadership (inspirational motivation and intellectual stimulation) producing a positive effect on organisational effectiveness. Centralisation was the only KM enabler to have a direct negative effect on KM processes. The combination of the KM enablers trust and

collaboration did not have any influence on KM processes and organisational effectiveness whilst the KM enabler T-shaped skills was dropped due to poor factor loadings. The KM processes of knowledge creation and knowledge protection produced direct effects on organisational effectiveness and mediated the relationship between some KM enablers and organisational effectiveness.

This study also concluded that KM is a fairly new concept for the Maltese Pharmaceutical Sector and it is still at its infancy stage. However, albeit such findings, both codification strategies and personalisation strategies, both essential elements of a KM strategy exist but these are not under the umbrella of KM or part of an official KM strategy. Metrics intended to measure effects of initiatives targeting organisational effectiveness were lacking and effort should be made by top management to introduce more metrics. Finally, this study also concluded that there is enthusiasm for KM for the foreseeable future and there is eagerness to see more KM initiatives officially introduced in the Maltese Pharmaceutical Sector.

6.3 Theoretical Contributions to Knowledge in the KM Field

The theoretical contributions of this study are various and include; (1) the development of an integrative model of KM using a wider array of KM enablers; (2) a decomposed view of KM processes by exploring their relationship with organisational effectiveness as singular variables; (3) exploring transformational leadership via its unique dimensions (known as the 4I's) and not as a global construct; (4) the identification of mediators using indirect effects; and (5) the

adoption of a mixed methods research approach which is a more novel approach to studying KM in organisations.

6.3.1 Development of an Integrative Model for KM

Many researchers in the KM field have stressed the importance of evaluating enablers and processes of KM to understand the successes and failures of any KM initiatives undertaken by an organisation (Lee, 2017; Lee & Steen, 2010; Nejatian *et al.*, 2013; Singh, 2018). Therefore, this study extended the existing academic body on KM by analysing an integrative model of KM enablers, KM processes and organisational effectiveness by investigating a more complete array of KM enablers than previous research.

6.3.2 Decomposed View of KM Processes

Unlike the vast majority of studies which have addressed KM processes as a holistic and unifying single dimension, this study adopted a more refined approach by exploring KM processes (knowledge creation, knowledge organisation, knowledge application and knowledge protection) as singular variables in line with similar approaches taken by Seleim and Khalil (2007) and Mills and Smith (2011). The latter argue that by grouping together the different KM processes, researchers will be focusing only on the overall effect whilst casting aside the understanding of how the particular KM processes effect organisational performance & effectiveness. In fact, this study provides

evidence that knowledge creation and knowledge protection had a positive direct effect on organisational effectiveness.

6.3.3 Exploring Transformational Leadership via its Unique Dimensions (4I's)

In the quantitative study, transformational leadership was treated from its unique behavioural elements (the four I's) and not as a global construct. Criticism poised by van Knippenberg and Sitkin (2013) postulates that it makes little sense to generate a composite model of transformational leadership and that one should test each of the dimensions separately as these hold lives of their own. Similarly, Deinert *et al.* (2015) “emphasized the importance of examining the TL sub-dimensions separately to gain a deeper understanding of the nature and the antecedents of these leadership behaviors” (p. 1095).

6.3.4 Identification of Mediators Using Indirect Effects

Another theoretical contribution of this study is the identification of mediators using indirect effects rather than the exceedingly popular, but flawed, Baron and Kenny (1986) approach (Hayes, 2009). Several sources (Hayes, 2013; Preacher & Kelley, 2011; Rucker *et al.*, 2011) argued that one should never make claims of full or partial mediation as was done by Baron and Kenny (1986). Such claims:

are not expressed in a meaningfully scaled metric.....they are not numerical, so the importance attached to the terms is largely subjective....it is impossible to compute confidence intervals for them...are not independent of sample size....they are highly imprecise (Preacher & Kelley, 2011, p. 97) .

This study therefore lends support to researchers such as Hayes (2013) who argue that it is more accurate to adopt methodologies that identify mediators through indirect effects by using a bootstrap test which is a superior and more rigorous test than competing methods.

6.3.5 Adoption of a Mixed Methods Approach for KM Studies

By adopting a concurrent (convergent parallel) mixed methods research design (QUAN + QUAL), this study contributed to the mixed methodology field and adopted quite a novel approach to the study of KM by shifting away from the dominant quantitative approach to KM studies. This is confirmed by a recent study carried out by Ngulube (2015) on trends in research methodological procedures in KM studies, where it was concluded that from 221 empirical studies published in the Journal of Knowledge Management during a five-year period (2009 – 2013), 133 adopted a quantitative approach, 86 a qualitative approach and only 2 adopted a mixed methods approach. As the author himself puts it, “methodological pluralism will enhance the validity of the results and enrich the research while providing KM researchers with an opportunity to have a deeper and balanced understanding of the complex KM phenomenon” (Ngulube, 2015, p. 136). By adopting a mixed methods approach, this study lends weight to claims by Ngulube (2015) that such mixed methods provide a

deeper understanding of a complex and dynamic academic field such as KM more so when investigated in a new context such as the Maltese Pharmaceutical Sector.

6.4 Managerial Implications of the Study Findings

Apart from the theoretical contributions, this study has nine managerial implications. These will be discussed briefly below:

1. From the findings of this study, it was concluded that although numerous KM initiatives are being undertaken by organisations in the Maltese Pharmaceutical Sector, these are not under the umbrella of an official KM strategy that is aligned with the vision and business strategy of the organisation. Management could promote an official KM strategy that caters for codification and personalisation knowledge strategies that are in line with the business/competitive strategy in order to create a sustained competitive advantage and increased effectiveness. This is more so when this study found that there is willingness from employees within the Maltese Pharmaceutical Sector to see more KM initiatives introduced by their top management as part of an official KM strategy.

As claimed by Venkitachalam and Willmott (2015), to implement a successful KM strategy, top management must align the ratio of codification/personalisation initiatives with the particular circumstances of

their organisation taking into consideration external factors such as competition and technology, and internal factors such as organisational politics, leadership and culture. For e.g., if the organisation favours a KM strategy with a dominant codification approach, an extensive investment in IT support (e.g. complex repositories, search engines and hierarchical knowledge databases managed by knowledge content specialists) would be required for employees to get the full benefit from the codified knowledge created (Venkitachalam & Ambrosini, 2017). On the other hand, if the organisation favours a KM strategy with a dominant personalisation approach, a more limited IT investment is required with focus on applications (e.g. email applications, online discussion and video conferencing tools) that help employees to connect and interact with experts and consultants so as their knowledge and experiences can be shared for the benefit of the organisation (Venkitachalam & Ambrosini, 2017).

2. This study provides evidence that IT support is a strong antecedent of KM processes since it exerted a direct positive effect on the four KM processes as well as an indirect effect on organisational effectiveness through knowledge creation and knowledge protection. IT support also exerts a direct effect on organisational effectiveness. This suggests that management could ensure a sound IT strategy that includes IT support. Emphasis needs to be made on providing more responsive IT personnel support and customised software for the day-to-day work requirements of the employees. Since investing in customised software and improving

IT personnel support could be costly for an organisation, it is important to monitor the return on such an investment through not only financial metrics but also by monitoring whether the IT strategy is resulting in increased employee efficiency and satisfaction.

3. This study showed that learning exerts a positive direct effect on knowledge creation and knowledge organisation. These findings highlight the importance for managers to establish a proper mentoring/shadowing programme aimed at preventing loss of tacit knowledge and experience; experience garnered by an employee is passed onto new recruits and no essential knowledge is lost when an employee resigns and leaves the organisation. This would necessitate an adequate workforce complement within the organisation in order to alleviate work pressure thus allowing proper mentoring of new recruits, under a structured internal mentoring program.

Management could also provide more opportunities for employees to be exposed to training abroad together with locally provided tailor made specialised (in-house and external) training in an attempt to meet the exigencies of the employees. It is also important for managers to measure employee performance so as they can gauge whether the training initiatives are bearing fruit. Such performance measure could include rating how helpful an employee is (through co-workers), rating efficiency (quantifiable statistics on a daily, weekly or monthly basis) rating quality (customer satisfaction; error rates) and finally rating

innovation by for example counting the number of new ideas or initiatives an employee comes up with per month, quarterly or per year.

4. An important managerial implication of this study concerns centralisation, an important aspect of organisational structure. As expected, centralisation was found to have a negative effect on knowledge creation. Therefore, although it may prove challenging, top management must be convinced that by ceding some control over certain levels of decision making (e.g. day to day operations; professional decisions; micromanagement) and keeping under their centralised competence other high-level decisions (e.g. policy; strategy; vision of the organisation), it will be increasing motivation of employees due to a gained sense of ownership and responsibility. In this way, employees are free to experiment and express their ideas, resulting in an improvement in the flow of knowledge within the organisation. To manage such a change effectively, top management needs to determine beforehand the impact of decentralisation and those affected by it, communicate the strategy clearly, train and support employees, and constantly monitor performance targets.

5. Another important facet of organisational structure is formalisation. This study showed that formalisation exerts a positive direct effect on both knowledge creation and knowledge protection. It is therefore important that formalisation is not seen as bureaucracy by both employees and their managers. Formalisation must instead be seen as a means of

increasing quality and efficiency through having in place throughout the organisation up to date rules and standard operating procedures which allow employees to carry out on the job decisions with greater speed, confidence and without the need to continuously refer to management. This is more so given the knowledge intensive and highly regulated nature of the pharmaceutical sector.

6. Given that intrinsic rewards have a positive effect on KM processes (knowledge application and knowledge protection), it is recommendable that management praises and recognises employees for contributing to dissemination of knowledge within the organisation. Having said this, management must use caution when implementing intrinsic rewards officially since as indicated by the qualitative study, this might cause discern amongst employees within the same organisation due to envy.

7. Transformational leadership was found to be a strong KM enabler since, through its four dimensions (idealised influence, inspirational motivation, intellectual stimulation and individualised consideration), it exerted direct positive effects on all four KM processes, indirect effects on organisation effectiveness through knowledge creation and knowledge protection and direct effects on organisational effectiveness through the dimensions of inspirational motivation and intellectual stimulation. These findings suggest that leaders must try their best to be highly considerate towards the employees' needs and also strive to find ways of stimulating employee creativity when tackling and solving problems. It is imperative

for organisations to recruit leaders with the skills, attributes and capabilities needed to be transformational leaders. As Neal (2016) puts it, such leaders should be “innovators who like to look at the business from a different perspective and warriors who aren’t afraid to constantly challenge conventional wisdom” (p. 3)

8. The identification of knowledge creation and knowledge protection as having a direct effect on organisation effectiveness as well as acting as mediators between KM enablers and organisation effectiveness also has managerial ramifications. To remain competitive, it is therefore important for top management to foster an environment that is conducive to the creation of knowledge. Additionally, given that the pharmaceutical sector spans different disciplines (regulatory, dispensing, clinical, manufacturing, wholesale dealing, etc.), top management needs to ensure that the organisation has in place sound measures that protect the knowledge assets from internal and external theft to safeguard knowledge protection.
9. The final managerial implication revolves around the importance of metrics used to measure knowledge initiatives undertaken by the organisation in order to improve effectiveness. This study through the qualitative research interviews has found that such metrics are lacking or boil down mainly to simple financial metrics. It is therefore important that top management introduces such metrics (e.g. knowledge stock, flow and utilisation indicators; patent-based performance metrics; intellectual

capital metrics) that would allow new knowledge initiatives, which can be very expensive, to be gauged so as it can be determined whether they are contributing or not to an increase in the effectiveness of the organisation.

6.5 Limitations of Study

As with every other research, this study has its share of limitations which should be noted.

First, this study focused exclusively on the Maltese Pharmaceutical Sector and hence caution needs to be exercised when generalising to other sectors and contexts.

Second, the questionnaire adopted in the quantitative study was very long and although this was split into three parts with a two-week gap in between, this might have caused acquiescence to respondents.

Third, the sample utilised for the quantitative survey was relatively small, but it exceeded the recommended acceptable minimum sample size of 200 for running SEM (Kline, 2016).

Fourth, a single informant per organisation was selected for this study. Although it was made sure that the informants selected were key personnel with vast experience of the mechanisms operating within their organisations, it

would maybe have been more desirable to target more informants per organisation and then aggregate responses and use these as an organisational indicator.

Fifth, since this study adopted a cross sectional design rather than a longitudinal design due to time limitations, the temporal order of effects could be reversed since cross sectional designs capture relationships at a specific point in time.

Finally, since I am an insider researcher, the qualitative study could have suffered from some insider research bias even though, as explained in the methodology chapter through a reflexivity process, I did my best and took several steps to mitigate the causes of such bias.

6.6 Suggestions for Future Research

This study proposes five specific avenues for further research which emanate from this current investigation.

First, transformational leadership and IT support emerged as very strong antecedents of KM processes since both enablers had a direct positive effect on the four KM processes (knowledge creation, knowledge organisation, knowledge application and knowledge protection). It would perhaps be interesting to explore whether these variables exert moderating or mediating

effects in the relationships between KM enablers and KM processes and between KM processes and organisational effectiveness.

Second, it would be insightful to examine the mediating influences of KM processes across varying cultural dimensions. This would permit us to understand whether these relationships hold or otherwise across different cultural settings.

Third, due to the number of variables tested for the KM model in the quantitative study, it was not possible to include also extrinsic rewards (e.g. monetary incentives; promotion incentives) with the KM enablers. It would be interesting to compare intrinsic vs extrinsic rewards as KM enablers.

Fourth, this study could be repeated in other knowledge intensive sectors and findings between these different sectors compared.

Fifth, this study adopted an Input-Process-Output (IPO) framework which is the dominant framework in KM studies (see section 2.12 in the literature review, chapter 2). However, some researchers have challenged this linear framework and suggested a more dynamic Input-Process-Output-Input (IPOI) (or Input-Mediation-Output-Input - IMOI) model with feedback loops in the I-P-O sequence (Ilgen *et al.*, 2005; Rosen *et al.*, 2014; Kozlowski, 2018). It would therefore be interesting to carry out a longitudinal study were data is collected and analysed at different points in time. In this way, besides identifying any patterns in variable relationships over time, any feedback mechanisms such as

organisational effectiveness feeding back on specific KM enablers and KM processes could be investigated.

6.7 Closure

This study has provided a rich learning experience for me during these six years and in the paragraphs below I will synthesise my thoughts reflecting on what I have learnt through this research. First of all, I have achieved the goals stated in the introductory chapter since this study has addressed a gap in the KM literature with regards to developing an integrative KM model describing the relationships between KM enablers, KM processes and organisational effectiveness. By utilising the Maltese Pharmaceutical Sector as the research context, it also addressed a gap regarding the lack of research on KM for a locally important knowledge intensive sector and explored the perceptions of practitioners in the Maltese Pharmaceutical Sector on KM.

This study has highlighted the need to promote a KM strategy that is aligned with the business strategy of organisations in the Maltese Pharmaceutical Sector. In this way, organisations can better focus their resources according to whether a dominant codification or personalisation strategy for knowledge has been chosen. From the integrative KM model developed, I have learnt that IT support and transformational leadership have both emerged as strong KM enablers for the KM processes coupled with exerting direct effects on organisational effectiveness. Reflecting on these findings, it is implied that organisations must adopt a sound IT strategy that is in line with the business

strategy. It is also envisaged that organisations need to recruit leaders with the skills, attributes and capabilities needed to be transformational leaders.

Other important findings that I have garnered from the integrative KM model concern the KM enablers of learning and intrinsic rewards. The fact that learning has been linked positively to the creation and organisation of knowledge highlights the importance for organisations in the Maltese Pharmaceutical Sector, to establish proper mentoring/shadowing programmes for sharing tacit knowledge and experience between experienced employees and new recruits as well as to develop proper in-house and external training programmes. With regards to intrinsic rewards, managers are encouraged to praise and recommend employee efforts that contribute to the dissemination of knowledge within the organisation since intrinsic rewards are positively linked with knowledge application and knowledge protection.

The integrative KM model developed for this study has also shed light on the relationship between KM processes and organisational effectiveness. From the findings I have learnt that the KM processes of knowledge creation and knowledge protection produced direct effects on organisational effectiveness. Both processes also mediated the relationship between some KM enablers and organisational effectiveness. Reflecting on these findings, it becomes imperative that management should foster a climate that is conducive to the creation of knowledge and ascertain that sound measures for protecting the organisation's knowledge assets from internal and external theft are in place.

This research has also imparted important lessons regarding organisational structure. As expected, centralisation was found to have a negative effect on knowledge creation. This implies that top management needs to carefully construct decentralisation of decision-making processes whilst constantly monitoring performance targets. Surprisingly, formalisation was found to have a positive effect on both the creation and protection of knowledge. Although this finding deviates from mainstream KM literature, other knowledge intensive and complex service and production oriented organisations have reported similar findings to my study. Learning from this finding, organisations in the Maltese Pharmaceutical Sector must have in place, and keep updated, set rules and standard operating procedures so as employees can easily relate to them thus increasing creation and protection of knowledge which in turn has a positive effect on organisational effectiveness.

This research experience, through the qualitative study, provided me with the opportunity to meet and discuss with professionals in the Maltese Pharmaceutical Sector and garner insights on KM. One valuable insight I managed to learn concern metrics intended to measure effects of initiatives targeting organisational effectiveness. The use of such metrics by organisations in the Maltese Pharmaceutical Sector was sadly found lacking. It is important to emphasise introduction of metrics which must not be limited to financial measures of performance but also include other measures such as customer knowledge and knowledge flow and utilisation indicators. Through the qualitative study I also learnt that there is enthusiasm for KM for the

foreseeable future and there is eagerness to see more KM initiatives officially introduced in the Maltese Pharmaceutical Sector.

Finally, through the scholarly contributions of this study I learnt that by adopting a decomposed view to investigate the relationship between KM processes and organisational effectiveness instead of unifying the different KM processes into one dimension, I managed to portray a clearer picture of how the individual KM processes affect organisational effectiveness. I also adopted a similar approach to investigate transformational leadership since this enabler was studied through its four dimensions (4 I's) instead of as a global construct. In this way, I managed to garner a deeper understanding of the effects of the individual dimensions of transformational leadership on KM processes.

Globalisation and the knowledge economy have increased the pressure on knowledge intensive sectors to remain competitive. The leverage of an organisation's knowledge and therefore the role of KM have taken centre stage for modern management. I hope that through this study, besides contributing to the KM domain in general, I have also contributed to the Maltese Pharmaceutical Sector by providing insights to policy makers and stakeholders on how to better manage their knowledge assets thus helping organisations in the Maltese Pharmaceutical Sector to reach their financial targets, and ultimately the goal of:

'delivering a better pharmaceutical service to Maltese patients'

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APPENDICES

Appendix A – UREC Ethics
Approval, Survey Introductory
Letters & Interview Consent Form

Re: Proposal form - Mr David J Baldacchino

1 message

Frank Bezzina <frank.bezzina@um.edu.mt>

11 October 2016 at 13:17

To: Fema Ethics Committee <research-ethics.fema@um.edu.mt>

Cc: Simon Grima <simon.grima@um.edu.mt>, David Baldacchino <david.j.baldacchino.96@um.edu.mt>

Dear Josian and Simon
Noted with thanks. Great news indeed.
Kind regards
Frank
CC David Baldacchino

On 11 October 2016 at 11:19, Fema Ethics Committee <research-ethics.fema@um.edu.mt> wrote:
Dear Professor Bezzina,

Please note that approval has been given by UREC for Mr David J Baldacchino's proposal form

Please inform student accordingly.

Kind regards,

Josian Grech
Secretary to the FEMa Research Ethics Committee

Faculty of Economics, Management & Accountancy

Dean's Office
Room 425
Humanities B (FEMA)
University of Malta
Msida
☎ +356 2340 3417

Email: research-ethics.fema@um.edu.mt

Prof. Frank Bezzina, PhD
Head, Department of Management
Dean, Faculty of Economics, Management & Accountancy
University of Malta
Malta

Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector – KM Enablers (Survey – Part 1)

Welcome!

My name is David Baldacchino and I am a Senior Principal Pharmacist working within the Ministry of Health. I am currently reading for a Doctor of Philosophy (Ph.D.) Degree in Management under the academic supervision of Prof. Frank Bezzina, Head of Management and Dean at the Faculty of Economics, Management and Accountancy (FEMA) of the University of Malta. My research involves exploring *Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector*.

As part of my doctoral thesis, I will be carrying out a quantitative analysis by means of a web-based survey instrument. The survey consists of three parts, a main part followed by two short parts. This is the main part of my survey focusing on ***KM Enablers***. The link for the survey can be found below:

[insert survey link]

The second and third part of my survey will be sent to you in the coming weeks. I would be very grateful for your assistance in filling up all the three parts of my survey since the success of my study depends on your combined responses to this three-part survey. Each survey part takes only a few minutes to complete.

Anonymity and confidentiality are guaranteed. The data collected will be solely used by me, and used only for the purpose of this study. Filling in and submitting the survey constitutes giving your consent for participation in this study. However, you are free to withdraw from this study at any time without any prejudice.

Should you have any queries, please do not hesitate to contact me or my supervisor on david.j.baldacchino.96@um.edu.mt and frank.bezzina@um.edu.mt respectively. Finally, I would like to express my thanks for your support in helping me out with my research.

Best Regards,

David Baldacchino

Researcher

Prof. Frank Bezzina

Supervisor

Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector – KM Processes (Survey – Part 2)

Welcome!

My name is David Baldacchino and I am a Senior Principal Pharmacist working within the Ministry of Health. I am currently reading for a Doctor of Philosophy (Ph.D.) Degree in Management under the academic supervision of Prof. Frank Bezzina, Head of Management and Dean at the Faculty of Economics, Management and Accountancy (FEMA) of the University of Malta. My research involves exploring *Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector*.

As part of my doctoral thesis, I will be carrying out a quantitative analysis by means of a web-based survey instrument. The survey consists of three parts, a main part followed by two short parts. This is the second part of my survey focusing on ***KM Processes***. The link for the survey can be found below:

[insert survey link]

The third part of my survey will be sent to you in the coming weeks. I would be very grateful for your assistance in filling up all the three parts of my survey since the success of my study depends on your combined responses to this three-part survey. Each survey part takes only a few minutes to complete.

Anonymity and confidentiality are guaranteed. The data collected will be solely used by me, and used only for the purpose of this study. Filling in and submitting the survey constitutes giving your consent for participation in this study. However, you are free to withdraw from this study at any time without any prejudice.

Should you have any queries, please do not hesitate to contact me or my supervisor on david.j.baldacchino.96@um.edu.mt and frank.bezzina@um.edu.mt respectively. Finally, I would like to express my thanks for your support in helping me out with my research.

Best Regards,

David Baldacchino

Researcher

Prof. Frank Bezzina

Supervisor

Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector – Organisational Effectiveness and Demographics (Survey – Part 3)

Welcome!

My name is David Baldacchino and I am a Senior Principal Pharmacist working within the Ministry of Health. I am currently reading for a Doctor of Philosophy (Ph.D.) Degree in Management under the academic supervision of Prof. Frank Bezzina, Head of Management and Dean at the Faculty of Economics, Management and Accountancy (FEMA) of the University of Malta. My research involves exploring *Knowledge Management (KM) and Organisational Effectiveness in the Maltese Pharmaceutical Sector*.

As part of my doctoral thesis, I will be carrying out a quantitative analysis by means of a web-based survey instrument. This is the last part of my survey focusing on ***Organisational Effectiveness and Demographics***. This last part follows the other two parts that I have sent to you in the previous weeks. The link for the survey can be found below:

[insert survey link]

I would be very grateful for your assistance in filling up all the three parts of my survey since the success of my study depends on your combined responses to this three-part survey. Each survey part takes only a few minutes to complete.

Anonymity and confidentiality are guaranteed. The data collected will be solely used by me, and used only for the purpose of this study. Filling in and submitting the survey constitutes giving your consent for participation in this study. However, you are free to withdraw from this study at any time without any prejudice.

Should you have any queries, please do not hesitate to contact me or my supervisor on david.j.baldacchino.96@um.edu.mt and frank.bezzina@um.edu.mt respectively. Finally, I would like to express my thanks for your support in helping me out with my research.

Best Regards,

David Baldacchino
Researcher

Prof. Frank Bezzina
Supervisor

Consent Form

Name of Researcher: David Baldacchino
Contact Email: david.j.baldacchino.96@um.edu.mt
Name of Supervisor: Prof. Frank Bezzina
Contact Email: frank.bezzina@um.edu.mt
Title of Dissertation: Knowledge Management (KM) in the Maltese Pharmaceutical Sector
Purpose of the study: To study the relationship between KM enablers, KM processes and organisational effectiveness in the Maltese Pharmaceutical Sector.

Method of data collection: one on one/face to face interviews

Use made of the information: the outcome of this study will be used for University research purposes only

I will abide by the following conditions:

1. *Your real name will not be used in the study.*
2. *Participation is voluntary, and you are free to quit from the study at any point and for whatever reason. In the case you withdraw, all records and information collected will be destroyed.*
3. *There will be no deception in the data collection process.*
4. *The interview will be audio recorded.*
5. *The recording will be destroyed 3 years after the interview takes place*

I AGREE TO THE CONDITIONS LISTED IN THIS CONSENT FORM

Name of participant: _____

Signature: _____

Date: _____

I AGREE TO THE CONDITIONS LISTED IN THIS CONSENT FORM

Researcher's Signature: _____

Supervisor's Signature: _____

Date: _____

Appendix B – Survey Questions & Interview Guide

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

Survey Instructions

For the purpose of this survey, '*Knowledge Management (KM)*' can be defined as '*all the practices involving people, technology and processes that help to facilitate the creation, organisation, application and protection of knowledge within organisations, thus improving organisational effectiveness.*'

As stated in the introductory page, this survey exercise is divided into three parts. The main part below focuses on *KM Enablers*. These are *Organisational Culture, Organisational Structure, Organisational Strategy, Transformational Leadership, People, Human Resources Management (HRM) and Information Technology (IT)*.

The second and third part of this survey, which will be emailed to you in the coming weeks, focus on the *Knowledge Management Processes* namely *Knowledge Creation, Knowledge Organisation, Knowledge Application and Knowledge Protection and Organisational Effectiveness* respectively.

The goal of this study model is to investigate the relationship between the *KM Enablers*, the *KM Processes* and *Organisational Effectiveness*.

All the questions in this survey require you to choose a single reply reflecting your beliefs about the statements put forward. The replies range from *strongly disagree* to *strongly agree* using a five point Likert scale. Choose the reply from this range that best describes your belief to that statement.

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers

Organisational Culture

*** 1. Trust**

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My organisation members are generally trustworthy (T1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members have reciprocal faith in other members' intentions and behaviours (T2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members have reciprocal faith in others' ability (T3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members have reciprocal faith in others' behaviours to work toward organisational goals (T4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members have reciprocal faith in others' decisions favouring organisational interests over individual interests (T5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members have relationships based on reciprocal faith (T6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 2. Collaboration**

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My organisation members are satisfied by the degree of collaboration (CL1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members are supportive (CL2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation members are helpful (CL3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is willingness to collaborate across organisational units within my organisation (CL4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is willingness to accept responsibility for failure within my organisation (CL5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 3. Learning

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My organisation provides various formal training programs for performance of duties (L1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation provides opportunities for informal individual development other than formal training such as work assignments and job rotation (L2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation encourages people to attend seminars, symposia and so on (L3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation provides various programs such as clubs and community gatherings (L4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied by the contents of job training or self development programs provided by my organisation (L5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

Organisational Structure

*** 4. Centralisation** *(defined as degree of authority and control over decisions)*

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Any major decisions that I make must have this organisation's approval (C1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my experience with this organisation, even quite small matters have to be referred to someone higher up for a final answer (C2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My experiences with this organisation have included a lot of rules and procedures stating how various aspects of my job are to be done (C3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have to ask senior management before I do almost anything in my organisation (C4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can take very little action on my own until senior management approves of it (C5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 5. Formalisation** *(defined as degree of formal rules, procedures and standard policies)*

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
There are many activities in my organisation that are not covered by some formal procedure (F1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usually, my experience with this organisation involves doing things "by the book" (F2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contacts with my organisation are on formal or preplanned basis (F3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ignore the rules and reach informal agreements to handle some situations (F4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When rules and procedures exist in my organisation, they are typically written (F5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

Organisational Strategy

*** 6. Knowledge Management Strategy**

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My organisation has a clear vision for knowledge management (S1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has a clear objective for knowledge management (S2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has effective planning for knowledge management (S3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation tries to combine knowledge management planning with its business planning and Information Technology (IT) planning (S4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has consistent knowledge related policies throughout the organisation (S5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

Transformational Leadership

* 7. Idealised Influence (when leadership behaves in a way that causes followers to identify themselves with that leadership & the organisation he/she leads)

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
The leadership of my organisation talks about his/her most important values and beliefs (II1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation specifies the importance of having a strong sense of purpose (II2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation considers the moral and ethical consequences of decisions (II3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation emphasises the importance of having a collective sense of mission (II4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation instills pride in me for being associated with him/her (II5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation goes beyond self interest for the good of the group (II6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation acts in ways that builds my respect (II7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation displays a sense of power and confidence (II8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 8. Inspirational Motivation (leadership's ability to articulate future prospects and shape a common vision among organisational members)

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
The leadership of my organisation talks optimistically about the future (IM1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation talks enthusiastically about what needs to be accomplished (IM2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation articulates a compelling vision of the future (IM3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation expresses confidence that the goals will be achieved (IM4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 9. Intellectual Stimulation** (leadership's ability to challenge followers' assumptions & encourage workers to tackle problems from multiple perspectives)

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
The leadership of my organisation re-examines critical assumptions to question whether they are appropriate (IS1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation seeks differing perspectives when solving problems (IS2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation gets me to look at problems from many different angles (IS3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation suggests new ways of looking at how to complete assignments (IS4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 10. Individualised Consideration** (leadership's ability to attend to followers' needs and listen to their concerns)

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
The leadership of my organisation spends time teaching and coaching (IC1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation treats me as an individual rather than just as a member of a group (IC2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation considers me as having different needs, abilities and aspirations from others (IC3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The leadership of my organisation helps me to develop my strengths (IC4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

People

* 11. T-Shaped Skills *(defined as the degree of understanding by an employee of his/her own and others' task areas)*

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Employees within my organisation can understand not only their own tasks but also others' tasks (TSK1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation can make suggestions about others' tasks (TSK2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation can communicate well not only with their department members but also with other department members (TSK3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation are specialists in their own part (TSK4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation can perform their own task effectively without regard to environmental changes (TSK5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

Human Resources Management (HRM)

* 12. Intrinsic Rewards *(Rewards that cannot be measured by monetary value such as pride and public recognition)*

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
People within my organisation honour my job when I teach or share my own skills (R1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The more I share my own knowledge, the more my reputation would be enhanced within my organisation (R2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I share my knowledge, I get more chance to show my skills to my other work colleagues (R3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I share my knowledge, people within my organisation approve me as the expert in our team (R4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness In the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

KM Enablers (Contd...)

Information Technology (IT)

*** 13. IT Support**

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
My organisation has a formal Management Information Systems Department (ITS1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation employs a manager whose main duties include the management of our IT (ITS2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Every year my organisation budgets a significant amount of funds for new IT software and hardware (ITS3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation creates customised software applications when the need arises (ITS4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The employees within my organisation are linked together by means of a computer network (ITS5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Enablers (Survey - Part 1)

Date of Birth

**** This information is being requested for matching purposes only so as I will be in a position to tie the three parts of my survey into one response whilst respecting anonymity. It will not be used in any way for my survey results.***

* 14. Date of Birth

Fill Date Of Birth in the corresponding boxes

DD	MM	YYYY
<input type="text"/>	/ <input type="text"/>	/ <input type="text"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Processes (Survey - Part 2)

Survey Instructions

For the purpose of this survey, 'Knowledge Management (KM)' can be defined as 'all the practices involving people, technology and processes that help to facilitate the creation, organisation, application and protection of knowledge within organisations, thus improving organisational effectiveness.'

This is the second part of my survey, focusing on the Knowledge Management Processes. These are Knowledge Creation, Knowledge Organisation, Knowledge Application and Knowledge Protection.

All the questions in this survey require you to choose a single reply reflecting your beliefs about the statements put forward. The replies range from *strongly disagree* to *strongly agree* using a seven point Likert scale. Choose the reply from this range that best describes your belief to that statement.

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Processes (Survey - Part 2)

Knowledge Management (KM) Processes

*** 1. Knowledge Creation**

	Strongly Disagree	Disagree	Disagree Somewhat	Neither Disagree Nor Agree	Agree Somewhat	Agree	Strongly Agree
My organisation gives importance to gathering information from the various units (eg. sales, production sites, customer care etc.) within the organisation (S) (KC1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation gives importance to sharing experience with suppliers and customers (S) (KC2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation gives importance to engaging in dialogue with competitors and other organisations in the same business sector (S) (KC3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation gives importance to finding new strategies and opportunities by wandering inside the organisation (S) (KC4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation prioritises creating a work environment that allows peers to understand the expertise involved in their duties through practice and demonstrations by a master/mentor (S) (KC5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises creative and essential dialogue within the organisation (E) (KC6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation promotes the use of deductive and inductive thinking (E) (KC7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation encourages us to use metaphors (analogies) to enhance dialogue when creating new concepts (E) (KC8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises exchanging various ideas and dialogues (E) (KC9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation promotes subjective opinions (E) (KC10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises planning strategies by using published literature, computer simulation and forecasting (C) (KC11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises creating manuals and documents on products, services and operations (C) (KC12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises building databases on products, services and operations (C) (KC13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly Disagree	Disagree	Somewhat	Neither Disagree Nor Agree	Agree	Somewhat	Agree	Strongly Agree
My organisation emphasises building up material (eg. knowledge) by gathering management figures and technical information from all over the organisation (C) (KC14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises transmitting newly created concepts (C) (KC15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises the use of liaisoning activities between members of different functional teams and departments (I) (KC16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises forming teams as a model, conducting experiments and sharing the results with entire departments within the organisation (I) (KC17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation emphasises sharing new values and thoughts (I) (KC18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation promotes sharing and trying to understand management visions through communication with fellow members in the organisation (I) (KC19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 2. Knowledge Organisation

	Strongly Disagree	Disagree	Disagree Somewhat	Neither Disagree Nor Agree	Agree Somewhat	Agree	Strongly Agree
My organisation uses technologies such as databases to store knowledge such as reports, marketing materials etc. (KO1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation uses technologies to capture various tacit knowledge such as experience, best practices and lessons learned (KO2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation provides timely access to important knowledge such as working handbooks, standard operating procedures and regulations (KO3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has personnel specifically assigned to organise knowledge such as experience, best practices and lessons learned and generate relevant working handbook, and rules (KO4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has personnel specifically assigned to assess the value of newly obtained or newly generated knowledge (KO5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation classifies valuable knowledge (KO6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation filters knowledge in knowledge repositories by deleting useless and iterative knowledge (KO7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation regularly adds new knowledge into the repository (KO8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation can access the databases and knowledge repositories easily and conveniently (KO9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees within my organisation can easily contact experts within the organisation by means of email, knowledge map etc. (KO10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 3. Knowledge Application**

	Strongly Disagree	Disagree	Disagree Somewhat	Neither Disagree Nor Agree	Agree Somewhat	Agree	Strongly Agree
My organisation has processes for applying knowledge learned from mistakes (KA1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has processes for applying knowledge learned from experience (KA2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has processes for using knowledge to solve new problems (KA3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation matches sources of knowledge to problems and challenges (KA4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation uses knowledge to improve efficiency (KA5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation uses knowledge to adjust strategic direction (KA6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation is able to locate and apply knowledge to changing competitive conditions (KA7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation quickly applies knowledge to critical competitive needs (KA8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation quickly links sources of knowledge in solving problems (KA9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** 4. Knowledge Protection**

	Strongly Disagree	Disagree	Disagree Somewhat	Neither Disagree Nor Agree	Agree Somewhat	Agree	Strongly Agree
My organisation has processes to protect knowledge from inappropriate use inside the organisation (KP1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has processes to protect knowledge from theft from within the organisation (KP2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has processes to protect knowledge from theft from outside the organisation (KP3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation has technology that restricts access to some sources of knowledge (KP4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation values and protects knowledge embedded in individuals (KP5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my organisation, knowledge that is restricted is clearly identified (KP6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation clearly communicates the importance of protecting knowledge (KP7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - KM Processes (Survey - Part 2)

Date of Birth

**** This information is being requested for matching purposes only so as I will be in a position to tie the three parts of my survey into one response whilst respecting anonymity. It will not be used in any way for my survey results.***

* 5. Date of Birth

Please enter your Date Of Birth in the corresponding boxes

DD	MM	YYYY		
<input type="text"/>	/	<input type="text"/>	/	<input type="text"/>

Knowledge Management and Organisational Effectiveness in the Maltese Pharmaceutical Sector - Organisational Effectiveness & Demographics (Survey - Part 3)

Survey Instructions

For the purpose of this survey, 'Knowledge Management (KM)' can be defined as 'all the practices involving people, technology and processes that help to facilitate the creation, organisation, application and protection of knowledge within organisations, thus improving organisational effectiveness.'

For questions on Organisational Effectiveness you are required to choose a single reply reflecting your beliefs about the statements put forward. The replies range from *strongly disagree* to *strongly agree* using a four point Likert scale. Choose the reply from this range that best describes your belief to that statement.

For the Demographics Section, you are required to choose a single reply from the lists provided.

Organisational Effectiveness

* 1. Organisational Effectiveness

Over the past two years, my organisation has improved its ability to:

	Strongly Disagree	Disagree	Agree	Strongly Agree
Identify new business opportunities (OE1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coordinate the development efforts of different units (OE2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anticipate potential market opportunities for new products/services (OE3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adapt quickly to unanticipated changes (OE4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Anticipate surprises and crises (OE5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quickly adapt its goals and objectives to industry/market/business sector changes (OE6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decrease response times (OE7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
React to new information about the industry, market or business sector (OE8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be responsive to new industry/market/business sector/customer demands (OE9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Streamline its internal processes (OE10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduce redundancy of information and knowledge (OE11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Knowledge Management and Organisational Effectiveness in the Maltese
Pharmaceutical Sector - Organisational Effectiveness & Demographics (Survey - Part
3)

Demographics

* 2. Age

- 18 - 25 years 34 - 41 years 50 years and over
 26 - 33 years 42 - 49 years

* 3. Gender

- Male Female

* 4. Please select from the list below your current field of practice

- Regulatory and Policy Making Wholesale Dealing and Distribution Activities
 Manufacturing, Importation and Re-packaging Activities Dispensing and Clinical/Hospital Activities

* 5. Number of years employed in the Pharmaceutical Sector

- 0 - 2 years 6 - 8 years 12 - 14 years
 3 - 5 years 9 - 11 years 15 years and over

* 6. Number of years employed with your current organisation

- 0 - 2 years 6 - 8 years 12 - 14 years
 3 - 5 years 9 - 11 years 15 years and over

* 7. Size of your current organisation

- 5 - 9 employees 50 - 249 employees
 10 - 49 employees 250 employees and over

**Knowledge Management and Organisational Effectiveness in the Maltese
Pharmaceutical Sector - Organisational Effectiveness & Demographics (Survey – Part
3)**

Date of Birth

**** This information is being requested for matching purposes only so as I will be in a position to tie the three parts of my survey into one response whilst respecting anonymity. It will not be used in any way for my survey results.***

*** 8. Date of Birth**

Fill in Date of Birth in the corresponding boxes

DD	MM	YYYY
<input type="text"/>	<input type="text"/>	<input type="text"/>

Interview Guide

Investigating Knowledge Management (KM) in the Maltese Pharmaceutical Sector

Section 1 – Uptake of KM initiatives and focused KM Strategy

(The objectives of questions 1 – 4 are to assess what the participants know about KM and what is the uptake level of KM initiatives by their organisations. The participants will also be asked whether there is a focused KM strategy as part of the business strategy of the organisation.)

1. What are the first thoughts that come to mind when I mention the term “knowledge management”? **[probe to assess the understanding of term at work not only in general but ask for some examples]**
2. Is your organisation doing any initiatives it describes as “knowledge management?”
[probe so as interviewee would elaborate]

Introduce to interviewee a simple definition of knowledge management

[All the practices involving people, processes and technology that help to facilitate the creation, organisation, application and protection of knowledge within organisations thus improving organisational effectiveness]

3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management? **[probe so as interviewee would elaborate]**
4. Do you feel that your organisation’s business strategy incorporates a sound knowledge management/knowledge strategy? **[If interviewee states “Yes” ask to elaborate how]**

Section 2 – KM enablers

(The aim of Questions 5 – 13 is to garner the feelings and perceptions of the participants about the status and importance of KM enablers within their organisations.)

5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation? **[If interviewee states “Yes” probe to elaborate how]**
6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?
7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation? **[probe so as interviewee will elaborate further]**
8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation? **[probe so as interviewee will elaborate further]**
9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?
10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?
11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies? **[if interviewee answers ‘Yes’, elaborate; if interviewee answers ‘No’ – probe as to whether it is considered for introduction as a future HR policy]**
12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?
13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation? **[probe so as interviewee will elaborate further]**

Section 3 - Utilisation and Protection of Knowledge Assets

(Questions 14 – 16 focus on the level of utilisation and protection of knowledge, within organisations in the pharmaceutical sector.)

14. Do you feel that your organisation is making the best possible use of its knowledge capabilities? **[If interviewee states “Yes” probe to elaborate how]**
15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible? **[If interviewee states “Yes” probe to elaborate how]**
16. Are you satisfied with the degree of knowledge protection that your organisation has in place? **[If interviewee states “Yes” probe to elaborate how]**

Section 4 - Measuring Organisational Effectiveness

(Question 17 aims at discovering whether organisations in the pharmaceutical sector employ metrics to gauge initiatives geared at improving organisational effectiveness.)

17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful? **[If ‘Yes’ probe so as interviewee elaborates what metrics are in place]**

Section 5 - Future Role of KM

(Question 18, the concluding question of this interview, aims at assessing the beliefs of the participants regarding the role played by KM for the future of their organisations.)

18. Finally, where do you see your organisation’s position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation? **[Probe so interviewee elaborates as much as possible]**

**Appendix C – Samples of Interview
Transcripts**

Due to the large volume of text involved in presenting all the twenty interview transcripts obtained from the structured interviews carried out as part of the qualitative study , this appendix contains five randomly chosen transcripts. The full list of transcripts is available on request.

Interview Transcript – Interviewee No. 2

Q1. What are the first thoughts that come to mind when I mention the term “knowledge management” (KM)?

[Interviewee No. 2] Knowledge is power and it is one of the pillars of modern organisations. The more knowledge you have, the better the leverage you have to move forward as an organisation. So KM for me are all the methods that one uses to make the most efficient use of knowledge in order to help the organisation to move forward. This involves knowledge at both organisational and people level, processes etc.

Q2. Is your organisation doing any initiatives it describes as “knowledge management or KM?”

[Interviewee No. 2] No. We only have written processes I feel there is a lot more to do.

[Interviewer] So there is no official KM direction from the top management?

[Interviewee No. 2] No. There are initiatives which in my opinion are linked to KM but not described as KM.

[At this stage of the interview, interviewer introduces to the interviewee a simple definition of KM as used in this research – the interviewee is given time to go through it carefully]

Q3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management?

[Interviewee No. 2] Yes I feel that we have procedures in place. The organisation focuses more on the IT aspect for e.g. knowledge structuring and storing in databases. There is little support for initiatives related to the people aspect of KM.

Q4. Do you feel that your organisation's business strategy incorporates a sound knowledge management/knowledge strategy?

[Interviewee No. 2] No. There are no specific KM policies ingrained in our business strategy.

Q5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation?

[Interviewee No. 2] Yes I am quite satisfied. Technology is in place e.g. email, sharing of data, networking. There was a marked improvement in the organisation in the last 5 years.

Q6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?

[Interviewee No. 2] Training effort is done but the trainer is not properly trained. Top management must be more familiar about procedures and more formal training should be done. There is sometimes resistance for mentoring due to work pressure. People try to mentor new employees. However, there is place for improvement in training.

Q7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation?

[Interviewee No. 2] I feel this is symptomatic of government departments. There is fear to collaborate because he/she would be burdened with work or that newcomers replace him. E.g. I know how to use software but if I trust/collaborate and share with him, I will finish being burdened with his work too!

Q8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation?

[Interviewee No. 2] Trust and collaboration go hand in hand. Without trust there is no collaboration.

Q9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 2] Yes, definitely! You minimise conflict because rules are set and procedures are there. It helps efficiency

[Interviewer] But does it stifle creation?

[Interviewee No. 2] No because you still can have allowances for deviations which then need to be documented. It is important to explain the scope of formalisation to employees. This is more so in the Pharma sector which is highly regulated sector.

Q10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 2] I feel this is an old fashioned type of structure. Top management provides direction but then decentralises decisions on employees. I feel centralisation stifles efficiency.

Q11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies?

[Interviewee No. 2] Yes because they motivate employees. Output is related to motivation. If he/she feels rewarded intrinsically, it would help.

[Interviewer] Do you feel it helps for knowledge sharing?

[Interviewee No. 2] Yes, possibly, but it depends on the person.

[Interviewer] Do you feel it should be a policy in the organisation?

[Interviewee No. 2] I'm not quite certain about this because it can act as a double edged sword if done officially. It depends on the person. Some are more prone than others to being praised and recognised. Others might feel that it is a double-faced action by management and can act against sharing.

Q12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?

[Interviewee No. 2] This is a problem. Skills and tasks do not equate with each other e.g. pharmacist doing basic procurement, wasting his skills e.g. someone ideal for a clinical setup is placed in an administrative setup.

Q13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation?

[Interviewee No. 2] Leadership seems, charismatic, inspirational on a one to one basis but then when you go back to place of work, things change. More like politics! Maybe charismatic and inspirational but not considerate. I am afraid of charisma on a personal basis because it tends to mask the true nature of leadership.

Q14. Do you feel that your organisation is making the best possible use of its knowledge capabilities?

[Interviewee No. 2] No I don't think so. Knowledge organisation is lacking, and this limits the leveraging power of the organisation vis a vis knowledge. The organisation is not managing its knowledge in the best possible way. Also I feel that as an organisation, I feel that we place more emphasis on explicit knowledge than tacit knowledge.

Q15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible?

[Interviewee No. 2] No definitely not! Redundant knowledge is mixed with current knowledge with the risk that people might use the redundant knowledge.

[Interviewer] Does the organisation have the means to organise knowledge?

[Interviewee No. 2] Yes there are the means of managing data and knowledge but this is not adequately done.

[Interviewer] Do you see a role for a knowledge manager?

[Interviewee No. 2] Presently there is a person in IT but this person is not skilled enough to act as a knowledge manager. Employees do not have adequate direction from top management on this. Top management does not promote this culture of organising data/knowledge. I feel that there must be a more collective effort from

top management, employees and the IT personnel to handle redundant knowledge.

Q16. Are you satisfied with the degree of knowledge protection that your organisation has in place?

[Interviewee No. 2] Yes I am quite satisfied with the IT infrastructure that caters for theft. However, from a manual aspect we are lacking.

[Interviewer] Is there an ethos from top management to instil culture of protecting knowledge?

[Interviewee No. 2] No – I feel there is room for improvement regarding awareness of the importance of knowledge protection mostly manual aspect e.g. handling of files.

Q17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful?

[Interviewee No. 2] I feel that metrics are too much focused on statistics – it feels like a production line! We are geared on financial metrics. I feel we need more metrics that can gauge new initiatives and also metrics that gauge employee happiness.

Q18. Finally, where do you see your organisation's position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation?

[Interviewee No. 2] KM is important in some form or another. With the current lack of trust/collaboration, I do not see too many KM initiatives in the future. Culture change from the very top should occur or else only minor things will change. Organisation must work on trust/collaboration.

Interview Transcript – Interviewee No. 5

Q1. What are the first thoughts that come to mind when I mention the term “knowledge management” (KM)?

[Interviewee No. 5] Knowledge management is composed of two words, knowledge and management. So my understanding is how you make the best use of knowledge to obtain results and improve the organisation work flow. In this way knowledge obtained from teams, different departments and other organisations is shared so as to improve the workflow. If knowledge is not shared, the organisation will not succeed.

Q2. Is your organisation doing any initiatives it describes as “knowledge management or KM?”

[Interviewee No. 5] Yes, we have initiatives termed as KM but how much we are in practice implementing them leaves to be desired! There is some form of knowledge sharing between multidisciplinary team. However, the political, structural and financial agendas of our organisation ‘suffocate’ knowledge because sometimes it is not convenient to make available certain knowledge!

[At this stage of the interview, interviewer introduces to the interviewee a simple definition of KM as used in his research – the interviewee is given time to go through it carefully]

Q3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management?

[Interviewee No. 5] Knowledge initiatives to increase service and efficiency in the public sector. You can use knowledge to make financial savings. We have a lot of knowledge such as policies and practices – not so much about knowledge in people. Knowledge creation and organisation we are way back. Knowledge protection we are almost there. However government departments tend to work in silos. We don't work together between different departments. There is a lot of wasted knowledge which is not shared between different departments.

Q4. Do you feel that your organisation's business strategy incorporates a sound knowledge management/knowledge strategy?

[Interviewee No. 5] No it does not incorporate a sound KM strategy. It is a pity because there are knowledgeable people and their knowledge is lost.

Q5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation?

[Interviewee No. 5] Reaction time of IT support staff is ok. IT level of organisation has greatly improved in the last years. I feel that IT is still a bit lacking from software side with regards to tailor made packages. There is lack of tailor made software to cater for our needs. There is the requirement of competent people who filter IT initiatives which are important for organisation. However on the whole, IT has proved and is satisfactory.

Q6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?

[Interviewee No. 5] Training - external training is done but one to one training is lacking. It is important to introduce new staff to the systems of the organisation and new staff rotates for the first year so as person gets basic knowledge of the department. In this way, you appreciate other people's work and work improves.

Q7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation?

[Interviewee No. 5] Without trust between different departments there will not be collaboration so person does everything himself creating bottlenecks. It will reduce the organisational efficiency. Organisations must have procedures that instil trust in employees so as employee feels trusted and feels part of the organisation. Organisation must instil trust in employee. Organisation must trust employee and vice versa. Unfortunately we are in a stage where employee does not trust organisation. When someone shows initiative he is stunned by organisation and this reduces trust. So employee is not happy and does not collaborate.

Q8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation?

[Interviewee No. 5] Collaboration without trust can occur but with trust the flow of processes and the general work practices improve. With trust and collaboration working in harmony, the organisation will be more efficient. I worked and collaborated with knowledgeable people that I did not trust. I trusted his know how.

Q9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 5] Formalisation helps if you have personnel that is loyal to the organisation. I do agree however with a formalised way of proceeding e.g. SOPs, rules etc. However, a too rigid organisation that does not have leeway for exception, the formalisation can hinder effectiveness e.g. urgent delivery of a medicinal product. A formalised structure must also leave space for some exceptions to the rule in Pharma sector.

Q10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 5] I agree with a centralised organisation personally. Policy must be set by top management. However decision making must be decentralised. The vision and strategy must be set by top management but then there must be decentralisation of decision making to departmental managers. Policy and vision must be centralised but decision making at lower levels can be decentralised. You need balance. There must be top management to stir the boat or you will have anarchy. We must acknowledge that a one size fits all policy is not acceptable.

Q11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies?

[Interviewee No. 5] It is human nature that one feels satisfied when recognised as expert. But I also think that there should be the extrinsic part too to compliment that praise received.

[Interviewer] So you think there should be a mix of the two?

[Interviewee No. 5] Yes but not at the same time. Start with intrinsic than complement that with extrinsic e.g. promotion. This happens also in private sector when one feels he cannot move forward from a monetary point of view

Q12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?

[Interviewee No. 5] In our organisation the majority of the time people with skills are placed in roles that don't match their skills. We just fill the vacancy! We don't try to match skills with roles. This is lacking. It is a pity because a lot of knowledge is lost.

Q13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation?

[Interviewee No. 5] Charismatic and inspirational – Yes. However, I feel that top management is not considerate of employees. In general, there are certain policies which help being considerate e.g. maternity leave. Government is more considerate. Current leadership is charismatic and inspirational but if you do not see the results expected from that charisma and vision propose, then there is a problem. Charisma should tie with results.

Q14. Do you feel that your organisation is making the best possible use of its knowledge capabilities?

[Interviewee No. 5] Definitely no - as already discussed above.

Q15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible?

[Interviewee No. 5] We are still at a stage where people resist technology such as emails. We still have old processes that are outdated and which hinder organisational processes. If there is a new process which is valid why continue using old outdated practices? There is resistance to change. What was applicable years ago is not applicable now.

Q16. Are you satisfied with the degree of knowledge protection that your organisation has in place?

[Interviewee No. 5] Even though in the last years there was a degree of knowledge protection, this is used in a wrong way because protection is stifling sharing. Knowledge protection must be more specific. There is knowledge protection for sensitive data but at the same time there is knowledge which is being 'protected' when this should be shared. There should be more selection on what should be protected or not. We sometimes mix data with knowledge. Some protection that applies to data should not apply to knowledge. Sensitive data which needs protection is being protected but I feel we have gone too far.

Q17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful?

[Interviewee No. 5] Bluntly placing it – no, we don't have. It is only done when problems arise and we try to identify problem. We are not proactive and we do not validate processes or initiatives that the organisation takes. Also, the flow needs to be measured because one department can cause bottleneck in another. So metrics would identify this. We are reactive but we need to be more pro-active.

Q18. Finally, where do you see your organisation's position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation?

[Interviewee No. 5] I hope that there is a future for KM. I am convinced there is but I hope it is implemented in our organisation. Previous history shows that in the next five years there will not be progress – but I hope that I am wrong! There is no continuity even with political change and so I feel that KM initiatives will take longer to be introduced. Politicians need to be more continuous and have a common policy on KM.

Interview Transcript – Interviewee No. 13

Q1. What are the first thoughts that come to mind when I mention the term “knowledge management” (KM)?

[Interviewee No. 13] I understand those fine aspects of work which are difficult to concretise – nearest we go are the Standard Operating Procedures (SOPs). It also involves the competences of the individuals – the intrinsic aspects of knowledge that you need to codify. Putting this into practice at the place of work can be difficult because there are a lot of aspects to cater for such as ethical aspects.

Q2. Is your organisation doing any initiatives it describes as “knowledge management or KM?”

[Interviewee No. 13] Yes we have in house training, CPD sessions. We issue circulars. From a technical side, we have SOPs and induction period for new recruits. Organisations are complex and you need a good training programme. Also, when person leaves the organisation we lose that expertise. Unfortunately, in Malta we are lacking on this. Each employee is a ‘knowledge worker’ holding vast amounts of knowledge.

[At this stage of the interview, interviewer introduces to the interviewee a simple definition of KM as used in his research – the interviewee is given time to go through it carefully]

Q3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management?

[Interviewee No. 13] Yes – I can mention databases. You need to have a good backbone of IT system. In this way with databases we can access knowledge when required. Unfortunately they do not cascade down.

Q4. Do you feel that your organisation’s business strategy incorporates a sound knowledge management/knowledge strategy?

[Interviewee No. 13] No we do not have this – something which I would like to be involved in. Unfortunately in the public sector we tend more to be reactive than proactive e.g. falsified medicines directive which will put

stress IT and HR. It would definitely help to align KM/ Knowledge strategies with business strategies.

Q5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation?

[Interviewee No. 13] I am quite happy but I feel we can improve. With regards to IT support vis a vis personnel, I am very happy. However, I think we are lacking in tailor made software packages.

Q6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?

[Interviewee No. 13] External training is important, and we tap that. E.g. CDRT training courses. However, I would like to see more of these external courses offered which are more tailor made for the Pharma sector. Mentoring is very important. Since we are a very information dense and knowledge intensive environment, we have different types of workers. These people have roles that overlap and hence we expose them to the work environment, making clear to them these roles and when to seek higher authority or professional advice. I think we need to formalise more this type of training. We need to structure more our training regime. It must not be left to the manager of a section to do it on a voluntary basis.

Q7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation?

[Interviewee No. 13] Trust is the oil of the engine. This has to be mutual between top management, employees and vice versa. Also between employees themselves. Cultivation of trust is important or else the organisational structure will collapse dismally.

[Interviewer] Do you feel that there is lack of trust stemming from our Maltese culture?

[Interviewee No. 13] Sometimes mistrust comes from the concept of fear. Trust can be gained by being fair and by instilling culture of learning from mistakes (lessons learned). Managing by example.

Q8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation?

[Interviewee No. 13] I reiterate. Trust is the most important thing in the organisation. There can be no collaboration without trust.

Q9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 13] I feel that in a knowledge based organisation such as the Pharma sector, it is vital that you have a formalised organisation so as everyone relates to rules, regulations, procedures etc.

Q10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 13] World is moving towards a flatter hierarchy. Although regulations can be set by top management, their implementation must be done by ground workers. So decentralisation of power is important. However, problems must be referred to a central authority or else we will have a lot of monoliths moving in different ways.

[Interviewer] So centralisation of administrative power but professional decision making is decentralised?

[Interviewee No. 13] Yes – I agree since strategy and vision must always come from top management. Top management can then consolidate grass roots so as strategy and vision can be implemented by lower level staff.

Q11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies?

[Interviewee No. 13] Yes undoubtedly. We have a lot of professionals that crave recognition. We are not recognising our experts and I feel that rewarding by means of recognition is important. I feel that if this issue is not tackled, I fear that people may get alienated and this will affect performance. Why should people only speak to you to tell you what should have been done better and never praising an employee when he shares his knowledge or perform well on a project?

Q12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?

[Interviewee No. 13] Certificates sometimes do not represent how much you are capable at a professional level. You must gauge the lacunas of an employee so as you can help him garner those skills. I therefore think that employees are sometimes not adequately skilled to perform tasks required of them. I also feel that matching of skills depends on the size of the organisation and knowledge pool of employees available.

Q13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation?

[Interviewee No. 13] Yes I feel that leaders must have charisma and inspiration. I feel confident about my leadership's charisma and inspiration skills and yes I feel top management is considerate. I am very satisfied with my top management.

Q14. Do you feel that your organisation is making the best possible use of its knowledge capabilities?

[Interviewee No. 13] You always have to keep in mind that you can improve things. You cannot sit on your laurels! I would like to see more projects that disseminate knowledge. But these require HR. In a clinical setup we have worked to improve multidisciplinary teams to help disseminate knowledge.

Q15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible?

[Interviewee No. 13] I don't feel there is enough impetus. I feel that our IT system can be improved and I would also like to see the organisation recruit someone who is responsible for documentation.

[Interviewer] A knowledge officer?

[Interviewee No. 13] Yes – exactly. This would help archive superseded information and keep knowledge bases up to date. I think we require a culture change.

Q16. Are you satisfied with the degree of knowledge protection that your organisation has in place?

[Interviewee No. 13] I don't feel that competent on this. We always try to instil culture of data protection and knowledge protection and we follow these regulations.

[Interviewer] So knowledge protection awareness cascades down through the whole organisation?

[Interviewee No. 13] Yes – definitely. There is a lot of awareness on this nowadays.

Q17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful?

[Interviewee No. 13] Yes these are important for e.g. KPIs. It is important sometimes to quantify because it is mainly a qualitative work. We do have financial metrics and customer complaints/satisfaction metrics. This helps gauge the performance of the organisation.

Q18. Finally, where do you see your organisation's position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation?

[Interviewee No. 13] KM is the future! I don't have a crystal ball but the world is moving towards a knowledge world. I feel we need to prepare better to embrace KM initiatives for e.g. by improving training. We must embrace challenges and e.g. not be afraid to use IT.

Interview Transcript – Interviewee No. 15

Q1. What are the first thoughts that come to mind when I mention the term “knowledge management” (KM)?

[Interviewee No. 15] Everyone has a lot of knowledge residing in him. In a knowledge intensive and ever changing environment such as the pharma sector, it is important to find means to manage this knowledge. How to tackle communication of knowledge. What is the knowledge available and how can it be transmitted?

Q2. Is your organisation doing any initiatives it describes as “knowledge management or KM?”

[Interviewee No. 15] I feel that we started tackling KM initiatives by improving the dissemination of knowledge to interested parties through IT support such as via social media. However, we definitely need to improve!

[At this stage of the interview, interviewer introduces to the interviewee a simple definition of KM as used in his research – the interviewee is given time to go through it carefully]

Q3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management?

[Interviewee No. 15] Yes I feel that there are processes that try to tackle the KM processes. Knowledge creation – trying to share knowledge that is available to a large audience. Knowledge organisation – there is knowledge but this may not be arranged in a meaningful way. Knowledge protection – I feel we are tackling this but knowledge application we still have have work to do so as we make the best use of our knowledge. I feel that we should be reaching more our clients (patients) than we are today. We need to promote the good work we are making because sometimes we ar content with ‘good news is no news’ only.

Q4. Do you feel that your organisation’s business strategy incorporates a sound knowledge management/knowledge strategy?

[Interviewee No. 15] No I don't think so. There is no structured strategy as part of the business strategy.

Q5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation?

[Interviewee No. 15] Yes, our internal IT support is extremely helpful. However, I feel that we should tap social media.

[Interviewer] So you feel that social media helps in knowledge sharing and this is lacking?

[Interviewee No. 15] Yes – social media and communities of practice are practically nonexistent. Even the fact that we are fragmented and not in one building is a hindrance. We lack also software which can help us share knowledge.

Q6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?

[Interviewee No. 15] Yes both mentoring and external training are available. I feel that we should introduce rotation in the first few years of employment since this exposes employees to the different jobs available widening their skill base and improving their tacit knowledge. Exposing employees directly to different work scenarios will help them appreciate the complexities of working in the Pharma sector and prepare them better for work. To be more effective, you have to have a global view of the work scenario.

Q7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation?

[Interviewee No. 15] I feel that there are different levels of trust, differing from one person to another. There will be other entities that you have to collaborate with even though you don't trust. The relationship there will be more stressful/less productive and prone to problems. You have to build trust – I feel that training/exposure plays a role here – joint training between entities. It's crucial to have trust.

[Interviewer] Do you feel that this lack of trust is more problematic in interdepartmental relationships?

[Interviewee No. 15] Not only – I feel it also inside the organisation. To gain trust of employees first you have to gain their respect. Once there is trust you can collaborate more and share knowledge. Once you start getting mistrust, you start building walls between us.

Q8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation?

[Interviewee No. 15] Trust and collaboration are distinct but at the same time they are intimately linked. The more trust you have, the better the collaboration.

Q9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 15] In the Pharma sector you have to be formalised since we are highly regulated and we need to ascertain quality of end product to patient.

[Interviewer] So the fact that rules and regulations are established they help the effectiveness of the organisation?

[Interviewee No. 15] Yes, definitely.

Q10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 15] There must be a balance. It is important to have a central authority that is defined but the decision making is decentralised to trusted people. Trivial administration issues must be decentralised. The important thing to consider is the gravity of the decision for e.g. financial & strategy aspects must be centralised. Professional decisions can be decentralised to trusted professionals in the organisation.

Q11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies?

[Interviewee No. 15] I feel very strongly about intrinsic rewards and I find that we are very lacking. I feel that officially however, such initiatives may be a double edged sword. From a personal experience I can tell you that the envy I was exposed to after being praised publicly was terrible. So I feel that intrinsic rewards must be done on a spontaneous, genuine basis and not on an official basis

Q12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?

[Interviewee No. 15] I see this as a problem.

[Interviewer] So you feel there is room for improvement on this.

[Interviewee No. 15] Yes! A lot of people are doing what they are doing because they were placed there and not because they were skilled to do so.

Q13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation?

[Interviewee No. 15] I feel top management ticks all the boxes. Obviously no one is perfect but our top management does the outmost to be charismatic, inspirational and considerate taking into consideration the daily pressure they are subject to.

Q14. Do you feel that your organisation is making the best possible use of its knowledge capabilities?

[Interviewee No. 15] You can never be happy – there is always room for improvement. We have made improvements in our communication with stakeholders but there is work to do.

Q15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible?

[Interviewee No. 15] It depends on the type of knowledge. I feel that there is a lot of fragmented knowledge which is not organised and readily accessible. Also we sometimes have problems of access. I feel that we need to have better traceability and accessibility of knowledge. We have limited visibility of the knowledge we require to work with – e.g. records of prescribing trends. In this globalised world, we must have accessibility to our knowledge throughout, even on an inter-organisational level.

Q16. Are you satisfied with the degree of knowledge protection that your organisation has in place?

[Interviewee No. 15] Yes, I am satisfied with the level of knowledge protection. We have different levels of access and organisational culture that knowledge must be protected.

[Interviewer] So day to day function you feel knowledge protection is acceptable?

[Interviewee No. 15] Yes.

Q17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful?

[Interviewee No. 15] There is the will to have metrics such as KPIs but with the current load of work, each individual has, it is difficult to implement.

Q18. Finally, where do you see your organisation's position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation?

[Interviewee No. 15] Without KM the organisation would die in today's knowledge world! We are a knowledge intensive organisation where people have knowledge. An organisation which does not have an effective KM is doomed to fail!

[Interviewer] So you believe that in the next 5 years there will be more KM initiatives?

[Interviewee No. 15] Yes but I feel that unless we have people in charge of KM and KM is part of business strategy, KM initiatives will remain being haphazard and off the cuff.

Interview Transcript – Interviewee No. 16

Q1. What are the first thoughts that come to mind when I mention the term “knowledge management” (KM)?

[Interviewee No. 16] Knowledge management involves building your personal development. It can be on different levels. It can be on an academic level, building your own field of expertise and on a personal level – coaching/mentoring. In other words, building your own knowledge and expertise in your line of work.

[Interviewer] So you see the focus on knowledge but also involving the organisation & IT?

[Interviewee No. 16] Yes. All that is required to build yourself to perform better.

Q2. Is your organisation doing any initiatives it describes as “knowledge management or KM?”

[Interviewee No. 16] Yes. I feel that we have procedures such as coaching, mentoring and change management. The organisation only focuses on those initiatives that have to be done by law. The soft skills are made available for you to tap in of your free will.

[At this stage of the interview, interviewer introduces to the interviewee a simple definition of KM as used in his research – the interviewee is given time to go through it carefully]

Q3. After reviewing this definition of knowledge management, is it the case that your organisation is taking initiatives that, although not called knowledge management, fall under this definition of knowledge management?

[Interviewee No. 16] Yes because what we do involves people, processes and technology. Also the KM processes are involved and the goal is to achieve effectiveness. So, I feel that after reading this definition, initiatives taken fall under KM, but they are not termed KM.

Q4. Do you feel that your organisation’s business strategy incorporates a sound knowledge management/knowledge strategy?

[Interviewee No. 16] The people are the core of the organisation that help it achieve its goals. So Human Resources (HR) is part of the business strategy so I feel that KM initiatives related to people are in line with our business strategy.

Q5. Technology is an important factor that is a mainstay in any knowledge management initiative. Are you satisfied with the level of IT support provided by your organisation?

[Interviewee No. 16] IT support is very strong. Since we are part of global company all we do is online. IT people are located in another country. Personally, I feel that if we have a local IT person it would be better. However, we never had problems with hardware/software and I am happy with how we are.

Q6. Learning is an important factor associated with the creation of knowledge. Do new recruits receive in house training from more experienced employees (mentoring) and external training (eg. To utilise IT systems)?

[Interviewee No. 16] New recruits have 2 weeks basic training which is common to all departments and levels of the organisation. Then there is specific training program for each and every function. The training takes about 3-6 months depending on individual and need of individual. During this period, person is shadowed/mentored and also exposed to other departments so as there is knowledge sharing. Also, we have a culture of job rotation.

[Interviewer] So you feel that the tacit knowledge and experience of an individual are captured and if the employee leaves it is not that big a loss?

[Interviewee No. 16] Yes, they are even taught how to handle problems i.e. best practices. Experience is passed on the job such as lessons learned.

Q7. Would you consider lack of trust/collaboration as the biggest cultural barrier to knowledge management in your organisation?

[Interviewee No. 16] You can collaborate and not trust. I don't trust but we have a target and we need to reach it so we collaborate. When you work with a team of people where you are open and trustful, the collaboration is easier and smoother and the outcome is much better. I feel it depends on the individual character. You can build trust by showing it yourself. You must make people comfortable to show their weakness and not be afraid of being weak and show that – for e.g. you can make mistake and you do not know how to do something – ok it's

not the end of the world! You must build trust to have the best collaboration and the best outcome.

[Interviewer] You feel that at the basis of a good collaboration there must be trust?

[Interviewee No. 16] Yes – definitely.

Q8. Would you differentiate between trust and collaboration or do you consider them as having the same function in your organisation?

[Interviewee No. 16] Trust and collaboration are tied together but they may not necessarily be both present.

Q9. Do you agree that a formalised organisation that strives to follow set rules, regulations and procedures would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 16] In the pharmaceutical sector you must have a formalised organisation. It is a must because we are a very strict industry with rules and regulations to abide with.

Q10. Do you agree that a centralised organisation where the decision making power is concentrated at the top levels of the organisation would be a more effective organisation? Do you think such an organisation would be better suited for knowledge management?

[Interviewee No. 16] You have to have a centralised organisation responsible for core function but at the same time for things to move more smoothly you cannot have every single decision go through top management since industry is very vast and you have to respond quickly.

Q11. Intrinsic rewards such as praise and recognition are considered as HR policies that promote knowledge sharing between employees. Do you agree with this statement? Does your organisation employ such policies?

[Interviewee No. 16] Yes, I feel that intrinsic rewards are important. The organisation has a policy for intrinsic rewards. Besides praise we have an official rewards and recognition program.

[Interviewer] So you feel it has a positive effect?

[Interviewee No. 16] Not just that but I feel it is also the right thing to do. If a person goes the extra mile and shares expertise it is only right to praise that individual. In fact, we have a program called achieving

sustained performance through innovation, recognition and empowerment.

Q12. Do you feel that the employees within your organisation are adequately skilled to perform tasks required of them?

[Interviewee No. 16] Yes – they are adequately skilled to do the tasks required of them. If you have an employee with a development gap you create a development plan so as that person reaches the skill level required.

[Interviewer] So the organisation tries to match skills with tasks required?

[Interviewee No. 16] Yes this is done at interview stage too. For e.g. you cannot recruit a person for regulatory affairs and then place that person in marketing. The skill set required is very different.

Q13. Do you feel that the leadership of your organisation is charismatic and inspirational? Is it considerate towards the individual needs of employees within your organisation?

[Interviewee No. 16] I feel that leadership ticks all the three requisites. Leadership has to have vision and know how to project it. Leadership must always lead by example and put words into action. Nowadays, it is a must for a leader to be considerate – that you have a life beside the organisation and you have individual needs.

Q14. Do you feel that your organisation is making the best possible use of its knowledge capabilities?

[Interviewee No. 16] Yes but there is always room for improvement. The knowledge capabilities of the people who are being trained. It is up to the management to put it there where they best fit. You do training with a scope in mind or a personal development program is done with a scope in mind. You do not do it just to do it.

[Interviewer] So the organisation emphasises people aspect through training and uses IT as a backbone to implement this?

[Interviewee No. 16] Yes and then you have the legal/regulatory aspect of the Pharma sector. They go hand in hand.

Q15. Are you satisfied with the way that your organisation deals with redundant knowledge? Do you feel that the knowledge resources of your organisation are up to date and easily accessible?

[Interviewee No. 16] Yes, they are continuously changing and all the time improving and you have to do the effort to keep up to date.

[Interviewer] So organisation gives importance to knowledge not being redundant and always up to date and accessible? Do you have a person taking care of this?

[Interviewee No. 16] Globally, yes and at a local level we have procedures and Standard Operating Procedures which put an obligation on us to update.

[Interviewer] It is ingrained in the organisational procedures?

[Interviewee No.16] Yes, definitely.

Q16. Are you satisfied with the degree of knowledge protection that your organisation has in place?

[Interviewee no. 16] Yes the organisation has also procedures on this so as knowledge is protected. All is password protected and we have different levels of access. The organisation is very meticulous on this. Protection is very good.

Q17. Does your organisation have any metrics in place that measure its effectiveness say on a yearly basis? Do you feel that such metrics are/would be useful?

[Interviewee No. 16] Yes the organisation is very keen on metrics. From simple metrics to employee survey, 360° surveys, organisational climate surveys. These are done on a yearly basis.

[Interviewer] So you feel that metrics are important?

[Interviewee No. 16] Yes – definitely they are important.

Q18. Finally, where do you see your organisation's position vis-a-vis KM initiatives in the next 5 years? Do you see a future for knowledge management in your organisation?

[Interviewee No. 16] KM will become more important with how the world is moving forward and the vast amount of knowledge we deal with in the Pharma sector. Yes, I see a strong future for KM.