The influence of the supportive learning environment on the association between the knowledge management processes and continuous innovation in the UAE financial sector

تقييم أثر بيئة التعليم المدعّم على العلاقة بين "عمليات المعرفة الست " و "ديمومة الابتكار" في القطاع المصرفي لدولة الامارات العربية المتحدة

by

NOORA MOHAMMED SAEED ALSHAMSI

A thesis submitted in fulfilment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY IN PROJECT MANAGEMENT
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Thesis Supervisor
Professor Halim Boussabaine

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ABSTRACT IN ENGLISH

This thesis examines the influence of supportive learning environment on the association between the six knowledge processes and continuous innovation in the UAE financial sector. A conceptual model of the connections between knowledge management processes, supportive learning environment and continuous innovation was presented. The posited hypotheses were then tested statistically, using a survey dataset of 114 assistant mangers and above from the UAE financial sector.

Several statistical tests were carried out in this study. For example, relationships between knowledge processes variables and continuous innovation variables were inspected using Pearson Correlation tests. Whereas, Multiple Regression Analysis was carried out to determine the extent to which changes in the value of knowledge management processes were associated with changes in continuous innovation. To test the mediation effect in order to investigate if supportive learning environment mediate the relationship between knowledge management processes and continuous innovation, Multiple Regression Analysis was carried out using the Baron and Kenny (1986) method.

The result showed that while the combined knowledge processes have a beneficial impact on continuous innovation, knowledge capturing, storing and applying impact continuous innovation the most. In addition, supportive learning environment partially mediates the impact of capturing, storing and applying on continuous innovation. The findings could help scholars and practitioners to assess the likelihood that implementation of supportive learning environment initiatives will be successful or will increase the association between knowledge management processes and continuous innovation. Findings of this thesis suggested that mediation analysis is fruitful avenue for further research that may lead to a better understanding of such complex phenomena as knowledge processes and continuous innovation. The study is limited to UAE financial sector, consequently, generalization of the results to other sectors is challenged.

خلاصة البحث

تقدم هذه الرسالة البحثية فهما موضوعيا لتأثير بيئة التعليم المدعّم على العلاقة بين "عمليات المعرفة الست" و"ديمومة الابتكار" في القطاع المالي لدولة الإمارات العربية المتحدة. حيث انها تقدم نموذج فكري للعلاقات بين "عمليات إدارة المعرفة" وبيئة التعليم المدعّم وديمومة الابتكار. وأختبرت الدراسة فرضية العلاقة المذكورة إحصائياً بالاعتماد على مجموعة بيانات مسحية اشتملت على 114 مشارك تترواح رتبهم الوظيفية بين "مدير مساعد" الأ قمة الهرم المؤسسي في القطاع المالي و المصرفي لدولة الإمارات العربية المتحدة.

و قامت هذه الدراسة على استخدام عدة اختبارات احصائية كدراسة العلاقة بين متغيرات عملية المعرفة و متغيرات الابتكار المستمر وتحليلها بطريقة "Pearson correlation test " . كما تسخدمت اختبار الانحدار الاحصائي المتعدد لقياس مدى تأثير تغيرات قيم عمليات ادارة المعرفة على ديمومة الابتكار. الى جانب قيام الدراسة باختبار قدرة بيئة التعليم المدّعم على الربط بين عمليات ادارة المعرفة و الابتكار المستمر (Kenny& Baron 1986)

أظهرت نتائج البحث في المحصلة أنه على الرغم من أن عمليات ادراة المعرفة لها تأثير ايجابي على ديمومة الابتكار ، الا ان عمليات حصد، تخزين و تطبيق المعرفة له الاثر الاكبر على الابتكار . كما أظهرت الدراسة أن بيئة التعليم المدّعم تسهم بشكل جزئي بالربط بين تأثير عمليات حصد ، تخزين و تطبيق المعرفة من جهة و ديمومة الابتكار من جهة أخرى. و استنتاجا فان هذه نتائج الدراسة يمكن أن تساعد الباحثين والممارسين على تقييم احتمالية نجاح تنفيذ مبادرات بيئة التعليم المدعم و الربط بين عمليات إدارة المعرفة والابتكار المستمر. بالاضافة الى استنتاج الدراسة لاهمية و فعالية "تحليل الوساطة" لفهم العلاقات المعقدة كديمومة الابتكار و بيئة التعليم المدعم. في النهاية تجدر الاشارة بأن نتائج هذه الدراسة تنحصر في القطاع المالي و المصرفي لدولة الامارات العربية المتحدة فقط.

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Last but not least, my deepest gratitude goes to my beloved parents and family for their endless love, prayers and encouragement. It was because of all the love, kindness, encouragement and unwavering support of all these people that have allowed me to achieve this momentous success. You always will be a part of my life.

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List of abbreviations

BPR	Business Process Reengineering
CAI	Computer Aided Innovation
CI	Continuous Improvement
CI	Continuous Innovation
CIMA	Euro-Australian co-operation centre for Continuous Improvement and innovation Management
CKM	Customer Knowledge Management
CLT	Central Limit Throrem
CPI	Continuous Product Innovation
CRM	Customer Relation Management
EuroCINet	The European Continuous Improvement Network
ICT	Information and Communication Technology
IMPs	Innovation Management Practices
IT	Information Technology
KBV	Knowledge-Based View
KM	Knowledge Management
KMAI	Knowledge Management Assessment Instrument
KMS	Knowledge Management System
LCQ	Learning Climate Questionnaire
LDQ	Learning Diagnostic Questionnaire
LO	Learning Organization
MCS	Management Control System
OLD	Organizational Learning Disorders
PACE	Patient Access to Cancer care Excellence
PI	Product Innovation
R&D	Research and Development
RBV	Resource-Based View
SECI	Socialization, Externalization, Combination, and Internalization
SEM	Structural Equation Modeling
SMEs	Small and Medium Enterprises
TQM	Total Quality Management
UAE	United Arab Emirates
UBD	UAE Banks Federation
US	United State
VIF	Variance Inflation Factor

1. Chapter One: Introduction

1.1 Introduction

This chapter starts with introducing the study background, which is primarily about knowledge management processes and continuous innovation. It also lists the research aims, objectives, and questions. This chapter moves further to describe the context of this study, which is mainly performed in the United Arab Emirates (UAE) financial sector. It also points out the significance of the current research. The chapter concludes with brief details about the structure of this thesis.

1.2 Research background

Knowledge management has gained academic legitimacy on the back of Nonaka and Takeuchi (1995) work and Davenport and Prusak (2000). Since then, knowledge management has emerged as one of the most important and influential on organizational practices. Effective knowledge management in organizations involves a combination of technological and behavioral elements (Andreeva & Kianto 2011) . Knowledge management is about managing the different processes of knowledge including creating, capturing, organizing, storing, disseminating and applying (Bagher et al. 2016). Explicit knowledge and tacit knowledge should be taken into consideration as both of them are critical to understand in the knowledge management and its processes. Managing those processes in organizations may not be an easy task, and organizations need to employ numerous mechanisms to achieve such as state. Up to date there is little research that combined all the knowledge management processes (Bagher et al. 2016). Attention was given to three or four processes and very rare studies included the six processes of knowledge management (Lawson 2002; Andreeva & Kianto 2011; Abdi & Senin 2015; Bagher et al. 2016) Therefore, this study will expand the literature on knowledge to investigate the knowledge management and its six processes contribution to innovation outcomes.

Drawing from knowledge management literature, research has acknowledged that effective management of knowledge processes can enhance innovation (Nonaka & Takeuchi 1995; Mitchell et al. 2001; March & Stock 2006; Holtom et al. 2008). Innovation within organizational context can be refereed to creation of either new process or a new product or service which will have an impact on the way the organization conduct its business (Clegg et al. 2008). In similar vine, Asce et al. (2004) refers to innovation on organizational level as the “generation, development, and implementation of the ideas that are new to an organization and have practical or commercial applications”. The continuous innovation is categorized with ongoing process that aim at improving the organization performance in order to stay competitive. Prior research suggests that explicit and tacit knowledge promotes continuous innovation in organizations (Hall & Andriani 2003). Therefore, within the context of any organization, this relationship is important in order to stay competitive. Knowledge management and its processes are potentially beneficial to continuous innovation when practiced in effective way (Bagher et al. 2016; Frezatti et al. 2017). The success of an organization lies on its ability to utilize and integrate continuous innovation and knowledge management processes in its system and policy (Bagher et al. 2016). Recent research suggest that inter organizational collaboration in the context of innovation, concepts of organizational environment play a critical role. Nurturing positive organizational environment or climate through innovation and knowledge management association can impact the organizations drastically (Erhart & Kuenzi 2017). Research acknowledges that environment or climate in organizations is one of the most difficult areas to develop or change (Roffe 1999; Garvin et al. 2008; Battistella et al. 2017). Indeed, it requires a full commitment from senior management.

The concept supportive learning environment is critical in enhancing the relationship between knowledge management processes and continuous innovation. Organizational learning environments can be nurtured by placing care and effort into certain areas during building the strategy of knowledge management processes and innovation (Joshi et al. 2010; Pemsel & Müller 2012).

Literature suggests that more investigation into knowledge management processes and innovation is required and more empirical studies should be conducted (Gloet & Terziovski 2004; Dahiyat 2015; Turulja& Bajgorić 2018).

1.3 Thesis context

The thesis has studied knowledge management processes and continuous innovation association within the context of United Arab Emirates (UAE) financial sector. This has included the mediation impact of the supportive learning environment on association between knowledge management processes and continuous innovation. Furthermore, several contingencies that could impact the interrelationships between knowledge processes and innovation performance has been under researched area (Andreeva & Kianto 2011; Dahiyat 2015; Bagher et al. 2016; Turulja & Bajgorić 2018). Therefore, this research has addressed this gap. In order to address this gap, a quantitative research approach would be adopted as it would provide a more rigorous empirical results. The analysis has covered a wide range of participates working in different financial industries and different organization types such as banks, investments, insurances, financial houses and exchange houses.

The financial sector in the UAE started to witness valid expansion when the exploration of oil reserves started in the early 1960s. The financial sector first started with introducing only the banks. Indeed not until 1980s exchange houses, investments, insurances, financial houses has started to enter to the UAE market. Since then, the expansion of this sector has been tremendous and UAE has become known as the key financial hub of the Middle East.

Banks, investments, insurances, financial houses and exchange houses have been critical in the financial system entities of every economy (Ghair 2009). Therefore, it would be critical to manage the financial system in effective and efficient way in order to create a developed economy. The financial sector in the UAE at its growth phase, therefore, performance of those entities could affect the economy. Previous studies have focused on banks (eg. Hashimi 2007; Al-Tamimi & Charif 2011; Miniaoui & Gohour 2011) in great level of details and neglected other financial sector entities such as investments, exchange houses, insurances and others.

Within the context of financial sector in the UAE, this topic has been critical. First, knowledge management processes have been important to be managed in the most effective way in the financial sector in the UAE because it would help them to find, select, organize, share and apply critical information and expertise that would be critical for numerous practices such as problem solving, dynamic learning, strategic planning and decision-making (KPMGa 2018). The overall objective of the the financial sector is to improve customer satisfaction and increase revenues. Therefore, managing knowledge provides value and become a necessity for the financial sector.

The financial sector in the UAE has been considred as one of the most knowledge intensive sectors, and this is might be credited to the acknowledgment of several competitors in the market to the intellectual property (KPMGa 2018). The research pointed out that the culture of the financial sector, in addition to massive amount of knowledge and a highly regulatory environment could act as major obstacle in implementation knowledge management processes than other sectors (Miniaoui & Gohour 2011; KPMGa 2018). Within the context of the UAE financial sector, the culture could be categorized as complex as population of the UAE unique in nature which can make the implementation of knowledge management more difficult. In fact, for the year 2017, out of the 9.2 million, the expatriates holding a population share of 7.8 million whereas Emirati Nationals contributed to approximately of 1.4 million (National Bureau of Statistics 2017). This would mean that managing the various cultures would be more complicated and it needed a considerable efforts by the organizations. On the other hand, this has a very positive fact as it would mean that different knowledge perspectives can be seen. Nevertheless, effective implementation of successful knowledge management processes could be challenging. To support this point, research has agreed that even though knowledge management became a core focus for a number of industries, only a few financial institutions established efficient knowledge management processes (Dzinkowski 2001; Yasar & Kizildag 2013).

In addition, knowledge management processes could influence the continuous innovation in the organizations as knowledge provide building blocks for new ideas which are necessary to innovation (Mitchell et al. 2001; Frost 2014). Indeed, within the context of knowledge-based view, innovation has been looked at as a process of creating and implementing a novel idea in order to have a value (Trott 2005). Innovation in the financial sector in the UAE has been a must as the UAE government introduced the UAE 2021 vision.

The UAE 2021 vision could be summarized in the following statement: “In a strong and safe union, knowledgeable and innovative Emiratis will confidently build a competitive and resilient economy. They will thrive as a cohesive society bonded to its identity, and enjoy the highest standards of living within a nurturing and sustainable environment” (pg. 01).

In addition, the financial sector in the UAE has focused on several aspects of innovation such as enhancing their capabilities, focusing on the customer's related products and services, they have seen innovation as an organizational priority and partnership with external innovation suppliers (KPMG b 2018). This research has presented a new point of view since most the old research being done did not look at the Middle East which has its own flavor. As mentioned earlier, In addition, giving the fact that the population of UAE has a unique in nature, the knowledge management processes has an importance to look at as the complexity of implementing knowledge management would be a challenge.

Therefore, the expected outcomes or benefits of this thesis would be to establish this relationship and help the organizations in financial sector in the UAE in order to implement the right practices of knowledge management processes to enhance continuous innovation and provides the necessary supportive learning environment.

1.4 Research problem

Based on the review of literature, it is apparent that knowledge management processes and innovation are critical in the financial sector in the UAE. However, there is a low awareness about knowledge management concepts and processes. In addition with the context of the UAE, knowledge management practices were found to be in its infancy stage.

Innovation decreases in a great level when organizations fail to protect the knowledge as the people have no access to the memory of the organization neither the information (Dougherty & Bowman 1995; Bagher et al. 2016; Wang & Kwek 2018). In continuous innovation, knowledge capabilities are constantly upgraded to adopt to the technological and societal advances (Kollmann et al. 2009). However, the lack of research on continuous innovation, and its application in various contexts, reflects the need to further conduct studies on its uses and benefits not only in the IT and health care settings, but also in other contexts such as financial sector (Martini et al. 2012; Ovretveit et al. 2013; Saunila 2016). Financial outcomes is not only the measurement to assess the impact of knowledge management in the organization but it can include innovation performance measure (Massingham 2008; Massingham & Massingham 2014). In the same line of thoughts, Dougherty & Bowman (1995); and Obediat et al. (2016) argue that innovation decreases in a great level when organizations fail to manage knowledge management processes.

The relationship between knowledge management processes and innovation is acknowledged (Kianto 2011; Lai et al. 2014; Bagher et al. 2016). However, existing research lack in studying all the knowledge management six processes. As stated earlier, knowledge management processes and innovation requires more investigation. Therefore, this study will investigate the six knowledge management processes and their association with continuous innovation. Moreover, previous research acknowledged that the relationship between knowledge management processes and innovation is not fully explained and mediator variables need to be included to understand such relationship (Liao & Wu 2010; Wang & Kwek 2018). Therefore, supportive learning environment is thought to be linked to knowledge management research as well as innovation as per the literature reviewed.

In addition, as per the knowledge of the researcher, there is no study that investigated the influence of supportive learning environment on the association between knowledge management processes and continuous innovation. In addition, there is no single study conducted in the UAE and specifically in the financial sector. Consequently, it is important to present empirical evidence of this association in order to help the policy makers with clear picture of this contribution and the impact of this research.

1.5 Aim of the research

The purpose of this research is to investigate existence of the association between knowledge management processes and continuous innovation, specifically within the financial sector in the UAE. The role of knowledge management is inherently important for further understanding of innovative practices. To achieve this, the study suggests to uncover the various constructs that may influence the interrelationships between knowledge management processes and continuous innovation such as supportive learning environment. The thesis investigates the relationship between knowledge management processes and continuous innovation, and investigates correlations and indirect effect of supportive learning environment.

The research aimed to examine the interrelationship between knowledge management and continuous innovation and propose knowledge management model that could be used to enhance existing innovation practice in the UAE financial sector.

The aim of the thesis is accomplished through specific objectives:

1. To review existing literature review and identify and classify knowledge management processes.
2. To review existing literature on innovation and continuous innovation
3. To develop an instrument to measure knowledge management processes, supportive learning environment and continuous innovation
4. To critically investigate the relationship between knowledge management processes and the continuous innovation in the UAE financial sector.
5. To examine the mediating impact of the supportive learning environment on the relationship between knowledge management processes and continuous innovation in the UAE financial sector.

6. Propose knowledge management model that could be used to enhance existing innovation practice in the UAE financial sector.

1.6 Research questions

In the previous sector, aim of the research and objectives were discussed. Therefore, in order to achieve them, the following research questions and hypotheses was derived from the literature and examined in this thesis:

Q1: Do knowledge management six processes associate with continuous innovation in the UAE financial sector?

Q2: What is the role of the supportive learning environment on the association between knowledge management six processes and continuous innovation in the UAE financial sector?

1.7 Significance of the research

Research has acknowledged that innovation depends of the availability of knowledge. Recent concept has been discussed in the research and attracted many researchers that contribute highly in innovation; “knowledge management processes” (March & Stock 2006). Several studies have looked at the knowledge management in general and it its link to innovation (Zahra & George 2002; Zhou & Li 2012). However, this study will investigate the influence of supportive learning environment on the association between knowledge management processes and continuous innovation

The topic of knowledge management processes and its link to continuous innovation have a great value for UAE since it is a top-priority destination for work in Middle East (Abdallah et al. (2012). Knowledge management processes and its link to continuous innovation attracted the attention especially the UAE itself has a unique population flavor where the expatriates are more than UAE nationals and the chance that those people moving from one place to another could create a risk to innovation and knowledge. The failure of managing knowledge management processes cannot be only measured by financial outcomes but by lack of innovation (Massingham 2008). In the same line of thoughts, Dougherty & Bowman (1995) argue that innovation decreases in a great level when organizations fail to protect different processes of knowledge as the people have no access to the memory of the organization neither the information. The proposed research will add a great value to financial sector in UAE. This topic will present a new point of view since most the old research being done did not look at the Middle East which has its own flavor.

There are few studies have been done to explore certain aspect of knowledge and its relation to innovation such as Tsai (2001), who studied the effects of network position and absorptive capacity on business unit innovation and performance; Lichtenthaler and Lichtenthaler (2009) who investigated a capability-based framework for open innovation: Complementing absorptive capacity. Nevertheless, those studies are outdated, and the author believes that this topic will add a new value to the research agendas. In addition, it has been noticed that the studies on similar topic were heavily theoretical with limited empirical evidence. Therefore, this study will add richness to the empirical side of the research.

In addition, an extensive research from 2010 onwards has been done to look the empirical studies that have investigated similar research topic. Only few studies have been found including studies of Kianto (2011); Andreeva & Kianto (2011); Lee et al. (2013) and Bagher et al. (2016). However, none of those studies were conducted in the financial sector. Therefore, this study this research will provide an exciting opportunity to advance the knowledge of the association between knowledge management processes and continuous innovation empirically in a new sector.

Accordingly this research is set to expand the existing literature in the following areas:
The findings of this research should make an important contribution to the field of financial sector as it will be beneficial to many stakeholders to understand the important processes of knowledge management that are relevant to the sector. Also, this research will also provide an important opportunity to advance in understanding how does knowledge management processes impact the continuous innovation in the financial sector. In addition, there is an important area where this study makes an original contribution to understand the influence of supportive learning environment on the association between knowledge management processes and continuous innovation.

1.8 Organization of the chapters

Figure 1.1 presents an overview of the thesis chapters. The current thesis is organized into ten chapters. Chapter one is the research introductory chapter which includes a background to the thesis topic, context of the study and research problem. In addition the chapter highlights the aim of the research, research questions and significance of the research. Chapter two is the literature review on knowledge management processes and supportive learning environment. Chapter three is a continuity of the literature review on continuous innovation. Chapter four explains the thesis theoretical background and introduce research conceptual framework which is uses the build-up of the literature. Chapter five describes thesis methodology and justifies the use of a quantitative approach. Chapter six, seven and eight presents the results and data analysis of the thesis. Chapter nine discusses the results presented in Chapter 5, 6 and 7 and links those back to the literature review and the rest of the this thesis. Chapter ten concludes the thesis, provides the implications of the research, limitations, and provides future recommendations.

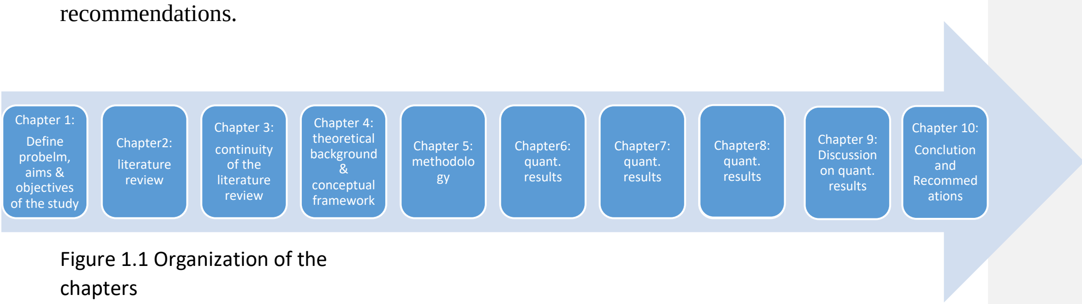


Figure 1.1 Organization of the chapters

1.9 Chapter summary

This chapter presented an overview of the research presented in this thesis. The chapter discussed the research background and thesis context. It moves then to summarizing research problem, research aim and questions. Finally, thesis significance and chapter organization were presented.

2. Chapter Two: Knowledge management processes and supportive learning environment

2.1 Introduction

The role of knowledge management is inherently important for further understanding of knowledge management processes. Knowledge management has become a critical factor in organizational management, which can further impact the competitiveness of the firm (Holtom et al. 2008). However, it should be noted that knowledge management discipline is not newly developed, nevertheless, understating the role of knowledge in enhancing knowledge management processes efforts within the organizational context is important.

Drawing from Tranfield et al. (2003) and Rowley and Slack (2004), the purpose of this chapter is to undertake a review of the literature and main theories that underpin this study. In this process, the literature review will serve as " a summary of a subject field that supports the identification of specific research questions" (Rowley & Slack 2004: p.31).

This literature review will consist of two main chapters: 1) Knowledge management processes and supportive learning environment and 2) and innovation. Under knowledge management, its definition, types, sources, knowledge management cycle, strategies and processes are discussed. Then the chapter moves to discuss supportive learning environment in which several aspects are covered such as learning organization definition, difference between learning organization and organizational learning, measuring learning organization and supportive learning environment. In the supportive learning environment, the study will focus in how to create a supportive learning environment and the distinguishing characteristics proposed by Garvin et al. (2008). Then, the literature on innovation, continuous innovation, and its internal and external drivers are discussed in the next chapter.

2.2 Background of knowledge management

Since the early 1990s knowledge management has been critical asset for organizations that are aiming to increase their productively and effectiveness (Zack 1999; Delong & Fahey 2000). Knowledge management is important part of the organization's strategy which can help an organization to leverage its resources in terms of know-how, experiences and talent. Inkpen (1996) argued that that organizations failure to manage knowledge as a critical asset could impact their performance in knowledge management.

Early in the literature, several studies have suggested that knowledge management was placed more on information technology domain (Koulopoulo & Frappaolo 2000; Grover & Davenport 2001). The later might be attributed to increased usage of computers in the second half of the 20th century which required adaption of technologies such as expert systems, information repositories and intranet. However, other researchers have looked beyond information and communication technology (ICT) infrastructures perspective, which is the softer side of knowledge management (Davenport el al 1998; Koulopoulo & Frappaolo 2000). This shift helps in enhancing the understanding of knowledge management. Indeed, many researchers looked at the knowledge management as a process rather than just information manipulation (Marshall et al.1996; Parikh 2001). Distinguishment between information and knowledge is clearly stated in Table 2.1

Information	Knowledge
Static	Dynamic
Independent of the individual	Dependent on individuals
Explicit	Tacit
Digital	Analogue
Easy to Duplicate	Must be re-created

Table 2.1 Information and knowledge adapted from Miller (2000)

2.3 Definition of knowledge

Knowledge is considered as the foundation of knowledge management. Consequently, for the effective management of knowledge, a critical understanding of the characteristics of knowledge is a required pre-requisite. A complex debate about the definition of knowledge is the subject of a dedicated branch of philosophy called *epistemology* (Zelic 2005; Jakubik 2007). One of the most widely used definition of knowledge is the top tier in a three-level hierarchy-See Figure 2.1

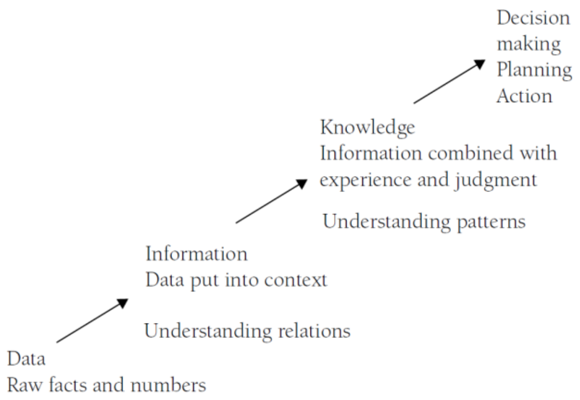


Figure 2.1 From Data to Knowledge Serban & Luan (2002), pp.9

The first level of this hierarchy begins with data (eg. Raw facts). This data is processed in different forms and its named as information which is the second level of hierarchy (Moteleb & Woodman 2007). The third level of hierarchy is the most complex level in which it is a combination of both experience and judgement that is used to make decisions; at this stage of hierarchy it is called knowledge (Kidwell et al. 2000). There are many researchers that have questioned the association between information and knowledge despite that this definition is classical in the literature (Hicks et al. 2006; Faucher et al. 2008). Faucher et al. 2008, for example, argued that the distinction between information and knowledge is ambiguous in several contexts. Therefore, several researchers attempted to define knowledge aside from the three level hierarchy. Other researchers define knowledge as a state of mind (Schubert et al. 1998), a process(Zack 1999), an object (Zack 1999), a condition of access (McQueen 1998), or a capability (Carlsson et al. 1996) and other definitions (Chang Lee et al. 2005).

In knowledge management research and other arenas, knowledge has been defined differently and many definitions for knowledge have been found highly abstract. According to Alavi & Leidner (2001), knowledge is “a justified belief that increases an entity’s capacity for taking effective action" (p.14). Furthermore, Alavi & Leidner (1999) suggested that there are several attributes for knowledge, which include: knowledge vis-à-vis information and data, state of mind, object, process, access to information, and capability (Refer to Table 2.2).

Views	Explanation	Implications
Knowledge vis-à-vis information and data	Data is fact, raw numbers. Information is processed/interpreted data. Knowledge is personalized information.	KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information.
State of Mind	Knowledge is the state of knowing and understanding.	KM involves enhancing an individual's learning and understanding through provision of information.
Object	Knowledge is an object to be stored and manipulated.	Key KM issue is building and managing knowledge stocks.
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creating, sharing, and distributing knowledge.
Access to Information	Knowledge is a condition of access to information.	KM focus is the organized access to and retrieval of content.
Capability	Knowledge is the potential to influence action.	KM is about building core competencies and understanding strategic know-how.

Table 2.2 Different Views of Knowledge According to Alavi & Leidner (1999)

While reviewing the knowledge management literature, there is a general agreement among the researchers that depending on which view of knowledge is adopted, the focus of knowledge management should be different. Alavi and Leidner (2001) pointed out that it is critical to understand knowledge as it has a direct impact on how to manage knowledge management. They elaborated that if knowledge is considered as a process, then the implied knowledge management emphasis should be more into knowledge flow and the processes of creating, sharing, and distributing knowledge. Whereas, if knowledge is viewed as an object, then knowledge management should focus upon the building and managing of knowledge stocks.

Considering the countless views of knowledge and lack of consensus of how best to define knowledge, for the purpose of this research knowledge will be defined as per Nonaka (1994) and Huber (1991) in which they viewed knowledge as a justified belief that increases an entity's capacity in order to take effective action.

2.3.1 Types of knowledge

Many researches classify knowledge types such as human knowledge, social knowledge and structured knowledge (Bhagat et al. 2002). On the other hand, Orlikowski (2002) introduced new knowledge types such as government, culture, and market knowledge. Other researchers have classified types of knowledge as personal and codified, individual and organizational, procedural and substantive, mature and immature (Blacker 1993; Bohn 1994; Nonaka & Takeuchi 1995; Spender 1996). Regardless of the many types of topic-based knowledge that have been proposed, two main categories have been established over time to refer broadly to knowledge; explicit and tacit. Michael Polanyi (1958, 1966) developed the notion of tacit and explicit knowledge classification (see Figure 2.2), whereas Nonaka and Tackeuchi are credited for further defining the characteristics of these two types of knowledge (Nonaka 1994; Koulopoulo & Frappaolo 2000; Parikh 2001).

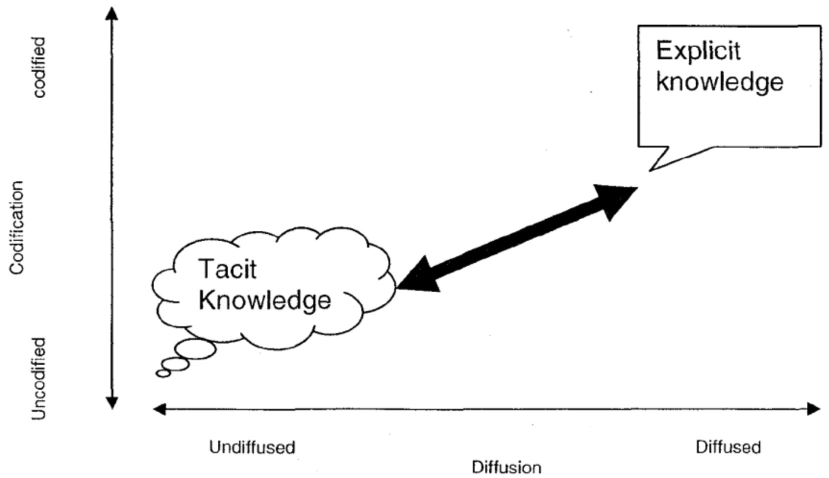


Figure 2.2 Tacit and Explicit Knowledge adopted from (Koulopoulo & Frappaolo 2000)

Explicit knowledge lends itself to recording and codification that can be stored into documents, databases and books (Rice & Rice 2005). This type of knowledge is easily shared and accessed via data retrieval among individuals in the organization (Davenport & Prusack, 1998). On the other hand, tacit knowledge is composed of several factors linked to the individual such as experience, wisdom, skills and personal knowledge (Patel et al. 2000). This type of knowledge involves intangible factors such as personal belief, perspectives, assumptions and values (Nonaka & Takeuchi, 1995). Researches acknowledged that tacit knowledge can be only shared in a social setting in a form of personal interaction. Interestingly, Becerra-Fernandez and Sabherwal (2001) found that social processes played significant role in the transfer of tacit knowledge between individuals in the organization. Therefore, workplace relationships promote the tacit knowledge (DeLong 2004).

Explicit knowledge can be documented by recording and codification, then subsequently stored into documents, databases and books (Rice & Rice 2005). This type of knowledge is easily shared and accessed via data retrieval among individuals in the organization (Davenport & Prusack 1998). Conversely, tacit knowledge is composed of several factors linked to the individual such as experience, wisdom, skills and personal knowledge (Patel et al. 2000). The retention of both explicit and tacit knowledge within an organization contributes to innovation (Hall & Andiani 2003). Table 2.3 summarize the major differences between explicit and tacit knowledge.

	Explicit Knowledge (Documented)	*Tacit Knowledge (Know-how embedded in people)*
Features	Easily codified Storable Transferable Easily expressed and shared	Personal Context-specific Difficult to formalize Difficult to capture, communicate, share
Sources	Manuals Policies and procedures Databases and reports	Informal business processes and communications Personal experiences Historical understanding

Table 2.3 Explicit Versus Tacit Knowledge adopted from Serban & Luan (2002).

For the purpose of this research both explicit knowledge and tacit knowledge will be taken into consideration as both of them are critical to understand. In addition, the knowledge management processes involve both explicit knowledge and tacit knowledge.

2.3.2 Sources of knowledge

Analysis of the source of knowledge was inspired by Davenport and Prusak (1998).

Davenport and Prusak's (1998) proposed five types of knowledge. First is the acquired knowledge which refers to the knowledge that comes from outside. For example, many organizations buy knowledge from other sources like consultants. Second, dedicated resources is another source of knowledge in which an organization selects several employees or a department such as Research and development for certain need or purpose. These dedicated resources are protected from competitive pressures in order to develop profitable products. Third source of knowledge is fusion which is shaped by selecting several employees with different perspectives and backgrounds to work on same project. Davenport and Prusak (1998) pointed out that conflicts is associated with fused knowledge. Fourth, adaptation is knowledge that results from responding to new processes or technologies in the market place. Five source of knowledge comes from networking in which people share information with one another formally or informally.

2.3.3 Knowledge creation cycle

One of the pioneering research and models being discussed in the literature is the Socialization, Externalization, Combination, and Internalization (SECI) model developed by Nonaka and Takeuchi (1995). The first stage of the model is called "Socialization" in which tacit knowledge is being shared among people via several methods such as observation, practice and participation in both formal and informal interactions. It is the stage where people start to have social interactions with each other. "Externalization" is the most critical stage of the model where tacit knowledge is transformed to explicit knowledge. This process helps the people to share knowledge with each other. This stage is classified as the creation of new knowledge as tacit knowledge is changed to explicit knowledge. "Combination" is the next process where explicit knowledge is transformed to documents and data in which storing them is easy. "Internalization" is the process of embodying explicit knowledge into tacit knowledge (Nonaka & Takeuchi, 1995). Nonaka & Takeuchi (1995) pointed out that this process is very close to learning by doing, however, it does not limit the person to learn just from doing or experiencing, it could be done by listening to other people experiences. Figure 2.3 shows the relationship of each process based on the model (Nonaka & Takeuchi, 1995).

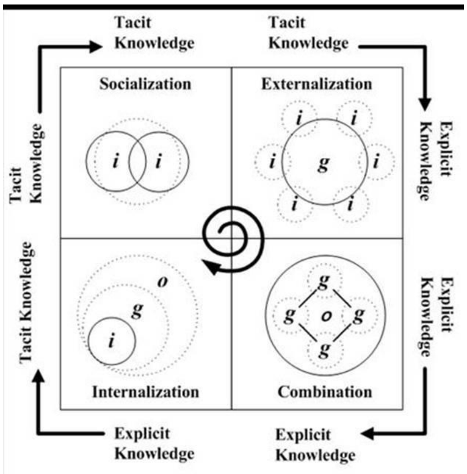


Figure 2.3 SECI model of knowledge creation by Nonaka & Takeuchi (1995)

Several researchers have criticized the SECI model. For example, Gourlay (2006) argued that SECI model is based on unclear ideas about knowledge. In addition, several empirical studies have failed to implement the model (Gourlay, 2006). Furthermore, Stacey (2001) posited that the developers of SECI model are knowledge theorists who have a strong believe that knowledge is an item. However, Stacey (2001) argued that knowledge is an active process where people choose to voluntary share it and therefore, it is hard to manage it in a system format. Despite having its challengers (Wilson 2002; Cesar et al. 2017), this model is extensively used in the literature as a foundation for discussing knowledge management.

2.4 knowledge management

Within the academia, still there is no agreement as to how ‘knowledge management’ should be explained, and the definitions that appear in the field are depend upon the researchers, their experience, background and interest (Koulopoulo & Frappaolo 2000; Parikh 2001;

Aboelmaged 2014; Bagher et al. 2016). For example, Horwitch and Armacost (2002, p. 27), defined knowledge management as "The practice of creating, capturing, transferring, and accessing the right knowledge and information when needed to make better decisions, take actions, and deliver results in support of the underlying business strategy." Whereas, Wiig (1993) referred to knowledge management as fundamentally the management of corporate knowledge and intellectual assets that can improve a range of organizational performance characteristics and add value by enabling an enterprise to act intelligently.

Knowledge management can also pertain to how organizations create, retain, and share knowledge by means of databases, procedures, documents and people's experiences (Huber 1991). Knowledge management refers to how organizations create, retain, and share knowledge (Huber 1991; Alavi & Leidner 2001). Knowledge management is a discipline that helps the organization to identifying, capturing, and retrieving and sharing information among people in the organization. The information is a combination of databases, procedures, documents and people's experiences (Huber 1991). Despite all of these definitions, it is it is recommended to define knowledge management carefully and according to the aim of the study. For the purpose of this research, the definition given by Gupta, et al.(2000, p17) is used, "Knowledge management is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning, and decision making".

According to Tzortzaki and Mihiotis (2014), the key theoretical aspects of knowledge management in its current state are: (a) a dynamic knowledge-based theory of the firm; and (b) intellectual capital. As a knowledge-based theory, knowledge management's dynamic capabilities involve the notion of the knowledge worker and the knowledge-intensive firm (Tzortzaki & Mihiotis, 2014). In relation to intellectual capital, knowledge management is perceived as a fresh form of economic value and is intimately associated with individual and organizational knowledge (Tzortzaki & Mihiotis, 2014). Furthermore, Tzortzaki and Mihiotis (2014) classified knowledge management into two perspectives: scientific and social perspective. It is, then, the function of knowledge management to ensure an organization's continuity and profitability in the ever-changing business markets.

Previous studies further implied that individual experiences affect how to interpret the information (Cohen & 1990; Muthusmay & White 2005). For instance, Nonaka and Takeuchi (1995) argued that management of knowledge plays an important role in achieving the competitive advantage since the 1980s and 1990s. Knowledge management considers the opportunity for improvement and the need for coordination that are critical in business processes (May-Chiun et al. 2017; Martínez-Martínez et al. 2018). Martínez-Martínez, Suárez, Montero, and del Arco (2018) explored the importance of knowledge management as a tool for improving business processes in different industrial contexts. Using data from an archaeological museum, findings revealed that interventions focused to add value for the visitors have caused significant gains in operational opportunities through the reduction of errors (Martínez-Martínez et al. 2018). In this case, knowledge management provided a methodology to improve the museum processes at different levels of management performance (Martínez-Martínez et al. 2018).

2.5 knowledge management strategies

Denford and Chan (2011, p. 103) adopt a definition which refers to Knowledge strategy as "the overall approach an organization intends to take to align its knowledge resources and capabilities to the intellectual requirements of its business strategy". Consequently, it is apparent that knowledge strategy focuses on business outcomes and reinforces competitive advantage. On the other hand, knowledge management strategy deals with technical and structural issues of management.

The majority of organizations follow the most common used strategies of knowledge management which are personalization or codification. Hansen et al.(1999) argued that there are two distinct knowledge management strategies. First is the codification strategy in which the organization management strategy emphasis on codifying and storing the knowledge in certain knowledge management system and keep it accessible to employees. Usually codification is carried out in the form of electronic document systems that allow codification and storage. This way the knowledge is easily disseminated and re-used whenever needed. Whereas, the second strategy is personalization strategy in which organization focuses on building networks to facilitate sharing along with transfer of knowledge between employees. Several technologies including e-mail, telephone and meeting are used to facilitate the personalization strategy. Usually, personalization strategy is used to direct individual expertise to help less expertise employees to improve the objectives of the organization. Liebowitz (2004) argued that knowledge management strategy should be used to supplement other strategic initiatives such as competency, performance and change management. There are four main factors that affect the success of both personalization and codification strategies including a) People, b) Process, c) Leadership and d) Information technology (See Table 2.4).

Strategy	people	Process	Leadership	Information technology
codification	1.The people ability to use the computer 2.The people ability to search the content 3.Documentation skill	1.Focus on legislation, knowledge documentation and storing 2.Clearing the roles and responsibilities of the people 3.Providing job security for the People	1.The management 's special attention to the execution of regulation and policies	1.High investments in IT 2. Developing information management system 3.Creating decision making support system

		4.Motivational and reward system for knowledge documentation 5.Using the principals of project Management 6.Employing the staff on the basis of experience and IT knowledge 7.Applying process management System 8. Using office automation system	2. Providing time and resources for the people to document 3. Controlling role and organizing the managers 4.Manager's practical contribution in using the systems of information and knowledge documentation	3. Database integration
Personalization	1.Organizational commitment and affiliation 2.People trust to each other 2.Internal motive to create and share the knowledge and learning 3.Dialogue skill 4.Sympathizing , cooperative and teamwork spirit 5.Communicative Skill 6.Risk taking 7.Specialty and Experience 8.Morality and Spirituality 9.Self-confidence of people 10.Alignment of people objectives with organization objectives	1.Creating teamwork structures 2.Participatory decision making system 3.Learning-oriented educational system 4.Reformation of employment system on the basis of absorbing the innovative and creative labor 5.Considering non-financial reward 6.The flexibility of organizational structure and creating horizontal structure 7.Making an open physical work space	1.Facilitating and coaching role of the managers 2.Encouraging the people to collaboration and empathy 3.Supporting individual's innovation and their accepting risks 4.Clarification of organizational vision 5.Motivating and encouraging to people 6.Showing the value of knowledge sharing to the people 7.Creating the chance of self-learning 8.Creating job satisfaction and commitment	1.Knowledge sharing groupware 2.Supporting hardwares 3.Supporting softwares

Table 2.4 Factors and the enablers affecting the success of knowledge by relying on the type of strategy, adopted from (Nouri el al. 2013)

For this research it is important to understand different strategies used in knowledge management including personalization or codification as it will help in understating different knowledge management processes and understand both types of knowledge including tacit and explicit knowledge .

2.6 Knowledge management processes

Parikh (2001) pointed out that knowledge management is a continuous process and becomes an expanding spiral as more and more knowledge is added and managed over time. From reviewing the literature review, the knowledge management cycle or knowledge management processes is used interchangeably. For this research knowledge processes will be used throughout the thesis. Knowledge processes are divided into sequential and overlapping phases of three to six processes depending on the researcher.

Many theorists have described the knowledge management processes that is undertaken by organizations; although the specific names used for different steps of the process differ, they generally center around creating, retaining, and then distributing or applying knowledge (Alavi & Leidner 2001; Grove & Davenport 2001; Hsia et al. 2006). Knowledge management has three underlying dimensions: (a) knowledge acquisition, (b) knowledge dissemination, and (c) responsiveness to knowledge (Rusly et al. 2015). Whereas, Marr and Schiuma (2001) stated seven knowledge management processes. This model identifies seven main processes of knowledge management including : knowledge generation, knowledge codify, knowledge application, knowledge sharing, knowledge mapping, knowledge storing, and knowledge transfer. On the other hand, Chen (2010) proposed nine knowledge management processes including: selection, acquisition, learning, creation, dissemination, construction, storage, management systems, and culture.

Several researchers proposed numerous ways of understanding knowledge management processes. In the early conceptualization of knowledge management, Davenport et al. (1996) argued that knowledge management processes should include knowledge acquisition, creation, packaging, application, and reuse. Content generation, organization, development, and distribution are the main steps proposed by Garvin (1997). It was further developed by

Grove and Davenport (2001), stating that knowledge management entails knowledge generation, codification, and transfer, which is also quite like the notion proposed by Alavi and Leidner (2001). Gold et al. (2001), however, added protection as a knowledge management process. Interestingly, close analysis of these proposed knowledge management processes signifies similarities and overlaps on the definition. For instance, the terminology of *content generation* refers to the same process same as *creation and acquiring*. Thus, an in-depth study carried out by Gover and Davenport (2001) classified knowledge processes into four major categories (see Figure 2.4):

1. *Knowledge creation*: It is the first stage where people discover certain information or creativity of new ideas. At this stage, it is essential for organizations to have system in which information can be kept for use and reuse.

2. *Knowledge codification*: It is the stage where the knowledge is transferred from tacit knowledge into explicit knowledge. This stage is considered the most important stage and without it, it will be impossible to move to the following stages. Researchers refers to this stage of knowledge organizational memory.

3. *Knowledge sharing:* It is the challenging stage when the knowledge is transfer from one source to another/ one person to another.

4. *Knowledge application:* This is the last stage of knowledge management processes which refers to the application of knowledge. Many researchers have acknowledged that this stage is critical and requires management skills such as taking decisions and actions. Researchers have considered knowledge application as the source of competitive advantage that leads to innovation.

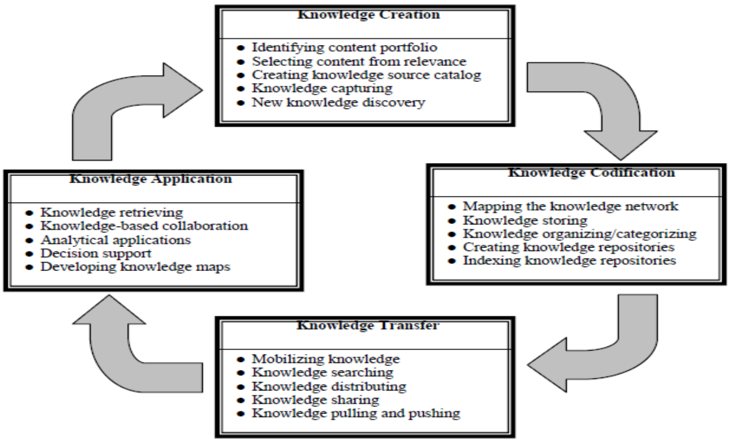


Figure 2.4 Knowledge management processes defied by Hsia et al (2006)

Dalkir (2011) presented identified the three fundamental process of knowledge management cycle involving: knowledge capture, knowledge sharing and knowledge acquisition. Whereas, Tiwana (2002) presented integrated knowledge management processes including (a) knowledge acquisition, (b) knowledge sharing, and (c) knowledge utilization. In a similar vine, other researchers as shown in Table 2.5 proposed several knowledge management processes.

Theorist	Processes
Wiig (1993)	1. Creation and sourcing 2. Compilation and transformation 3. Dissemination 4. Application and value realization
Parikh (2001)	1. Knowledge Acquisition 2. Knowledge Organization 3. Knowledge Dissemination 4. Knowledge Application
Horwitch and Armacost (2002)	1. Create knowledge 2. Capture knowledge 3. Organize knowledge 4. Transfer knowledge 5. Use knowledge

Table 2.5 Different Views of Knowledge According to Alavi & Leidner (1999)

For the present study, the knowledge management processes is based on the conceptualizations of Wiig (1993), Nonaka and Takeuchi (1995), Bukowitz & Williams (1999), Gamble & Blackwell (2001), Parikh (2001), Lawson (2002), Horwitch and Armacost (2002), Botha et al. (2008), Andreeva & Kianto (2011), and Kianto (2011). The model shows how building, divesting, and enhancement of assets are critical in the management of knowledge (Haslinda & Sarinah 2009; Sathishkumar & Karthikeyan 2017). The model proposed for the present study includes the following key knowledge management processes: (a) creating, (b) capturing, (c) organizing, (d) storing, (e) disseminating, and (f) applying. Each of these process are defined below for this study.

- Knowledge creating - Organizations invest its effort to search and define relevant knowledge and its sources that are relevant to its filed. This knowledge can be either within the organization boundaries or outside its boundaries. Knowledge is generated by discovery new ways of doing tasks, organizational activities, from products to technological processes to managerial practices (Lawson 2002; Andreeva & Kianto 2011)

- Knowledge capturing - New knowledge is identified which should be relevant and valuable to current and future needs for the organization. It is represented in a reasonable way where it is easily accessed, extracted and shared (Lawson 2002; Kianto 2011).

- Knowledge organizing - New knowledge is refined and organized. This is achieved by filtering to identify useful knowledge for diverse products and services. The knowledge is placed in context consequently that it is actionable and it can be reviewed and kept up-to-date and relevant to the organization (Lawson 2002; Kianto 2011).

- Knowledge storing - Codified knowledge is stored in specific format that is easy understood so the employees can have access to it. Several methods are carried out in knowledge storing such as database management and data warehousing technologies (Lawson 2002; Andreeva & Kianto 2011).

- Knowledge disseminating - Provides the manner by which knowledge can be distributed in the organization. Knowledge at this stage is more personalized and shared in a simple format that meet the needs of employees. It is critical that the knowledge is articulated in a shared language and using tools that are understood by all employees (Lawson 2002; Park 2006).

- Knowledge applying - Knowledge is applied to new situations or a problem where employees can learn and create new knowledge. In the learning process there must be analysis and critical evaluation to generate new patterns and knowledge for future use (Lawson 2002; Park 2006; Andreeva & Kianto 2011).

2.7 Supportive learning environment

Intentionally or unintentionally all organizations learn to some extent. In order for organizations to stay competitive and survive they need to adopt to learning. Garvin (1994) argued that several organizations are extremely aggressive and seek learning in order to conduct their business in the best ways. However, other organizations take a passive approach to learning. Many knowledge management researchers have emphasized the importance of focusing on people and processes issues related. In fact, researchers pointed out that and have argued information technology can cannot deliver knowledge management (Davenport 1997; Ruggels 1998; McDermott 1999). Yet, the field of organizational learning offers some useful insights.

In this section, two main parts are covered. First, learning is defined, mechanisms of learning will be explained. Then, cultural diversity and learning will be highlighted and the barriers to learning will be presented. This section then moves to learning organizational, which is explained in more detail, from its origins to its current consideration in scholarly research. In addition, learning organizational is defined. The section then moves on to explaining the difference between learning organizational and organizational learning. It then explains different mechanisms in measuring learning organization. Second, the section defines the supportive learning environment and provides examining in the difference between organizational climate versus culture. It then explains the related influences of supportive learning environment. The section then moves to explaining why Garvin et al. (2008) approach in “supportive learning environment is chosen and why organizations should chase it.

2.7.1Learning definition within organizational context

Dodgson (1993; p.378) defined learning as "purposive quest to retain and improve competitiveness, productivity and innovativeness in uncertain technological and market circumstances". Whereas learning organization is one that facilitates the learning of all the individuals (Pedler 1989). The learning in the organization is not just simple as gaining knowledge. Learning involves several knowledge management processes to be in place such as knowledge capture, sharing, dissemination and applying (Sloan & Hyland 2000). Hence, learning is synergistic efforts of the organization and not only a cumulative learning of individuals as stated by (Hedbery 1981). Schein (1985) suggested that in order for learning to flourish the organization need to have a culture that encourage learning.

2.7.2 Mechanisms for learning

Several researchers have identified empirically mechanisms for learning including Pedler el al. (1989); Stata (1989); Dixon (1992); Mckee (1992); Bowen at al. (1994) and Leroy and Ramanantsoa (1997). Studies by these researchers were done based on the context of factors affecting the direction, content and amount of learning. These mechanisms can be summarized in Table 2.6

Theorist	Processes
Organization strategy and goals	The strategies and goals of the organization should be made clear to employees as they guide and focus learning processes though communication on strategic decisions and activities.
Performance measurement	The performance measurements in the organization facilitate the development of shared perception of

	gap between actual and desired state of performance. They include benchmarking and reward systems. These gaps could then be regarded as opportunities for learning.
Human resource management	The human resource management practices could help in the process of learning an providing opportunities to develop and change behaviors, skills and increase knowledge. For instance, the company could engage in human resource development, managerial rotation, teamwork, education and training, and brining in people from the outside with new knowledge.
Organizational arrangements (structural and integrating mechanisms)	The organization could deploy additional resources or special arrangements in enabling learning and development; such as small teams, temporary teams, appointment of gate-keepers or boundary spanners who connect the organization to the realization of its goals and relate parts of the organization and processes
Project planning and control mechanisms	The organization could also influence the behavior repertoires by setting standard operating procedures and protocols. In this way, they can constitute a set of expected behaviors and outcomes as employees conform and adopt to the rules as set.
Computer based technologies (including ICT and design tools)	The information and technology that the organization institutes can also steer the direction of and enhance communication and cooperation. With ICT and designing the mechanisms, there will be standardization and normalization of

	employee behaviors and learning processes

Table 2.6 Mechanisms for learning adopted from Caffyn et al (2000)

2.7.3 Cultural diversity and learning

The culture and environmental aspects of learning contribute significantly to potential for success and organizational competitiveness (Nicholas & Stey 2017). Researchers such as Battistella, Nonino, and Palombi (2017) have argued that this continues to be one of the most under researched areas the organizational environment. They claim that seeking to discover how different cultures affect the management and behavior of members within the context of learning is an ambitious aim (Battistella et al. 2017).

Schein (1996) reviewed the classification of management culture which is very insightful to understand the cultural diversity. In his study "Three Cultures of Management: The Key to Organizational Learning", he brought forward interpretation of sub-cultures namely the internal operator culture, engineering culture and executive culture. He argued the learning could be increased if these cultures, communication, group values, ethics for workforce are aligned.

There are several cultural elements that have been investigated including but not limited to: technology, material life, language, religion, social interactions, value systems and education (Loosemore & Al Muslmani 1999; Hauke 2006). In addition, many studies have found out that cultural values are responsible for the dissimilarity in individuals' performance in organizations (Shane 1993; Tse et al. 1988). For example, a study by Shachaf (2008) suggests that cultural difference could impact decision-making in teams in a positive manner; nevertheless, it could also affect other aspect of communication negatively. Another study by Katz et al. (1999) suggests that culture is responsible on how mangers take decisions.

Culture has also been linked to learning and knowledge sharing (Kucharska & Kowalczyk 2016). Collaborative cultures that inspire a normality of trust have been argued as the best culture to allow for the advancement of learning and knowledge practices (Kucharska & Kowalczyk 2016). Similarly, collaborative cultures have also shown to inspire innovative thinking (Game et al. 2017). According to Game et al. (2017) the world's leading companies and organizations are increasingly changing and adapting their strategies and practices to diminish misunderstandings in communication, but also to promote collaborative cultures in problem solving. These new trends have also led to an increase in the frequency of learning and knowledge, not just within the organizations but across multiple stakeholder groups (Gama et al. 2017). The purpose is to increase the implementations of adaptable coordination practices in companies so there is a reduction in cultural differences, leading to heightened collaborative success (Gama et al. 2017).

Similarly, Hyland et al. (2000) argued that organizations that support diversity will have better approaches in problem solving, creativity, learning and innovation. Organizations need to adopt and develop new practices in order to accommodate the diversity; having flexible system and provide an environment that support learning and development is a must.

2.7.4 Barriers to learning

Despite the importance of organizational learning in the research, there were few empirical studies that focused on barriers of learning (Miner & Mezias 1996; Watkins & O'Neil 2013). Therefore, it is critical to understand the barriers of learning in order to enhance the learning in organizations. There are several terms to refer to learning barriers used by researchers as learning errors (Marsick & Watkins 1990), learning barriers (Shaw& Parkins 1991), learning obstacles (McGrill & Slocum 1994) and Organizational Learning Disorders (OLD) (Snyder & Cummings 1998). Some of the most important barriers of learning found in the literature were information systems, reward systems, human resource practices, leadership, structure of the organization and departments, organizational culture, and lack of management support (Morgan 1986; Hayes et al. 1988; Stata 1989; Dixon 1992; Bowen et al. 1994; McGrill & Slocum 1994; Miner & Mezias 1996; Viitala 2004; Gravin et al.2008; Chen & Huang 2009; Hung et al. 2010; Liao & Wu 2010).

2.8 Learning organization

The concept of learning implies both formal training activities and informal learning. Within the context of organization, learning takes place while doing tasks and projects (Marsick & Watkins 1990; Eraut 2000; Ellström 2011). Peter Senge (1990) says; "So it is the organizational, and not merely the individual learning, which makes the difference. Although, organizations learn only through individuals who learn but individual learning does not guarantee organizational learning without it no organizational learning occurs". Therefore, Organizational learning requires more than individual level learning, although it is important. To elaborate, when organizational learning occurs people at the organizations are required to accept changes in organizational practices (e.g. routines and procedures, structures, technologies) which are mediated through individual learning or problem-solving processes (Ellström 2001).

Kim (1993) argued that all organizations learn even if they deliberately choose to or not. Indeed, the organization is consisted of individuals therefore the learning is carried out by those individuals (Caffyn et al. 2000). Therefore, it is important to understand how learning takes place between individual and organizational learning and how individual learning is transferred to the organization.

An organization is formed via a set of group of individuals that transcend many levels of an organization. A group has developed a specific culture, with the strength of that culture dependent of several factors such as the length of group's existence, the stability of the memberships of individuals in the group, and the emotional intensity of the actual historical experiences they have shared (Schein 2004). It is inherently important that all factors that contribute to a culture are practiced together, and not developed individually. Therefore, it require time investment to nurture a new culture, e.g. a learning one.

For the past forty years organizational learning has attracted many researchers in the management literature (Gieskes & Hyland 2000). Starting in the 1960s with Cangelosi and Dill (1965), Bateson (1972) and Argyris (1977), there has been growing research related to organizational learning. During the 1980s, the organizational learning started to establish conceptual frameworks such as Hedberg (1981), Fiol and Lyles (1985) and Levitt and March (1988). The major shift happened during the 1990s with the introduction of the Senge's Fifth Discipline on building the learning organization.

The concept of 'learning organization' was initially popularized by Peter Senge's "The Fifth Discipline: The Art and Practice of the Learning Organization" (Senge, 1990), who discussed what is learning organization and what are the five personal disciplines that are key features of a learning organization. His remarkable work in the field of learning organization have stimulated the researchers to work on this subject. A learning organization is defined as "an organization that exhibits adaptability, learns from mistakes, explores situations for development, and optimizes the contribution of its personnel" (Wilkinson el at. 2004).

A Learning Organization is categorized with a culture that supports learning activities and innovations both by individuals and by the organization itself (Wiig 1993). Several researchers including Pedler el at. (1989) and Blodgood & Salisbury (2001) took a broad view of Learning Organization in that they argued that learning organization should have an environment that encourages a culture of learning, a community of learners, and it ensures that individual learning is provided and enhanced by the organization. The learning process should be part of the culture and not solution to a problem that might encounter an organization (Schein 2004).

For this research supportive leaning environment will be taken into consideration for more investigation. Supportive learning environment is well studied under the learning organization. As stated before the concept of learning organization is well established in the literature and it is not new in the field of management sciences since the introduction of Senge's book " The Fifth Discipline" in the 1990s. Therefore, many organizations started to invest in their workforce in terms of knowledge practices which can help the organizations to be a learning organization (Garvin et al. 2008). There are three main features that distinguish organizational learning including: 1) supporting learning environment , 2) tangible facilitating processes and practices, 3) and management and leadership support (Garvin et al. 2008). Garvin et al. (2008) argued that there three features can be studied in isolation and independently as each of them consists of many subsections. Later in the following sections more focus of the supportive learning environment related literature will be provided.

2.8.1 The difference between learning organization and organizational learning

The terms *organizational learning* and *learning organization* are used interchangeably in many literature. However, many studies have sought to further understand the difference. Literature have stated that there is a difference between the terms *learning organization* and *organizational learning*. The learning organization denotes to the systems, principles and characteristics required in order to ease learning and they are usually done as a collective effort of the organization. Whereas as, organizational learning refers to how learning is achieved and occurs. Organizational learning is a result of the learning organization.

2.8.2 Learning organization theories

In order to study learning organization, Chris Argyris and Donald Schon (1983) developed and tested a conceptual model about the two stages of learning: single and double loop. These two stages have also been categorized to adaptive learning versus generative learning. In single-loop learning, decisions are based only on observation. This stage of learning does not require a new thinking of processes. The main objective of this stage is to improve already existed method. On the other hand, double-loop learning includes modification and adjustment to overall organization rules and norms. Double-loop learning has a long-term influence on all aspects of the organization (Miner & Mezias 1996; Murray & Moses 2005). In double-loop learning, existing knowledge is challenged and all the employees are required to rethink about the already existed methods that have been proven inadequate.

Eskildsen et al. (1999) agreed with the arguments and stages put forth by Argyris & Schon (1996). Eskildsen et al. (1999) enhanced the model by adding additional stage of learning and called it triple-loop. Triple-loop learning is a higher stage and more complicated in which a complete change of mindset is required when making decisions. It involves reflection, feedback and learning something completely new in order to achieve shared objectives. Double and triple-loop learning produce new actions and processes. See Figure 2.6.

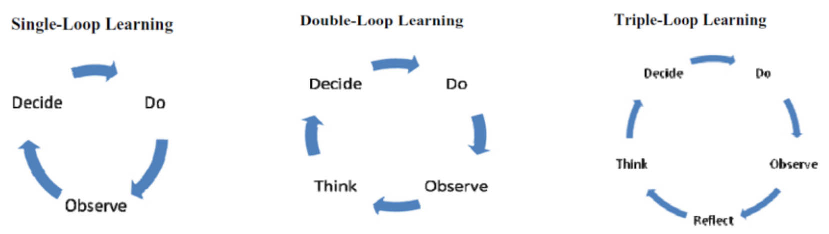


Figure 2.6 Single-, Double-, and Triple-Loop Learning

Thomas at al. (2001) conducted a case study in order to study the relationship between strategic learning, knowledge asymmetries and organizational performance. In their study, they have refereed triple-loop to strategic learning. A handful of key themes were noted by Thomas at al. (2001) as inherently necessary for successful strategic learning and knowledge management. These were: Strategic learning produces the learning of new ideas, meanings, and processes including the past and present experiences. In addition, strategic learning maximizes the organization's ability to learn over period of time by storing and using knowledge for future process and product enhancements. These findings are highly important, while synthesizing previous published literature and theories.

2.8.3 Measuring the learning organization

There are several measurements for learning organization that are proposed by the researchers. Four main measurements are commonly used in the research including the following:

1. Energy flow model: in which Pedler et al.(1989) argued that there are two type of movements : "a) vertically from an individual to the collective and vice versa linking ideas and policy and b) horizontally from vision to action and vice versa linking actions and operations". These flows are supported by eleven features that create the learning organization: "1) The learning approach to strategy; 2) Participative policy making; 3) Informating; 4) Formative accounting and control; 5) Internal exchange; 6)

Reward flexibility; 7) Enabling structures; 8) Boundary workers as environment scanners; 9)Inter-company learning; 10) Learning climate; 11) Self-development opportunities for all". One of the main shortcoming of this model is that it failed to define the relationships between flows.

2. Senge's model: Senge (1990) introduced five elements which can be critical for learning organization. These includes: 1) building a shared vision; 2) personal mastery; 3) working with mental models; 4) team learning; and 5) systems thinking. Senge's model did not structure the elements in a model and the relationships between these elements are not identified.

3. Dimensions of the learning organization questionnaire: Marsick & Watkins (2003) introduced the dimensions of the learning organization questionnaire (hereafter DLOQ) as an instrument to measure the learning organization. The model has four levels; individual, teams, organization, and society. For each of these levels, seven dimensions are included 1) Create continuous learning opportunities; 2) Promote inquiry and dialogue; 3) Encourage collaboration and team learning; 4) Create systems to capture and share learning; 5) Empower people toward a collective vision 6) Connect the organization to its environment and 7) Provide strategic leadership for learning. Kim at al. (2015) argued that there is not sufficient evidence from the empirical point of view that all the seven dimensions of a learning organization and recommended that more research need to be conducted in this topic. Knowledge leadership survey: in which Viitala (2004) proposed a knowledge leadership framework based on two presumptions: leadership that supports learning in an ideal situation, and leadership that supports learning in practice. There are four major dimensions of knowledge leadership including 1) Orienteering of learning; 2) Creating climate that supports learning; 3) Supporting individual and group level learning

processes and 4) Acting as a role model. It was suggested by the founder of the Knowledge leadership survey that more empirical studies needs to be conducted in order to gain in depth understating of the of knowledge leadership.

4. Diagnostic survey of the learning organization: Garvin et al. (2008) introduced the diagnostic survey of the learning organization, which is a survey that have three building blocks including 1) supportive learning environment; 2) concrete learning practices and 3) leadership that reinforces learning. In addition, the three building blocks are defined to have the following characteristics. The supportive learning environment is characterized by psychological safety, appreciation of differences, and openness to new ideas in addition to ensuring time for reflection. Concrete learning processes and practices consist of experimentation, information collection, analysis, education and training, and finally information transfer. The leadership that reinforces learning building block consists of topics connected to leadership of the managers (Garvin et al. 2008)

However, Garvin et al. (2008) argued that over the last two decades there has been a significant growing focus on organizational research learning focusing on three main elements: a supportive learning environment, concrete learning processes and practices, and leadership behavior that provides reinforcement. These are all important elements of organizational learning that have to be further understood later in this section. However, for this study, the researcher will focus only on one aspect of the learning organization which is the supportive learning environment due to the limited empirical studies conducted on this area (Battistella el at.2017).

2.9 Supportive learning environment

This section will seek to discuss supportive learning environment. The purpose of this is to uncover any relevant literature pertaining to potential sources of positive supportive learning environment, and the data that previous research has uncovered that may contribute further to positive outcomes of this research. These will be broken down into individual subsections: (a) organizational climate verses culture, (b) supportive learning environment definition, (c) Supportive learning environment related influences, and (d) Garvin et al. (2008) approach in “supportive learning environment.

2.9.1 Organizational climate versus culture

There is ambiguous association between organizational culture and climate (Schneider 1985). Barker (1994) pointed out that these two concepts have been used synonymously. Nevertheless, the literature differentiates these inter-related concepts. Moran and Volkwein (1992) argued that culture and climate are distinctly different. Culture refers to how people feel about the organization and the beliefs, values, and assumptions that provide the identity and set the standards of behavior (Moran & Volkwein 1992; Stolp & Smith 1995). Whereas, climate refers to the shared perceptions of the people in a group or organization, while culture is made up of shared assumptions (Ashford 1985; Stolp & Smith 1995). Both culture and climate impact behaviors of the people in the group, however, culture is viewed as a wider concept than climate. Stolp and Smith (1995), pointed out that “culture is a product of the relationship history in a school while climate is a function of how people perceive those relationships in the present (Stolp & Smith 1995, p.87)

2.9.2 Supportive learning environment definition

Hypothetically the learning environment structures, social support, technology, rewards and policies are the components which learning can take place. While reviewing the relevant literature, it was found that learning environment and learning climate have been used interchangeably within the context of workplace (Clarke 2005). Billett's (2001) defined learning environment within workplace as, "one that affords opportunities for individuals to engage in and be supported in learning at work". Ellstrom et al. (2008), on the other hand, defined the learning environment as "the conditions and practices in an organization that are likely to facilitate or hinder learning in and through work at a particular workplace". It should be noted that Ellstrom et al. (2008) is not restricted to workplace only unlike the definitions of Clarke's (2005) and Billett's (2001). For the purposes of this study, the definition of the learning environment is: "The organizational conditions and practices that are likely to facilitate or hinder learning."

2.9.3 Supportive learning environment related influences

Both cultural and environmental factors could act as learning drivers and shape learning outcomes within organizations (Nicholas & Steyn 2017). According to Battistella, Nonino, and Palombi (2017) however, both these factors have not been researched as they should be in the field of organizational environment. In essence, a culture of learning should be embodied and promoted by organizations, which can only happen if the components of teamwork, collaboration, adaptability, and solidarity are all facilitated for and encouraged (Goffee & Jones 1996; Fey & Denison 1999). While teamwork and collaboration are self-explanatory, Fey and Denison have defined adaptability in an organization learning context as a team member's ability and willingness to learn and make changes if necessary for betterment and success. On the other hand, solidarity refers to the ability of team members to share and work towards similar objectives and assignments that will overall benefit the organization or the team (Goffee & Jones 1996).

Various researchers put forward that employee engagement can be facilitated or influenced by leadership. This is because leaders are the best reflections of the organizations they are leading and the work environment they are a crucial part of (Baranik et al. 2010; Shuck et al. 2010;

Shuck & Herd 2012). Often, how employees perceived their leaders can influence the level of engagement they will demonstrate towards their work or the level of disengagement they would exhibit, affecting their performance as a result. There exist tools that can help a leader become more effective in their roles, particularly in improving their employees' engagement levels. Moreover, perceived organizational support is also found as essential for affecting employee engagement levels, mentoring effectiveness, and leadership. Perceived organizational support encompasses the employees' ideas and beliefs about how their organizations value their well-being and their efforts (Eisenberger et al.1986).

An unsupportive leader is one that can possibly create a negative culture while an effective one does the opposite. Effective leaders offer positive organizational support and put into place positive cultures that can trigger employees to be more engaged. Some of the ways effective leaders carry these out are by designing encouraging programs and facilitating fair job environments (Cheng & Wong 2011).

If proper leaders are in place, who are those with supportive behaviors, employees will feel safe, positive, and worthy. It is the role of the organization itself to make sure leaders are effective. Other characteristics of effective leaders are those who mentor well and cultivate organizational support at the same time. For instance, various scholars asserted that included among the roles of leaders is to provide favorable results for the team members (Dawley et al. 2010; Finney et al. 2012). Leaders who are good mentors are found to make their employees perceive greater levels of organizational support than those who did not experience being mentored (Dawley et al. 2010; Tolar 2012).

Leader-member exchange can also be affected by the work setting and the environment it has. In turn, the quality of leader-member exchange can affect the perceived quality of support. Mentoring, as a type of tool, does not just support employee engagement efforts, but also alleviate chances of employee burnout. Burnout can have an adverse impact on the engagement of employees. Even though these networks can offer critical support, there are going to cases when at least of the networks would fall short of meeting the support needs of the mentee. The manner in which employees perceive their organization often shape how they respond to their peers, customers and more importantly, their leaders. Employees' perceptions of organizational support are tied with how they feel they are being well-cared for and actively supported.

For some employees, support refers to receiving mentorship from their leaders, which provide consistent as well as trusted communication. According to Neves and Eisenberger (2012) open communication with management is more than just getting information or disclosing information, but an exchange where employees ascertain their meaning within their organizations. The problem is that some employees perceive their leaders as ineffective because of lack of support. As a result, they asserted that organizational support can be instrumental for triggering feelings of separation, absenteeism, and employee turnover (Eisenberger et al. 1986; Finney et al. 2012). If the perceived organizational support is at the negative, this reflects the fact that leaders could be uncaring and employee engagement is going to be low at this particular institution (Fairlie 2011). A review of the literature on perceived organization support could confirm the need for the current study. Moreover, a review of relevant literature can show how reduced efforts of mentoring could lower perceived organizational support.

According to Pemsel and Muller (2012), organizational learning environments can be effectively put into place or promoted by placing care and effort in particular areas of knowledge management processes. Organizations, especially the leaders should know what is needed to increase employee engagement, a crucial component of achieving profitability, productivity, customer loyalty, and quality (Zhang el at. 2014). Organizational support through leadership is a key driver for increasing engagement levels of employment. Employees who had fostered an emotional connection with their leaders are found to exert more efforts toward the organization, a sign that they are engaged (Anitha 2014). Employee engagement should be a combination of continuous learning, improvement, and action (Bedarkar & Pandita 2014). Research studies have shown that causes such as fairness, procedural justice, and opportunities for learning could make employees be more engaged and in turn, more productive (Anitha 2014; Bedarkar & Pandita 2014; Zhang et al. 2014).

2.9.4 Supportive learning environment

This study will follow Garvin et al. (2008) approach in "supportive learning environment" as the most significant element to be the learning organization. Although Garvin et al. (2008) included three building blocks for learning environment, this study will take into consideration only supportive learning environment. The researcher acknowledged that the other two building blocks are very crucial but those are skipped from this study. The major reason behind focusing on supportive learning environment is to completely put the focus on it. In addition, by omitting these two building blocks, it will refrain the study from being too ambiguous. Therefore, the research will be following the main four fundamentals to determine the level of supportive learning environment in any organization which were defined by the David A. Garvin: 1) Psychological safety; 2) Appreciation of differences; 3) Openness to new ideas; 4) Time for reflection.

The concept of "psychological safety" was introduced fifty years ago as an important factor in helping people learn new behaviors and overcome defensive routines (Schein & Bennis 1965). Psychological safety plays a vital role in enhancing learning and improve human interactions (Edmondson el at. 2001). Several prior studies showed that psychological safety can act as a major player in helping people overcome barriers to learning and change in interpersonally challenging work environments (Garvin et al. 2008; Kark & Carmeli 2009).

Though numerous definitions of psychological safety have been proposed in the lecture, the majority of studies have followed Edmondson (1999) by defining it as a shared belief amongst individuals as to whether it is safe to engage in interpersonal risk-taking such as speaking up or asking for help in work environments in which learning matters (Edmondson et al. 2007; Edmondson & Lei 2014). Research showed that psychological safety differs significantly among workgroups within organizations, which can have practical and theoretical implications for learning and human development (Edmondson 1999). Garvin et al. (2008) argued that employees should be comfortable with expressing their opinion without fear. Disagreement between the employees, asking naive questions, making mistakes should be acceptable. Appreciation of differences is the second important factor in order to have supportive learning environment. Garvin et al. (2008) pointed out that learning can only take place when employees are aware of the opposite ideas. In addition, employees become more motivated

Garvin et al. (2008) argued that employees should feel safe to ask naive questions, express ideas and doubts, admit to mistakes and disagree with others' ideas without having fear. While learning, mistake can occur, therefore, tolerance should in in place. In a similar vine of thoughts, Eisenhardt and Martin (2000) pointed out that some employees can get motivated to learn if they make small failures without the defensiveness associated with major failures.

The relationship between time have been discussed in conjunction with pressure being critical and creative at work. Garvin et al. (2008) also highlighted that the ability to think critically, diagnose problems and be creative can get impacted negatively during time pressure at work such as deadlines. Therefore, supportive learning environments allow time for pause and allow people to review the work and different organization processes (Garvin et al. 2008).

Clarke (2005) whose study sought to ascertain the workplace learning environment and its relationship with learning outcomes noted that encouraging mangers to reflect will enhance learning transfer abilities. In addition, learning can only happens with exposure to other ideas and opposite points of view (Garvin et al. 2008). For instance, one way that can force employees to learn, develop new skills and share existing skills and experiences with new colleagues is lateral cross-functional transfers (Slater & Narver 1995).

Being open to new ideas was one of Garvin et al.'s (2008) supportive learning environment characteristics. The researchers argued that line mangers/ leaders have a significant influence on the learning environment. Mangers should be open to new ideas and encourage employees to initiate new ideas. Such encouragement is important and can help employees to implement new ways of doing their work.

2.10 Chapter summary

After introducing the concept of knowledge management and explaining it in sufficient, the focus of this chapter shifted to provide a systematic review on knowledge definition, types of knowledge, source of knowledge, knowledge creation cycle and knowledge management strategies. The chapter then moves to discuss in detail knowledge management processes related literature. The chapter concludes with discussing the supportive learning environment in which several sections were covered such as learning definition within organizational context; Mechanisms for learning; Cultural diversity and learning; Barriers to learning; Learning Organization (LO); The difference between learning organization and organizational learning; Learning Organization Theories; Measuring the learning organization; Supportive learning environment concept; Supportive learning environment related influences and Supportive learning environment, Gravin et al.(2008) approach.

3. Chapter three: Innovation theoretical background

3. 1 introduction

The business leader’s challenge is to find effective strategies that drive innovative ideas in the firm’s product or service lines. Business competition demands innovative solutions and products to meet the needs of the global marketplace. Research agendas suggest that several dominant concepts of innovation arose from efforts to improve the organization’s performance and competitive advantage. Innovation starts with a simple idea that is usually has a direct link to introduce a new product or service to the market. The successful implementation of the idea could have a direct impact on the organization in terms of enhancing efficiency (Seaden 2003). Innovation can greatly influence how an organization is run, and successful implementation of innovation helps organizations to perform better (Sexton & Barrett 2003). The purpose of this chapter is to explain the concept of innovation and related topics. It starts with defining innovation, explaining the term newness to innovation and the difference between creativity and innovation. It then provides a detailed approach of innovation processes and types of innovation. The chapter then details the models of innovation, innovation management, diffusion of innovation are also explained. In addition, internal and external drivers of innovation are highlighted. The concept of continuous innovation, the difference between innovation and continuous innovation, the difference between continuous innovation and continuous improvement are explained later in this chapter. Then, the state of the theory on continuous innovation is also highlighted. The chapter concludes with discussing the different factors affecting continuous innovation

3.2 Innovation definition

Innovation pertains to the implementation of improved products, services, processes, or methods in business practices (Rathinam 2017; Winter & Silveira 2017). Although many definitions of innovation exist, all innovation-based studies included in this review centered around five main processes: “generate, adopt, develop, incorporate and implement”. These processes have both commercial and practical applications within organizations (Asce et al. 2004).

Duus (1992) highlighted that innovativeness is a ‘‘profitable increases in economic efficiency brought about by the putting up of new resource combinations by entrepreneurs’’ (Duus 1992, p. 5). Innovation can occur in several levels such as organizational, technology, and market development (Duus 1992).

Urabe (1988) referred to innovation as the generation of a new idea and its implementation into a new product, process, or service. Similarly, Amabile (2000) defined innovation as an efficient application of creative ideas by organizations. Innovation is the creation, improvement, and application of ideas that are novel to an organization and has commercial or practical benefits, covering the adoption and implementing products or processes advanced outside an organization. (Park el at. 2004; Dulaimi el at. 2005). A wider description of innovation was provided by Damanpour (1992) in which he argued that innovation is the successful implementation of an idea or behaviour, whether a system, policy, program, device, process, product or service, which is new to the organization. Considering all of these definitions for this study, innovation definition is adopted from Gibbons et al. (1994): innovation could be defined as the application of new ideas for the organization, irrespective of whether these ideas are related to products, processes, services or organizational, administrative or commercial systems, capable of generating positive changes that increase the organization’s competitiveness.

3.3 Innovation as newness

Tewari (2011), however, argued that the definition of innovation evolved over the time and numerous definitions were proposed by many researchers. But, all of those definitions shared a major component "Newness". It is apparent from the literature, that the definition of innovation included the concept of newness. Slappendel (1996) argued that the perception of newness is critical and important to the concept of innovation as it can differentiate change from innovation. All innovation can result a degree of change, however, not all change produce innovation. The literature suggested that there are several approaches to address the matter of degree on newness to establish an innovation. Jahannessen el at (2001) argued that the extent of newness of an innovation is related to the field into which the innovation is adopted. In addition, innovation can be studied in terms of both newness to the organization, newness to the market and industry. For this research innovation is critical to be look at from both newness to market and industry as it can assure the competitive advantage over others and the organization as general.

3.4 Innovation and creativity

Creativity and innovation are related concepts but they are referred to two different definitions. Contemporary research especially, project management has investigated the concept of creativity in deeper depth (Brady & Soderlund 2008). Creativity has been defined as "the ability to produce work that is both novel (i.e, original , unexpected) and appropriate (i.e, useful, adaptive concerning task constrains)… it is relevant when one is solving problems…" (Sternberg & Lubart 1999:3). Creativity is a trait that individual is born with as the traditional theory have proposed. However, Ambile (1997), argues that that creativity could be learned. All individuals with regular capabilities are creative within the work environment with different levels. The major difference between creatively and innovation that the first is about generating an idea whereas the second is about the application of this idea (An & Youn 2018; Sosa & Connor 2018).

3.5 Innovation processes

Trott (2002) pointed out that innovation is a serious of several activities that are related to each other and not a singular event. Therefore, innovation can be understood better as a process which has serious of phases (Gopalakrishnan & Damanpour 1997). In similar line of thoughts, Sheu & Lee (2011) suggested that innovation is a process that has several steps that begins with identifying a work opportunity to technology aspects to the implementation of a newly established technology, tools, and/or products. To elaborate more, a number of studies found that organizations that are categorized with high performance in innovation commonly have a formal process for developing new products and services (Griffin 1997; Tatikonda & Rosenthal 2000; Shaw et al. 2001). Consequently, considering and identifying the stages of these processes can be insightful.

Understanding how innovation works, its processes, and indicators entails systematic analysis and improvement of technology and innovation management (Szymczyk & Kaminski 2014; Marinković el at. 2016). With reference to Figure 3.1, innovation process has five major processes. The first process which is creativity where the idea is generated followed by the second process of invention which is the conceptualization of the idea and how useful to adopt it. The invention is followed by innovation where the idea is allocated and then diffusion take place where the idea is shared across the social system. Then diffusion takes place, and it is speared of idea and communication of the idea. In order for the innovation of diffusion to happen certain factors are required such as communication, project champions, knowledge management and technology. The final stage is adoption which is the acceptance of change. Szymczyk & Kaminski (2014) argued that innovation requires quality assurance and effective marketing externally in order meet the expectations of the customers.

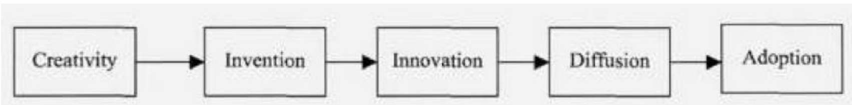


Figure 3.1 Innovation progress process by Ehigie and McAndrew (2005)

A more recent model to explain difference innovation processes was developed by Veenendaal & Bondarouk (2015) in which it has three main phases. These phases were named as idea generation, idea championing, and idea application as shown in Figure 3.2. The first phase idea generation refereed to creating ideas as solution by people when they face problems and opportunities. The second phase is about being accountable to implement the creative idea ‘‘Idea championing”. The third phase is called ‘‘Idea application’’ is moving the implemented ideas into business. The last two phases can be grouped under one umbrella and name it as implementation.

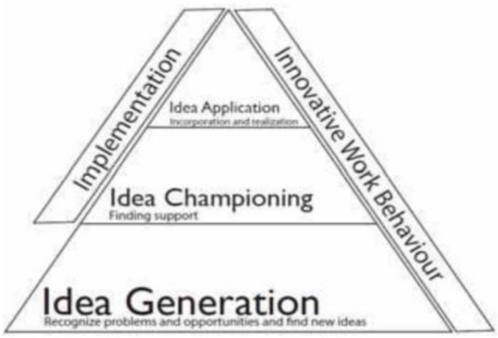


Figure 3.2 Innovation three dimensions process (Veenendaal & Bondarouk 2015, P. 142)

Reflecting the process laid out by Ehigie and McAndrew (2005), Marinković et al. (2016) assessed the government performance based on a model with 39 indicators according to planning, organizing, and control. More specifically, planning indicators referred to investments in technological and innovative activities, organizing indicators included infrastructures, and control indicators pertained to national research and development and business outcomes (Marinković el at. 2016). Results showed that collaborative Research and development (R&D) projects and investments in developing different fields at different levels of the country are key in improving a knowledge-based economy through innovative practices (Marinković el at. 2016). As such, the innovation process which includes planning, organizing, and control is a useful framework that considers macro and micro-level factors of governance (Marinković el at. 2016). See Figure 3.3.

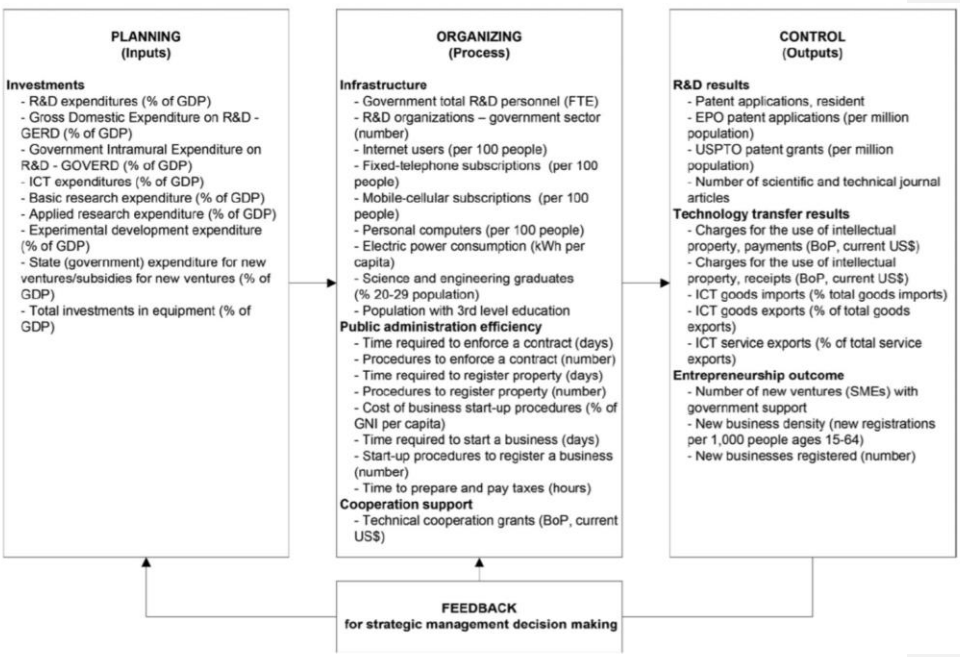


Figure 3.3 Model for measuring and monitoring government performance adapted from (Marinković el at. 2016).

In another study, Van der Panne et al. (2003) focused on the internal research and development (R&D) departments. The most common identification of success or failure of an innovation project was defined as a product (service) deemed superior to the competition. The authors posited that the perception and anticipation (or lack thereof) of market factors and existing levels of dedicated financial support played a significant role in the outcome of an innovation project (Van der Panne et al. 2003). On the other hand, Computer aided innovation (CAI) uses the latest technology software to complement traditional closed innovation processes (Hüsig & Cohn 2011). The use of change techniques such as process models or portfolio methods benefits from CAI software (Hüsig & Cohn 2012). CAI software decreases the redundancy of emergent ideas and enhances the operational status of multiple departments fulfilling new product development. Hüsig and Cohn (2011) pointed out, that using CAI is akin to the traditional closed innovation process.

3.6 Types of innovation

There are three types of innovation based on the literature review including product innovation, process innovation and organizational innovation. According to Johne (1999) product innovation generates the most revenue to the organization. The long term business growth depends on continuous improvement to products. Product innovation help the organizations to retain their market position and stay competitive. Consequently, it is essential that organizations frequently renew their products according to their customer needs and market. A very interesting concept introduced by Mitchell (1996) called " Inflation" in which he argued that organizations should always review their core products features and either improve them or change them. He also pointed out that organizations should not only engage to product innovation for the sake of it.

Process innovation on the other hand can improve quality and save costs. Process innovation is more complex than product innovation, however, time and effort investment will yield great benefits. Johne (1999) pointed out that service organizations focus on process innovation as it help them to promote their service quality and reduce operating costs. The third type of innovation is organizational innovation. Tidd el at. (2001; p.315) defined organizational innovation as “an integrative set components which work together to create and reinforce the kind of environment which enables innovation to flourish”. Innovation at its core is about teamwork and creative combination of diverse disciplines and perspectives of employees. Therefore, Tidd el at. (2001) suggested several components that influence the organizational innovation as follow:

1. Shared vision and leadership: The management has to have shared vision among its employees. The later can be achieved by shifting the mind-set of employees to the right directions and focusing on the core competencies of the organization and employees.
2. Appropriate structure: Organizational structure is the process by which tasks are allocated, coordinated, and supervised (Goetsch & Davis 2014). Organizational structure has become an important part of scientific research in the last decade due to technological developments, and the inherent importance of ensuring that the organizational structure is designed in such a way for both productivity and innovation (Doroshenko et al. 2015). These structures are predominantly hierarchical in their design (Ashkenas et al.2015). Tidd el at. (2001) pointed out that appropriate organization structure can enhance creativity, learning and innovation.
3. Key individuals: A significant factor is the presence of key figures within the organization that can have influence on innovation. Tidd el at. (2001) highlighted that the organization needs to identify several employees who should have specific personal traits that can impact the innovation such as energy, enthusiasm, inspiration

and power. In addition, the organization need to identify sources of knowledge and information within employees.

4. Effective team working: According to Tidd el at. (2001) team can generate more ideas and problem solving than individuals. They also suggested that team can form a decentralized operating structure, with autonomy that can impact the innovativeness of the organization.
5. Continuing and stretching individual development: Training and development of employees is critical to enhance innovation. Tidd el at. (2001) argued that employees can be more motivated to acquire news skills when organizations invest in their individual development.
6. Extensive communication

Innovation depends on the creation, combination, sharing and application of knowledge. There in turn put strong emphasis on the communication channels (Tidd el at. 2001). For these communication channels to be opened up efficiently, structure should be taken into account when formalizing direct communication channels, which can bypass organizational levels if the situation requires (Collyer 2016). These channels can involve emails, drop-ins in offices, face-to-face meetings, as well as more informal techniques such as the water cooler discussions (Collyer 2016). These informal communications have been thought to increase the collective consciousness of issues pertaining to multiple stakeholders (Collyer 2016).

7. High involvement in innovation: Tidd el at. (2001) argued that mangers should encourage creative skills and problem solving. When organizations invest in employees skills and involve them during innovation process they are likely to have competitive advantage.
8. Creative climate: Tidd el at. (2001) pointed out that the management should facilitate the creative climate conductive for innovation. The management should be responsible

for " building a creative climate involving systematic development of organization structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurement systems and deployment of strategy (Tidd el at. 2001; p337).

9. Learning organization: Tidd el at. (2001) suggested that innovation can be seen as a learning cycle. They elaborated that the concept of learning organization involves managing knowledge and learning which can facilitate the innovation process as well.

3.7 Innovation models

3.7.1 Static models

3.7.1.1 Incremental versus radical innovation

Innovation is radical if the technological knowledge required to exploit from its existing knowledge. Innovation is considered radical if the result is superior product which can make the existing products non-competitive. On the other hand, incremental innovation still allow the existing products or services remain competitive (Afuah 1998).

3.7.1.2 Abernathy-Clark model

Abernathy-Clark model explains why existing organization can perform better than new organizations in terms of radical innovation (Abernathy & Clark 1985). There are two main forces for the innovation of this model including the technological and market knowledge.

Abernathy and Clark (1985) provided of the most significant taxonomy in the literature. They define transilience as "the significance of innovation for competition depends on its capacity to influence the firm's existing resources, skills and knowledge – What we shall call its 'transilience'." With reference to Figure 3.4, the market transilience scale is in the vertical dimension whereas the technology transilience scale in the horizontal. The main outcome of this model was the transilience map in which four classifications of innovation as shown in Figure 3.4

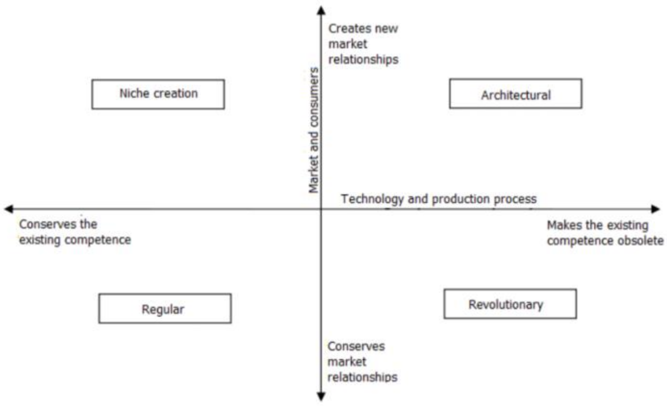


Figure 3.4 Transilience map, adopted from Abernathy and Clark (1985)

As per the model presented in Figure 3.4, the researchers sought to point out that at the extreme of creation of new market relationships are the architectural innovations and niche creation. They argued that new customers segments are attracted and markets are established, however in order to serve this new segment several elements are needed such as new distribution channels, new services and new ways of communication. Whereas at the extreme of innovation in technology and production process are the architectural and revolutionary innovations. The researchers pointed out that in this range, new relationships are established with suppliers, there is an extensive replacement of materials, new production systems and new competences are essential. The architectural innovation is the one with the greatest degree of innovation for both market and technology and therefore it requires both technological and market capabilities become absolute (Abernathy & Clark 1985).

3.7.1.3 Henderson-Clark model

Another model of innovation was created by Henderson and Clark (1990) in which they have carried out the study to find out the issues that facing the organizations with incremental innovations. Their investigation lead them to divide the technological knowledge to knowledge of the components and knowledge of the linkage between them which is called architectural knowledge. Their study resulted in creating four types on innovation in accordance with the effects on innovation on knowledge (See Figure 3.5 and Table 3.1)

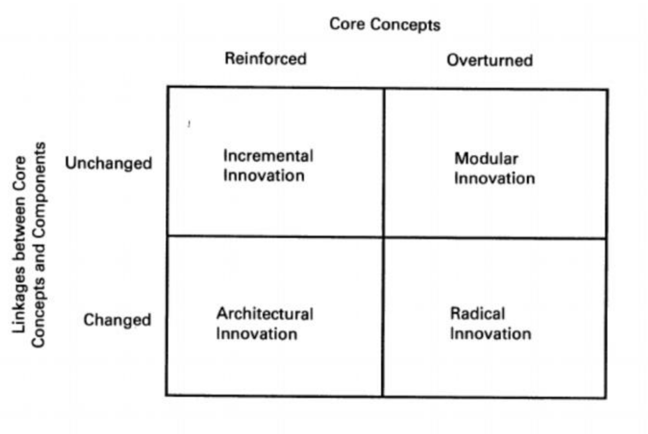


Figure 3.5 Henderson-Clark model adopted from Henderson and Clark (1990) p.11

Types of Innovation	Effects
Incremental	Innovation enhances both component knowledge and architectural knowledge.
Radical	Innovation destroys both component knowledge and architectural knowledge.
Architectural	Innovation destroys architectural knowledge and enhances component knowledge.
Modular	Innovation destroys component knowledge and enhances architectural knowledge.

Table 3.1 Henderson-Clark model adopted from Henderson and Clark (1990)

3.7.1.4 Porter's value added chain

An interesting model was also introduced by Porter (1985) in which his model suggested why an organization can perform better than new entrants at radical innovation and why it might fail. Porter (1985) studied the entire added value chain where supplier, customers, innovators and others are included. He investigated the impact of innovation in all the previous mentioned players. He also argued that the innovation is incremental to the organization and its suppliers and it is radical to its customers and innovators.

3.7.1.5 Roberts-Berry model

Roberts and Berry offered a framework- the familiarity matrix. To ensure the success of innovation, organizations are required to utilize certain mechanism. Roberts and Berry (1985) proposed seven mechanisms depends on the technology and market. These are 1) internal development; 2) acquisitions; 3) licensing; 4) internal ventures; 5) joint ventures; 6) venture capital and 7) and nurturing and educational acquisitions. The selection of the suitable mechanism depend on how radical the innovation is to the organization.

With a reference to Figure 3.6, the familiarity matrix- that accounts, on the on hand, for the degree of familiarity with the underlying technology whereas on the other hand, for the degree of familiarity with the market. For example, if the organization is familiar with the technology but not familiar with the market. Therefore, the organization can find a partner organization that has the right market capabilities. This joint venture can have both technological capabilities and market capabilities. In addition, the organization can develop the innovation internally if they are used to the technology. However, if the organization is not new to the market but familiar and they have existing technology and have the marketing capabilities it can still have the innovation internally. A similar strategy can be applied when the technology is new but familiar and the market is existing. The organization can still develop the technology internally since the required capabilities are existing.

MARKET			
New and unfamiliar	Joint venture	Venture capital Venture nurturing Educational Acquisition	Venture capital Venture nurturing Educational Acquisition
New but familiar	Internal market development Acquisition	Internal venture Acquisition Licensing	Venture capital Venture nurturing Educational acquisition
Existing	Internal development (or acquisition)	Internal Product development Acquisition Licensing	"new style" joint venture
	Existing	New but familiar	New and unfamiliar
		TECHNOLOGY	

Figure 3.6 Market and technology affecting innovation adopted from Roberts and Berry (1985)

3.7.1.6 Teece model

David Teece proposed a model that can help the organization to profit from technologically radical innovations. There are two factors that can influence who can profit from innovation.

First is imitability which is refer to how easy competitor can copy the technology or a process of the innovation. There are several methods that an organization can protect themselves from imitation such as intellectual property rights and tacit knowledge. Second is complementary assets are all other capabilities such as strategic alliances, customer relationships, licensing agreements, marketing, distribution channels, services, reputation and brand name. If the imitation is weak and the complementary assets are easily available, then it is hard for an organization to gain profit from an innovation.

Complementary Assets

Imitability	Free or Unimportant	Tightly held
High	*Profit is Difficult*	*Holder of complementary assets*
Low	*Inventor*	*Inventory or party with bargaining power*

Figure 3.7 Teece model adopted from Teece (1986).

3.7.2 Models of innovation-dynamic models

3.7.2.1 Utterback-Abernathy model

Abernathy-Utterback model (A-U model) has significant impacts on innovation studies which explains why so many scholars adopted it . Abernathy and Utterback (1978) proposed three dynamic processes or phases that organization take during the evolution of the technology.

With reference to Figure 3.8, three phases were identified as the following:

- In the fluid phase: Product performance maximizing strategy where the market is categorized with uncertainties and the organization not yet sure if they should invest in research and development. Characteristics of products are custom designs with new product technology expensive and unreliable. During this phase the process innovation accounts for the minimum. Whereas, the basis of competition is mostly on product features.
- In the second phase however, which is called the transitional phase where the employees are more engage in product features which means that the uncertainty level has reduced compare to phase one. The rate of product innovation decreases as process innovation takes importance. In addition, the competition is expected to increase as new product or service will be introduce to the market. Sales maximizing strategy is implemented
- In the specific phase, there is a proliferation of products built around a dominant design and more emphasis on process innovation and incremental product innovations. In addition, the material and equipment are highly specialized and the basis of competition in low cost. Cost minimizing strategy is implemented at this stage

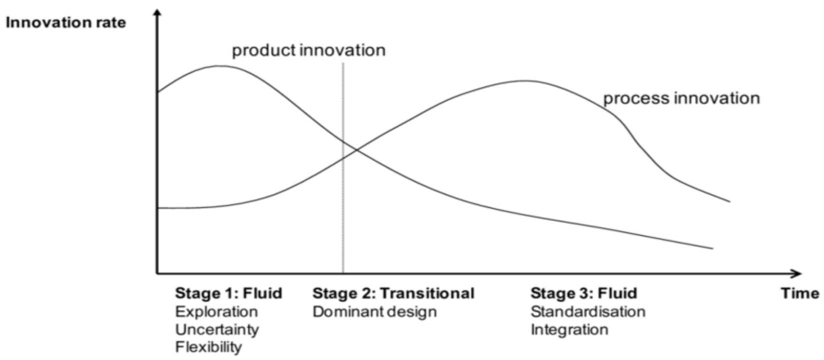


Figure 3.8 Model of Abernathy and Utterback adopted from (1978)

3.7.2.2 Tushman-Rosenkopf technology life-cycle model

Tushman and Rosenkopf (1992) investigated that the dynamics of innovation and looked at the extent of the organization's impact on the evolution of the innovation. They suggested that this depends on the amount of technological uncertainty, complexity of technology and stage of the evolution. Afuah (1998) argued that technology life cycle begins with a technological discontinuity which can either improve or abolish competence. Tushman and Rosenkopf (1992; p.318) mentioned that "rare, unpredictable innovations, which advance a relevant technological frontier, by an order magnitude, and which involve fundamentally different product or process design, and that command a decisive cost, performance or quality advantage over prior product forms". Once discontinuity ends, the technological and market uncertainty and competition are expected to increase. This model also pointed out that organizations need to have diverse capabilities at the different phase of the life cycle.

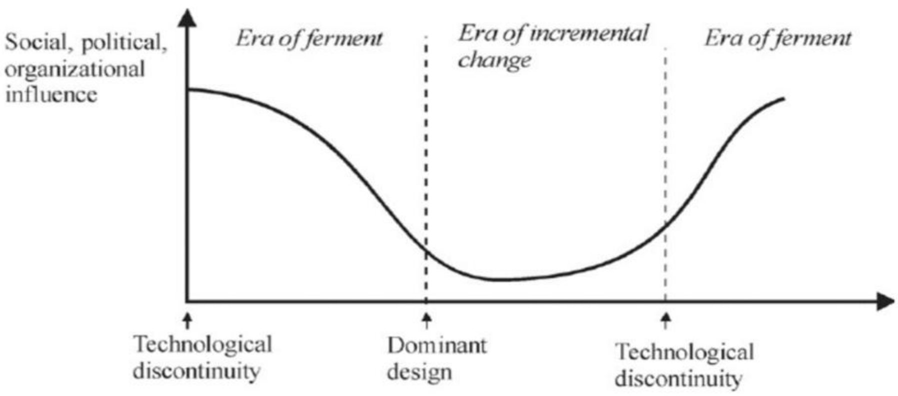


Figure 3.9 Degrees of social shaping during transitions and stable periods adopted from Tushman and Rosenkopf (1992: p.339).

To summarize all of the above models are important to take into consideration to get a deep understanding about several aspects of innovation such as how innovation happens, what are the different processes of innovation, types of innovation and so on. Within the context of this research, continuous innovation might fall under the incremental or radical innovation. Boer & Gertsen (2003) pointed out that continuous innovation can involve several aspects such as methodical, programmed, incremental or radical approach throughout the organization.

In addition, most of the models discussed above take into consideration innovation as a way to improve products, and processes in a specific lifecycle (Rathinam 2017). However, continuous innovation views innovation as a long term processes and ongoing process which requires sustainability (Kollmann et al. 2009).

3.8 Innovation management

Although there are millions of new products and services that are introduced every year by many organizations, many more of these fail than succeed (Simon 2009). Tidd el at. (2005) argued that although innovation differs by type, scale and sector, it is a process and it needs to be managed in a proper way. Back in the 80s, Tushman and Nadler (1986) foretold that managing innovation would be one of the most vital research areas. Therefore, the most challenging task by any organization is to find the mechanism and management techniques to control the process of innovation (Tidd el at. 2005). Song et al. (2015) agreed that managing innovation by employing innovation management techniques is critical to insure the success of the implementation. Therefore, it is important to understand how innovation can be managed in the most effective way.

Managing something that is complex and uncertain is not easy. There are problems in developing and refining new innovations, these problems might be related to adopting and applying, difficulty in the attainment of support, problems in getting approvals and resource and others. Several studies such as Branscomb and Auerswald (2002) and Storey and Salaman (2005) suggested that management should focus on managing risks as it is inherent in the nature of innovation. Lee-Mortimer (1995) argued that many organizations failed to identify risks associated with innovation. Andrews (2007) stated that it is critical to calculate risks associated with innovation. Therefore, having clear view of risks balanced against benefits can create a culture where innovation is nurtured.

Innovation management is about finding a balance among four elements: stimulating, supporting, controlling and setting direction. Stimulating and supporting are related to developing a culture of creativity that help employees to come up with new ideas (Endea el at. 2015). One of the major models discussed in helping stimulating and supporting creativity is Amabile (1988) componential model of creativity. Amabile (1988) proposed a componential framework to understand the major components employee creativity at work. With reference to Figure 3.10 , the framework predicts that three main components contribute to individual creativity namely: expertise, creative-thinking and intrinsic task motivation.

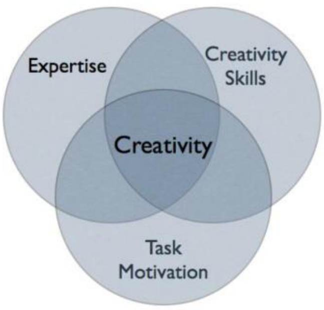


Figure 3.10 The three components of creativity, retrieved from (Amabile ,1998,p:8).

Domain-relevant skills refer to individual's expertise and knowledge in a specific field. At work, these domain-relevant skills are influenced by the availability of training, resources, and information (Amabile 1988; Sawyer 1992). It has been argued by Csikszentmihalyi (1997) that an individual who solves a problem with superior knowledge will show an enhanced level of creativity. Consequently, organizations should be aware about the importance of the breadth and depth of knowledge.

Creativity-relevant skills and processes refer to individual's ability to come up with new creative ideas and how to solve and approach problems and solutions creatively. Amabile (1997) argued that these skills are strongly related to the individual's personality characteristics such as independent, self-disciplined and risk-taking. The organization's culture and senior management and/ or leaders have to encourage unconventional methods to solve the problem and promote autonomy (Amabile et al 2004).

Task motivation refers to “positive reaction to qualities of the task itself” (Amabile 1996, p. 115). In fact, the individual's attitude toward the task is vital in determining whether he or she will respond creatively to it. For example, at work, the employee is likely to become more creative with his/her task if he/she is motivated. Thus, a motivated employee would be interested in and enjoying the work due to the qualities inherent in the work performed .

The componential model of creativity suggests that individual creativity increases due to simultaneous increases creativity components discussed above (Amabile 1988 & 1996). Researchers such as Woodman, Sawyer, and Griffin (1993) suggested that the employee’s creativity is affected by the interaction of personal and organizational factors. For example, Amabile et al. (1996), have developed the componential model with a further development where she and her collogues have integrated organizational and individual aspects (See Figure 3.11). The researchers have examined numerous contextual aspects of the work environment that have been proposed to influence employee creativity. Organizational and supervisory encouragement, work group support of creativity, job autonomy, sufficiency of resources, and workload demands are some of them.

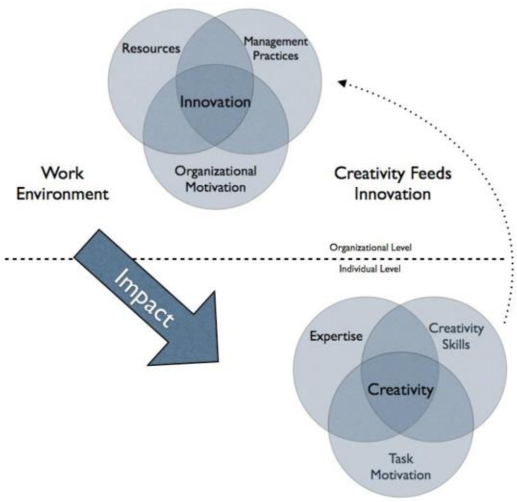


Figure 3.11 Componential theory - Retrieved from (Amabile ,1997,p:53).

“This theory assumes management practices, resources and organizational motivation as the components which are analogous to task skills or experience, creativity skills and task motivation respectively” (Asad & Ali 2008; p.6). Ambile 1997, pointed out that individual and team creativity is considered as the primary source that elevates the organizational creativity. In addition, work environment such as organizational motivation, management practices and resources influence creativity by impacting the individual components such as expertise or domain skills, creativity skills, and task motivation. With a reference to Figure 3.11 , there are three lower circles and three upper circles. The three lower circles include expertise or domain skills, creativity skills, and task motivation. These three components represent the individual creativity. The three upper circles symbolize the organizational components which include organizational motivation (refer to the overall organizational support towards creativity or/ and innovation such as effective communication and acknowledgement of novel ideas), management practices (management supervision, planning, positive feedback, effective communication and support for the employees), and resources (all what the organization have to support creativity such as expertise, funds, material resources, systems, processes and training) (Ambile 1997).

As discussed earlier, innovation management is about finding a balance among four elements: the first two elements were discussed. The third and fourth elements are controlling and setting direction. These two elements refer to supporting ideas with the organization's goals through setting criteria, running processes, and ultimately selecting the best ideas. This stage is critical and required high level of control by management as not all the idea will be selected. The management sit direction to the employees about the ideas and which one will enhance the organization strategy and which ideas could be implemented. Both of these elements can create tension (Ende el at. 2015). It has been argued by Ende el at. (2015) that the innovation outcome is more valuable when this tension is managed in proper ways.

There are several situational parameters that management need to consider while managing innovation. These include the state of the environment, availability of resources, organizational expertise and their ability to handle risks and the uncertainty associated with innovation (Gopalakrishnan & Damanpour 1997). Thomas et al. (2012) pointed out that innovation management usually initiated at senior management level. To do so, there are s five main processes that need to be conducted in order to initiate including (1) create innovation context, (2) management of innovation processes, (3) initiate innovation processes, (4) produce innovation content, and (5) implementing innovation results (Bossink 2002)

3.9 Internal and external drivers of innovation

There are several drivers that allow the organizations to adopt innovation, these drivers could be either internal to the organization or external. Innovation research shows innovation could have a better success results when more drivers are adopted. With reference to Figure 3.12, Bessant & Tidd (2011) propose several triggers for innovation.

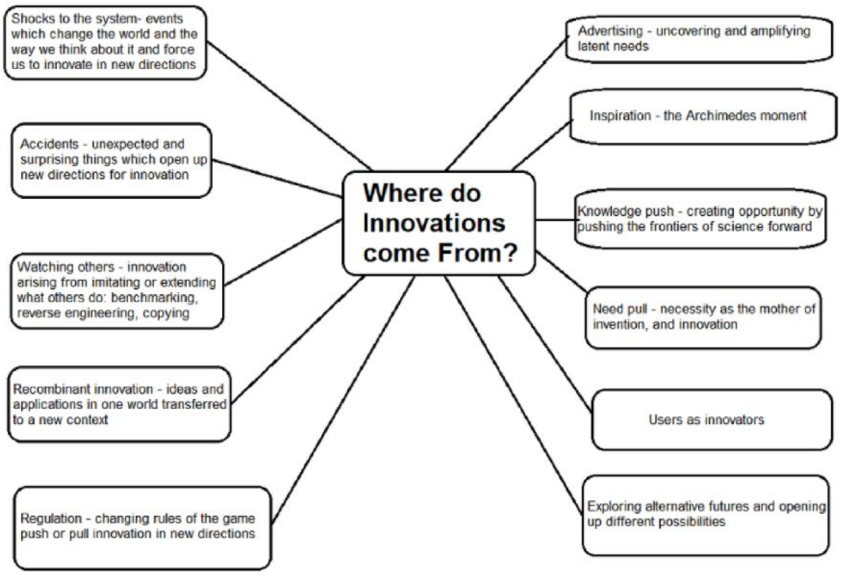


Figure 3.12 Factors and triggers for innovation by Bessant & Tidd (2011)

The triggers for innovation are a set of factors that allow innovation to happen. Other research on innovation has identified other drivers for innovation such as teamwork, knowledge, open communication, and economic pressure (Jamrog 2006). Customers and suppliers can work as a trigger for innovation, researchers such as Rigby & Zook (2002) have pointed out that organizations that have strong relationship and open communication with their suppliers have a higher chance for innovation.

However, an interesting driver that has been discussed in the innovation literature is organizational mimicry. This concept refers to the organization act in reviewing what their competitors are doing in term of service, processes and products. This review allows organizations to replicate the most successful practices of their competitors and amend any changes required with better cost and implementation (Lee & Pennings 2002). Market recession also work as a major trigger for innovation. When market recession take place, organizations take three major actions including reduce number of employees, cut cost or innovate new products, services or processes. Roberts (2003) suggested that the heavy investment in innovation is required in order for the organizations to recover from the recession.

Unexpected occurrence could also work as internal driver of innovation. In many cases, weaknesses in organizations are scanned, and if the management acknowledges that there is an urgency to improve certain product/process or a service then a flow of ideas is requested to address such improvement. Therefore, effective knowledge management play important role in this stage (Baldwin & Johnson 1996).

Users and customers are another external driver of innovation which lead to exceeding the customer expectation that in return increase the customer's loyalty. An interesting concept has been introduced by Urban & Hippel (1988) called the "Lead users". Lead users are those users who can predict the future developments and needs. Research has shown a strong relationship between lead users and innovation (Franke & Shah 2003). Indeed, those users usually tend to have a deep knowledge about the forecasted market trends. What is more interesting to see that number of studies have suggested that many innovations conveyed by lead users are accepted by the customers and seen as a commercially attractive (Hippel 2005).

Another external driver for innovation is the competition. The literature in innovation has agreed that competition stimulates the organization to innovate. A study carried out by Baldwin & Sabourin (2000) found out that competition is a major driver for innovation. Baldwin and Sabourin (2000), found out in their study that the possibility of product innovation increases if the number of competitors within the range of 6-20 competitor followed by the range of more than 20 competitors. On the other hand, the process innovation has a better probability with higher number of competitors-more than 20.

All of these previously mentioned drivers are important for this study to trigger innovation such as the suppliers, customers, competitors which will be considered in this study.

3.10 Diffusion of innovation

The concept of innovation diffusion usually refers to “the process by which an innovation is spread within a market, over time and over categories of adopters” (Crawford & Di Benedetto 2008, p.241). It is speared of idea and communication of the idea. Diffusion of innovation is critical at organizational and society level. In order for the innovation of diffusion to happen certain factors are required such as communication, project champions, knowledge management and technology.

Research in diffusion of innovation has undertaken several main evolutions. During the 1940s and 1950s, diffusion of innovation was a series of independent studies based on a discipline. Whereas, during the 1962, a major evolution happened with Rogers introducing the “Diffusion of innovations” in which he initially came up with a general model about the US market and then it was developed to be applied in any field. However, from mid-1960s onwards, more empirical studies have been conducted on the theories rather than introducing new ones. Furthermore, cross- disciplinary studies have emerged.

Throughout the literature, there are several conceptual models for diffusion of innovation, the founder French sociologist Gabriel Tarde (1903) is being discussed throughout the literature as the father of innovation diffusion. According to Tarde who introduced the "Law of Imitation", in which he argued that people learn and take knowledge about innovation by imitating other people adoption behavior. It should be acknowledged that Imitation in our today's research refers to the adoption of innovation or diffusion. Trade's pointed out that rate of adoption is followed by s-shaped curve and not a bell-shaped. The s-shaped starts to increase at a slow rate at the beginning because the number of adopters are few. However, with time the curve fast-tracks to the highest level in which 50% of adopters have adopted. Later, the curve starts to increase but at a lower rate as there are fewer people remaining to adopt. Several concepts were used in Trade's work that have been adopted later in the diffusion of innovation research as mass communication, opinion leaders and interpersonal influence. Also, Trade's model is composed of four major elements including press, conversation, opinion, and action (Katz 2000). Trade's argued in his model that without personal interaction in which conversation and formation of opinion happens, the imitation does not take place. Also, press have no value in terms of communication input if the interpersonal communication happens and actions are taken based on forming an opinion.

There are two major critiques that have been discussed about Tarde's work. First, most of the key concepts that he have used are originally from Gustave Le Bon's Collective Behaviour

Theory and not purely originated. Second, Trade did not conduct empirical research on this theory which make it a bit difficult task for future researchers to cite his work (Rogers 2003; Green el at .2009). Nevertheless, several quantitative studies were conducted after 40 years by other researchers. In addition, the term “imitation” might not give a sense of innovativeness. Therefore, it would have been better if Trade has used a different word such as influence or adoption.

Katz has also introduced a framework called Two-step flow theory – See Figure 3.13 in which he argues that there are two steps for the innovation diffusion:

1. Mass media message reaches opinion leaders
2. Opinion leaders translate the message from their own perspective and the actual content to those who are under them according to the authority level.

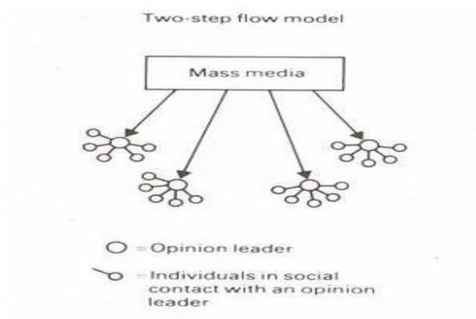


Figure 3.13 Two-step flow theory, Katz & Lazarsfeld (1955)

Due to the two steps above, opinion leaders could affect the attitude about the received communication to their followers. Opinion leaders are individuals who have persuasive power over their peers in a certain group. It is not easy to distinguish the opinion leaders from a group because it is a role and not a trait. Opinion leaders change from one issue to another and from a project to another (Littlejohn & Foss 2008).

Although the two step flow is outdated, several studies have conducted and proven that two step approach do exist such a Case el at. (2004) in which they have investigated how the theory works within the internet usage context. Their study found out that the there is a highly predominant people who screen the internet for information – opinion leaders and they spread the information to their other peers. Katz argued that this is due to lack of a public forum. However, this is no longer applicable with social networking introduction including Facebook, Twitter and Instagram.

The two-step flow model received two major criticism. First, several studies conducted by Katz (1957) and Schramm (1973) indicated that opinion leaders seek information from other people and do not depend on the media as a source of information as Katz's declared. Second, Katz's underestimated the media effect in terms of social persuasion. Indeed, in several of his studies he assumed that opinion leaders are the only element that contribute to the social persuasion power (Schramm 1973).

One of the most important conceptualization models of the innovation diffusion is Rogers (1962) innovation's diffusion model. Innovation diffusion answers the questions of how, why and what is the rate of new ideas and technology spread through cultures. Rogers argued that diffusion is a process where the innovation is communicated through the channels over a period of time between within a social system context. There are four main components in which innovation can be diffused according to Rogers:

1. Innovation in which Rogers defines it as: “An innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption” (Rogers 2003, p. 12). Throughout his research one of the major thought that has been discussed extensively is the uncertainty. Indeed, during the innovation phase since it is all about a new idea, therefore, it is expected that the individuals during this phase are uncertain about the successfulness of this idea. This level of uncertainty could be decreased to a great extant if the individuals learn about the advantages and disadvantages of idea.
2. Communication channel is “a process in which participants create and share information with one another in order to reach a mutual understanding” (Rogers 2003, p. 5). Mass media and interpersonal communication are two main communication channels. Yet, interpersonal communication is more influential within the context of diffusion of innovation because it is two-way communication type in which more than one party is involve. Additionally, diffusion of innovation is social in nature where interpersonal communication is required.
3. Time: Rogers argued that furthermost behavioral research neglected the time concept. Nevertheless, Rogers highlighted that time is influential enabler for innovation diffusion process.
4. Social system: Rogers (2003) referred to it as “a set of interrelated units engaged in joint problem solving to accomplish a common goal” (Rogers 2003, p. 23). One of the major points that has been discussed in the research is the aspect of social system as the nature of it affect the level of innovation to high extant. With reference to all the four aspects it is clearly noticed that human capital is important element for diffusion of innovation.

Rogers' theory suggests four major diffusion dimensions for any new technology including 1) perception of the characteristics of the innovation; 2) communication channels; 3) timing of adoption; 4) and the social system (Rogers 2003). The first diffusion dimension identified by Rogers is ‘‘Perception of the characteristics of the innovation’’. This dimension is decomposed into measurable functional constructs as the following:

1. Relative Advantage: Rogers (2003) defined relative advantage as “the degree to which an innovation is perceived as being better than the idea it supersedes” (p. 229). Relative advantage can be either about cost or a social status.
2. Compatibility: that “compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (p. 15).
3. Complexity: “the degree to which an innovation is perceived as relatively difficult to understand and use” (p. 15).
4. Trialability: “trialability is the degree to which an innovation may be experimented with on a limited basis” (p. 16).
5. Observability: as “the degree to which the results of an innovation are visible to others” (p. 16).

The second diffusion dimension is ‘‘communication channels’’ as per Rogers (2003) in which he defined it as a process by which individuals share information and can reach to common understanding. Yet, “diffusion is a very social process that involves interpersonal communication relationships” (Rogers, 2003, p. 19). Thus, interpersonal channels are more effective to change or create strong attitudes held by an individual (Rogers, 2003). The third dimension for diffusion of innovation is ‘‘timing of adoption’’ in which Rogers (2003) argued that mostly it can be determined by the degree of innovativeness of an individual adopter. Whereas, social system in which innovation is diffused plays a significant role in the success of the diffusion process. If the social system is homogeneous, there is a better chance for the success of the diffusion process as it can easily address the norms of the social system (Rogers 2003). The characteristics of the decision making unit have in influence on the diffusion of innovation. The decision makers of the innovation diffusion should be venturesome, cosmopolite, and having high social and having wide social network (Rogers 2003).

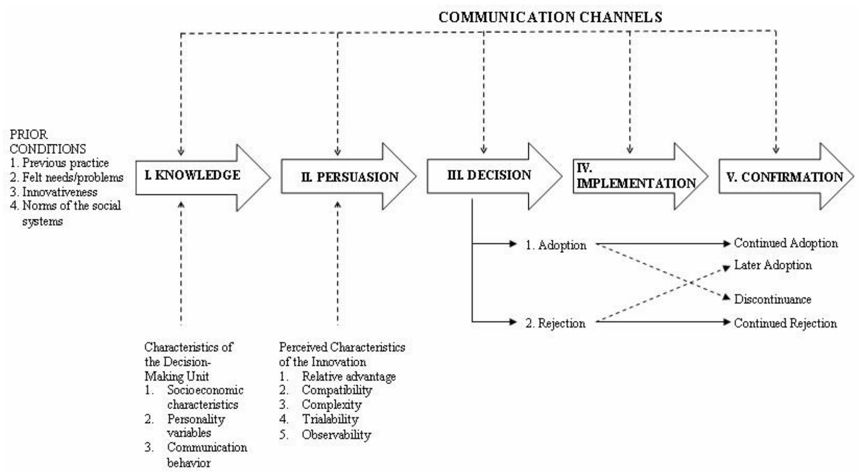


Figure 3.14 A Model of Five Stages in the Innovation-Decision Process

Rogers (2003) conceptualizes the application of innovation diffusion as illustrated in the figure above and it functions as follow:

1) Knowledge stage: This is where individual learns about the existence of innovation; the individual explores related information and strives to look for three major answers for

what, how and why of this innovation. The answers for these questions then are translated into concrete information and knowledge in which it could be shared across all levels of the organization or the team involve in the project. At the end of this stage, individuals are aware of the knowledge and understand how the innovation works does (Rogers 2003). Similarly, Franceschinis et al. (2016), argued that acquiring knowledge about innovation is mediated by personality variables and socioeconomic characteristics (i.e. age or education).

2) The persuasion stage: The individual moves from the cognitive stage of knowing to the feeling stage in which individual develops an attitude about innovation either negatively or positively. During this stage, the individual is affected by the innovation's perspective from other people working on the innovation project.

3) The decision stage: Taking the call to go or not to go with the innovation. Rogers argued that in this stage the individual plans into actions the innovation or reject it. He also pointed out that at any point of any innovation stage the rejection can take place (Rogers 2003). Franceschinis et al. (2016), subjective assessment of product or characteristics leads to making a final decision in case the innovation should be accepted or rejected. Type of culture plays a major role at this stage. For example, if the culture is distinguished as a collective culture then the decisions are made much faster about the innovation adoption. Whereas, if the culture is categorized with individualistic culture the decision might take a longer time (Rogers 2003).

4) The Implementation stage: it is a critical stage where planning is moved to implementation phase. The risks are increasing at this stage where the output of the innovation is not clear. Rogers argued that the availability of expertise and change management expertise can ease this stage.

5) The confirmation stage: The individual seeks for support for his decision from his peers or his superiors (Rogers 2003)

Continuous innovation can be related to Rogers (2003) diffusion of innovation in several ways. Diffusion is a process where the innovation is communicated via certain channels over a span of time between the people within a social system which is important element in continuous innovation. In addition, continuous innovation requires high involvement from the management in several stages similar to diffusion of innovation such as knowledge stage, the persuasion stage, the decision stage, the implementation stage and the confirmation stage.

3.11 The concept of continuous innovation

The concept of continuous innovation is a relatively new discipline in the literature of innovation (Kollmann el at. 2009). Continuous innovation is "the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, exploitation and exploration" (Boer & Gertsen 2003; pp.806). Continuous innovation refers to the process of the successful application of new ideas and methods in which it aim at organization improvement. This encompasses of several aspects of the organization including work functions, products, technologies, facilities and others. The continuous innovation requires a methodical, programmed, incremental or radical approach throughout the organization in which all employees in the organization should be involved. The continuous innovation is categorized with ongoing process that aim at improving the organization performance in order to stay competitive.

Ahmed (1998) argued that continuous innovation requires taking risks, investment and commitment in long term. Furthermore, the employees should have innovation modest in order to always seek new ways of doing their tasks. In Singapore, the Ministry of Manpower created a list of important characteristics of a dynamic and innovative workface as shown in Table 3.2

Characteristics	Description
Learning to learn	Employees have to independently acquire and apply new knowledge and skills required for meeting constantly changing needs. They find resources that facilitate learning.
Literacy	This is essential, as people are then able to raise their proficiency in reading, writing and computation for interpreting, analyzing and using more complex information and data. From this they can express ideas in writing and interpret data, identify trends, estimate results and make recommendations.
Listening and oral communication	Employees have to learn from co-workers and customers, understand needs and explore new opportunities. Participants learn how to sharpen their listening skills and express ideas orally to enhance their interaction with co-workers and customers.
Problem solving and creativity	Employees go beyond conventional approaches, offer novel solutions and make the leap to innovation. They learn how to identify potential problems and apply creativity in problem solving that generates innovative ideas.
Personal effectiveness	Employees take personal responsibility for self-development and meeting the changing needs of the organisation. They motivate themselves and set goals for improving work performance, then plan beyond the current jobs and prepare for the future by improving themselves through continuous learning.
Group effectiveness	Employees achieve synergy among team members for achieving higher performance. They acquire techniques for interacting effectively with team members from diverse backgrounds and collaborating for mutual benefit. They communicate, provide feedback, resolve conflicts, negotiate and tap the strengths of each other.
Organizational effectiveness and leadership	Employees understand the values and systems, take the lead and make decisions which support the organization goal. They function more effectively given the specific goals, values, culture and mode of operation. They inspire confidence, direct activities, lead co-workers, external contractors and customers and to anticipate the consequences of their decisions and assess their appropriateness.

Table 3.2 Characteristics of an innovative workforce, adopted from Singapore Ministry of Manpower (2000).

3.11.1 The difference between innovation and continuous innovation

Innovation pertains to the implementation of improved products, services, processes, or methods in business practices (Rathinam 2017; Winter & Silveira Chavez 2017). On the other hand, continuous innovation is a type of innovation that involves the potentiality of an innovation process to be sustainable in the long run (Kollmann et al. 2009). Innovation could be reflected by the concept of absorptive capacity which is defined as a means to acquire, transform, and use knowledge for the firm's benefit (Zahra & George 2002). Continuous innovation pertains to how organizations utilize these knowledge to continuously innovate (Joshi et al. 2010).

One striking difference of continuous innovation is its ability to provide the management with new insights based on the ever-changing markets, thus allowing better estimates of profitability of consumers through customer segmentation (Sood & Kumar 2017). In addition, Sood and Kumar (2017) proposed a time-based segmentation for identification of consumers and prediction of consumer adoption to new products. In essence, continuous innovation entails the creation of "road maps" that can be used for targeting profitable clients (Sood & Kumar 2017). Another potential benefit of continuous innovation can be seen through its use in the health care setting. Sorrow et al. (2015) introduced a novel, flexible value model called Patient Access to Cancer care Excellence (PACE) Continuous Innovation Indicators to rigorously track the employment of cancer treatment. These indicators allow the users to learn and understand the different values and assessments in cancer research, and as such, users can visualize and map unmet needs and progress of the cancer over time (Sorrow et al. 2015). For this research continuous innovation will be adopted.

3.11.2 The state difference between continuous improvement and continuous innovation

Several researchers such as Bessant and Caffyn (1997) have used continuous improvement and continuous innovation interchangeably. However, many others do not agree that these concepts are synonymous. Collins (1994) argued that continuous improvement is related to Total Quality and it describes an approach to quality assurance. Similarly, Wilkinson et al. (1998) defined continuous improvement to include the application of quality assurance to all the organization activities and it characterized by the application of best practices in the market. On the other hand, Boer et al. (2000; p.1) defined continuous improvement as "the planned, organized and systematic process of ongoing, incremental and company-wide change of existing practices, aimed at improving company performance". Therefore, it is a concept focusing on the process of new product development in manufacturing organizations. Continuous improvement can be a subset of innovation. Continuous innovation can be an illustration of innovation through continuous improvement. The later has been found in Pereira and Aspinwall's (1997) study in which they compared continuous improvement and Business Process Reengineering (BPR). Their study suggested that BPR is equal to innovation, and evolves out of a continuous improvement initiative. Another study conducted by Wiele and Brown (1998) also found out that organization can progress from continuous improvement to effective innovation by having a culture which inspires innovation.

Similar to continuous improvement, continuous innovation constitutes a substantial range of opinions and ideas among the researchers. Continuous innovation is even much broader as it combined learning, improvement and how knowledge can be acquired, created, diffused, consolidated and then applied in the organization (Boer et al. 2001). It should be said that the learning and improvement cover many areas such as products, technology, system, innovation and not only limited to organization processes. As per Boer (2002), continuous innovation can be defined as "ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, exploitation and exploration"

The concept of continuous improvement versus continuous innovation are very related and similar. The Euro-Australian co-operation, a research initiative on continuous innovation was conducted with the support of the European Continuous Improvement Network (EuroCINet). The main aim of it was to help organizations to promote the process of continuous improvement in product innovation. To elaborate, the research objectives were formulated as follows (original phrasing in the research proposal 1997):

- "Describe how companies stimulate a process of continuous Improvement (CI) of their product innovation capabilities by facilitating a diffuse of continuous flow of knowledge both within their organizational boundaries and with other organizations".

- "Explain this process in terms of specific barriers and enablers to CI of product innovation capabilities".

- "Identify contingencies which drive the choice of specific enablers, with particular reference to companies competing in global environments".

- "Explore the effects of different choices in terms of performance and capabilities".

- "Suggest companies" actions to foster CI and knowledge transfer in product innovation processes coherently with their specific objectives and characteristics".

- “Derive implications for actions at the regulatory and infrastructural levels, to enhance co-operation between Europe and Australia”.

ESPIRIT-project-26056. (2002).

The main outcome of the research initiative was the development of a model called Euro-Australian co-operation center for Continuous Improvement and innovation Management (CIMA) which has been used for fostering product innovation process in manufacturing companies and mainly for new product development (Hyland et al. 2001). Boer et al. (2001) pointed out that CIMA can explain the association between variables that have an influence on performances in continuous innovation processes and contributes to the understanding of continuous learning within product innovation processes- See Figure 3.15

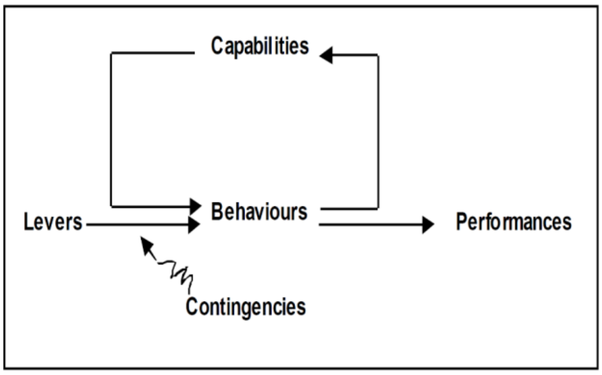


Figure 3.15 Elements in the CIMA explanatory for learning in CPI, Boer et al. (2001).

Boer et al. (2001) suggested that the CIMA model can describe and explain how organizations can gain competitive advantage by extending their innovation efforts to other phases of the product life cycle and by facilitating knowledge transfer and learning both within the organization and with other partner organizations. With reference to Figure 3.15, The CIMA model describes the learning and knowledge generation processes within product innovation in terms of a number of interrelated variables. The variables are: Continuous Innovation (CI) performance; behaviors that are supporting continuous innovation and learning within product innovation (PI); levers that can enhance these behaviors; company contingencies; and continuous learning/innovation capabilities.

Performances are the result of improvement activities which are conducted usually in the innovation process. It can be measured by, for example, looking at the generation of improvements and the diffusion of improvements and learning experiences within and between product innovation projects. In addition, there are several behaviors enacted by employees including creating, using and transferring knowledge; aligning improvement activities with strategic goals and objectives; and experimenting with new solutions. All of the previously mentioned behaviors can be impacted by the implementation and application of levers.

Boer et al. (2001) pointed out that levers or enablers are mechanisms that managers can utilize when managing learning in product innovation processes. They argued the successful implementation of these mechanisms can impact the organization's knowledge aspects including creating, storing and transferring. Examples of categories of levers comprise strategic planning and policy deployment, organizational integration mechanisms, project planning and control, performance measurement, design techniques and methods, computer-based technologies, and human resource management activities.

On the other hand, contingencies in the CIMA model can be described as factors that influence the choice of levers to nurture behaviors such as the size of the organization, the market situation, and product and process complexity. Boer et al. (2001) pointed out that some of the contingencies are external and cannot be affected by the organization, but other contingencies can be influenced by the organization, such as strategy and management actions. However, capabilities can be referred to as integrated stocks of resources that are accumulated over time through learning or established through deliberate decisions. The stocks of resources include technical skills, organizational routines, and organization's assets (i.e. information systems, databases, libraries, tools, and handbooks). Boer et al. (2001) sought that the level of a organization's continuous innovation capabilities determines the efforts that are needed to stimulate the corresponding behaviors.

3.11.3 The state of the theory on continuous innovation

There are four theories that continuous innovation is built on continuous improvement, learning and innovation. Boer & Gertsen (2003) argued that innovation theory is established area of research whereas continuous improvement and learning are relatively new area of research. They also pointed out that most theories on organizational learning and learning organizations are categorized as normative, however rarely validated , or are based on anecdotes and a few limited case studies. On the other hand , the theory on continuous improvement has a better empirical basis in which many studies have been condcated.

However, recently a new approach which is proposed by knowledge-based view (KBV) attracted many researchers to understand the innovation drivers based on understating knowledge (Zhou & Li 2012). KBV is proposing that innovation only happen if the organizations can create and manage knowledge. A study carried out by Zhou & Wu (2010) found that existing knowledge of the organization is considered as the main trigger for innovation. Furthermore, the success of an organization lies on its ability to utilize and integrate leadership, innovation, and knowledge management in its system and policy (Bagher el at. 2016). Uncertainty and the increasing technological change can easily influence the intensity of innovation within a firm (Bagher el at. 2016). In addition, the culture within an organization may influence utilization of knowledge management processes (Tahnnhuber et al. 2017), thereby affecting organizational innovation (Bagher el at. 2016; Frezatti et al. 2017). These processes reflect the notion that knowledge is process-based, in which knowledge management is focused on knowledge flows and the process of creating, sharing, and distributing knowledge in an organization (Alavi & Leidner, 1999). knowledge-based view (KBV) will be discussed in more details in Chapter four.

3.11.4 Factors affecting continuous innovation

As business becomes more competitive, firms depend on their knowledge capabilities to continuously innovate (Joshi et al. 2010). In this sense, IT provides the capability to create, disseminate, and utilize knowledge, and further integrating firms' knowledge capacities to innovate (Joshi el at. 2010). As the term suggests, continuous innovation involves the establishment of opportunities and processes that ensure the streamlining of tasks and methods (Karlsson & Björk 2017). However, there is a scarcity of research focusing on the understanding and utilization of specific processes to ensure continuous innovation.

The success of entrepreneurial growth companies may be attributed to ambidextrous management and the concept of continuous innovation (Kollmann et al.2009). Kollmann et al. (2009) posited that the aim of ambidexterity is overcoming organizational threats and ensuring survival of the firm. Thus, through continuous innovation, ambidexterity can ensure the sustainability of an organization (Kollmann et al.2009). This is further reflected on the results of Joshi et al.'s (2009) study, which highlighted the enhancement of innovation outcomes through IT-enabled knowledge capabilities. In addition, it was indicated that IT-enabled systems have different effects on firm's continuous innovation (Joshi et al.2010).

In another study, Karlsson and Björk (2017) examined how a network for continuous innovation can be established by performing a longitudinal case study on the product management of R&D department of a multinational company. Findings showed that the utilization of intra-organizational networks has the potential to provide organizational pressure, which consequently leads to innovation (Karlsson & Björk 2017). This organizational pressure is characterized by reciprocal expectations and demands between management and employees (Karlsson & Björk 2017). Karlsson and Björk (2017) concluded that network structure, change facilitation, and top down and bottom up are interdependent and can potentially invoke not only innovative outcomes within the organization, but more importantly, it can lead to continuous innovation.

3.12 Knowledge management and innovation in the financial sector

3.12.1 Overview of the knowledge management and innovation in the financial sector

The financial sector including banks, insurances, exchange houses and financial houses are categorized with customer focused perspective. Consequently, many financial institutions shifted their focus to obtain and use customer knowledge and develop their services and products in order to exceed customers' expectations (Ribiere & Chou 2001; Ping & Kebao 2010).

Miles (2011) argued that the financial sector is not categorized with a routine work but it rather a complex and requires many analytic work based on several elements such as complex projects, problem solving, computer and internet use and adopting to new learning skills. The globalization of financial markets are pushing all the financial institutions to be more effective in managing knowledge especially in their operations in order to leverage all knowledge aspects such as creating, capturing, organizing, storying, disseminating and applying in order to enhance innovations (Chatzoglou & Vraimaki 2009; Mizintseva & Gerbina 2009).

There are many examples of product and process innovation in banks, insurances and exchange houses. For example, product innovation for the exchange houses includes smart phone transaction. Another example of product innovation in the banks is the credit card options such gold, silver, platinum or corporate card. Whereas process innovation for the insurances for example, online application and approval within 30 minutes. There are many studies that have investigated the product and process innovations in the financial sector including Akamavi (2005); Batiz-Lazo and Woldesenbet (2006); Damanpour and Gopalakrishnan (2001). Damanpour and Gopalakrishnan (2001) have carried out a study in which they have used a sample of 101 commercial banks in the United States. They have found out that product innovations are adopted at a greater rate and speed than process innovations. In addition, their study findings revealed that the adoption of product innovations is positively associated with the adoption of process innovations. In addition, high-performance banks adopt product and process innovations more aggressively than low-performance banks. With reference to Figure 3.16

Product innovations	**Process innovations**
ATMs (on bank premises)	Truncation of the check handling process
ATMs linked to statewide networks	Automated mortgage generation
Debit cards	Computerized loan document generation
Credit cards	On-line teller terminals
NOW/Super NOW accounts	Derivatives (swaps, options futures/forwards)
Zero balance disbursement accounts	Lobby automation (video banking)
Sweep (asset management) account	Automated voice response systems
Self-directed IRA accounts	High speed image processing of checks
Linked certificates of deposit	High speed image processing of office documents
Money market deposits	Automated check reconciliation systems

Figure 3.16 An example of product and process innovations in banks adopted from Damanpour and Gopalakrishnan (2001, p. 53)

Now days, there are several innovation in the financial industry including the following:

Bank of America introduced its AI-powered chatbot called Erica.The chatbot is integrated with Bank of America’s financial literacy library in order to provide resources to customers. Erica is able understand voice or text commands and gives customers a virtual personal banker in their pocket. In addition, Erica allow customers to search transactions, transfer and deposit funds and get advice on financial products and services.

Banco Bilbao Vizcaya Argentaria, banking group in Spain have introduced a new app called “Bconomy” which allow customers to set goals, save money and track their progress. Furthermore, the app provides the customers which several suggestions on how to save money and compare prices on utilities, groceries and general shopping. In addition, the app allows its users to compare their spending with the people from their similar spending behavior.

Another great example also the Chase Bank example of introducing the self-serve teller kiosks in all of its branches. The self-serve teller is fully automated and allow the customers to help themselves without waiting for someone to serve them. Another example is Zelle which is one of the biggest exchange houses in USA in the world have introduced an app that allow all the people to transfer their money with the click of a button. It allows customers to transfer money between banks and send money and deposit checks.

Russian bank Sberbank uses an AI-based tool called “Tips” which is made to help customers improve their financial habits while saving time and money. Tips in a smart app that can analyzes each customer’s banking behavior in terms of spending and saving. It also provide personalized estimates for the future which can allow the customers can set financial goals and get connected to the best products and services that meet their needs.

In U.K, Barclaycard bank introduced Grab+Go feature that turns customers’ smartphones into wallets. Therefore, customers don’t need to carry their physical cards and they can use their smartphones. Furthermore, this app allow customers can scan items into the app and pay for them without having to wait in line.

(Morgan 2018)

3.12.2 Importance of managing banking knowledge

The financial sector has started to change and many institutions have started to offer many diverse services and products apart from their standard products and services with the purpose of gaining competitive advantage. Knowledge management and knowledge management processes has become an vital factor for the financial sector including banks, insurances, exchange houses and ect. Within this context, many financial institutions have started to challenge and compete to know their customers in the best way possible and offer solutions for individual needs in order to have a life-long relationship with the customer. Therefore, proper management of knowledge becomes even more critical in the financial sector (Ugurlu & Kizildag 2013). For example, information technology have enabled the banks to have new interfaces such as ATMs to deal with the daily operations for the customers instead of branches. The later helped the banks to safe their operational costs and shifted their focus to more added value services for the customers.

Due to the global economy, the financial sector has to adopt more effectively and efficiently to the dynamic changes. Therefore, senior management and mangers in the financial institutions should be more aware about managing the knowledge in the best ways especially with the operations aspects. In addition, mangers should be knowledgeable about the new products and services that are in the market in order to stay competitive and adopt to the changes in the customer needs and expectations. The later require from the mangers to constant exchange information from different sources such as customers, competitors and quarterly and annual reports (Chatzoglou & Vraimaki 2009).

The financial institutions need to focus on how to obtain customer knowledge in order from them to offer the best match products and services to customers. There are several ways in which customer knowledge could be acquired such as employees who have a direct contact with customers, information technology products, Automatic Teller Machines (ATMs), internet and e-finance (Ping & Kebao 2010; Yamagata 2002). Taherparvar el at. (2014) pointed out that there are many benefits from using the customer's knowledge such as awareness of external environment, new changes in customers' needs and perspectives which can enhance the innovation and performance. In addition, Calabrese and Remshard (2006) suggested that financial institutions should focus on enhancing the internet platform such as internet banking in order to capture customer specific knowledge and other important knowledge such as e-mail records and customer requests/complaints.

Financial institutions are required to understand how to capture useful information which is relevant to the organizational knowledge in order to enhance the quality of its operations and innovations (Alrawi & Elkhatib 2009; Cebi et al. 2010). Mizintseva and Gerbina (2009) argued that knowledge management play a critical role in the financial sector by supporting customer relation management (CRM), human capabilities and risk management. Customer relationship management CRM is a software project. It is a system in which a financial institution can manage its relationship with its customers and its mostly common in banks and insurances.

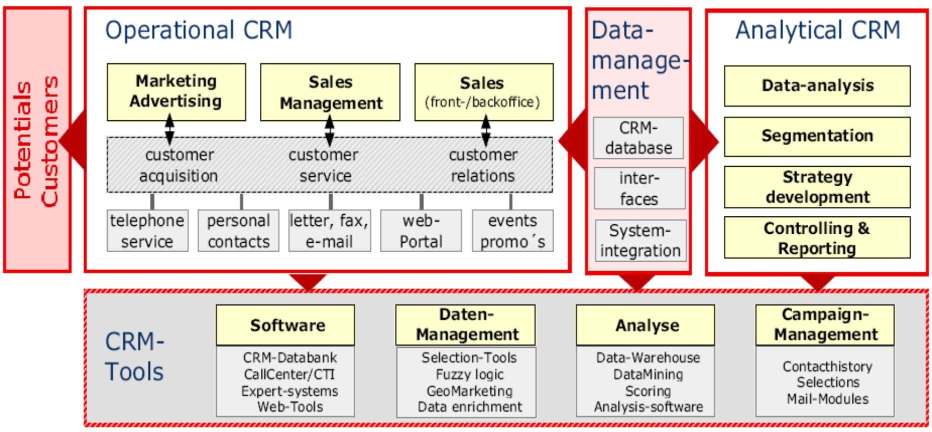


Figure 17: CRM Framework , source Citibank (2018)

The CRM software focuses on creating a customer database that presents a consistent picture of the customer's relationship with the bank, and provides that information in specific applications such as sales force automation and customer service- See Figure 18- Example.

Figure 18: Sample of CRM customer details, Citibank (2018)

The CRM information for each customer is updated regularly. The main benefits of CRM are summarized below:

- 360˙Customer View such as demographics, all products, offers & responses and phone number history
- Campaign management
- Anticipate customer expectations and predict customer behavior such as intention to purchase, lifetime profitability, and credit risk.
- Contact management
- Lead management
- Customer holistic overview
- Integrated solution across all channels
- Identify the customers' present and future financial needs.

- Meet individual customer needs
- Increased operational efficiency

3.12.3 Implementation of knowledge management and the processes in the financial sector

The financial sector is challenged with an increasing amount of data and information on day to day. It addition it is a very complicated sector that involves continuous collaboration and knowledge incentives however, the financial sector also has to adhere to strict security, privacy and compliance regulations (Ali & Ahmad 2006). For example, the introduction of social media in the financial sector has increased several knowledge risks that could leak knowledge and therefore leads to loss of competitive edge. Therefore, knowledge related risks need to be closely monitored with overall organizational risk management (Thalmann et al. 2014). Arigianni el at. (2015) suggested several ways in which financial institutions can use to control significant risks of knowledge leakage in social media as illustrated in Figure 19.

	Business Computers	Business Mobile Devices	Personal Devices
Technical	Restricted access of social media	User authentication	Controlled Wi-Fi
	Traffic monitoring	Limited administrator rights	
	Firewalls	VPN	
	Email Encryption	Encrypted Containers	
Organizational	Awareness building & training (Web based training, workshops, training sessions prior entrance)		
	Creation of corporate culture		
	Social media policies		
	Code of conduct		
	Contracts of confidentiality		
	Restricted Usage of personal devices		

Figure 19 Technical and organizational countermeasures Arigianni el at. (2015)pp.10

Several researchers have pointed out that there are several factors that can challenge the implementation of knowledge management in the financial sector such as culture. Although knowledge management and its processes became an important focus of several industries, only a few financial institutions have managed to develop efficient knowledge management strategies and this is due to the massive amount of knowledge and highly regulatory environment (Jayasundara 2008; Chatzoglou & Vraimaki 2009; Tanaji 2012).

Ali and Ahmad (2006) argued that it is critical for the financial sector to manage knowledge in the most effective way in order to drive innovation. According to Huang and Lai (2010) study in which they have surveyed the insurance sector in Taiwan. Their study found out that there is a lack of empirical research in understanding the knowledge management in the insurance sector. The findings also revealed that disseminating, capturing and applying knowledge are the most relevant processes in the insurance sector and they can drive innovation.

An extensive case study has been carried out by Haryanto and Efendy (2017) in investigating the Knowledge Management System (KMS) including capture, storage, retrieval, transfer and reuse of knowledge in the Bank Central Asia (BCA). The study concluded that BCA has been very successful in implementing the KMS which enhances their innovation in both products and services.

Another study was carried out by Zaky and Soliman (2017) titled with "The Effect of Knowledge Management Critical Success Factors on Knowledge Management Effectiveness and Performance: An Empirical Research in Egyptian Banking Sector" investigated the critical success factors that related to the knowledge management effectiveness within banks. In order to do so, they have selected three banks and tested the proposed research model in a self- administrated survey. The study found out that effective human resources practices, leadership, Information Technology, strategy, process on knowledge management effectiveness. However, they found out that the culture has not influence on knowledge management effectiveness.

Liao et al. (2012) carried out an extensive study in which they have covered the top 100 financial enterprises in Taiwan surveying a 449 participants. The study aimed at investigating the relationships among organizational culture, knowledge acquisition, organizational learning, and organizational innovation in Taiwan's banking and insurance industries. The study results indicated that organizational learning found to be a partial mediator between organizational culture and organizational innovation. Also, the organizational culture has an impact on organizational learning and innovation through knowledge acquisition. In addition, organizational learning has a full mediation effect on knowledge acquisition and organizational innovation.

Cebi et al. (2010) have investigated the relationship of the benefits obtained from knowledge management implementation in five largest banks in Turkey. The study concluded that knowledge management implementation can yield many benefits such as innovation, better usage of resources and improve the performance of the organization.

Kridan and Goulding (2006) conducted qualitative research of 35 interviews in three major banks in Libya including the Central Bank, a specialist bank in real estate and investment, and commercial bank. Their study aimed at exploring to what extend the employees understand the knowledge concept and knowledge management. The study found out that approximately 93% of the employees acknowledged that knowledge is the most important resource for the financial sector. However, the findings of the research also suggested that there was a low awareness about the knowledge management concepts and processes. In addition about 87% of the employees said that their relevant financial institution does not apply knowledge management activities and processes. 69% of the employees claimed that the financial sector in Libya might have difficulties in adopting knowledge management processes due to organizational culture and lack of infrastructure.

Chee at al. (2000) surveyed senior managers of 25 international organizations including four banks, insurances and others to investigate if knowledge management can add value to their organization. The study found out that knowledge management is essential for the CRM, the decision making process, and innovation. Capturing and sharing knowledge were found to be the most relevant processes relevant to their organizations. In addition, internet, human resource systems, groupware and workflow management systems can help in enhancing knowledge management as stated by the senior managers. The study concluded that motivating people to share knowledge can act as a major obstacle in adopting to the knowledge management processes in those financial intuitions.

Mutinda (2017) carried out a study in which he surveyed 43 commercial banks to investigate the relationship between knowledge management and innovation. The study found out that knowledge management was found to enhance innovation among commercial banks. The study also found that knowledge creating and disseminating had a positive impact on the innovation. In addition, the implementation of knowledge acquisition and disseminating practices remain weak.

Taherparvar el at. (2014) conducted a study in which 35 private banks in Guilan (Iran) were examined. The data was collected via questionnaires from managers of private banks in Guilan in which a total 265 were collected. The main objective of the study was to examine the impact of customer knowledge management (CKM) on continuous innovation and firm performance. The study found out that knowledge from customers has a positive impact on both innovation speed and innovation quality in addition to operational and financial performances.

Within the context of the UAE, a study titled with “Knowledge Management Practices In The Banking Industry: Present And Future State - Case Study” was carried out by Alrawi and Elkhatib (2009). Based on a survey of 72 managers working in the banking sector in Abu Dhabi Emirate, UAE. The study concluded that knowledge creation, knowledge sharing, and knowledge acquisition are critical in those institutions in the UAE. They also found out that proper management of knowledge management practices can enhance the operations quality. In addition, the study of Alrawi and Elkhatib (2009) found that knowledge management practices were found to be in its infancy stage and are not very effective this is due to lack of integration between management and employees and lack of improvement in human capital. They also pointed out that senior management in the banking industry need to focus on building an organizational culture based on trust to help the employees and management to exchange knowledge and build long-term strategies based on that knowledge gained.

Abdallah et al. (2012) carried out a study in which they have investigated the relationship between knowledge sharing and innovation capability, by examining the influence of individual, organizational and technological factors on knowledge sharing (i.e knowledge donating and knowledge collecting). For this study 103 employees were surveyed from several sectors including financial sector in the UAE. The study found out that there is no impact of knowledge sharing on innovation capability. However, technological factors such as ICT use has a direct impact on innovation capability.

Cedar at al. (2013) carried out structured in-depth, qualitative interviews with CEOs, senior managers, and department heads of eight banks in the UAE with aim to gain insight into the extent that knowledge management (KM) is practiced by Islamic and conventional banks in the United Arab Emirates (UAE). The study found out that Islamic banks were more actively practicing knowledge management than conventional banks. Nevertheless, both Islamic and conventional banks were found to be focused on knowledge capture, knowledge transfer, and knowledge sharing. In addition, the study indicated that most of the banks at early implementation phase of knowledge management. The study found none of the eight banks have a dedicated knowledge champion (KM Officer) or an organizational culture that force employees to practice knowledge management processes. Cultural norms concerning privacy can act as a major challenge in willingness to participate and information sharing.

To summarize it is apparent that knowledge management processes and innovation critical are in the financial sector and several points can be concluded from previous empirical studies:

- There is low awareness about the knowledge management concepts and processes.
- The globalization played as important force to push financial institutions to invest in managing knowledge especially in their operations
- Creating, capturing, organizing, storing, disseminating and applying knowledge are critical in order to enhance innovations in financial sector.
- Innovation in the financial sector is classified into process or product.
- Customer knowledge is critical to capture knowledge for other products and services available in the market.
- Knowledge management practices were found to be in its infancy stage.
- Islamic and conventional banks were found to be focused on knowledge capture, knowledge transfer, and knowledge sharing.

Chapter four: Conceptual Framework

4.1 Introduction

The main objective of this chapter is to present and explain the study's conceptual framework, which will facilitate the reader's comprehension of the subject in hand, and enable the reader to build a logical sequence of concepts, constructs, relationships explained by this study. This chapter takes the reader through the journey of building this study conceptual framework. This chapter starts with theoretical background of the study. The chapter then moves to presenting the research conceptual framework. The chapter then discuss the relationships between the dependent, mediator and independent variables. Consequently, the chapter will be divided into the following sections: theoretical background, research conceptual framework, research variables and study hypotheses sections.

4.2 Knowledge- Based view

Knowledge-Based View (KBV) of the organization has spawned a growing amount of research growth in the field of organizational learning (Bapuji & Crossan 2004). Furthermore, the fields of knowledge management and intellectual capital have likewise garnered a strong recognition and representation in academia, business, and government (Bontis 2002; Choo & Bontis 2002). In addition, there is a growing research in Knowledge-Based View processes and innovation which reflects a growing recognition that knowledge based view can influence the innovation (Andreeva & Kianto 2011; Kianto 2011).

There are numerous models of a knowledge-based processes of innovation can be found in the literature (e.g., Nonaka & Takeuchi 1995; Galunic & Rodan 1998; Tsai & Ghoshal 1998). These models explore the characteristics of knowledge and their impact on the knowledge processes whose output is implicitly viewed as an innovation. While these models highlight the role of knowledge processes in enhancing innovation most of them consider single process like creation rather than the six processes of knowledge. Schulze and Hoegl, (2008) argued that more research should be conducted in order to understand how different knowledge management processes associate to an innovation outcome. In addition, theoretical models in learning organization did not directly target the innovation process, however they did have incorporated the interaction effects that occur in the development of knowledge and learning toward the broader goal of organizational change (Kim 1993; Woodman et al.1993; Crossan et al. 1999; Menon & Pfeffer 2003; Lawrence et al. 2005). Hence, adopting the knowledge based view to build the relationship with innovation is justified and fill in the gap of the other unexplored processes of knowledge in relation to innovation. The following section will explore the Resource-Based which is the foundation of the Knowledge-Based View development.

4.2.1 The Resource-Based View of the organization

The main theme of the Resource-Based View addresses a major a question of why organizations are diverse and how organizations can attain and sustain competitive advantage by using their resources. These ideas are not novel and during the last 50 years, several researchers have contributed to the development of this topic and related concepts. To give an example, Selznick's (1957) idea of an organization's "distinctive competence" is related to the Resource-Based View. In addition , Chandler's (1962) notion of "structure follows strategy", in addition to Andrews' (1971) who wrote about the concept of "distinctive competencies". However, Penrose in 1959 is recognized as one of the earliest main contributors to the theoretical foundations of the Resource-Based View (RBV) in which he considered the organization as an administrative and a collection of productive resources, both tangible and intangible (Kor & Mahoney 2000; Rugman & Verbeke 2002). Tangible resources can include elements such as physical or financial resources while intangible may include organizational culture, employee know-how, and brand name reputation.

Resource-Based View focuses on the inside of the organization including its resources and capabilities in order to justify the profit and value of the organization (Grant 1991; Peteraf 1993; Makhija 2003). The view provides a framework for understanding the importance of organizational resources and offers an explanation that performance of an organization depend on the resources controlled by the organization (Wernerfelt 1984). The main assumption of the Resource-Based View is that competitive advantage is a direct consequence of the organization's resources which are categorized with certain characteristic such as strategic value, hard to imitate, hard to transferred and distributed heterogeneously among firms (Barney 1991; Peteraf 1993).

In the same vein, Amit & Schoemaker (1993) pointed out that Resource-Based View suggests that the resources of the organization should be difficult to imitate, valuable, rare and give the organization competitive advantage. Indeed, these resources should possess certain characteristics in order to consider them as strategic assets (Amit & Schoemaker 1993; Michalisin et al. 1997). Amit and Schoemaker (1993, p. 36) defined strategic assets as "the set of difficult to trade and imitate, scarce, appropriable and specialized resources and capabilities that bestow the firm's competitive advantage." Many researchers argued that these assets are viewed intangible, rather than tangible (Michalisin et al. 1997; Srivastava et al.1998; Conner 2002; Ray et al. 2004).

Since the 1990s onwards, resource-based research has focused on intangible assets more than tangible assets. For example, Sampler (1998) included information whereas Spender (1996) suggested knowledge as important intangible asset and Teece et al. (1997) discussed dynamic capabilities in their research. Prahalad and Hamel (1990) pointed out that resources are derived from practical and theoretical knowledge acquired through experience and formal learning. These resources and capabilities can include organizational processes and routines, management skills and organization specific information and knowledge (Barney 2001). Other researchers argued that not all the resources are important for achieving competitive advantage for the organization. Only valuable resources can improve the organization's performance. This indicates a complementary between Resource-Based View and Porter's industry analysis of customers. Several researchers such as Lopez 2001; Wiggins and Ruefli 2002; Zahra and Nielsen 2002 argued that the Resource-Based View is growing as several empirical studies have utilized it, therefore, the perspective may evolve into a theory. As evident in the Resource-Based View, a perspective is different than theory. A perspective involves issues of terminology and concept confusion while a theory has addressed these matters.

4.2.2 From the Resource-Based View to the Knowledge-Based View of the organization

Throughout the course of the Resource-Based View development it has branched into several diverse directions including Knowledge-Based View. Since the evolution of the Resource-Based View to Knowledge-Based View, there is a general agreement that Knowledge-Based View of the organization is an extension of Resource-Based View (Grant 1996; Sveiby 2001; Bontis 2002; Huizing & Bouman 2002; Balogun & Jenkins 2003).Theoretically, the central premise of the Resource-Based View of the organization considers knowledge as the most important strategic resource. Intangible assets such as knowledge is highly valued and considered critical intellectual capital asset (Bontis et al. 1999; Petrick et al. 1999; Bontis et al. 2000; Eustace 2000; Hitt et al. 2001; Grant 2002; Bontis 2004). The interpretation of knowledge as a resource could act as the theoretical connection between the Resource-Based View and Knowledge-Based View (Ariely 2003).

The Knowledge-Based View of the firm is an extension of the Resource-Based View of the organization because it reflects that organizations are heterogeneous entities loaded with knowledge (Hoskisson et al. 1999). The resource base of the organization gradually consists of knowledge-based assets (Roos et al. 1997; Sveiby 2001; Marr 2004). Similarly, Wiklund and Shepherd (2003) argued that knowledge resources are critical to ensure that competitive advantage. These knowledge resources are viewed as difficult to imitate and are the foundation for sustainable differentiation. Similarly, Conner and Prahalad (2002) suggested that the Knowledge-Based View of organization lies with the Resource-Based View. They elaborated that at the beginning of the 2000s, within the strategic management literature, many researchers included knowledge while discussing the Resource-Based View and they considered knowledge as a basis for competition. Grant (1997) viewed the Knowledge-Based View as the "climax" of Resource-based theory.

In addition, Knowledge-Based View theorists distinguished resources from capabilities. Foss and Eriksen (1995) pointed out that two key features distinguish resources from capabilities: tradeability and the extent they are tied to individual. Resources are tradeable and often tied to the individual. Whereas, capabilities are not tradeable and do not essentially belong to sole individuals.

With reference to Table 4.1 the difference between the Resource-Based View and Knowledge-Based View is presented.

Main Theme	Resource-based view	Knowledge-based view
Locus of attention is the firm and its resources	Firms are bundles of resources including tangible and intangible resources	Firms exist to integrate and coordinate individual, specialized knowledge
Source of competitive advantage	Strategic resources (theorized to be intangible resources)	Strategic resources (theorized to be intangible resources)
Isolating mechanisms	History, specificity, immobility, path dependency, causal ambiguity, non-equivalency	Span of knowledge integration, internal knowledge replication, non-transferability of knowledge, time compression diseconomies
Key management challenge	Accumulating, developing, and deploying rent-yielding (i.e., strategic) resources	Coordination and internal transfer of specialist knowledge

Table 4.1 Difference between the Resource-Based View and Knowledge-Based View (KBV) adopted from Conner (1991) and Galbreath (2004).

4.2.3 The Knowledge-Based View of the firm organization

In the mid-1990s, the knowledge-based attracted the attention of many researchers who sought to explain organizational phenomena beyond the traditions of competitive advantage and organizational performance (Foss 1993; Grant 1996; Liebeskind 1996). Spender (1996, p. 59), pointed out that Knowledge-Based View "can yield insights beyond the production-function and resource-based theories of the firm by creating a new view of the firm as a dynamic, evolving, quasi-autonomous system of knowledge production and application." There is a general agreement among researchers that Knowledge-Based View does exist in organization because the markets are not capable or incompetent in creating, transferring and applying knowledge (Bartlett & Ghoshal 1993; Nonaka 1994; Spender 1994; Nonaka & Takeucki 1995; Choi & Lee 1997). In a similar vein, Kogut and Zander (1996, p. 503) proposed "that a firm be understood as a social community specializing in the speed and efficiency in the creation and transfer of knowledge." Therefore, based on the Knowledge-Based View the main source of organizational performance is knowledge.

Indeed, researchers such as Drucker (1988), Grant (1996), and Spender (1996) argued that knowledge is the only source of competitive advantage. Nahapiet and Ghoshal (1998), argued that organizations need to have several capabilities for creating and sharing knowledge in order to create a distinctive advantage. Nevertheless, it should be pointed out that storing the organization's knowledge in an IT system does not promote any competitive advantage (Carlsson 2003). Rather, in order for the organizations to create and stay competitive they need to use existing knowledge effectively in solving problems, make decisions, and take actions. Unlike the other theories that focused on the historically dominant view, the Knowledge-Based View differentiates itself by focusing value creation rather than value appropriation (Moran & Ghoshal 1996).

Within the context of the organizations, the Knowledge-Based View addresses four important aspects. First, it seeks to understand why the organization exists. Second, it tries to understand the nature of coordination within the organization. Third, it covers the organizational structure, hierarchies, and decision-making authority. And fourth, it determinants of organization boundaries (Conner & Prahalad 1996; Foss 1996; Grant 1996). Therefore, it is very critical to understand each of these aspects of Knowledge-Based View in order to gain and sustain a competitive advantage.

4.3 Selected study theoretical approach and relevance to research questions

This thesis utilized Knowledge-Based View for several reasons. First, the importance of creating, capturing, organizing, storing, disseminating and applying have been emphasized in the Knowledge-Based View literature (March 1991; Nonaka 1994; Grant 1996; Spender 1996; Droge et al. 2003). Knowledge-Based View perspective have considered organizations as bodies that generate, integrate and distribute knowledge, therefore, this perspective is the most suitable approach for this study (Narasimha 2000; Miller 2002). In addition, according to the Knowledge-Based View, organizations have existed because they have provided generalized institutional capabilities that have allowed them to create, share, exploit, and protect knowledge more effectively than the limited and costly legal institutions that have been available in the market (Liebeskind 1996; Grant & Baden-Fuller 2004). Therefore, this perspective could reflect the different six knowledge management processes for this study. Moreover, Knowledge-Based View have represented an appropriate fit with the research questions that aimed to understand the knowledge management processes association with continuous innovation in the UAE financial sector. Second, adopting to Knowledge-Based View to this study would waived the shortcoming of this view as it has incorporated all the knowledge management processes without neglecting any aspect.

Droge et al. (2003) argued that several organizations only focused on few knowledge management processes and mostly on the application of knowledge rather than its creation or others processes. He also pointed out that other organizations focused on how to create knowledge and overlooked the application or disseminating of knowledge. Knowledge-Based View theorists argued that all the processes of knowledge management are equally important. Third, Knowledge-Based View would be the most appropriate approach for this research. This study has looked at the relationship between knowledge management processes and continuous innovation. Leonard-Barton (1995) adopted the Knowledge-Based View to understand the contribution of knowledge to innovation. She argued that the successful innovators are organizations that can manage knowledge in effective way possible. She also pointed out that organizations can only be innovative if they adopt to learning and knowledge sharing and disseminating. In addition, she suggested that employees should look for the best ways to use knowledge while performing skills. Furthermore, top management should encourage employees to be more creative in problem solving and utilizing their best knowledge practices.

4.4 Research Conceptual framework

The conceptual analysis undertaken here and laid down along the lines of the Knowledge-Based View in which six knowledge management processes were included in the conceptual framework. Building upon the previous literature on knowledge management, the following key processes are to be used: (a) capturing, (b) creating, (c) organizing, (d) storing, (e) disseminating, and (f) applying. In reference to Figure 4.1, a holistic model is presented to test the relationship between the six knowledge management processes and continuous innovation and explore the mediating role of supporting learning organization.

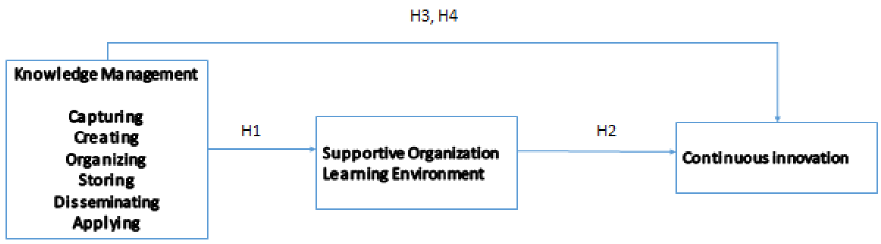


Figure 4.1 The knowledge management processes model and its relation to supportive organization environment and continuous innovation.

The conceptual framework for this study will be built on Knowledge-Based View, learning organization and continuous innovation. Knowledge-Based View is the most widely utilized perspective for understanding the knowledge management processes to date (Zemaitisa 2014; Naqshbandi & Jasimuddin 2018). Based on the knowledge management literature, research has acknowledged that effective management of knowledge processes can promote innovation (Nonaka & Takeuchi 1995; Mitchell et al. 2001; March & Stock 2006; Holtom et al. 2008). Therefore, the researcher proposes a conceptual model that brings those variables into the research field and addresses the association between knowledge management processes and its relation to continuous innovation in the in the UAE financial sector as well as the influence of supportive learning environment on this association as shown in figure 4.1.

Effective knowledge management processes enhance the organizational performance; innovation is the product of creative instinct and imaginative thinking; supportive learning environment eventually creates core competence of the organization to enhance this relationship. The justification of brining those variables along together is that despite that the direct relation between knowledge management processes and innovation have been found in the literature (Cardinal et al. 2001; Darroch & McNaughton 2002; Pyka 2002; Adams & Lamont 2003; Du Plessis 2007; Bagher et al. 2016; Frezatti et al. 2017). Within the knowledge management studies, large number of the studies have looked at one and maximum of four knowledge management processes. Therefore, this study will investigate if all of the six knowledge management processes will associate with innovation or not. From the literature, knowledge management processes are essential for innovation which creates competitive advantage by using core competence of the organization. Most of the studies found in the literature, studied one aspect of knowledge management process and innovation. For example, Herkema (2003) looked at the association between knowledge creation process and innovation. Whereas, Pyka (2002) and Cavusgil et al (2003) investigated the relationship between knowledge creation, capturing and innovation. In addition, another study Shani et al (2003) suggested the association between the knowledge storing and innovation. Du Plessis (2007) found out that organizing, storing and disseminating the knowledge contribute to innovation. Four knowledge management processes including creating, capturing, disseminating and applying were related to innovation in Arias-Pérez and Tavera-Mesías (2015) study. Therefore, it is apparent that there is a empirical gap in addressing the six knowledge management processes and innovation which will be addressed by this study.

Several previous studies have proved that effective knowledge management processes implementation can help organization's in many aspects including innovation (Brachos et al. 2007; Chen & Huan 2009; Sáenz et al. 2009; Liao & Wu 2010). Consequently, researchers developed several frameworks to achieve successful knowledge management processes implementation. However, these frameworks differ in their orientation depending on the different viewpoints and backgrounds of the researchers (Shahrokhi 2010). The main objective of the knowledge management processes framework is to provide a guide to implement knowledge management in an organized way (Elashaheb 2005; Kim 2009). Previous studies acknowledged that there are several knowledge management frameworks in the literature. However, many organizations still not capable of implementing it. This may be attributed to the limited comprehensive framework in this area (Kim 2009; Yang et al. 2009; Shahrokhi 2010). Therefore, this conceptual framework is covering all the aspects of knowledge management processes found in the literature.

In addition, this conceptual framework is testing the knowledge management processes with innovation. Innovation was found to be associated with knowledge management processes. Previous research acknowledged that, knowledge management plays an important role in innovation through different means such as facilitating collaboration, assisting in tacit knowledge conversion into explicit knowledge, identifying knowledge gaps and ensuring that knowledge is available and accessible (Du Plessis 2007). Consequently, knowledge management researchers have investigated the association between knowledge and innovation (Boer et al. 2001; Gopalakrishnan & Bierly 2001; Darroch & McNaughton 2002; Darroch 2005; Sousa 2006; Xu et al. 2010).

With reference to Table 4.2, an extensive research has been carried out to look at the previous research done in similar research. Only peer-reviewed papers have been used and most updated research 2009 onwards. The purpose of exercise was to review relevant literature pertaining to this subject matter in order to uncover any limitations within current research conceptual framework.

As very few studies have been completed in order to explore particular aspects of knowledge management processes and its relation to innovation, so this paper aims to fill a gap in research and understanding in this area. In order to do this, a strategic search of relevant literature was conducted using online databases, in order to identify relevant prior research. Search terms including, but not limited to, the following were input: *types of knowledge, knowledge management, knowledge management tools, knowledge management processes, knowledge creation, knowledge application, knowledge capturing, knowledge documentation, knowledge storing, knowledge acquisition, knowledge generation, knowledge codification, , models of knowledge management , knowledge management theories, innovation, innovation in knowledge management , innovation process and knowledge , drivers of innovation and knowledge management , triggers of innovation, building innovation and knowledge management, supportive learning environment and knowledge processes, supportive learning environment and innovation, knowledge creation and innovation, knowledge application and innovation, knowledge capturing and innovation, knowledge documentation and innovation,* *knowledge storing and innovation, knowledge acquisition and innovation, knowledge generation and innovation, knowledge codification and innovation, continuous innovation and knowledge management processes.*

Author & year of publication	Knowledge management processes	Innovation Type
Chen and Huang (2009)	Acquisition/Sharing/ Application	Technical and administrative
Garcia-Muina et al. (2009)	Codification and Storage	Technical
Hu et al. (2009)	Sharing	Service/product
Huang and Li (2009)	Acquisition/Sharing/ Application	Technical and administrative
Li et al. (2009)	Sharing and Application	Technical and administrative
Hung et al. (2010)	Creation and generation/ Codification/storage/ Application	Service/product /process
Liao and Wu (2010)	Acquisition and Application	Organizational
Liao et al. (2010)	Acquisition	Innovation capability
Maurer (2010)	Acquisition	Innovation performance
Zhang et al. (2010)	Acquisition/ Creation and generation	Innovation performance
Alegre et al. (2011)	Codification and Storage/ Sharing	Innovation performance
Andreeva and Kianto (2011)	Acquisition/Creation and generation/ Codification/storage/ Sharing / Application	Innovation performance
Camelo-Ordaz et al. (2011)	Sharing	Service/product /Innovation performance
Kianto (2011)	Acquisition/Codification/storage/ Sharing	continuous innovation
Zheng et al. (2011)	Acquisition/Creation and generation	Innovation performance
Hu et al. (2012)	Sharing	Service/product
Kumar and Rose (2012)	Sharing	Service/product /Innovation performance
Liao et al. (2012)	Acquisition	Organizational
Lin et al. (2012)	Acquisition/Sharing / Application	Service/product
Martinez-Canas et al. (2012)	Acquisition	Service/product
Marvel (2012)	Acquisition	Radical innovation
Saenz et al. (2012)	Sharing	Innovation capability
Shu et al. (2012)	Creation and generation	Service/product /process
Wang and Wang (2012)	Sharing	Other
Zhou and Li (2012)	Sharing/Acquisition	Radical innovation
Lee et al. (2013)	Acquisition/ Codification and storage/ Sharing / Application	Technical
Parra-Requena et al. (2013)	Acquisition	Service/product

Wong (2013)	Sharing	Service/product /process
Zelaya-Zamora and Senoo (2013)	Creation and generation	Innovation performance
Aboelmaged (2014)	Acquisition/Sharing/Application	Technical and administrative
Hu and Randel (2014)	Sharing	Innovation performance
Lai et al. (2014)	Acquisition/Creation and generation/ Codification/storage/ Sharing	Innovation performance
Maes and Sels (2014)	Sharing	Radical innovation
Molina-Morales et al. (2014)	Acquisition	Service/product
Soto-Acosta et al. (2014)	Sharing	Other
Al-Husseini and Elbeltagi (2015)	Sharing	Product
Dahiyat (2015)	Acquisition/Application	Organizational
Bagher et al. (2016)	Acquisition/Creation and generation/ Codification/storage/ Sharing / Application	Organizational
Obediat et al. (2016)	Acquisition/ sharing/Application	Product /process
Chen et al. (2017)	Sharing	Organizational
Jones (2017)	Sharing	Technical
Turulja& Bajgorić (2018)	Acquisition/ Application	Organizational
Wang and Kwek (2018).	Sharing	Organizational

Table 4.2 Previous studies on knowledge management processes and innovation

From reviewing the previous studies in Table 4.1, it is clear that knowledge creation and knowledge application appear as two central processes influence innovation while knowledge acquisition and knowledge sharing are the most frequently studied knowledge processes. In addition when it comes to types of innovation it is apparent that innovation performance is the most studied in relation to difference knowledge management processes, followed by organizational. It is also worth mentioning that only Kianto (2011) study looked at the association between knowledge management processes and continuous innovation which indicates that more empirical research is required in this area. However, her study only included four knowledge management processes including acquisition, codification, and storage and sharing. Whereas, this study will cover all the six processes of knowledge management.

In addition, previous research suggested that sometimes the association between knowledge management processes with innovation is not fully explained and mediator variables need to be included to understand such relationship (Liao & Wu 2010; Wang & Kwek 2018). For example, Vítor and Monteiro (2017) argued that all knowledge processes can directly support innovation however other organizational variables such as organizational learning, learning organization and absorptive capacity can mediate this relationship. The researcher, therefore, selected the supportive learning environment to be included in this conceptual framework. Supportive learning environment found to be linked to knowledge management research as well as innovation as per the literature reviewed in chapter 2.

Previous studies have suggested that there are three types of mediation relationships found in empirical studies including the following:

- Knowledge management processes (as mediating variable), independent variable and innovation (See Table 4.3).
- Knowledge management processes (as independent variable) mediating variable and innovation (See Table 4.4).
- Knowledge management processes (with some processes mediating the relationship between other processes and innovation) (See Table 4.5).

Author(s)	Independent variable	Mediator variable	Mediation results
Chen and Huang (2009)	Strategic human resources practices	KM capacity (Acquisition; sharing; application)	Full mediation

Huang and Li (2009)	Social interaction (trust; communication; coordination)	KM (acquisition; sharing; application)	Full mediation
Lin et al. (2012)	Market orientation	Customer KM (acquisition; sharing; application)	Full mediation
Martinez-Canas et al. (2012)	Social capital	Knowledge acquisition	Full mediation
Shu et al. (2012)	Managerial ties	Knowledge creation (exchange and combination)	Full mediation
Hu and Randel (2014)	Extrinsic incentives for knowledge Sharing	Tacit knowledge sharing	Partial mediation
Lai et al. (2014)	Industry clusters	KM (Knowledge creation and acquisition; knowledge dissemination and storage)	Full mediation
Molina-Morales et al. (2014)	Cognitive proximity	Knowledge acquisition	Partial mediation

Table 4.3 Previous studies on Knowledge Management processes as mediators between independent variables and innovation.

Author(s)	Independent variable	Mediator variable	Mediation results
Alegre et al. (2011)	KM practices (dissemination; storage)	KM dynamic capabilities (internal and external learning competence)	Full mediation
Hu et al. (2012)	Knowledge sharing	Leader-member exchange (LMX; Team member exchange (TMX))	Partial mediation
Hung et al. (2010)	KM initiatives (creation; storage; transfer; and application)	Total quality management practices	Full mediation
Liao and Wu (2010)	KM (acquisition; conversion; application)	Organizational learning	Full mediation

Liao et al. (2010)	Knowledge Acquisition	Absorptive capacity	Full mediation

Table 4.4 Previous studies on mediation variables between Knowledge management processes and innovation.

Author(s)	Independent variable	Mediator variable	Mediation results
Li et al. (2009)	Knowledge sharing	Knowledge application	Full mediation
Zhang et al. (2010)	Knowledge acquisition	Knowledge creation	Full mediation
Andreeva and Kianto (2011)	Knowledge acquisition; knowledge sharing and application; knowledge storage and documentation	Knowledge creation	Full mediation
Zheng et al. (2011)	Knowledge acquisition; knowledge generation	Knowledge combination	Full mediation
Lee et al. (2013)	Knowledge acquisition	Knowledge sharing	Full mediation
Dahiyat (2015)	Knowledge acquisition	Knowledge integration and knowledge application	Full mediation

Table 4.5 Previous studies on Knowledge management processes as mediators and independent variables

4.5 Research Variables

As per the literature review in chapter two and three, the study variables are extracted and defined as follows:

4.5.1 Independent variables

- Knowledge creating could be defined as the development of new tacit or explicit knowledge from previous knowledge it is also generated by discovery new ways of doing tasks (Lawson 2002; Andreeva & Kianto 2011)
- Knowledge capturing happens when tacit knowledge is converted to an explicit form or vice versa. It is represented in a reasonable way where it is easily accessed, extracted and shared (Lawson 2002; Kianto 2011).
- Knowledge organizing entails the classification of knowledge into useful resources (Lawson 2002; Kianto 2011).
- Knowledge storing refers to the process in which knowledge is retained through various means such as database management and data warehousing technologies (Lawson 2002; Andreeva & Kianto 2011).
- Knowledge disseminating - Provides the manner by which knowledge can be distributed in the organization (Lawson 2002; Park 2006).
- Knowledge applying is the utilization of available tacit or explicit knowledge in the decision-making processes or the performance of tasks (Lawson 2002; Park 2006; Andreeva & Kianto 2011).

4..5.2 Independent variable

- Continuous innovation is the ongoing process of the successful application of new ideas and methods in which it aim at organization improvement (Boer & Gertsen 2003).

4.5.3 Mediator variable

- Supportive learning environment refers to the organizational conditions and practices that are likely to facilitate or hinder learning (Billett 2001; Clarke 2005).

4.6 Research hypotheses

The following research hypotheses are derived from the literature review with a reference to chapter two and three and they are aimed to answer the study's research questions

4.6.1 Knowledge management processes and continuous innovation

To answer question 1:Q1: How do knowledge management processes associate with continuous innovation in the UAE financial sector?

Research hypotheses H01 and HA1 are developed from the literature and previous studies that showed the relationship between knowledge management processes and continuous innovation as follows:

H01: There is no association between knowledge management processes and continuous innovation in the UAE financial sector.

HA1: There is an association between knowledge management processes and continuous innovation in the UAE financial sector.

4.6.2 Supportive learning environment on the association between knowledge management processes and continuous innovation.

To answer question 2: What is the role of the supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector? The following hypotheses are developed based on the literature review and the proposed conceptual framework.

H02: Supportive learning environment will not mediate the association between knowledge management processes and continuous innovation in the UAE financial sector

HA2: Supportive learning environment will mediate the association between knowledge management processes and continuous innovation in the UAE financial sector

4.7 Summary

This chapter has so far presented the conceptual framework which encapsulates the theory of this thesis. In developing the conceptual framework, the Knowledge-Based-View was used. Then, from the previous literature review chapters, the major research questions and the conceptual framework were designed. It then shifted its focus in proposing the theoretical aspects of Knowledge-Based-View and the association between knowledge management processes and continuous innovation and how does supportive learning environment impact this relationship. The chapter also presented a brief review of the previous studies which investigated similar relationships. It then moved to highlight the final definitions of each of the conceptual framework components and proposed research hypotheses. The chapter then ended with highlighting the reasons for selecting the study theoretical approach and relevance to research questions.

5. Chapter Five: Research Methodology

5.1 Introduction

The main objective of this chapter is to explain the rationale behind the research method selected for this study. This chapter begins with research philosophy, approach, methodology and method. This chapter then details the questionnaire design, structure, questions types and the tools that have been used to measure the study variables. In addition, reviews from the pilot study from academicians and practitioners are incorporated in the research instrument. This chapter then moves to discuss the sample selection, statistical analyses tools that are used to analyze the collected data. Furthermore, the chapter covers the scale reliability of the study data. Checking the data outliers is also highlighted. This chapter provides the results for normality and appropriate data transformation solution for this study.This chapter is ended by highlighting the ethical considerations for this study.

5.2 Research philosophy: Identification of the appropriate stance

Research philosophy is important because specific paradigms may be associated with certain methodologies. According to Collis and Hussey (2009) "a research paradigm is a philosophical framework that guides how scientific research should be conducted, based on people's philosophies and their assumptions about the world and the nature of knowledge." Kuada (2011) points out that the development paradigms is largely influenced by how people view reality and therefore it could be objective or subjective. Over period of time, people's perception about reality changes which justify the reason of having many paradigms (Hussey 2009). There are three main common paradigms that are widely used in research. First is positivist paradigm which refers to the single reality that can be measured and known, therefore, it is more likely that quantitative methods will be used. Contrary, constructivist paradigm is the second type which is believes that there is no single reality and therefore, reality needs to be investigated and interpreted. Qualitative methods are more common to be used in the constructivist paradigm in order to get sense of the multiple realties that need to be investigated. The third types is pragmatists which believe that reality is always renegotiated, debated, interpreted. In most of the researches problem solving method is the most appropriate method while using the pragmatists view.

With a reference to Table 5.1, a detailed overview of each paradigm (and contains subjectivism and critical) are presented.

Paradigm	Ontology *What is reality?*	Epistemology *How can I know reality?*	Theoretical Perspective *Which approach do you use to know something?*	Methodology *How do you go about finding out?*	Method *What techniques do you use to find out?*
Positivism	There is a single reality or truth (more realist).	Reality can be measured and hence the focus is on reliable and valid tools to obtain that.	Positivism Post-positivism	Experimental research Survey research	Usually quantitative, could include: Sampling Measurement and scaling Statistical analysis Questionnaire Focus group Interview
Constructivist / Interpretive	There is no single reality or truth. Reality is created by individuals in groups (less realist).	Therefore, reality needs to be interpreted. It is used to discover the underlying meaning of events and activities.	Interpretivism (reality needs to be interpreted) • Phenomenology • Symbolic interactionism • Hermeneutics Critical Inquiry Feminism	Ethnography Grounded Theory Phenomenological research Heuristic inquiry Action Research Discourse Analysis Femenist Standpoint research etc	Usually qualitative, could include: Qualitative interview Observation Participant Non participant Case study Life history Narrative Theme identification etc
Pragmatism	Reality is constantly renegotiated, debated, interpreted in light of its usefulness in new unpredictable situations.	The best method is one that solves problems. Finding out is the means, change is the underlying aim.	Deweyan pragmatism *Research through design*	Mixed methods Design-based research Action research	Combination of any of the above and more, such as data mining expert review, usability testing, physical prototype
Subjectivism	Reality is what we perceive to be real	All knowledge is purely a matter of perspective.	Postmodernism Structuralism Post-structralism	Discourse theory Archaeology Genealogy Deconstruction etc.	Autoethnography Semiotics Literary analysis Pastiche Intertextuality etc.
Critical	Realities are socially constructed entities that are under constant internal influence.	Reality and knowledge is both socially constructed and influenced by power relations from within society	Marxism Queer theory feminism	critical discourse analysis, critical ethnography action research ideology critique	Ideological review Civil actions open-ended interviews, focus groups, open-ended questionnaires, open-ended observations, and journals.

Table 5.1   Comparison between different research adapted Crotty (1998)

Rebecca (2015) suggest to use a top down or a bottom up approach). In a bottom up approach, the researcher first decide on the research question, then selects a method, methodology and finally a theoretical perspective. On the other hand, bottom up approach is the opposite of bottom up approach.

With a reference to this study research questions of this study discussed in previous chapter, it is apparent that positivist approach is the most appropriate paradigm as the researcher needs to measure the studied phenomena. Earlier in the literature review (see chapter 2 and 3) it was highlighted that there is a lack of empirical evidence that have looked at a similar study. Therefore, positivist approach will help in providing a statistical evidence which can be used for the financial sector in the UAE. In addition, the researcher have reviewed a large extensive literature in order to develop a conceptual framework in which empirical testing can be carried out. Several hypotheses are developed in order to examine the association between the dependent, mediator and independent variables.

5.3 Research approach

Researchers use one of the two research approaches when designing their research. Deductive approach in which the researcher has to deduct hypothesis based on developed theories and test them. On the other hand, inductive approach is related to developing theories through observations and data collection (Bryman & Bell 2015). Trochim (2006) argues that inductive starts from specific to general whereas deductive begins with general and ends with specific. A compassion between the deductive and inductive approaches is presented in Figure 5.1

Deduction emphasises	Induction emphasises
• scientific principles • moving from theory to data • the need to explain causal relationships between variables • the collection of quantitative data • the application of controls to ensure validity of data • the operationalisation of concepts to ensure clarity of definition • a highly structured approach • researcher independence of what is being researched • the necessity to select samples of sufficient size in order to generalise conclusions	• gaining an understanding of the meanings humans attach to events • a close understanding of the research context • the collection of qualitative data • a more flexible structure to permit changes of research emphasis as the research progresses • a realisation that the researcher is part of the research process • less concern with the need to generalise

Figure 5.1 Inductive and deductive research approaches (Saunders et al. 2016, p. 145).

Each of these logics (induction and deduction) requires a certain approach and methodology for testing to carry out the research (Corley & Gioia 2011). Several researchers such as Wacker (1998) and Ritchie et al. (2013) point out that deductive approach is associated with post-positivist which implies using quantitative approach to test the theory. Contrary to this is the inductive approaches which is more inclined towards qualitative research (Meredith 1998; Wacker 1998). When there is insufficient knowledge about a certain theory usually it is accepted to utilize qualitative approach as it is more subjective unlike the quantitative approach (Eisenhardt & Graebner 2007).

This research will adopt a deductive approach as this approach is fit the objective of the study and it is the best when the researcher aims to examine if the observed phenomena can fit with the previous research expected (Wiles et al.2011). In addition, this research aims at explaining a causal relationship between several variables such as knowledge management processes, continuous innovation which deductive approach is more appropriate to do so. Furthermore, this study will test several hypotheses based on the conceptual framework which was created based on the literature, therefore, deductive approach will fit better than inductive. In addition, this study will be measured using quantitative approach which is the general practice of deductive approach.

5.4 Research methodology

Research methodology is defined as the theory of how the research should be carry out (Saunders et al. 2007). There are two main ways in which the research study can be carried out; one is the quantitative methods which use objective means for data collection and analysis (Wacker 1998), whereas qualitative methods are based on theory of induction (Ritchie et al.2013). Several methods are used to carry out the research investigations when the researcher adopts either qualitative or and quantitative. For example, qualitative approach use several instruments such a case- study and interviews whereas quantitative approach use surveys (Eisenhardt & Graebner 2007; Ritchie et al. 2013).

This research will adopt quantitative approach. Thomas (2004) argues that it is critical that the researcher select the right quantitative instrument that is suitable for the research questions and aims. The research questions suggested at the initial chapter is repeated here for ease of reference:

> *RQ1: Do knowledge management processes associate with continuous innovation in the UAE financial sector?*

> *RQ2: What is the role of the supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector?*

The first question is attempts to investigate the relationship between knowledge management processes and continuous innovation in UAE financial sector. This question requires first to investigate if there is an association between the six knowledge management processes and continuous innovation in UAE financial sector. The second question investigates the role of supportive environment learning in explaining the association between the six knowledge processes and continuous innovation in the in UAE financial sector. The first question is a high level of association whereas the second question is investigating the relationships in more level of details. Both of these questions require to enhance reliability of both parts, increase its generalizability and answer the question with more specificity. This research was carried out by using questionnaire instrument.

Quantitative approach mainly utilize survey to collect data and carry out the analysis. Researchers utilize survey approach to carry out one of the following: an exploratory survey associated with early stage of researching a phenomenon to establish a conceptualization theory or a confirmatory survey which is based on a well-established theories, frameworks and hypotheses, OR a descriptive survey research which is associated with generalizing a specific phenomenon into certain population (Pinsonneault & Kraemer 1993; Forza 2002) . It is therefore, the intention of this thesis to carry out a confirmatory type of survey research which is based on the nature of the research questions, literature review and the theory of KBV.

Forza (2002) points out that when choosing a confirmatory type of survey, a theoretical framework is required in order to construct units of analysis, develop a questionnaire, collect and analysis data. The unit of analysis refers “to the level of data aggregation during subsequent analysis. The unit of analysis in may be individuals, dyads, groups, plants, divisions, companies, projects, systems, etc". (Flynn et al. 1990). Defining the units of analysis leads to the production of the study constructs and variables. After that the questionnaire is developed using a scale. Then the researcher distribute and monitor the data collection. Once the data is completed, appropriate data analysis is used.

The justification for the usage of quantitative approach for this thesis is is based on several considerations, such as the fact that relevant literature such as knowledge management, learning organization and innovation have used quantitative approach more than qualitative (Eg, Alavi & Leidner 2001; Kianto 2011; Saunila 2016). Therefore, this confirms that quantitative method is appropriate and proven to be successful in the field of this research previously. In addition, while there are few number of empirical studies on this subject is slim as claimed by researchers such as Kianto (2011) and Saunila (2016), these studies can be viewed as a measure of and an indication about future research implying a level of positivity in this regard. Another influencing factor is the researcher motivation to perform quantitative approach.

5.5 Research method

The conceptual framework that was discussed in chapter four will be tested using a survey which is the most appropriate tool for measuring attitudes and orientations of large populations. Furthermore, in applied social research survey tool is the most common way of measurement. Generally speaking, survey encompasses any measurement procedures that involve asking questions of respondents. Surveys come in several forms; it can be written, oral or electronic (Jankowicz 2005).

A quantitative questionnaire survey was chosen to conduct this study. Several reasons could be attributed to such selection. First, the nature of the study is looking at the relationship between the influence knowledge management processes and continuous innovation. The survey, as suggested by Page and Mayer (2000) is considered as a strong reliable research tool to perform statistical analysis which helps in finding the cause and effect relationship. Creswell (2003) points out that survey allow the researchers to compare and contrast responses across groups. Third, timeframe to conduct this study is limited thus the survey is considered less time consuming method compares to cross-case study method or non- structured interviews. Fourth, the ease of data access and survey development.

In this research, written questionnaire was used as method of survey because it is more accurate and can ensure no missing data as the researcher will conduct the research and review it. The participants will be asked to rate their perception about the six different knowledge management processes, supportive learning environment and continuous innovation. Saunders et al. (2003) points out that surveys are the most common way to collect data however, the response rate is influenced by mode of application. To wave the risk of low response rate, the researcher selected self-administered questionnaire mode. In addition, self-administered questionnaire allow the respondents to ask questions, clarify statements and suggest improvements.

5.6 Research instrument

The questions for the survey are generated from the literature. The questionnaire comprises of three parts, each addressing a particular facet of the theoretical framework. Part one includes an assessment of KM processes, whereas part two includes questions related to supportive learning environment and part three includes questions related to continuous innovation.

The most common scale that it used to measure the questionnaire is the five-point Likert scale (Hussey& Hussey 1997). Therefore, a Likert-scale will be used to measure questions dealing with KM processes, supportive learning environment and continuous innovation. The scale is ranging from (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

5.6.1 Knowledge management processes scale

There are a several measures of knowledge processes that are presented in the literature (e.g. Alavi & Leidner 2001; Darroch 2003; Kulkarni & St Louis 2003; Marque´s & Simo´n 2006; Zack et al. 2009; Mitchell & Boyle 2010). Yet, as knowledge management discipline is still in the development phase, numerous authors model the knowledge management processes. One of the major limitations of all the scales presented in the literature that they did not group all the 6 knowledge management processes except Lawson's (2002) Knowledge Management Assessment Instrument (KMAI). Consequently, for the purposes of this research, the scales for knowledge processes were combined by the authors based on the literature to present the total 6 knowledge management processes. With a reference to Table 5.2, all the knowledge management processes including knowledge creating , knowledge capturing , knowledge organizing , knowledge storing, knowledge disseminating , and knowledge applying were combined and refined based on knowledge management literature. Each of these processes scale has six to seven descriptive statements and utilizes a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Knowledge management processes	**Item code**	**Item**	**Reference**
Creating	CR1	My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, customers and competitors.	Lawson (2002)
	CR2	My organization has mechanisms for creating new knowledge from existing knowledge and uses lessons learnt from projects to improve successive projects.	
	CR3	My organization has processes for the exchange of ideas and knowledge between individuals and groups.	
	CR4	My organization rewards employees for new ideas and knowledge.	
	CR5	My organization frequently comes up with new ideas about our products and/or services.	Andreeva & Kianto (2011)
	CR6	My organization develops a new method if a traditional method is not effective anymore.	Andreeva & Kianto (2011)
Capturing	CA1	My organization has explicit strategies for knowledge development and capture.	Kianto (2011)
	CA2	My organization responds to employees ideas and documents them for further development.	Lawson (2002)
	CA3	My organization has mechanisms in place to absorb and transfer knowledge from employees, customers and business partners into the organization.	
	CA4	My organization has mechanisms for converting knowledge into action plans to design new products and/or services.	
	CA5	My organization has policies in place to allow employees to present new ideas and knowledge without fear.	
	CA6	My organization regularly showcases new ideas from employees to other staff.	
	CA7	My organization pays attention to capture valuable and useful knowledge.	Kianto (2011)
Organizing	OR1	My organization has a policy to review knowledge on a regular basis.	Lawson (2002)

	OR2	My organization assigns tasks to employees to keep knowledge current and up to date.	
	OR3	My organization has mechanisms for filtering, cross listing and integrating different sources and types of knowledge.	
	ORG4	My organization gives feedback to employees on their ideas and knowledge.	
	ORG5	My organization has processes for applying knowledge learned from experiences and matches sources of knowledge to problems and challenges.	
	ORG6	My organization has adequate storage infrastructure (physical/electronic) for proper organization of knowledge.	Kianto (2011)
Storing	ST1	My organization utilizes databases and uses information technology applications to store knowledge for easy access by all employees.	Lawson (2002)
	ST2	My organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees.	
	ST3	My organization has different publications to store and display the captured knowledge.	
	ST4	My organization has mechanisms to patent and copyright new knowledge.	
	ST5	My organization does a lot of work to refine and store the collected knowledge.	Andreeva & Kianto (2011)
	ST6	My organization documents and keeps things that are learnt in practice.	
Disseminating	DI1	My organization has knowledge in the form that is readily accessible to employees who need it. (Intranets, internet, etc.)	Lawson (2002)
	DI2	My organization sends out timely reports with appropriate information to employees, customers and other relevant organizations.	
	DI3	My organization has libraries, resource center and other forums to display and disseminate knowledge.	
	DI4	My organization has regular symposiums, lectures, conferences and training sessions to share knowledge.	

	DI5	My organization is actively sharing information and knowledge within the units.	Park (2006)
	DI6	My organization encourages employees to share with others what they have learned from their assignments.	
Applying	AP1	My organization has different methods for employees to further develop their knowledge and apply them to new situations.	Lawson (2002)
	AP2	My organization has processes to identify restricted knowledge.	Park (2006)
	AP3	My organization has mechanisms to protect knowledge from inappropriate or illegal use inside and outside of the organization.	Lawson (2002)
	AP4	My organization applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving.	
	AP5	My organization has methods to analyze and evaluate knowledge to generate new patterns for future use.	
	AP6	My organization always informs the employees about changes in procedures, instructions and regulations.	Andreeva & Kianto (2011)

Table 5.2 Knowledge management processes scale

5.6.2 Supportive learning environment

In the field of management sciences, the concept of learning organization is established and not a new. However, they are very few validated learning organization diagnostic instruments. For example, Jashapara (2003) has industrialized an instrument of a learning organization whereas others such as Honey and Mumford's (1989) who introduced Learning Diagnostic Questionnaire (LDQ). However, low alpha coefficients were reported for their tool (Fung et al. (1993) and Pedler et al. (1991) who developed a Learning Climate Questionnaire (LCQ). However, this tool received a critique that it did not look specifically at the environment of learning but rather on how learning organization should be. Therefore, supportive learning environment was developed to measure the supportive learning environment. The scale is adopted from Garvin el at. (2008). The original questionnaire consists of three major parts covering three building blocks, which included behaviour of leadership and processes of learning along with the environmental component, but only the part consisting the questions about supportive learning environment will be adopted for this study. With reference to Table 5.3 seven descriptive statements are shown along with the coding

Item code	Supportive learning environment items	Reference
SI1	In my organization, it is easy to speak up about what is on our mind.	Garvin el at. (2008)
SI2	In my organization, employees are usually comfortable talking about problems and misperception.	
SI3	In my organization, employees are eager to share information about what does and doesn't work.	
SI4	In my organization, differences in opinion are welcomed.	
SI5	In my organization, employees are open to alternative ways of getting work done	
SI6	In my organization despite the workload, people find time to review how the work is going	
SI7	In my organization , we are given the time we need for both formal and informal learning	

Table 5.3 Supportive learning environment scale

5.6.3 Continuous innovation scale

There is no comprehensive scale to measure the continuous innovation. The later might be attributed that the description of continuous innovation concept is insufficient in the literature which impacted the limited understanding of the CI concept (Garud et al.2011; Steiber 2014). Saunila (2016) has developed a scale to measure continuous innovation based on the literature at an organizational level. On the basis of the literature review, twelve items of continuous innovation measurement were operationalized. All the statements were constructed by the researcher based on the validated research that has been done by the work of Saunila (2016 &

2017) in which she gathered all the relevant literature concerning measuring the continuous innovation. The scale was developed on a strong theoretical basis and validity, the reliability of the scale was assessed by other researchers (Saunila 2017). For each of the twelve items, the respondents were asked to indicate their opinions on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) shown in Table 5.4.

Item code	**Continuous innovation**	**Reference**
CI1	In my organization we are encouraged to gain knowledge through external contacts (e.g. customers, competitors and suppliers).	Saunila (2016
CI2	In my organization, proactive leadership such as encouragement of individual initiatives, performance evaluation and trust is highly evaluated.	Saunila 2016
CI3	In my organization employees' ideas are evaluated.	Saunila 2016
CI4	In my organization employees' work well-being (e.g. integrity, loyalty and openness to others) is measured.	Saunila 2016
CI5	In my organization, employees' expertise is evaluated or measured.	Saunila 2016
CI6	In my organization we support and reflect on internal processes and structures that support innovation.	Saunila 2016
CI7	In my organization we have a clear measures for evaluating employee learning and development.	Saunila 2016
CI8	In my organization the development of action plans are evaluated or measured.	Saunila 2016
CI9	In my organization, we always identify areas of a business that need attention and improvement.	Saunila 2016
CI10	In my organization we are encouraged to be creative and work with intrinsic motivation.	Saunila 2017
CI11	In my organization we tolerate mistakes when we try out new ideas.	Saunila 2017
CI12	In my organization we are encouraged to be proactive in leading and responding to change.	Saunila 2017

Table 5.4 Continuous innovation Scale

5.7 Research sample

It is a critical aspect of the research to decide on appropriate research population and proper sampling procedure in order to answer research questions and objectives. Jankowicz (2005) argues that sampling is a calculated choice of number of the people, representing a given population. Researcher should decide on sampling size and sampling frame in order to gather findings from the representative set of population.

Probability and non-probability sampling are the two main known techniques used for sampling procedure. Saunders et al. (2009) defined probability sampling as chance of each case being selected from the population is known and equal. On the other hand, non-probability sampling is a case where sample has not been selected using the random selection method. It suggests that some units are more likely to be selected than others in a given population (Bryman & Bell 2015). Figure 5.2 suggests the types of sampling techniques**.**

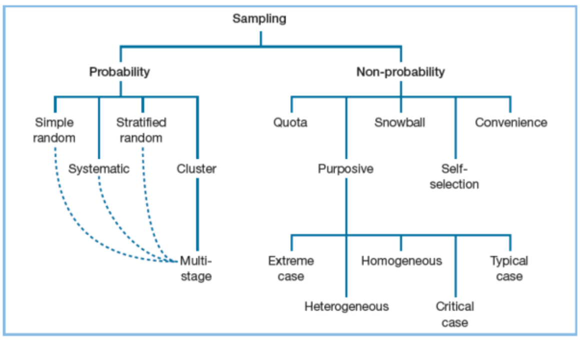


Figure 5.2 Types of Sampling Techniques (Source: Saunders et al. 2009)

Saunders et al. (2003) argue that unlike non-probability, probability sampling is complex and associates with time consuming and high cost as the technique is based on of population randomization. Non-probability sampling is more common to be used in business and management studies (Saunders et al. 2007). There are several advantages of utilizing non-probability sampling including, cheaper cost and it is more appropriate if the researcher intention is to investigate a perception (Churchill 1995; Saunders et al. 2003). On the other hand, probability sampling is more appropriate for survey research and statistical estimations while non-probability sampling is more common to be used in qualitative research (Saunders et al. 2003). Therefore, the researcher will use probability sampling for this research as it is more appropriate since it is utilizing survey instrument. As recommended by Saunders et al. (2009), this sampling technique was performed by:

1. Identifying sample frame from the research objectives/questions
2. Deciding sample size. i.e 62 responses (Justified below)
3. Assuring sample represents the population, i.e. assistant mangers and above in the financial sector in the UAE were the target population.

5.7.1 Population for this research

From the total population, only assistant mangers and above in the financial sector in the UAE are selected from the total population because they will be more familiar with the topic selected in the research (Walker & Hills 2012). Random sample selection from the financial sector in the UAE was applied in this research where only assistant mangers and above were selected to participate in the survey.

5.7.2 Sampling size

Sample size depends on the research questions and objectives of the research and also the analytical skills of the researcher (Patton 2002). It is pointed out that a sample of larger than

40 should be accepted and the research can assume normality (Ghasemi & Zahediasl 2012). In same line of thought Saunders et al. (2016) suggest that the research sample size can impact the statistical tests of research variables relationships.

Nevertheless, Forza (2002) developed a table for acts as initial guidance for selecting the research sample size. Applying this table to this research and taking into consideration the medium-size effect with both acceptable values of significance and statistical power of 0.001 and 0.8, respectively, this produces an initial sample size of 62 respondents could be sufficient to carry out this study. However, the collected responses for this research was 114 which exceeds the minimum required sample size indicated as per the Table below.

	Stat. power = 0.6		Stat. power = 0.8	
	sig. = 0.05	sig. = 0.001	sig. = 0.05	sig. = 0.001
Large effect (e.g., strong association)	12	18	17	24
Medium effect (e.g., medium association)	30	45	44	62
Small effect (e.g., small association)	179	274	271	385

Table 5.5 Effect size and statistical power and sample size (Forza 2002)

5.7.3 Data collection

Both email and phone calls were conducted to get in touch with human resource head in order to introduce the research and structure the sample of the research with each relevant organization. A total number of 114 responses from the target population received. Therefore, the response rate was 57% which is high response rate. To conduct the research, an appointment was set with HR, in which the head of HR was given the instruction of the target respondents needed by the researcher such as the position, assist manger and above. The HR got the contact details of the target respondents and informed them about the research. All the survey participants were approached through an introductory letter by email introducing the research. The questionnaire was self-administered and collected.

5.8 Pilot study

The main objective of the pilot study is to refine the questionnaire in terms of understanding questions and statements. Saunders et al. (2009) argue that pilot study help the researcher to check the reliability and validity of the data to be collected. Therefore, Pilot study was carried out to verify the questions and statements and also to give feedback on the language in terms appropriate usage. Pilot study was conducted with one professor, two fellow PhD students and three practitioners.

Size of the organization was changed it was below 50, below 100 and above 1000. It was mentioned that the scale is confusing as below 50 could also fit into below 100. And also the jump from 100 to 1000 was huge. Therefore, the size of the organization was revised to be below 100, 100-500 and above 500. One of the comments was to be consistent to use either my organization or our organization in all the statements. Previous to the pilot study some of the statements were having my organization and some them our organization. After the pilot all the statements were revised to my organization. Another comment was to change the scale from very unlikely, unlikely, neutral, unlikely, very unlikely to strongly disagree, disagree, neutral, agree and strongly agree as it was the same scale which previous studies have used.

For the knowledge management processes, all the factors were having four statements each. It was suggested by the pilot to add additional two statements in order to have better reliability in case of any deletion while analyzing the data. Therefore, additional two statements in each of the six processes of the knowledge management were added based on the literature review.

Supportive Learning Environment scale, one statement was removed as it was not clear to many of the pilot respondents suggest to remove it , “In my organization, we have a shared strategy for our learning culture where there is shared accountability across the organization”. In addition, another statement was “In my organization despite the workload, people in this unit find time to review how the work is going” and it was changes to” In my organization despite the workload, people find time to review how the work is going”.

In the continuous innovation scale, some of the statements were modified as follows” “In my organization employees’ work well-being (e.g. integrity, loyalty and openness to others) is measured” was rephrased to “In my organization employees’ work well-being (e.g. integrity, loyalty and openness to others) is measured”. And “In my organization we have a clear measures for evaluating learning and development “ changed to “In my organization we have a clear measures for evaluating employee learning and development”. Similarly statement “ In my organization the development of action paths is evaluated or measured” changed to “In my organization the development of action plans are evaluated or measured.”

5.9 Data analysis

5.9.1 Descriptive analysis

Several tests were conducted to test the research instrument and to provide descriptive analysis for the data:

- Descriptive analysis was conducted to analyze the distribution of the sample in terms of demographics and study variables and. A total number of 114 employees have participated in this study. The results indicated that majority of participants were male and work as in a managerial level. In addition, the majority of them worked in Dubai in private sector and mostly in banks. Study variables of all the indicators for the knowledge management six processes, supportive learning environment and continuous innovation were also analysed.

- Reliability test: Internal consistency refers to the degree to which the items of the scale “hang together” (Pallant 2016). On another words, it examines if all the items are measuring the same construct. Cronbach's Alpha coefficient is selected as the research reliability method as it is the most common method to test the internal consistency of the scale items (George and Mallory 2003). Cronbach's Alpha is assessed based on George and Mallory’s (2003) measure in which they have stated that if the Cronbach's Alpha is above 0.70 it is acceptable and Cronbach's Alpha between 0.80-0.90 is good and above 0.90 is excellent.
- Outliers checking and suitable treatment: Many of the statistical techniques are sensitive to outliers; which are data values either above or below the majority of all other data. Therefore, an inspection of the research data for the existence of outliers using SPSS Boxplots is preformed where there were outliers among the data. SPSS Boxplots allow the researcher to identify each outlier case along with the participant’s code (Pallant 2016). Each outlier will be inspected separately to make sure it is not an error due to data entry. Filed (2009) proposes several methods to transform the data which can be only selected based on shape of the normal distribution curves generated for the study scales.
- Assessing data normality: Assessing the assumption of data normality is important. Normality tests are used to check if the collected sample data is distributed in a normal curve. Gravetter & Wallnau (2000), argue that normality is used to describe a symmetrical, bell-shaped curve where the greatest frequency of scores are in the middle with smaller frequencies towards the extreme. Several tests are used to assess the normality including skewness and kurtosis values, the Kolmogorov-Simrnov and Shapiro-Wilk, Anscombe-Glynn Kurtosis test, Jarque-Bera test and histograms shapes . Skewness and kurtosis values is the most common test used to investigate normally distributed data. Therefore, the researcher will choose this test to assess the data

normality. The is a general agreement among the researchers that the z-values of skewness and kurtosis values should be within the range of -1.96 to + 1.96 for the sample that are less than 200 (Pallant 2011; Ghasemi & Zahediasl 2012).

5.9.2 Inferential statistics

5.9.2.1 Analysis process

Parametric tests will be utilized to carry out this research based on the normality test outcome (discussed in chapter 5). Those tests will help to answer the research questions. In order to answer research question one:"*RQ1: "How do knowledge management processes associate with continuous innovation in the UAE financial sector?"*. Both Pearson Correlation test and Multiple Regression Analysis will be employed to determine the extent to which changes in the value of knowledge management processes are associated with changes in continuous innovation. Both of these tests are used to measure the relationship between knowledge management processes and continuous innovation. Once the relationship is confirmed, a mediation test will be carried out to investigate the influence of supportive learning environment in mediating the relationship between knowledge management processes and continuous innovation.

To answer question two "*RQ2: What is the role of supportive environment learning on the association between the six knowledge processes and continuous innovation in the in UAE financial sector".* Pearson Correlation test will be carried out to test the relationship between the six knowledge processes and continuous innovation and also the supportive environment learning in order to identify the significant association. After that stepwise Multiple Regression Analysis will be used to identify which of the six knowledge processes will have a significant contribution to continuous innovation. Once the relationships are identified and confirmed, a mediation test will be carried out to investigate the influence of supportive learning environment in mediating the relationship between six knowledge management processes and continuous innovation.

5.9.2. Checking Assumptions

Several assumptions need to be investigated in great details to ensure the suitability of carrying out the Pearson Correlation test and multiple regression tests. Several preliminary analysis for correlation should be done before performing a correlation analysis such as checking for outliers, normality, linearity and homoscedasticity (Gravetter &Wallnau 2000). In addition, several verifications are important to consider before performing multiple regression analysis (Tabachnick & Fidell 2013) including the following:

- Multicollinearity: one of the model output of multiple regression analysis is a table labelled correlations. Two types of association should be looked at. First, the correlation between the independent variables and dependent variables should be above .3. Second correlations between the predictors/ independent variables should not be too high. According to Pallat (2016), any association value of r=.9 or more between the independent variables is a major concern. In addition, problem with multicollinearity might not be evident in the correlation matrix. Therefore, two main values usually found in Coefficients table should be considered: Tolerance and VIF. Tolerance is a indicator of how much of inconsistency of a particular independent is not explained by other independent variables in the model. Tolerance value of less than .10. For this study sample, all the tolerance values for the variables were less than .10. VIF (Variance inflation factor) on the other hand, which is the opposite of Tolerance value. VIF indicates if a variable or a predictor has a strong linear association with other variables or predictors (Filed 2009). VIF value of above 10 indicating multicollinearity.

- Outliers, normality, linearity and homoscedasticity: multiple regression analysis provides two methods to check all of these assumptions. First, Normal Probability Plot of the regression standardized residuals which can show where points lies. A straight diagonal line from bottom left to top right would suggest that no major deviations from normality. Second Residual scatter plots can help in showing outliers cases. It provide a visual examination of the assumption homoscedasticity between the predicted dependent variable scores (continuous innovation) and the errors of prediction. The values should not be more than 3.3 or less than -3.3. Tabachnick & Fidell (2013) suggest that if outliers were found in large sample it should be ignored.

5.9.2.1 Reliability tests

It is critical to make sure that the study scales are reliable (Pallant 2016). Internal consistency of the scale is what matters. Internal consistency refers to the degree to which the items of the scale "hang together" (Pallant 2016). On another words, it examines if all the items are measuring the same construct. Low reliability shows that the items that make up the scale do not correlate strongly and they don't share high similarity, therefore, it might not measure the same construct. One of the most commonly used indicators of internal consistency is Cronbach's Alpha coefficient (Wang et al. 2013; Pallant 2016). For this research Cronbach's Alpha coefficient was used to identify unreliable items that need to be excluded from the scale to increase the Cronbach's Alpha. Cronbach's Alpha is assessed based on George and Mallory's (2003) measure-See Figure 5.3.

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Figure 5.3 Measure of reliability (Adopted from George and Mallory 2003).

Alphas normally range between 0.00 and 1.00. The closer the Cronbach's alpha coefficient is to 1.00 the greater the internal consistency of the items in the scale. Alpha coefficients above 0.70 are considered acceptable (George & Mallery 2003). The results of the reliability analysis of this study are presented in Tables 5.6; 5.7 and 5.8. The tables show the acceptable level of internal consistency (Nunnally 1978; Hair et al. 2010; Bryman & Cramer 2011). It also demonstrates how the internal consistency can be improved if one measure is deleted from the set. Fortunately, the overall results of the Cronbach alpha test support all of the factors' measurement set.

Factor	**Code**	**Item**	**Cronbach Alpha**
		Knowledge management processes variables	
Creating	CR1	1. My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, customers and competitors.	0.863
	CR2	2. My organization has mechanisms for creating new knowledge from existing knowledge and uses lessons learnt from projects to improve successive projects.	
	CR3	3. My organization has processes for the exchange of ideas and knowledge between individuals and groups.	
	CR4	4. My organization rewards employees for new ideas and knowledge.	
	CR5	5. My organization frequently comes up with new ideas about our products and/or services.	
	CR6	6. My organization develops a new method if a traditional method is not effective anymore.	
Capturing	CA1	1. My organization has explicit strategies for knowledge development and capture.	0.874
	CA2	2. My organization responds to employees ideas and documents them for further development.	
	CA3	3. My organization has mechanisms in place to absorb and transfer knowledge from employees, customers and business partners into the organization.	
	CA4	4. My organization has mechanisms for converting knowledge into action plans to design new products and/or services.	

	CA5	5. My organization has policies in place to allow employees to present new ideas and knowledge without fear.	
	CA6	6. My organization regularly showcases new ideas from employees to other staff.	
	CA7	7. My organization pays attention to capture valuable and useful knowledge.	
Organizing	ORG1	1. My organization has a policy to review knowledge on a regular basis.	0.855
	ORG2	2. My organization assigns tasks to employees to keep knowledge current and up to date.	
	ORG3	3. My organization has mechanisms for filtering, cross listing and integrating different sources and types of knowledge.	
	ORG4	4. My organization gives feedback to employees on their ideas and knowledge.	
	ORG5	5. My organization has processes for applying knowledge learned from experiences and matches sources of knowledge to problems and challenges.	
	ORG6	6. My organization has adequate storage infrastructure (physical/electronic) for proper organization of knowledge.	
Storing	ST1	1. My organization utilizes databases and uses information technology applications to store knowledge for easy access by all employees.	0.847
	ST2	2. My organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees.	
	ST3	3. My organization has different publications to store and display the captured knowledge.	
	ST4	4. My organization has mechanisms to patent and copyright new knowledge.	
	ST5	5. My organization does a lot of work to refine and store the collected knowledge.	
	ST6	6. My organization documents and keeps things that are learnt in practice.	
Disseminating	DI1	1. My organization has knowledge in the form that is readily accessible to employees who need it. (Intranets, internet, etc.)	0.808
	DI2	2. My organization sends out timely reports with appropriate information to employees, customers and other relevant organizations.	
	DI3	3. My organization has libraries, resource center and other forums to display and disseminate knowledge.	
	DI4	4. My organization has regular symposiums, lectures, conferences and training sessions to share knowledge.	
	DI5	5. My organization is actively sharing information and knowledge within the units.	
	DI6	6. My organization encourages employees to share with others what they have learned from their assignments.	
Applying	AP1	1. My organization has different methods for employees to further develop their knowledge and apply them to new situations.	0.808
	AP2	2. My organization has processes to identify restricted knowledge.	
	AP3	3. My organization has mechanisms to protect knowledge from inappropriate or illegal use inside and outside of the organization.	
	AP4	4. My organization applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving.	
	AP5	5. My organization has methods to analyze and evaluate knowledge to generate new patterns for future use.	
	AP6	6. My organization always informs the employees about changes in procedures, instructions and regulations.	

Table 5.6 Cronbach's Alpha for knowledge management processes variables

Factor	Code	Item	Cronbach Alpha
Supportive learning environment variables			
Supportive learning environment	SL1	1. In my organization, it is easy to speak up about what is on our mind.	0.907
	SL2	2. In my organization, employees are usually comfortable talking about problems and misperception	
	SL3	3. In my organization, employees are eager to share information about what does and doesn't work.	
	SL4	4. In my organization, differences in opinion are welcomed.	
	SL5	5. In my organization, employees are open to alternative ways of getting work done	
	SL6	6. In my organization despite the workload, people find time to review how the work is going	
	S;L7	7. In my organization , we are given the time we need for both formal and informal learning	

Table 5.7 Cronbach's Alpha for supportive learning environment variables

Factor	Code	Item	Cronbach Alpha
Continuous innovation variables			
	CI1	1. In my organization we are encouraged to gain knowledge through external contacts (e.g. customers, competitors and suppliers).	
	CI2	2. In my organization, proactive leadership such as encouragement of individual initiatives, performance evaluation and trust is highly evaluated.	
	CI3	3. In my organization employees' ideas are evaluated.	

Continuous innovation	CI4	4. In my organization employees' work well-being (e.g. integrity, loyalty and openness to others) is measured.	
	CI5	5. In my organization, employees' expertise is evaluated or measured.	
	CI6	6. In my organization we support and reflect on internal processes and structures that support innovation.	
	CI7	7. In my organization we have a clear measures for evaluating employee learning and development.	
	CI8	8. In my organization the development of action plans are evaluated or measured.	0.932
	CI9	9. In my organization, we always identify areas of a business that need attention and improvement.	
	CI10	10. In my organization we are encouraged to be creative and work with intrinsic motivation.	
	CI11	11. In my organization we tolerate mistakes when we try out new ideas.	
	CI12	12. In my organization we are encouraged to be proactive in leading and responding to change.	

Table 5.8 Cronbach's Alpha for continuous innovation variables

5.9.2.2 Checking for outliers

Outliers refer to responses that are largely different from the rest of the responses which can impact distortion of statistical tests (Hair et al. 2010). On another words, outliers are the data values that are above or below the majority of the data. Tabachnick & Fidell (2007) suggest that outliers might limit the analysis of the data which will eventually impact the results. For this research, data outliers were checked using SPSS Boxplots where there were outliers among the data. One of the great advantages of using the SPSS Boxplots that it allows the researcher to identify each outlier case along with the participant's code (Pallant 2016). Filed (2009) proposes several methods to transform the data which can be only selected based on shape of the normal distribution curves generated for the study scales. Transform the variables involve mathematically modifying the scores using several formulas until the data distribution look normal.

Before transforming the data, the normality bell shape should be investigated to decide which tool is the most appropriate. For this study the data was skewed to negative, “reflect and log” was chosen to normalize the data and eliminate the outliers as much as possible (Figure 5.4 & Figure 5.5).

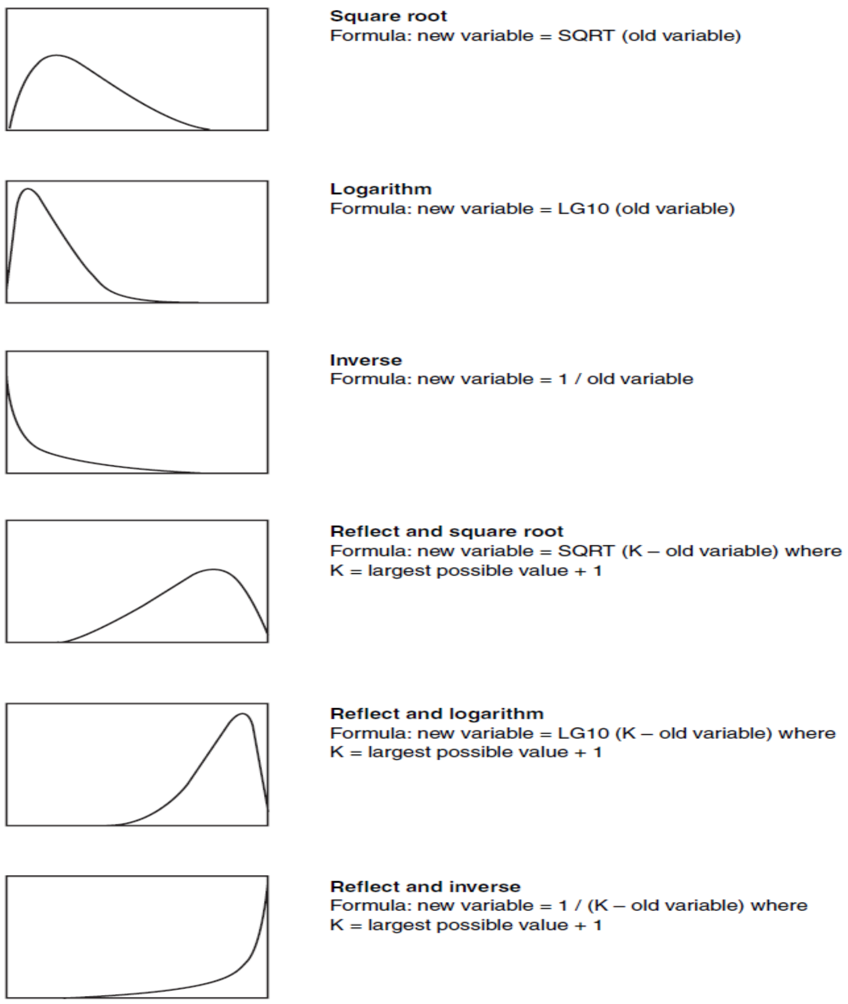


Figure 5.4 Bell shape and appropriate data transformations (Pallant 2016, pp.83).

Data Transformation	Can Correct For
Log transformation (log(X_i)): Taking the logarithm of a set of numbers squashes the right tail of the distribution. As such it's a good way to reduce positive skew. However, you can't get a log value of zero or negative numbers, so if your data tend to zero or produce negative numbers you need to add a constant to all of the data before you do the transformation. For example, if you have zeros in the data then do log(X_i + 1), or if you have negative numbers add whatever value makes the smallest number in the data set positive.	Positive skew, unequal variances
Square root transformation ($\sqrt{X_i}$): Taking the square root of large values has more of an effect than taking the square root of small values. Consequently, taking the square root of each of your scores will bring any large scores closer to the centre – rather like the log transformation. As such, this can be a useful way to reduce positive skew; however, you still have the same problem with negative numbers (negative numbers don't have a square root).	Positive skew, unequal variances
Reciprocal transformation (1/X_i): Dividing 1 by each score also reduces the impact of large scores. The transformed variable will have a lower limit of 0 (very large numbers will become close to 0). One thing to bear in mind with this transformation is that it reverses the scores: scores that were originally large in the data set become small (close to zero) after the transformation, but scores that were originally small become big after the transformation. For example, imagine two scores of 1 and 10; after the transformation they become 1/1 = 1, and 1/10 = 0.1: the small score becomes bigger than the large score after the transformation. However, you can avoid this by reversing the scores before the transformation, by finding the highest score and changing each score to the highest score minus the score you're looking at. So, you do a transformation $1/(X_{Highest} - X_i)$.	Positive skew, unequal variances
Reverse score transformations: Any one of the above transformations can be used to correct negatively skewed data, but first you have to reverse the scores. To do this, subtract each score from the highest score obtained, or the highest score + 1 (depending on whether you want your lowest score to be 0 or 1). If you do this, don't forget to reverse the scores back afterwards, or to remember that the interpretation of the variable is reversed: big scores have become small and small scores have become big!	Negative skew

Figure 5.5 Data transformations and their uses (Field 2009).

5.9.2.3 Assessing data normality

Normality tests are used to check if the collected sample data is distributed in a normal curve. Gravetter & Wallnau (2000), argue that normality is used to describe a symmetrical, bell-shaped curve where the greatest frequency of scores are in the middle with smaller frequencies towards the extreme. Several tests can help in assessing normality including skewness and kurtosis values, the Kolmogorov-Simrnov and Shapiro-Wilk, Anscombe-Glynn

Kurtosis test, Jarque-Bera test and histograms shapes. For this research sample, skewness and kurtosis values will be used to determine if the data is normally distributed. Skewness and kurtosis values used to investigate normally distributed data. The skewness test determines the symmetry of distribution whereas kurtosis value refers to information about the distribution "peakedness". According to Tabachnick & Fidell (2013), the normally data distributed should have zero values for skewness and kurtosis. Pallant (2011) argues that in real world, it is not common to find values of skewness and kurtosis are equal to zero. In the same line of thoughts, Newsom (2005) argues that the z- value of less than or equal to 2 for z-value skewness and a value of less than or equal to 3 for kurtosis should be acceptable to indicate that the data is normally distributed. However, most of the researchers said that the z-values of skewness and kurtosis values should be within the range of -1.96 to + 1.96 for the sample that are less than 200 (Pallant 2011; Ghasemi & Zahediasl 2012).

The result of the normality tests for this study will be calculated using the Z-value for the skewness and kurtosis using the following formula:

Z- skewness= skewness/SE skewness

Z- kurtosis= kurtosis /SE kurtosis

*SE: standard error

With a reference to Table 5.9 to Table 5.16, most of the indicators are normally distributed therefore, the researcher will assume normality and will use parametric tests. Pallat (2016) points out that if the research sample is more than 30; the violation of normality assumption would not cause any problems when analyzing the data. Therefore, data distribution can be ignored with large sample sizes and parametric procedures can be used. With a reference to the Central Limit Theorem – CLT which is a statistical theory that states that means of the random samples from any distribution will have normal distribution in case the sample size is large (> 30 or 40), (Elliott & Woodward 2007).   In a same line of thoughts, Ghasemi & Zahediasl (2012) argue that in large samples (>30 or 40), the sampling distribution is likely to be normal, regardless of the shape of the data. The sample of this data is 114 which is three times higher than the required sample to assume normality. Therefore, it is safe to assume that this data is normally distributed and parametric tests can be carried out. Nevertheless, using skewness and kurtosis values it is apparent that the majority of the data is normally distributed and by using visual inspection of normal plots and frequency distributions histograms it is quite normal with a very minor deviation for few indicators. These few indicators are found to be slightly negatively skewed. Nevertheless, since the majority of the variables are normality distributed data will be considered normal and parametric tests will be carried out. In the multiple regression tests, normality will be again checked using Normal P-P plot of regression standardized residual to make sure that normality is within the range and the results are not affected.

		CR1	CR2	CR3	CR4	CR5	CR6	Creating
N	Valid	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0
Skewness		-0.448	-0.342	-141	-0.269	-0.075	-0.468	-0.232
Std. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-1.98	-1.51	-623.89	-1.19	-0.33	-2.07	-1.03
Kurtosis		-0.32	-0.456	-0.701	-1.06	-1.362	-0.59	-0.068
Std. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		-0.71	-1.02	-1.56	-2.36	-3.03	-1.31	-0.15

Table 5.9 Skewness and Kurtosis values for Creating and its six indicators

		CA1	CA2	CA3	CA4	CA5	CA6	CA7	Capturing
N	Valid	114	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0	0
Skewness		-0.556	-0.512	-0.555	-0.559	-0.380	-0.532	-0.554	-0.489
Std. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-2.46	-2.27	-2.46	-2.47	-1.68	-2.35	-2.45	-2.16
Kurtosis		0.107	0.04	0.271	-0.144	-0.309	-0.015	0.325	0.567
Std. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		0.24	0.09	0.60	-0.32	-0.69	-0.03	0.72	1.26

Table 5.10 Skewness and Kurtosis values for Capturing and its seven indicators

		ORG1	ORG2	ORG3	ORG4	ORG5	ORG6	Organizing
N	Valid	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0
Skewness		-0.601	-0.446	-0.922	-0.272	-0.529	-0.405	-0.489
Std. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-2.66	-1.97	-4.08	-1.20	-2.34	-1.79	-2.16
Kurtosis		0.369	-0.055	1.107	0.436	0.241	-0.200	0.567
Std. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		0.82	-0.12	2.47	0.97	0.54	-0.45	1.26

Table 5.11 Skewness and Kurtosis values for Organizing and its six indicators

		ST1	ST2	ST3	ST4	ST5	ST6	Storing
N	Valid	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0
Skewness		-0.261	-0.706	-0.517	-0.773	-0.678	-0.586	-0.419
Std. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-1.15	-3.12	-2.29	-3.42	-3.00	-2.59	-1.85
Kurtosis		-0.154	-0.442	0.025	0.496	0.365	0.345	0.848
Std. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		-0.34	-0.99	0.06	1.10	0.81	0.77	1.89

Table 5.12 Skewness and Kurtosis values for Storing and its six indicators

		DI1	DI2	DI3	DI4	DI5	DI6	Disseminating
N	Valid	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0
Skewness		-0.452	-0.270	-0.783	-0.510	-0.373	-0.449	-0.393
DId. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-2.00	-1.20	-3.47	-2.26	-1.65	-1.99	-1.74
Kurtosis		-0.682	-0.828	0.345	0.213	-0.063	-0.150	0.600
DId. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		-1.52	-1.85	0.77	0.47	-0.14	-0.34	1.34

Table 5.13 Skewness and Kurtosis values for Disseminating and its six indicators

		AP1	AP2	AP3	AP4	AP5	AP6	Applying
N	Valid	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0
Skewness		-0.292	-0.604	-0.267	-0.409	-0.540	0.017	-0.037
APd. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-1.29	-2.67	-1.18	-1.81	-2.39	0.07	-0.17
Kurtosis		0.464	0.556	-0.584	0.852	-0.298	-1.112	0.397
APd. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		1.03	1.24	-1.30	1.90	-0.66	-2.48	0.88

Table 5.14 Skewness and Kurtosis values for Applying and its six indicators

		SE1	SE2	SE3	SE4	SE5	SE6	SE7	Supportive learning environment
N	Valid	114	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0	0
Skewness		-0.457	-0.419	-0.479	-0.297	-0.490	-0.508	-0.326	0.557
SEd. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		-2.02	-1.86	-2.12	-1.31	-2.17	-2.25	-1.44	2.47
Kurtosis		0.378	-0.302	0.540	-0.093	0.065	-0.096	-0.304	-0.246
SEd. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		0.84	-0.67	1.20	-0.21	0.14	-0.21	-0.68	-0.55

Table 5.15 Skewness and Kurtosis values for Supportive learning environment and its seven indicators

		CI1	CI2	CI3	CI4	CI5	CI6	CI7	CI8	CI9	CI10	CI11	CI12	Continues innovation
N	Valid	114	114	114	114	114	114	114	114	114	114	114	114	114
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness		0.466	0.046	0.475	0.077	0.595	0.703	0.458	0.402	0.290	0.334	-0.309	-0.490	0.711
CId. Error of Skewness		0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226	0.226
Z-Skewness		2.06	0.20	2.10	0.34	2.63	3.11	2.03	1.78	1.28	1.48	-1.37	-2.17	3.15
Kurtosis		0.808	-0.017	0.132	-0.279	0.312	1.314	-0.362	0.141	-0.119	-0.028	0.790	0.065	-0.005
CId. Error of Kurtosis		0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449
Z-kurtosis		1.80	-0.04	0.29	-0.62	0.70	2.93	-0.81	0.31	-0.26	-0.06	1.76	0.14	-0.01

Table 5.16 Skewness and Kurtosis values for Continuous innovation and its twelve indicators

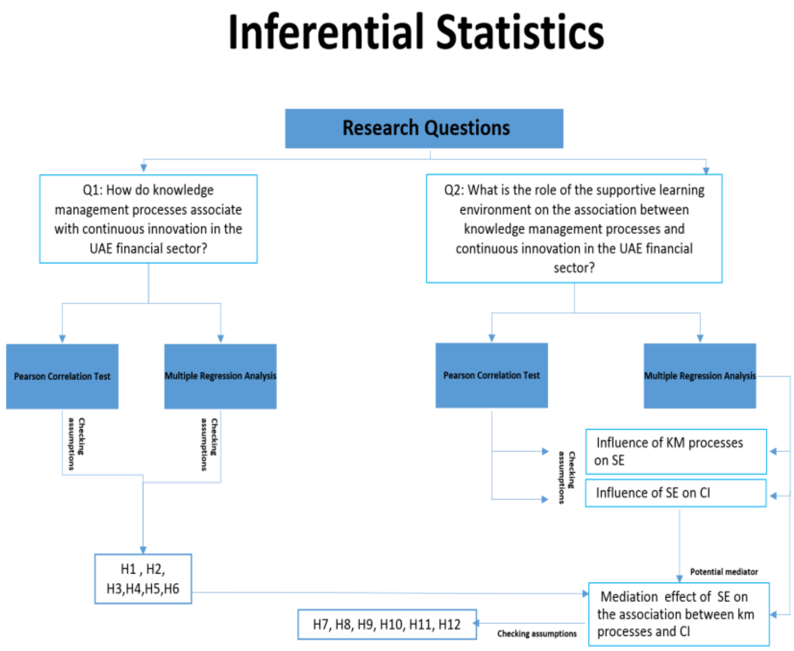


Figure 5.6 Analysis process for inferential Statistics

5.10 Ethical consideration

Ethical issues in conducting the research refer to “the moral principles, norms or standards of behaviors that guide moral choices about the researcher’s relationship with others” (Saunders et al.2007). To ensure high ethical standards the following steps has been implemented. First, required approvals were requested such as the dissertation's advisor, Head of human resources in each of the participated organization. In addition, to ensure the confidentiality of the employee's identification, no personal information were asked. Second, an email notification of the research aims and objectives was send to all the participants along with a consent form. The participants were informed that they can withdraw any time from the survey without any penalty. Third, to guarantee the anonymity and confidentiality of the participants the survey responses were stored with the researcher and results were reported without revealing the participant's identity information-eg.name. Fourth, the researcher's contact details such as number and email were provided in the survey emailer in case further information was required or respondents wished to raise any concerns.

5.11 Overall chapter summary

This chapter has so far presented the rationale behind the research method selected for this study. The chapter started with research philosophy, then it moved to presenting the approach taken to conduct the research and methodology. In addition, details the questionnaire design, structure, questions types and the tools that have been used to measure the study variable were detailed and discussed. Furthermore, reviews from the pilot study from academicians and practitioners were incorporated in the research instrument. This chapter also discussed the sample selection, statistical analyses tools that were used to analyze the collected data. In addition, several tests were carried out to investigate reliability, normality and checking for outliers. This chapter helped in understanding and interpreting data that have been gathered in order to carry on for further analysis in the next coming chapters. This chapter is ended by highlighting the ethical considerations producers taken for this research.

6. Chapter Six : Descriptive Data Analysis

6.1 Introduction

This chapter primarily focuses on descriptive data analysis of this study. This chapter starts with providing demographic information of the used sample for this dissertation. In addition, this chapter provides detail analysis of the study variables.

6.2 Descriptive analysis for demographics

A total number of 114 employees have participated in this study. The following table reflects the sample distribution according to demographic variables (Table 6.1). The majority of participants were male and work as in a managerial level. In addition, the majority of them worked in Dubai in private sector and mostly in banks.

	Gender	Position	Emirate of operation	Organization Type	Size of Organization	Years of experience	Sector
Male	69						
Female	45						
Assist manger		25					
Manager		24					
Senior manger		22					
Assist Vice President		18					
Vice President		11					
Other		14					
Abu Dhabi			24				
Ajman			5				
Sharjah			14				
Dubai			51				
Fujairah			3				
Ras Al Khaimah			7				
Umm Al Quwain			10				
Government				4			
Semi-Government				46			
Private				64			
Below 100					5		
100-500					29		
Above 500					80		
Below 5 years						10	
Between 5-10						34	
Above 10 years						70	
Bank							50
Exchange houses							17
Insurance							24
Stock market							9
Finance house							14
Total	114	114	114	114	114	114	114

Table 6.1 Sample Description

With a reference to Figure 6.1, the collected data shows that out of 114 participates, 61% were males and 39% were females (See Figure 6.1)

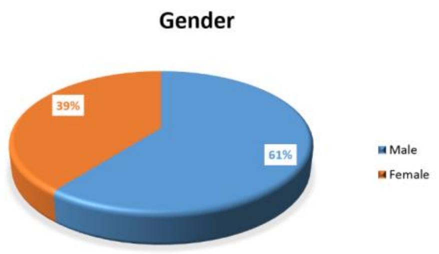


Figure 6.1 Gender

More than 50% of the participants work in private sector, followed by 40% who work in semi-government sector, and very small numbers around 4% work under the government sector. With a further investigation to investigate more detailed level in which the majority of participates 44% were in banks, followed by 21% were in insurances, 15% were in exchange houses, 12% were in finance houses and 8% were in stock market (See figure 6.2 and 6.3)

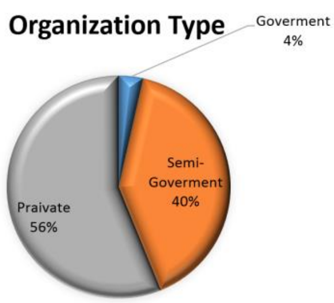


Figure 6.2 Organization type

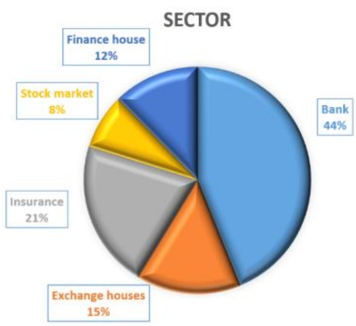


Figure 6.3 Sector

While looking at the organizational size, more than 70% of the participates relevant organization size was above 500 employees, 26% ranging from 100-500 whereas only 4% work in organization size below 100. Results indicates Emirate of operation for the participates in which the majority 45% are working in Dubai, followed by Abu Dhabi accounting for 21%, 12% were in Sharjah, 9% were in Umm Al Quwain, 6% were in Ras Al Khaimah and 3% were in Fujairah (Figure 6.4 and Figure 6.5).

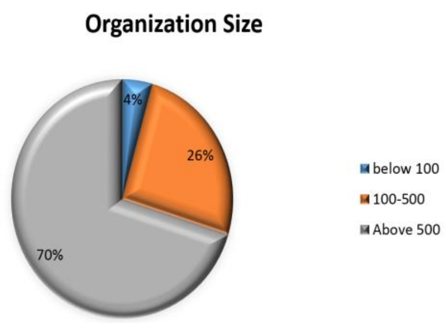


Figure 6.4 Organization size

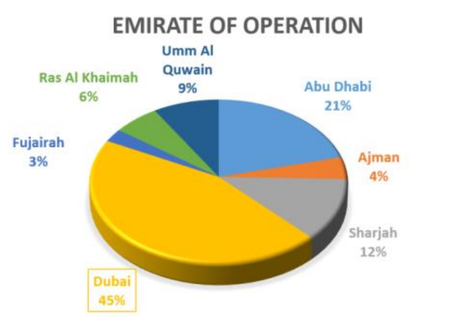
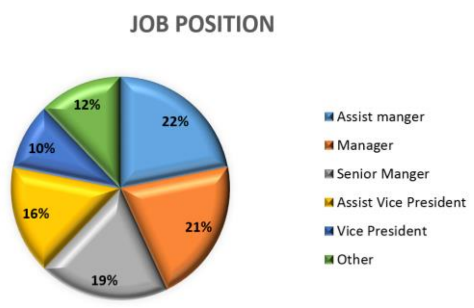


Figure 6.5 Emirate of Operation

Participant's position within their organizations shows that 22% were assist mangers, 21% were mangers, 19% were senior managers, 16% were assistant vice president, 10% were vice president and 12% reported other positions. More than 60% of the examined sample have more than 10 years of experience, followed by 30% of the participates have experience ranging from 5-10 years whereas 9% of the participates have below 5 years' experience (See Figure 6.6 and 6.7)



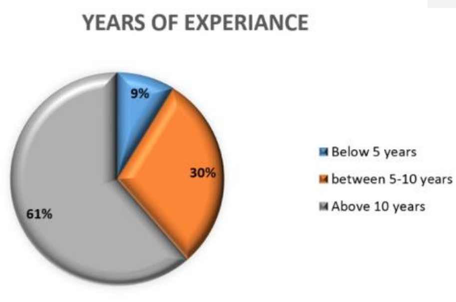


Figure 6.6 Job position

Figure 6.7 Years of experience

6.3 Descriptive analysis of study variables

6.3.1 Knowledge management processes

A list of 6 constructs (total of 37 indicators) related to Knowledge management processes derived from the literature were provided to the respondents of the survey. A five-point Likert scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) was used to measure the 37 items.

6.3.1.1 Creating

With the reference to Figure 6.8, 6 questions were asked to the respondents. Around 77% of the respondents have expressed their agreement by selecting agree and strongly agree when they were asked “My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, customers and competitors” CR1. This indicates significantly the importance of having such mechanisms to enhance knowledge creating.

Whereas 18% of the respondents were not sure if their organisations have mechanisms for creating knowledge from different sources. On the other hand only 4% disagree with the CR1 which is a low percentage compare to high percentage of agreement towards CR1. The low disagreement could explain the none-existence of not providing strongly disagree answer to CR1 by the respondents.

There was optimistic indication outlook for the CR2" My organization has mechanisms for creating new knowledge from existing knowledge and uses lessons learnt from projects to improve successive projects.", with 71 % of the respondents expressed their agreement (agree and strongly agree "with this indicator, CR2 his reflects that this indicator might explain a significant percentage of variance in the dependant variable. On the other hand, approximately 21% of the respondents did not decide an answer from CR2 which is an indication that the respondents are not aware if such practice does exist in their organisations. However, 8 % respondents expressed level of disagreement (disagree) which is double percentage of CR1 disagreement level.

Likewise, when asked about" My organization has processes for the exchange of ideas and knowledge between individuals and groups"CR3, more than 75 percent of respondents agree on the statement (strongly agree and agree). Just 15 percent say they are not sure or cannot decide if their organizations does have processes for the exchange of ideas and knowledge between individuals and groups. The percentage of undecided for CR3 is the lowest in all the 6 indicators of creating. However, 9% respondents expressed level of disagreement ranging from disagree to strongly disagree which is higher than CR1 and CR2.

While rewarding employees for new ideas and knowledge is important, only 64% provided the answer of agree and strongly agree combined to the statement "My organization rewards employees for new ideas and knowledge", CR4. The percentage of agreement is lower than CR1, CR2 and CR3. In contrast, 25% reported the answer "undecided" which is higher than

CR1, CR2, and CR3. While respondents also show higher level of disagreement compare to the first three statements with 12 % selecting disagree and strongly disagree.

In order for organizations to stay competitive, they need to introduce new ideas about their products and/or services. 66 % say their organizations “frequently comes up with new ideas about our products and/or services”, providing agree and strongly agree answers which is 2% higher than CR4 and lower than CR1, CR2 and CR3. On the other hand, approximately 20% of the respondents did not decide an answer for CR5 which is an indication that the respondents are not aware if such practice does exist in their organisations. However, 13% of the respondents disagree when it comes to introducing new ideas about products and/or services by their organizations. Whereas, none of the respondents did provide an answer to strongly disagree to CR5.

Approximately 57 % of the respondents have expressed their agreement by selecting agree and strongly agree when they were asked “My organization develops a new method if a traditional method is not effective anymore”. CR6 recoded the lowest percentage among all the 6 indicators of creating. Therefore, this indicator might explain the lowest impact in the dependant variable among all the 6 indicators of creating variable. Statement CR6 rated the highest in terms of undecided equivalent to 28% and statement CR3 rated the lowest in terms of undecided equivalent to 15%. The lack of certainty may reflect a tendency among respondents that they are only familiar with the traditional methods and not aware if their organizations develop new methods in case traditional methods were not effective. A percentage of 14% was the disagreement level among the respondents which is also the highest among all the 6 indicators of creating variable (disagree and strongly disagree).

To sum up, all of the first three statements CR1, CR2 and CR3 were concerning about the mechanisms of creating knowledge internally and externally either from people or lesson learnt and the processes of exchanging the ideas and knowledge in which the agreement percentages were ranging from 51% to 57% (agree). Whereas, 38 % of the respondents agreed on statement CR4, 33% agreed on statement CR5 and 39 % agreed on statement CR6. It is apparent that most of the respondents responses where towards agreement side for the 6 statement of creating with a minimum percentage of 57%. A percentage ranging from 18 to 33% was the strongly agreement level across the 6 different statements of creating.

A percentage ranging from 15 % to 28% across all the 6 statements of creating variable where the respondents have chosen "undecided" in which statement CR6 rated the highest in terms of undecided equivalent to 28% and statement CR3 rated the lowest in terms of undecided equivalent to 15%. On the other hand a percentage ranging from 4% to 14% was the disagreement level among the respondents where CR6 was the highest among all the 6 indicators of creating variable and CR1 was the lowest.

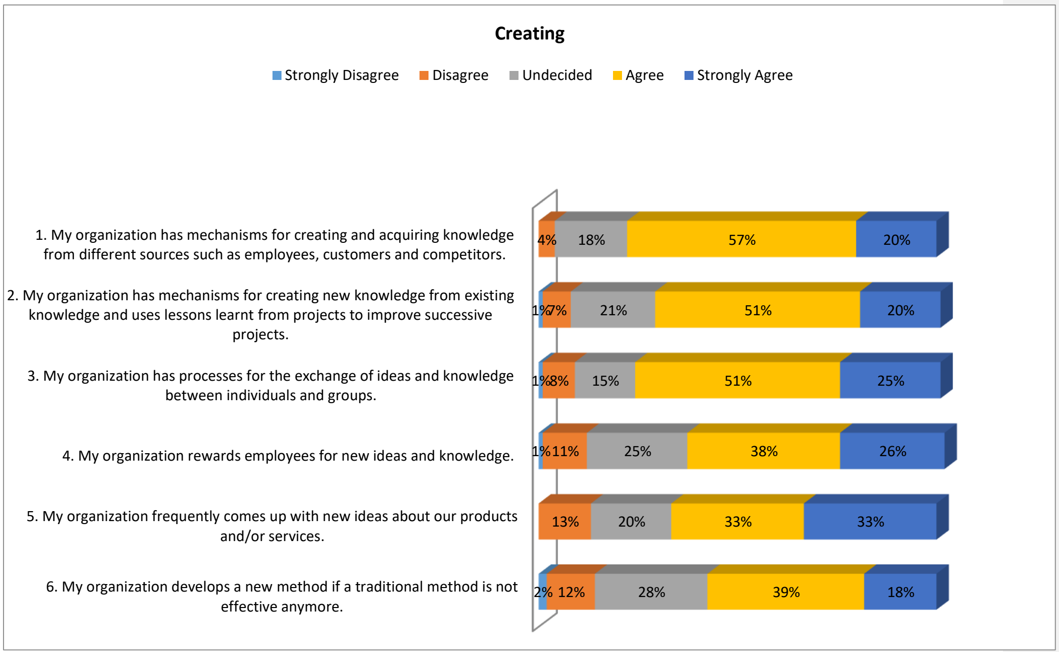


Figure 6.8 Creating variable with the 6 indicators.

6.3.1.2 Capturing

With the reference to Figure 6.9, 7 questions were asked to the respondents. While having clear strategies for knowledge capture and development is significant, more than 50% of the respondents have expressed their agreement by selecting agree and strongly agree when they were asked “My organization has explicit strategies for knowledge development and capture” CA1. Whereas 32% of the respondents were not sure about their answer to CA1. This is a reflection that the respondents were not aware about the strategies that their organization might have. When asked to select if the organization has explicit strategies for knowledge development and capture, some respondents expressed level of disagreement (disagree and strongly disagree) accounting for 12%.

There was indication of optimistic outlook for the CA2" My organization responds to employees ideas and documents them for further development." with 60 % of the respondents expressed their agreement (agree and strongly agree) with this indicator. On the other hand, approximately 29% of the respondents did not decide an answer from CA2 which is an indication that the respondents are not aware if such practice does exist in their organisations. Furthermore, respondents say that they disagree that their organization do have strategies to develop and capture the knowledge with a percentage of 11%.

Among respondents who have an opinion about CA3 "My organization has mechanisms in place to absorb and transfer knowledge from employees, customers and business partners into the organization", 55 percent of respondents agree on the statement (strongly agree and agree). While 27 percent say they are not sure or cannot decide if their organization has mechanisms in place to absorb and transfer knowledge from employees, customers and business partners into the organization. However, 18 % respondents expressed level of disagreement (disagree) which is higher than CA1 and CA2. Nonetheless, none of the respondents have selected the answer strongly disagree for CA3.

A significant proportion of respondents fully agree with CA4 "My organization has mechanisms for converting knowledge into action plans to design new products and/or services" with a percentage of more than 59%. The percentage of agreement is higher than CA1 and CA3 with a percentage lower than CA2. In contrast, 29% reported the answer "undecided" which is similar to CA2 and higher than CA3 and lower than CA1. While respondents show similar percentage of disagreement level to CA1 and lower than CA3 and higher than CA2 (disagree and strongly disagree.

Fear plays an important role in hindering employees from presenting new ideas and knowledge. Therefore, having polices in place to help employees to share their new ideas is a must. Two-thirds say their organizations “has policies in place to allow employees to present new ideas and knowledge without fear” CA5. Notably, respondents themselves appear to be the most unsure about CA5, with a quarter reporting they do not know if their organizations have policies in place to allow employees to present new ideas and knowledge without fear. Though respondents agree on CA5 with high percentage of more than 60%, they also expressed their disagreement accounting for 12% which is equivalent to CA1 and CA4 and lower than CA3 and higher than CA2.

By wide margins equivalent to 55%, respondents agree that their organizations regularly showcases new ideas from employees to other staff which is the most important way for knowledge capturing, CA6. Respondents do, however, with more than quarter were not sure if their organizations regularly showcases new ideas from employees to other staff which can be attributed that organizations either don’t have regular showcases sharing session or only certain category of respondents are involved in such practice. Among all respondents, 20% disagree with CA6 which is higher than all the first five statements of capturing discussed earlier (disagree and strongly disagree).

Nearly three-quarters of the respondents agreed that when they were asked “My organization pays attention to capture valuable and useful knowledge.” CA7. CA7 recorded the highest level of agreement among all the 7 indicators of capturing which means that this indicator is likely to have higher influence on dependent variable. On the other hand, approximately 23% of the respondents did not decide an answer for CA7 which is an indication that the respondents are not aware if such practice does exist in their organizations. Nevertheless, the percentage for undecided is the lowest compare to all the other capturing indicators. The high level of agreement among the respondents for CA6 can explain the low level of disagreement in which only 6% have selected the answer disagree. Whereas, none of the respondents did provide an answer to strongly disagree to CA6. .

In summary, Capturing 7 statements showed high level of agreement among the respondents ranging from 44% and 58% as presented in Figure 6.9 which is high. The highest statement with agreement was statement CA7 “My organization pays attention to capture valuable and useful knowledge”. A percentage ranging from 8 to 17% was the strongly agreement level across the 7 different statements of capturing. In addition, CA7 rated the lowest when it comes to disagreement among the respondents with a percentage equivalent to 6%. However, it is observed that all of the statements have scored higher undecided range compare to creating variable ranging from 23-32 %. However, statement 3 and 7 did not have any strongly disagreement among the respondents. A percentage ranging from 6 to 18% was the disagreement level across the 7 different statements of capturing. And percentage ranging from 1 to 3% was the strongly disagreement level across the 7 different statements of capturing

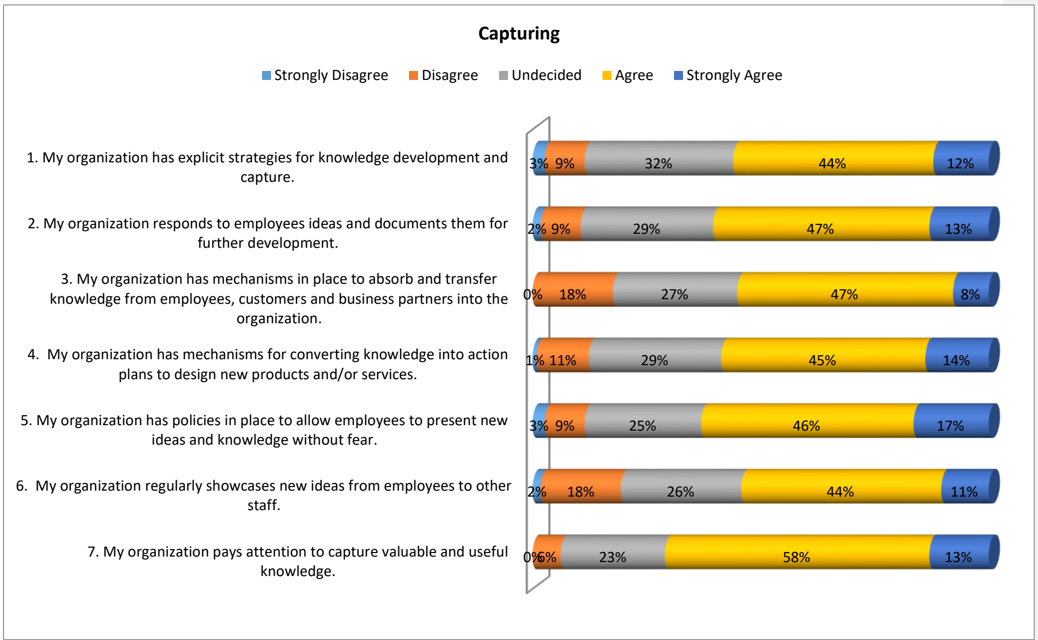


Figure 6.9 Capturing variable with the 7 indicators.

6.3.1.3 Organizing

Organizing data and knowledge is the key to stay competitive in the current market. With reference to Figure 6.10, respondents are more likely to say their companies are having policies to review knowledge on a regular basis, ORG1, in which more than 50% of the respondents expressed their agreement. While, 32% of the respondents are not sure if their organizations do have policies to review knowledge on a regular basis. This finding suggests that either the organizations does not have such polices or the higher management are not communicating with their employees about those polices. However, 15 % of the respondents express level of disagreement ranging from disagree to strongly disagree.

The ORG2" My organization assigns tasks to employees to keep knowledge current and up to date." Suggests positive indication with more than 50 % of the respondents express their agreement (agree and strongly agree "with this indicator, ORG2. On the other hand, approximately 32% of the respondents did not decide an answer from ORG2 which is an indication that the respondents are not aware if such practice does exist in their organisations. Furthermore, with 15% respondents say that they disagree that their organizations assign tasks to employees to keep knowledge current and up to date.

Among respondents who have an opinion about ORG3 “My organization has mechanisms for filtering, cross listing and integrating different sources and types of knowledge”, only 38 percent of respondents agree on the statement (strongly agree and agree). Therefore, this indicator might explain the lowest impact in the dependant variable among all the 6 indicators of organizing variable. While 43 percent say they are not sure or cannot decide if their organization have mechanisms for filtering, cross listing and integrating different sources and types of knowledge. Lack of employees’ knowledge or none- existence of such practices could be attributed to large number of the respondents who chose undecided answer to ORG3. However, 19 % respondents show level of disagreement (disagree) which is higher than ORG1 and ORG2.

With total agreement, two-thirds say their organizations “gives feedback to employees on their ideas and knowledge.” ORG4. Notably, respondents themselves appear to be the most unsure about ORG4, with a quarter reporting they do not know if their organizations gives feedback to employees on their ideas and knowledge. Though respondents agree on CA5 with high percentage of more than 60%, they also show their disagreement accounting for 14% which is nearly lower than ORG1 and ORG2 with a difference of 1 percent and much lower than OR3 with a difference of 5%.

A significant proportion of respondents fully agree with ORG5 “My organization has processes for applying knowledge learned from experiences and matches sources of knowledge to problems and challenges." with a percentage of more than 50%. The percentage of agreement is higher than and ORG1, ORG2 and ORG3 and lower than ORG4. In contrast, 30% reported the answer "undecided" which is similar to ORG1 and ORG2, lower than ORG3 and higher than ORG4. While 11% of respondents show disagreement level to ORG5 which is the lowest across all the organizing variable indicators

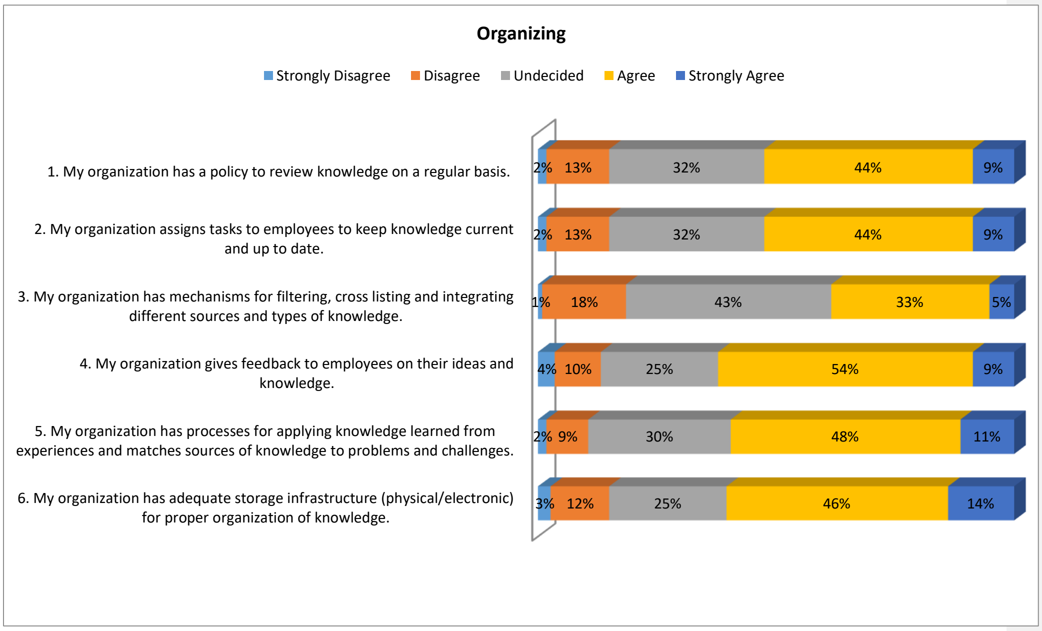
Organizations needs to have adequate storage infrastructure for proper organization of knowledge. By wide margins equivalent to 60%, respondents agree that their organizations have adequate storage infrastructure (physical/electronic) for proper organization of knowledge", ORG6. With a quarter reporting they do not know if their organizations have adequate storage infrastructure (physical/electronic) for proper organization of knowledge which can be attributed that only certain respondents are involved in this process or the organization is not aware of the importance of such practice. Among all respondents, 15% disagree with ORG6 which is similar to ORG1 and ORG2, close to ORG4 with a difference of 1%, higher than ORG5, and lower than ORG3.

To sum up, the bar chart demonstrated in Figure 6.10 shows the percentage of each of the 6 statements of organizing. The results revealed that the respondents rated all the six statements with agree ranging percentage from 33% to 54%. With a reference to ORG3 "My organization has mechanisms for filtering, cross listing and integrating different sources and types of knowledge "it is a clear than only 33% of the respondents agree on having mechanisms for filtering different resources and types of knowledge. In addition, respondents provided answer strongly agree ranging from 5-14% across the six statements of organizing. A percentage ranging from 25% to 43% was given "undecided" for the 6 statements of organizing. ORG3 also rated the highest with a 43% when it comes to "undecided" selected answer which means that the respondents are unaware if such mechanisms does exist in their organizations. A percentage ranging from 9 to 18% was the disagreement level across the 6 different statements of organizing where ORG3 rated the highest and ORG5 rated the lowest. A percentage ranging from 1 to 4% was the strongly disagreement level across the 6 different statements of organizing which is low.

Figure 6.10 Organizing variable with the 6 indicators.

6.3.1.4 Storing

There were indications of an optimistic outlook for the ST1"My organization utilizes databases and uses information technology applications to store knowledge for easy access by



all employees", with 50% of the respondents expressed their agreement with this indicator, this reflects that this indicator might explain a significant percentage of variance in the dependant variable. In contrast, less than a quarter of the respondents did not decide an answer for ST1 which is an indication that the respondents are not aware if such practice does exist in their organisations. Furthermore, with 16% respondents say that they disagree that their organizations utilize databases and use information technology applications to store knowledge for easy access by all employees (disagree and strongly disagree).

Among respondents who have an opinion about ST2 “My organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees.” 49 percent of respondents agree on the statement (strongly agree and agree). While 35 percent say they are not sure or cannot decide if their organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees. However, 17 % respondents expressed level of disagreement (disagree and strongly disagree) which is higher than ST1 with a difference of only 1%.

Likewise, when asked about” My organization has different publications to store and display the captured knowledge.”ST3, more than 50 percent of respondents agree on the statement (strongly agree and agree). A quarter of the respondents say they are not sure or cannot decide if their organizations that they belong to have different publications to store and display the captured knowledge. The percentage of undecided for ST3 is lower than ST2 and higher than ST1. However, 18 % respondents expressed level of disagreement ranging from disagree to strongly disagree which is close to ST1 and ST2.

A significant proportion of respondents fully agree with ST4 “My organization has mechanisms to patent and copyright new knowledge.” with a percentage of more than 50%.

The percentage of agreement is higher than ST2 and close to ST and ST3 (agree and strongly agree). In contrast, 25% reported the answer “undecided” which is similar to ST3, lower than ST2 and higher than ST1. While 18% of respondents show disagreement level to ST4 which is quite similar to ST1, ST2 and ST3 (disagree and strongly disagree).

With total agreement, 49% of the respondents say their organizations “My organization does a lot of work to refine and store the collected knowledge.” ST5. Notably, respondents themselves appear to be the most unsure about ST5, with more than a quarter reporting they do not know if their organizations does a lot of work to refine and store the collected knowledge. However, 17 % respondents expressed level of disagreement ranging from disagree to strongly disagree.

With total agreement, more than 50% say their organizations “My organization documents and keeps things that are learnt in practice.” ST6. Notably, respondents themselves appear to be the most unsure about ST6, with more than quarter reporting that they do not know if their organization documents and keeps things that are learnt in practice. Though respondents agree on ST6 with high percentage of more than 50%, they also expressed their disagreement accounting for 11% which is the lowest among all the other indicators of storing.

To sum up, around 63% of the respondents agreed on ST1 whereas 49% agreed on ST2. However, ST3, ST4 and ST6 rated equal agreement percentage at 46%. However, when respondents were asked to rate their perception about ST5 “My organization does a lot of work to refine and store the collected knowledge” only 40% agreed whereas 34% provided neutral answer which means they are not aware of this practice in their relevant organizations. Another interesting result to analyse is ST3 where the respondents were asked to rate their perception about this statement “My organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees”, only 32% provided agree answer and 35% undecided. Undecided answer means that the responds were not having the information or knowledge about the exciting of such practice.

With the reference to Figure 6.11, a percentage ranging from 9 to 17% was the disagreement level across the 6 different statements of storing where the responded said disagree. On the other hand, a percentage ranging from 1 to 4% was the disagreement level across the 6 different statements of storing where the respondents said strongly disagree. In contrast, across the 6 statements of storing, the respondents provided their highest level of agreement “strongly agree” with a percentage ranging from 9 to 17%. And a percentage ranging from 32% to 50% for agree across all the 6 statements of storing. However, it is observed that all of the statements have scored undecided ranging from 20-35 %.

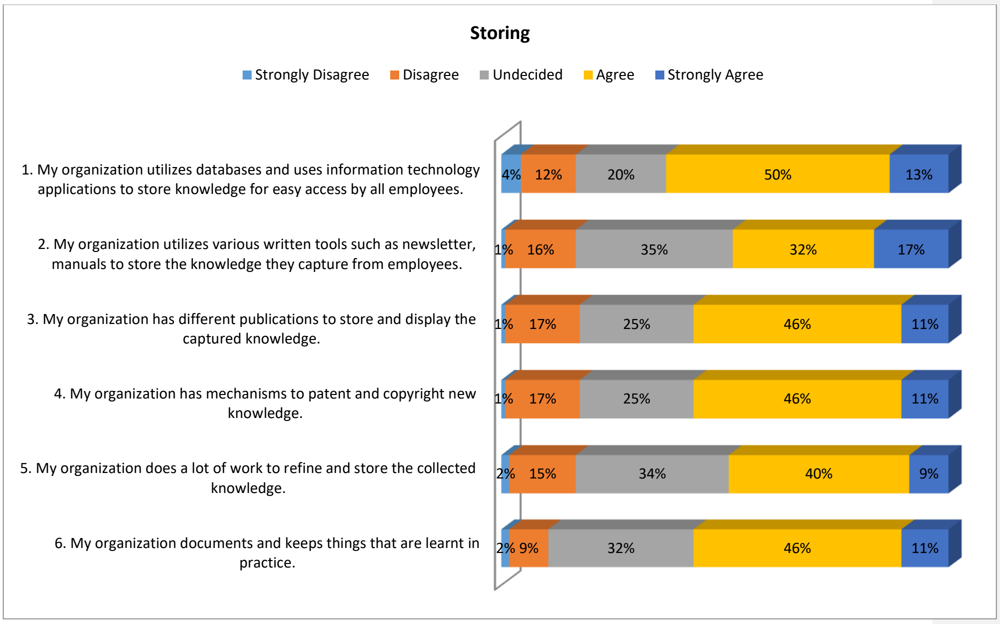


Figure 6.11 Storing variable with the 6 indicators.

6.3.1.5 Disseminating

Disseminating has 7 different indicators as illustrated in figure 6.12. In this section of the survey respondents were asked to share their perception about disseminating practices in their organizations. Interestingly, approximately two-thirds say and agreed that their relative organization "has knowledge in the form that is readily accessible to employees who need it. (Intranets, internet, etc.)", DI1. It stands to reason that organizations need to know that better access to employees is needed to share knowledge which is probably important reason why 8% of the respondents disagree with DI1. 29 percent of respondents surveyed claimed that they are not aware or sure that their organizations do or don't have access to knowledge. This high percentage is quite high where almost 30% which might be attributed to restricted access in the financial sector information based on the category and positions of employees.

It is notable that 67% of the respondents share their positive perspective with agree and strongly agree when they were asked "My organization sends out timely reports with appropriate information to employees, customers and other relevant organizations", DI2. It is also a logical expectation on the part of organizations that if they share more reports, the customers and other relevant organizations will be more knowledge and that is clear from the low percentage of "undecided" given to DI2. And it is indeed the lowest percentage given compare to all disseminating 6 indicators. On the other hand, 13% of the respondents did not agree to DI2 which is higher than DI1 disagreement level.

DI3, tend to be less positive than DI and DI2, only 46% of the respondents agree when they were asked if their organizations "have libraries, resource center and other forums to display and disseminate knowledge", DI3 (agree and strongly agree). This result is also reflected in "undecided" answer where 34% of the respondents are not aware if such practices does exist or the organization itself does not have it. This percentage is the highest among all the disseminating 7 indicators. On the other hand, 20% of the respondents showed level of disagreement with DI3 which is higher than DI1 and DI3 (disagree and strongly disagree). This result indicate considerable room for improvement where the organizations need to invest in such practices to enhance disseminating practices.

Among respondents who have an opinion about DI4 "My organization has regular symposiums, lectures, conferences and training sessions to share knowledge." More than 50 percent of respondents agree on the statement (strongly agree and agree). While 32 percent say they are not sure or cannot decide if their organization have regular symposiums, lectures, conferences and training sessions to share knowledge. The high agreement percentage contributed to the lower disagreement level with DI4 where only 12% disagree which is lower than DI3.

A significant proportion of respondents fully agree with DI5 “My organization is actively sharing information and knowledge within the units.” with a percentage of nearly 70%. The percentage of agreement is higher than all the previous disseminating four indicators this reflects that this indicator might explain a significant percentage of variance in the dependant variable. It is also a logical expectation that the disagreement level will be low since the agreement level is high. Indeed, 9% of the respondents expressed disagreement. While nearly quarter of the respondents were not sure or could not decide on DI5. The later might be attributed that some respondents require information only from their own units and not from other units or specific information is confidential that is why the organization cannot share it will different units.

Likewise, when asked about “My organization encourages employees to share with others what they have learned from their assignments.”DI6, more than 50 percent of respondents agree on the statement (strongly agree and agree). Since sharing past assignment lesson learnt is self-initiated and also it is sometimes mandatory by some organizations it is important for employees to be cooperative in order to increase the disseminating of knowledge. The high level of agreement is reflected in the low disagreement to DI6 with only 9%. 29 percent of respondents surveyed claimed that they are not aware or sure that their organizations encourages employees to share with others what they have learned from their assignments. This high percentage is quite high almost 30% which might be attributed to either those employees are not involved in such practice or the organization does not have those kind of practices.

In summary, with a reference to Figure 6.12 more than half of the respondents agreed with DI5 “My organization is actively sharing information and knowledge within the units”. In addition, 46% of the respondents agreed when it comes to sharing lesson learned from their assignment as stated in DI6 “My organization encourages employees to share with others what they have learned from their assignments”. Whereas, the respondents agreed with other statements DI1, DI2, DI3, DI4 with a percentage ranging from 37% to 44%. In addition, a cross all the 6 different statements of disseminating, respondents provided answer strongly agree with a percentage ranging from 11-23%.

On the other hand, it is observed that all of the statements have scored undecided ranging from 20-34 % which is very similar to the range of storing. In contrast, a percentage ranging from 6 to 19% was the disagreement level across the 6 different statements of disseminating where the responded said disagree. On the other hand, a percentage ranging from 1 to 4% was the disagreement level across the 6 different statements of disseminating where the respondents said strongly disagree which is also identical to storing range.

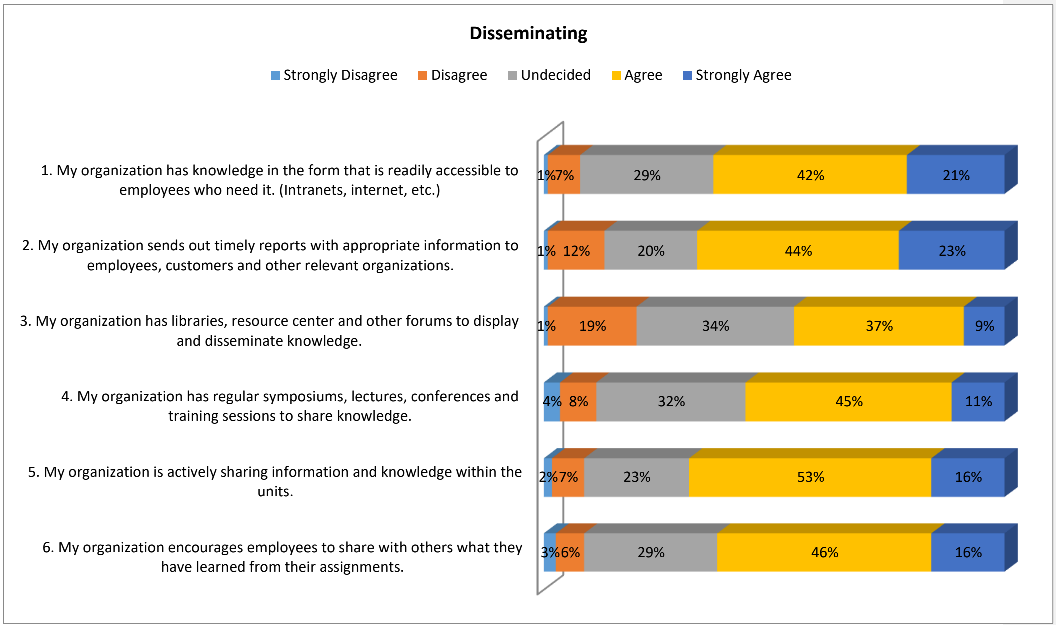


Figure 6.12 Disseminating variable with the 6 indicators.

6.3.1.5 Applying

Applying knowledge is the critical ingredient of any strategy. Nonetheless for many organizations, advantage is an elusive goal. The results of the first statement of applying suggest that more than 50% of the respondents agree that “My organization has different methods for employees to further develop their knowledge and apply them to new situations.” AP1. Just 13 percent of the respondents disagree with AP1. In contrast, nearly quarter of the respondents were not sure if their organizations have different methods for employees to further develop their knowledge and apply them to new situations. One likely explanation could be that the respondents did not take proper training in this aspect of applying knowledge.

When respondents were asked if their organizations have processes to identify restricted knowledge, AP2, only 48% of the respondents expressed their level of agreement (agree and strongly agree). The financial sector in general have strong processes about restricted knowledge because it usually involve information about their relevant client or higher management future plans. However, 34% of the respondents answer “undecided” to AP2 which is quite interesting as this might be related to lack of awareness by the employees about the processes of identifying restricted knowledge within their relevant organization that they are working for. Meanwhile, having processes to identify restricted knowledge is critical; nearly 18% of them disagree with AP2 (disagree and strongly disagree).

A significant proportion of respondents fully agree with AP3 “My organization has mechanisms to protect knowledge from inappropriate or illegal use inside and outside of the organization.” with a percentage of nearly 70%. The percentage of agreement is higher than all the previous applying two indicators this reflects that this indicator might explain a significant percentage of variance in the dependant variable. It is also a logical expectation that the disagreement level will be low since the agreement level is high. Indeed, 15% of the respondents expressed disagreement (disagree and strongly disagree). While 17% of the respondents were not sure or could not decide on AP3.

Two-thirds of the respondents agree that their organizations “applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving.” AP4. Notably, respondents themselves appear to be the unsure about AP4, with a quarter reporting they do not know if their organizations apply knowledge to critical competitive needs and quickly link sources of knowledge in problem solving. Though respondents agree on AP4 with high percentage of more than 60%, they also expressed their disagreement accounting for 9% which lower than the first applying indicators AP1, AP2 and AP3.

There were indications of an optimistic outlook for the AP5" My organization has methods to analyze and evaluate knowledge to generate new patterns for future use." with 60 % of the respondents express their agreement (agree and strongly agree) with this indicator. On the other hand, approximately 29% of the respondents did not decide an answer from AP5 which is an indication that the respondents are not aware if such practice does exist in their organisations. Furthermore, 12% respondents expressed disagreement with AP5.

By wide margins equivalent to almost 80 %, respondents agree that their organizations always inform them about changes in procedures, instructions and regulations, AP6 (agree and strongly agree). The percentage of agreement is higher than all the previous applying five indicators this reflects that this indicator might explain a significant percentage of variance in the dependant variable. It is also a logical expectation that the disagreement level will be low since the agreement level is high. Indeed, 7% of the respondents expressed disagreement (strongly disagree and disagree). Just, 14 % selected undecided for ST6 is the lowest in all the 6 indicators of applying.

To sum up, there were indications of an optimistic outlook for the AP4 "My organization applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving" with 58% of respondents expressing agreement whereas more than 55%

respondents have agreed to AP1 “My organization has different methods for employees to further develop their knowledge and apply them to new situations”. The results revealed that the respondents rated all the other statements of applying AP2, AP3, AP5 and AP6 with agree ranging percentage from 42% to 49%. In contrast, across the 6 statements of applying, the respondents provided their highest level of agreement “strongly agree” with a percentage ranging from 6 to 34% which is the highest range compare to the first four knowledge management processes. It can be assumed that applying variable might have the greater impact than the other knowledge management processes. In addition, it is observed that all of the statements have scored undecided ranging from 14-34 %.

A percentage ranging from 7 to 16% was the disagreement level across the 6 different statements of applying where the responded said disagree. On the other hand, a percentage ranging from 1 to 2% was the disagreement level across the 6 different statements of applying. However, ST6 did not record any strongly disagree percentage.

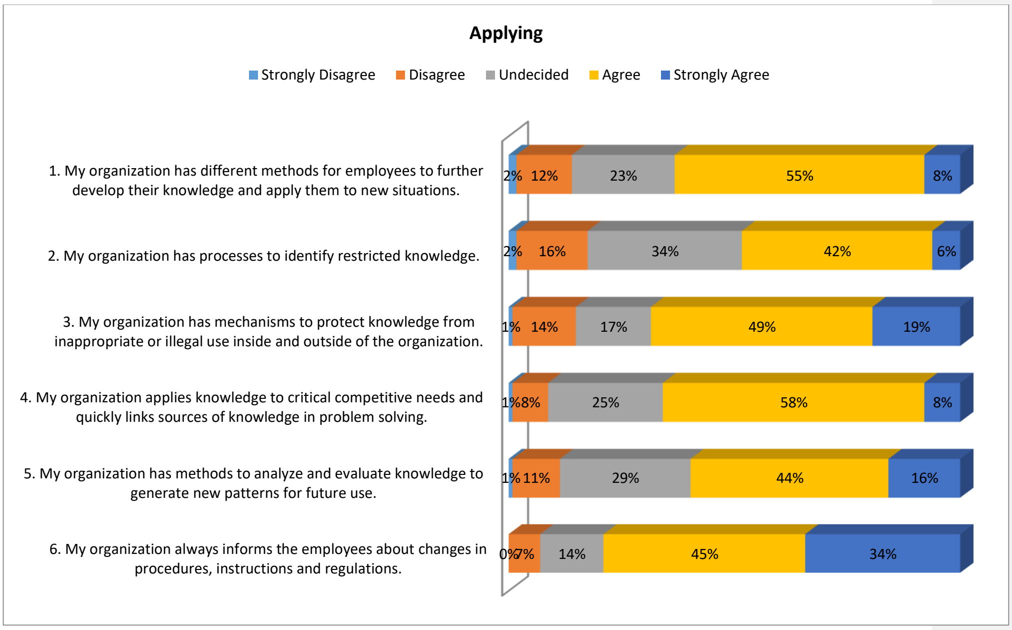


Figure 6.13 Applying variable with the 6 indicators.

6.3.1.6 Descriptive summary of the Knowledge management processes indicators

With a reference to Table 6.2, descriptive summary of the Knowledge management processes indicators is provided.

Knowledge management processes	Top two positive influential indicators (agree+ strongly agree)	Top two negative influential indicators (disagree+ strongly disagree)
Knowledge creating	CR1:77% CR3:76%	CR6: 14% CR5: 13%
Knowledge capturing	CA7: 77% CA1:66%	CA6:20% CA3: 18%
Knowledge organizing	ORG4: 63% ORG6: 60%	ORG3: 19% ORG1, ORG2, ORG4 and ORG6:15%
Knowledge storing	ST1: 63%	ST3 and ST4: 18%

	ST3,ST4 and ST6: 57%	ST2 and ST5: 17%
Knowledge disseminating	DI5:69% DI6:62%	DI3:20% DI2:13%
Knowledge Applying	AP6: 79% AP3:68%	AP2: 18% AP3:15%

Table 6.2 Descriptive summary of the Knowledge management processes indicators

6.3.2 Supportive learning environment

One variable for the SE which consists of 7 indicators derived from the literature were provided to the responded of the survey. A five-point Likert scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) was used to measure the 7 indicators of SE. SE is the mediator variable in this research.

The majority of the respondents around 57% have expressed their agreement by selecting agree and strongly agree when they were asked “In my organization, it is easy to speak up about what is on our mind.” SE1. Notably, respondents themselves appear to be the most unsure about SE1, with nearly quarter reporting they are not sure and can’t decide if they have the freedom to talk freely in their organizations. However, 22 % respondents expressed level of disagreement ranging from disagree to strongly disagree.

With total agreement, 54% of the respondents say their organizations “In my organization, employees are usually comfortable talking about problems and misperception.” SE2. While 23 percent say they are not sure or cannot decide about their comfort level in talking about problems and misperception within their own organizations. However, nearly quarter of the respondents expressed certain level of disagreement with SE2 (disagree and strongly disagree).

More than half of the respondents also agreed with SE3 “In my organization, employees are eager to share information about what does and doesn’t work” which is very important in terms of saving time and cost and preform the best practices. The high level of agreement is reflected in the low disagreement to SE2 with only 14% which is the lowest among all the 7 indicators of supportive learning environment. While 31 percent of respondents surveyed claimed that they are not aware or not sure about SE3. This high percentage is quite high with almost 30% which is the highest percentage among all the all the 7 indicators of supportive learning environment. Among respondents who have an opinion about SE4 “In my organization, differences in opinion are welcomed.” more than 60 percent of respondents agree on the statement (strongly agree and agree). While 21 percent say they are not sure or cannot decide if their organization accept difference in opinions. On the other hand, 16% of the respondents disagreed with SE4 (disagree and strongly disagree).

Likewise, when asked about” In my organization, employees are open to alternative ways of getting work done.”SE5, more than 50 percent of respondents agree on the statement (strongly agree and agree). It requires a courage and accepting change in order for employees to be open about other ways of getting the work done. Therefore, it is expected that some respondents will disagree to this statements in which the level of disagreement was 17% (disagree and strongly disagree). On the other hand, 26% of the respondents provided the answer “undecided” to SE5.

By wide margins equivalent to 54%, respondents agree that they have time to review how the work is going despite having a workload, SE6. Both SE5 and SE6 shared similar results to “undecided” answer to their relevant statements. Among all respondents, 20% disagree with statement 6 which is lower than SE1, SE2 and higher than SE3 and SE4. It is notable than 59% of the respondents share their positive perspective with agree and strongly agree when they were asked “In my organization, we are given the time we need for both formal and informal learning”, SE7. On the other hand, 20% of the respondents disagree with SE7 and similar to SE6 percentage also was given to “undecided” answer.

In summary, with a reference to figure 6.14, there were indications of an optimistic outlook for all the SE indicators, with 42% to 49% of respondents expressing agreement as agree. SE4 refers to “In my organization, differences in opinion are welcomed” rated the highest in term of agreement with a 49% whereas SE2 refers to “ In my organization, employees are usually comfortable talking about problems and misperception” rated the lowest in terms of agreement. Therefore, SE4 reflects that this indicator might explain a significant percentage of variance in the dependant variable whereas SE2 indicator might explain the lowest impact in the dependant variable among all the 7 indicators of supportive learning environment.

Whereas SE1, SE3, SE5, SE6 and SE7 statements rated agree between 43% to 48%. In contrast, across the 7 statements, the respondents provided their highest level of agreement “strongly agree” with a percentage ranging from 7 to 13 % where SE7 rated the highest and SE3 rated the lowest. In contrast, across the 7 statements, the respondents provided their highest level of agreement “strongly agree” with a percentage ranging from 9 to 17%.

However, it is observed that all of the statements have scored undecided ranging from 20-35 %, where SE3 rated the highest and SE7 rated the lowest.

With the reference to Figure 6.14, a percentage ranging from 14 to 20% was the disagreement level across the 7 different statements where the responded said disagree. On the other hand, a percentage ranging from 2 to 5% was the disagreement level across the 7 different statements where the respondents said strongly disagree.

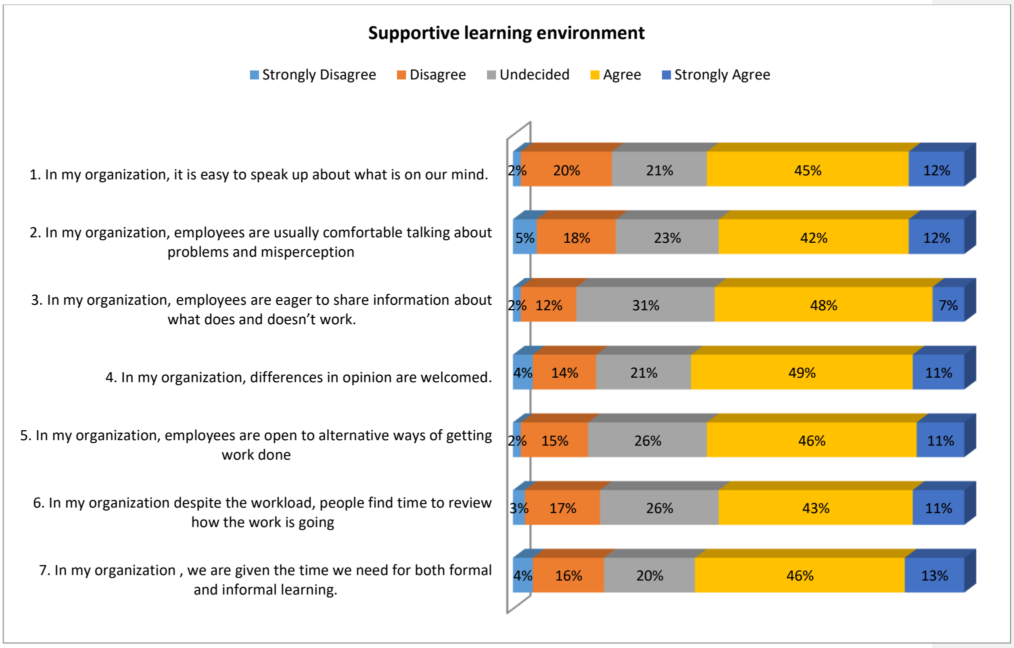


Figure 6.14 Supportive learning environment with the 7 indicators

6.3.2.1 Descriptive summary of the Supportive learning environment indicators

With a reference to Table 6.3, descriptive summary of the Supportive learning environment indicators is provided.

Supportive learning environment	Top two positive influential indicators (agree+ strongly agree)	Top two negative influential indicators (disagree+ strongly disagree)
Supportive learning environment indicators	SE4:60% SE7:59%	SE2: 23% SE1: 22%

Table 6.3 Descriptive summary of the Supportive learning environment indicators

6.3.3 Continuous innovation

One variable for the CI which consists of 12 indicators derived from the literature were provided to the respondents of the survey. A five-point Likert scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) was used to measure the 12 items.

Respondents indicate that their organizations are encouraging them to gain knowledge through external contacts (e.g. customers, competitors and suppliers). For example, 66 percent agreed with CI1 “In my organization we are encouraged to gain knowledge through external contacts (e.g. customers, competitors and suppliers)” (agree and strongly agree). Notably, even among respondents that they agree that their organizations are encouraging them to gain different types of knowledge through different types of resources, where innovation is likely to be enhanced, and 27 percent say that they cannot decide or they are not aware if their organizations allow or promote such practice. This result indicates considerable room for improvement where the organizations need to encourage their employees about such practices to enhance exchanging new ideas from different resources in order to promote innovation. On the other hand, 6% of the respondents disagreed with CI1 (disagree and strongly disagree). The latter might be attributed that some organizations are very strict with sharing information as it might include sensitive information that might put them under risk.

Nearly 55% of the current survey's respondents agreed (agree and strongly agree) that proactive leadership such as encouragement of individual initiatives, performance evaluation and trust is highly evaluated in their relevant organizations, CI2. This result is slightly lower than CI2. However, CI2 rated higher than CI1 in terms of providing "undecided" answer with a difference of 8% which is also the highest among all the 12 indicators of continuous innovation. A big part of the problem may be the absence of a formal proactive leadership process within the organization. This might be explains why 10% of the respondents disagree with CI2 which is higher than CI1 with a difference of 3% (disagree and strongly disagree).

Evaluating and appreciating individual ideas is critical to boost innovation. Therefore, more than 50% of the respondents agreed (agree and strongly agree) to CI3 "In my organization employees' ideas are evaluated." Not surprisingly, 30% of the respondents are not aware or they did not provide an answer to CI3, this is might be explained that some respondents fear to share ideas, or they are used to traditional way of working or their organizations does not encouraging such practices. The disagreement level has increased by 8% in comparison to CI1 this is expected as the agreement level is lower than CI1 (disagree and strongly disagree). To improve innovation, it seems to be crucial to evaluate employees' ideas. Nevertheless, some organizations still haven't tried doing so which is reflected in "undecided" and disagree answers towards CI3.

More than 50% of the respondents agreed (agree and strongly agree) that “employees’ work well-being (e.g. integrity, loyalty and openness to others is measured.” CI4. Notably, respondents themselves appear to be the unsure about CI4, with 30 percent reporting they do not know if employees’ work well-being is measured within their relevant organizations. Though respondents agree on CI4 with high percentage of more than 50%, they also expressed their disagreement with a similar percentage as CI3 and higher than CI1 and CI2 (disagree and strongly disagree).

CI5, tend to be also positive similar to CI1, CI2, CI3 and CI4, with nearly 60% of the respondents agree (agree and strongly agree) when they were asked if “employees’ expertise is evaluated or measured.” in their organizations, CI5. On the other hand, 14% of the respondents showed level of disagreement (disagree and strongly disagree) with CI5 which quite similar to CI3 and CI4. While 27 percent say they are not sure or cannot decide if their organization are measuring or evaluating employees’ expertise. The survey respondents had a favorable view for CI6 with nearly 70 percent stating that their organizations support and reflect on internal processes and structures that support innovation. This high percentage would have a positive impact on innovation, either by improving new products or enhancing employee’s innovation capabilities. The latter development could eventually translate into higher competitive advantage. On the other hand, quarter of the respondents were not sure if such practice does exist that is why they provide an answer of “undecided”. Moreover, 7% of the respondents disagreed with CI6 which is similar to CI1 disagreement level (disagree and strongly disagree).

Equally important, more than 50% percent of respondents agreed (agree and strongly agree) that their organizations “have a clear measures for evaluating employee learning and development”. That means it could produce many more benefits and improvements to innovation since learning and development enhance individual critical thinking to become more innovative. On the other hand nearly a quarter of the respondents selected “undecided” to CI7. 21% of the respondents expressed their level of disagreement when they were asked if their organizations “have a clear measures for evaluating employee learning and development” which means that clear measures for learning and development should be in place (disagree and strongly disagree).

Likewise, when asked if their organizations evaluate and measure the development of action plans, CI8, more than 60 percent of respondents agree on the statement (strongly agree and agree). The high level of agreement is reflected in the low disagreement to CI8 with only 13%(disagree and strongly disagree). 26 percent of respondents surveyed claimed that they are not aware or sure that their organizations evaluate and measure the development of action plans. The creation of innovative products and service requires regular identification of area that needs to be improved. Hence, significant proportion of respondents fully agree with CI9“In my organization, we always identify areas of a business that need attention and improvement.” with a percentage of more than 70%. The percentage of agreement is higher than all the previous 8 continuous innovation indicators. In contrast, 19% reported the answer “undecided” which is lower than all the previous 8 continuous innovation indicators. While just 11% of respondents show disagreement level to CI9, the low disagreement could explain the none-existence of not providing strongly disagree answer to CI9.

Intrinsic motivation which is derived from the passion, engagement, satisfaction, challenge, curiosity and enjoyment to do the work is also important element in boosting innovation. Indeed, 60% of the respondents agreed when they were asked if their organizations encouraging them to be creative and work with intrinsic motivation, CI10 (agree and strongly agree). While 26% of the respondents selected “undecided” for CI10. On the other hand 13% of the respondents disagree with CI10 “In my organization we are encouraged to be creative and work with intrinsic motivation” which is higher than CI9. This result shows that mangers should be a good role model for employees, appreciate individual contribution and involve employees in taking decisions.

Mistakes are expected when trying new ideas. Among respondents who have an opinion about CI11 “In my organization we tolerate mistakes when we try out new ideas.” 52 percent of respondents agree on the statement (strongly agree and agree). While 33 percent say they are not sure or cannot decide if their organizations can be tolerable in case they make mistakes while trying new ideas. Fear can play in important role in hindering trying new ideas to avoid any mistakes. Therefore, organizations need to allow employees making mistakes within certain limits. However, 15 % respondents expressed level of disagreement (disagree and strongly disagree) which is similar to CI3 and CI4 and lower than CI7 and higher than CI1,CI2,CI5,CI6,CI8,CI9 and CI10.

A significant proportion of respondents fully agree with CI12 “In my organization we are encouraged to be proactive in leading and responding to change.” with a percentage of more than 70 this reflects that this indicator might explain a significant percentage of variance in the dependant variable. It is also a logical expectation that the disagreement level will be low since the agreement level is high. Indeed, 9 % of the respondents expressed disagreement (disagree and strongly disagree). While 18% of the respondents were not sure or could not decide CI12 which is the lowest among all the 12 indicators of continuous innovation.

In summary, there were indications of an optimistic outlook across all the 12 indicators for the continuous innovation with a percentage ranging from 39% to 61 % of respondents expressing agreement as “agree”. 8 indicators out of 12 rated more than 50% of the agreement whereas 3 were above 40% and only one was below 40% (39%). It is apparent that C111 indicator might explain the lowest impact in the dependant variable among all the 12 indicators of continuous innovation. Whereas CI 9, might explain significant percentage of variance in the dependant variable.

With a reference to Figure 6.15 , the results revealed that more than 60% of respondents rated CI6 which refers to “In my organization we support and reflect on internal processes and structures that support innovation” with agree. From the later indicator CI6, it is apparent that most the organizations where does the respondents are working have processes and structures that support innovation in place. Similarly, CI12 which is refers to “In my organization we are encouraged to be proactive in leading and responding to change” rated with over 59% with agreement. Innovation and change are associated, therefore, a high agreement among the respondents reflect that relationship.

In contrast, across the 12 statements of continuous innovation, the respondents provided their highest level of agreement “strongly agree” with a percentage ranging from 5 to 15 %. In addition, it is observed that all of the statements have scored undecided ranging from 18-35 %. On the other hand, a percentage ranging from 4 to 15% was the disagreement level across the 12 different statements of continuous innovation where the responded said disagree. On the other hand, a percentage ranging from 1 to 6% was the disagreement level across 12 different statements of continuous innovation except CI8 where the respondents said strongly disagree.

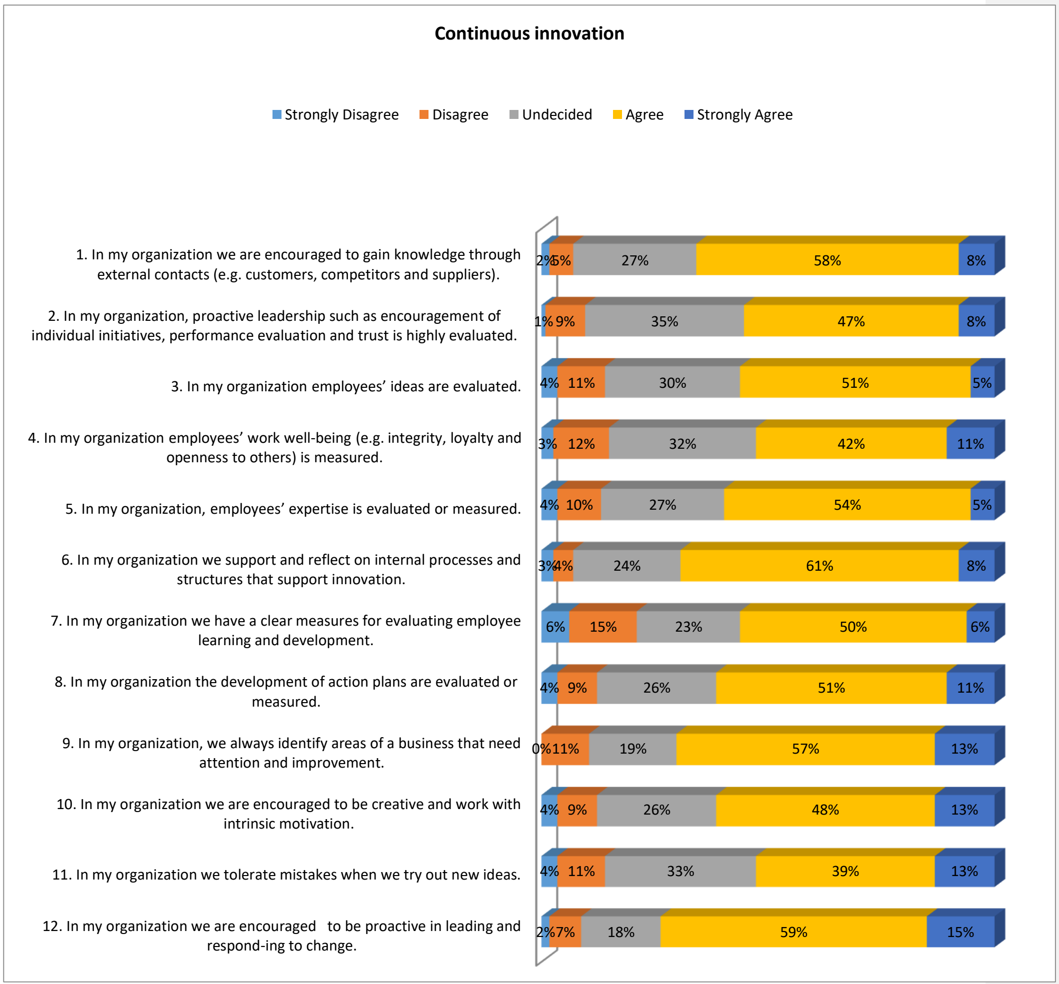


Figure 6.15 Continuous innovation with the 12 indicators.

6.3.3.1 Descriptive summary of the continuous innovation indicators

With a reference to Table 6.4, descriptive summary of the Continuous innovation indicators is provided.

Continuous innovation	Top two positive influential indicators (agree+ strongly agree)	Top two negative influential indicators (disagree+ strongly disagree)
Continuous innovation indicators	CI12:74% CI9:70%	CI3, CI4 and CI11:15% CI5:14%

Table 6.4 Descriptive summary of the Continuous innovation indicators

6.7 Chapter summary

This chapter discussed the collected data descriptive statistics. This chapter have provided a detailed overview of the demographic and study variables.

Chapter seven: Association Analysis

7.1 Introduction

Correlation analysis is used to describe the strength and direction of the relationship of the study variables. This chapter explores and interprets in details of the study results using bivariate Pearson product-moment correlation coefficient test. In addition, the chapter lists assumptions that were checked before conducting the Pearson product-moment correlation coefficient test. Next, the chapter also discusses the relation between correlation tests and the derived hypotheses in framework chapter. Additionally, seven detailed tests were conducted and results were discussed. The first six variables for knowledge management processes-independent variable and continuous innovation-dependent variable. Also, a test was performed between supportive learning environment-mediator variable and dependent variable   continuous innovation.

7.2 Assumptions and relevance to research questions

Correlation coefficients such as the Pearson product-moment correlation help researchers to understand both the strength and direction of association between the study's variables. The correlation's strength and direction can be easily seen in the table of correlation (Pallat 2016). Bivariate Pearson product-moment correlation coefficient test can only take values from -1 to +1. The test can indicate if there is a positive or negative relationship exist between variables. The later can be done by looking at the front sign which is outside indicator either as + or -. The positive relationship indicates that as one variable increases the other associated variable will also have a positive effect whereas the negative relationship indicates that as one variable increases the other associated variable will also have a negative effect. The strength of the relationship can also be investigated by looking at the absolute value this can range from -1.00 to 1.00. To elaborate, a correlation of 0 refers that there is no relationship between the variables, whereas a correlation of 1.0 indicates positive relationship and -1.0 refers to negative relationship. It should be noted that negative and positive indication only refers to the direction of the relationship and not the strength (Pallant 2016). Cohen (1988) points out that strength of relationship can be classified based on the following:

r=.10 to .29 or r=-.10 to -.29 Small

r=.30 to .49 or r=-.30 to -.49 Medium

r=.50 to 1.0 or r -.50 to -1.0 Large

Several preliminary analysis for correlation should be done before performing a correlation analysis such as checking for outliers, normality, linearity and homoscedasticity (Gravetter &Wallnau 2000). For this study, the outliers effect is mitigated by transforming the data into reflect and log as discussed before in chapter six which also helped in smoothing the data to be close to normally distributed. Linearity and homoscedasticity were also verified where straights lines appeared on the scatterplots and had almost equal cigar shape along its length.

Correlation results will help in measuring association of relationships between research variables and answering research question of how knowledge management processes relate to continuous innovation. The main reason to preform correlation test for this study is to answer the following research questions:

- How do knowledge management processes associates with continues innovation in UAE financial sector with the presence of supportive learning environment
- What is the role of supportive environment learning on the association between the six knowledge processes and continues innovation in the in UAE financial sector

7.3 Correlation analyses

A correlation test was carried out using the bivariate Pearson product-moment correlation coefficient test to explore the relationship between knowledge management processes, supportive learning environment and continuous innovation. To accomplish this, seven tests were carried out to investigate the relationship between the seven independent variables with the dependent variables for the study.

7.3.1 Knowledge management processes

A correlation test was conducted for all the 6 indicators of creating. The results indicated that all the indicators were positively and significantly correlated with the continuous innovation variable at $p<.01$ and the strength of correlation ranges from small to large ($r=.295$ to $r=576$ both at $p<0.01$).This correlation was reflected in the significant positive association of the knowledge creating variable with the continuous innovation variable at $p<.01$ with correlation coefficient of $r= .561$ –(see Table 7.1)

Correlations

		CR1	CR2	CR3	CR4	CR5	CR6	CR	KM	SE	CI
CR1	Pearson Correlation	1	.711**	.452**	.428**	.517**	.458**	.756**	.628**	.274**	.434**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.003	.000
	N	114	114	114	114	114	114	114	114	114	114
CR2	Pearson Correlation	.711**	1	.515**	.429**	.435**	.447**	.752**	.543**	.191*	.308**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.042	.001
	N	114	114	114	114	114	114	114	114	114	114
CR3	Pearson Correlation	.452**	.515**	1	.541**	.504**	.413**	.737**	.541**	.239*	.295**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.011	.001
	N	114	114	114	114	114	114	114	114	114	114
CR4	Pearson Correlation	.428**	.429**	.541**	1	.646**	.436**	.767**	.568**	.314**	.490**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.001	.000
	N	114	114	114	114	114	114	114	114	114	114
CR5	Pearson Correlation	.517**	.435**	.504**	.646**	1	.550**	.793**	.701**	.397**	.576**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
CR6	Pearson Correlation	.458**	.447**	.413**	.436**	.550**	1	.747**	.583**	.264**	.450**
	Sig. (2-tailed)	.000	.000	.000	.000	|000		.000	.000	.005	.000
	N	114	114	114	114	114	114	114	114	114	114
CR	Pearson Correlation	.756**	.752**	.737**	.767**	.793**	.747**	1	.785**	.379**	.561**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.628**	.543**	.541**	.568**	.701**	.583**	.785**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.274**	.191*	.239*	.314**	.397**	.264**	.379**	.615**	1	.742**
	Sig. (2-tailed)	.003	.042	.011	.001	.000	.005	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.434**	.308**	.295**	.490**	.576**	.450**	.561**	.759**	.742**	1
	Sig. (2-tailed)	.000	.001	.001	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7.1 Significant correlations between creating variable (with its 6 indicators) with continuous innovation.

Within the same direction of positive association with the continuous innovation variable, the knowledge capturing variable showed higher positive association along with its 6 capturing indicators at 99.9% confidence level where the coefficient of determination ranges from 21.3 % to 36%. It was also noted the capturing fourth indicator (My organization has mechanisms for converting knowledge into action plans to design new products and/or services) with the highest correlation was (r= .605, $p<0.01$) where the coefficient of determination explains 36% of the variance in the respondents' scores on continuous innovation scale-See Table 7.2. In addition, there was a large positive correlation between the capturing variable and continuous innovation (*r*=.713, *p*<.01), where high level capturing is correlated with high level of continuous innovation.

Correlations

		CA1	CA2	CA3	CA4	CA5	CA6	CA7	CA	KM	SE	CI
CA1	Pearson Correlation	1	.426**	.653**	.558**	.269**	.416**	.393**	.715**	.655**	.449**	.472**
	Sig. (2-tailed)		.000	.000	.000	.004	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA2	Pearson Correlation	.426**	1	.526**	.501**	.575**	.565**	.558**	.778**	.620**	.385**	.592**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA3	Pearson Correlation	.653**	.526**	1	.635**	.400**	.512**	.376**	.791**	.659**	.425**	.462**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA4	Pearson Correlation	.558**	.501**	.635**	1	.603**	.502**	.385**	.801**	.695**	.566**	.605**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA5	Pearson Correlation	.269**	.575**	.400**	.603**	1	.537**	.475**	.723**	.636**	.565**	.603**
	Sig. (2-tailed)	.004	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA6	Pearson Correlation	.416**	.565**	.512**	.502**	.537**	1	.481**	.773**	.644**	.394**	.557**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA7	Pearson Correlation	.393**	.558**	.376**	.385**	.475**	.481**	1	.645**	.595**	.299**	.497**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.001	.000
	N	114	114	114	114	114	114	114	114	114	114	114
CA	Pearson Correlation	.715**	.778**	.791**	.801**	.723**	.773**	.645**	1	.855**	.586**	.713**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.655**	.620**	.659**	.695**	.636**	.644**	.595**	.855**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.449**	.385**	.425**	.566**	.565**	.394**	.299**	.586**	.615**	1	.742**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.001	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.472**	.592**	.462**	.605**	.603**	.557**	.497**	.713**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.2 Significant correlations between capturing variable (with its 7 indicators) with continuous innovation.

With a reference to Table 7.3, all the 6 indicators of organizing were positively and significantly correlated with the continuous innovation variable at p<.01 and the strength of correlation ranges from (r=.361 to r=571, both at p<0.01). However. The organizing variable negatively correlated with continuous innovation variable at p<.01 with correlation coefficient of (r= -.681, p<0.01), where the coefficient of determination was high at 46%.

Correlations

		ORG1	ORG2	ORG3	ORG4	ORG5	ORG6	ORG	KM	SE	CI
ORG1	Pearson Correlation	1	.575**	.576**	.333**	.494**	.404**	-.684**	.623**	.328**	.361**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG2	Pearson Correlation	.575**	1	.544**	.466**	.371**	.415**	-.691**	.599**	.302**	.461**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.001	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG3	Pearson Correlation	.576**	.544**	1	.415**	.450**	.513**	-.671**	.701**	.401**	.452**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG4	Pearson Correlation	.333**	.466**	.415**	1	.468**	.323**	-.659**	.614**	.386**	.571**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG5	Pearson Correlation	.494**	.371**	.450**	.468**	1	.449**	-.683**	.712**	.479**	.526**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG6	Pearson Correlation	.404**	.415**	.513**	.323**	.449**	1	-.637**	.651**	.379**	.469**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ORG	Pearson Correlation	-.684**	-.691**	-.671**	-.659**	-.683**	-.637**	1	-.814**	-.523**	-.681**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.623**	.599**	.701**	.614**	.712**	.651**	-.814**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.328**	.302**	.401**	.386**	.479**	.379**	-.523**	.615**	1	.742**
	Sig. (2-tailed)	.000	.001	.000	.000	.000	.000	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.361**	.461**	.452**	.571**	.526**	.469**	-.681**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.3 Significant correlations between organizing variable (with its 6 indicators) with continuous innovation.

On the other hand all the six storing indicators correlated positively with the continuous innovation variable. The highest value of correlation was ($r= 0.560$, $p<0.01$) which is considered as large while the lowest was ($r= 0.369$, $p<0.01$) which is classified as medium. In addition the storing variable correlated positively with continuous innovation variable at ($r=0.608$, $p<0.01$) which is categorized as large correlation and the coefficient of determination explains 36.9% of the variance in the respondents' scores on continuous innovation scale- See Table 7.4.

Correlations

		ST1	ST2	ST3	ST4	ST5	ST6	ST	KM	SE	CI
ST1	Pearson Correlation	1	.443**	.447**	.511**	.468**	.354**	.723**	.587**	.319**	.424**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.001	.000
	N	114	114	114	114	114	114	114	114	114	114
ST2	Pearson Correlation	.443**	1	.597**	.308**	.454**	.275**	.705**	.506**	.426**	.459**
	Sig. (2-tailed)	.000		.000	.001	.000	.003	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ST3	Pearson Correlation	.447**	.597**	1	.544**	.636**	.472**	.839**	.659**	.457**	.506**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ST4	Pearson Correlation	.511**	.308**	.544**	1	.491**	.196*	.704**	.544**	.281**	.369**
	Sig. (2-tailed)	.000	.001	.000		.000	.037	.000	.000	.002	.000
	N	114	114	114	114	114	114	114	114	114	114
ST5	Pearson Correlation	.468**	.454**	.636**	.491**	1	.575**	.803**	.676**	.442**	.560**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ST6	Pearson Correlation	.354**	.275**	.472**	.196*	.575**	1	.619**	.593**	.365**	.426**
	Sig. (2-tailed)	.000	.003	.000	.037	.000		.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
ST	Pearson Correlation	.723**	.705**	.839**	.704**	.803**	.619**	1	.800**	.506**	.608**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.587**	.506**	.659**	.544**	.676**	.593**	.800**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.319**	.426**	.457**	.281**	.442**	.365**	.506**	.615**	1	.742**
	Sig. (2-tailed)	.001	.000	.000	.002	.000	.000	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.424**	.459**	.506**	.369**	.560**	.426**	.608**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7.4 Significant correlations between storing variable (with its 6 indicators) with continuous innovation.

Within the same direction of positive association with the continuous innovation variable, the knowledge disseminating variable showed higher positive association along with its 6 disseminating indicators at 99.9% confidence level where the coefficient of determination ranges from 10.6 % to 30.6%. It was also noted the disseminating variable correlated positively with highest correlation at ($r= .617$, $p<0.01$), where the coefficient of determination explains 38% of the variance in the respondents' scores on continuous innovation scale.

Correlations

		DI1	DI2	DI3	DI4	DI5	DI6	DI	KM	SE	CI
DI1	Pearson Correlation	1	.607**	.294**	.358**	.428**	.227*	.653**	.544**	.227*	.328**
	Sig. (2-tailed)		.000	.001	.000	.000	.015	.000	.000	.015	.000
	N	114	114	114	114	114	114	114	114	114	114
DI2	Pearson Correlation	.607**	1	.398**	.433**	.470**	.211*	.723**	.576**	.334**	.373**
	Sig. (2-tailed)	.000		.000	.000	.000	.024	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
DI3	Pearson Correlation	.294**	.398**	1	.517**	.330**	.318**	.698**	.530**	.294**	.405**
	Sig. (2-tailed)	.001	.000		.000	.000	.001	.000	.000	.002	.000
	N	114	114	114	114	114	114	114	114	114	114
DI4	Pearson Correlation	.358**	.433**	.517**	1	.534**	.406**	.778**	.642**	.408**	.505**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
DI5	Pearson Correlation	.428**	.470**	.330**	.534**	1	.569**	.757**	.653**	.491**	.470**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
DI6	Pearson Correlation	.227*	.211*	.318**	.406**	.569**	1	.617**	.563**	.389**	.554**
	Sig. (2-tailed)	.015	.024	.001	.000	.000		.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
DI	Pearson Correlation	.653**	.723**	.698**	.778**	.757**	.617**	1	.826**	.495**	.617**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.544**	.576**	.530**	.642**	.653**	.563**	.826**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.227*	.334**	.294**	.408**	.491**	.389**	.495**	.615**	1	.742**
	Sig. (2-tailed)	.015	.000	.002	.000	.000	.000	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.328**	.373**	.405**	.505**	.470**	.554**	.617**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7.5 Significant correlations between disseminating variable (with its 6 indicators) with continuous innovation.

With a reference to Table 7.6 , all the 6 indicators of applying showed statistically significant positive association with the continuous innovation variable at p<.01 and the strength of correlation ranges from (r=.323 to r=684 both at p<0.01) which is the highest range compare the previously discussed associations. This correlation was reflected in the significant positive association of the knowledge applying variable with the continuous innovation variable at p<.01 with correlation coefficient of (r=.675 at p<0.01).

Correlations

		AP1	AP2	AP3	AP4	AP5	AP6	AP	KM	SE	CI
AP1	Pearson Correlation	1	.376**	.164	.340**	.429**	.308**	.614**	.615**	.477**	.684**
	Sig. (2-tailed)		.000	.081	.000	.000	.001	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP2	Pearson Correlation	.376**	1	.479**	.383**	.392**	.278**	.699**	.575**	.402**	.485**
	Sig. (2-tailed)	.000		.000	.000	.000	.003	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP3	Pearson Correlation	.164	.479**	1	.468**	.358**	.369**	.698**	.560**	.387**	.323**
	Sig. (2-tailed)	.081	.000		.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP4	Pearson Correlation	.340**	.383**	.468**	1	.526**	.413**	.731**	.587**	.352**	.451**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP5	Pearson Correlation	.429**	.392**	.358**	.526**	1	.418**	.756**	.587**	.446**	.461**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP6	Pearson Correlation	.308**	.278**	.369**	.413**	.418**	1	.641**	.580**	.414**	.414**
	Sig. (2-tailed)	.001	.003	.000	.000	.000		.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
AP	Pearson Correlation	.614**	.699**	.698**	.731**	.756**	.641**	1	.850**	.602**	.675**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.615**	.575**	.560**	.587**	.587**	.580**	.850**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.477**	.402**	.387**	.352**	.446**	.414**	.602**	.615**	1	.742**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.684**	.485**	.323**	.451**	.461**	.414**	.675**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.6 Significant correlations between applying variable (with its 6 indicators) with continuous innovation.

7.3.2 Supportive learning environment

Supportive learning environment seven indicators association with continuous innovation was investigated. The result showed that 7 indicators of Supportive learning environment were positively and significantly correlated with the continuous innovation variable at $p<.01$ and the strength of correlation ranges from ($r=.499$ to $r=675$ both at $p<0.01$). The correlation for 6 out of 7 indicators is considered large while only one indicator was at the end of the medium range. It was also noted the Supportive learning environment correlated positively with highest correlation at (r= .743, p<0.01), where the coefficient of determination explains 55.2% of the variance in the respondents' scores on continuous innovation scale which is high. In addition, supportive learning environment has a strong positive association with knowledge management processes variable at p<.01 with correlation coefficient of (r=.615).

Correlations

		SE1	SE2	SE3	SE4	SE5	SE6	SE7	KM	SE	CI
SE1	Pearson Correlation	1	.744**	.563**	.518**	.336**	.374**	.395**	.417**	.684**	.570**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE2	Pearson Correlation	.744**	1	.671**	.740**	.576**	.570**	.562**	.490**	.870**	.675**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE3	Pearson Correlation	.563**	.671**	1	.682**	.575**	.533**	.614**	.507**	.822**	.618**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE4	Pearson Correlation	.518**	.740**	.682**	1	.540**	.508**	.569**	.476**	.812**	.629**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE5	Pearson Correlation	.336**	.576**	.575**	.540**	1	.505**	.531**	.417**	.720**	.499**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE6	Pearson Correlation	.374**	.570**	.533**	.508**	.505**	1	.753**	.514**	.788**	.544**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE7	Pearson Correlation	.395**	.562**	.614**	.569**	.531**	.753**	1	.533**	.815**	.574**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	114	114	114	114	114	114	114	114	114	114
KM	Pearson Correlation	.417**	.490**	.507**	.476**	.417**	.514**	.533**	1	.615**	.759**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	114	114	114	114	114	114	114	114	114	114
SE	Pearson Correlation	.684**	.870**	.822**	.812**	.720**	.788**	.815**	.615**	1	.742**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	114	114	114	114	114	114	114	114	114	114
CI	Pearson Correlation	.570**	.675**	.618**	.629**	.499**	.544**	.574**	.759**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	114	114	114	114	114	114	114	114	114	114

**. Correlation is significant at the 0.01 level (2-tailed).

Table 7.7 Significant correlations between supportive learning environment (with its 7 indicators) with continuous innovation.

Based on the results in section 7.3.1, it can be concluded that there is a statistical evidence between supportive learning environment and the knowledge management processes where the strength of association is categorized as large except for creating where the association is medium. In addition, all the relationships are positive except for organizing where the relationship is negative. Therefore, supportive learning environment can explain medium to large change in knowledge management processes.

In addition, based on the results in section 7.3.2, it can be concluded that there is a statistical evidence between supportive learning environment and continuous innovation with large strength correlation. Therefore, supportive learning environment can act as a predictor for continuous innovation. Based on the results from the above, it is clear that supportive learning environment does have a relationship with the six knowledge processes and continues innovation in the in UAE financial sector.

7.4 Chapter summary

Several correlation findings were found in this chapter. First, correlation analyses were linked to relevant research questions. Second, assumptions for performing correlation tests were checked. Third, correlations tests results were presented and analyzed. More details about inferences and conclusions are presented in the next chapters.

In order to identify significant variables of the knowledge management processes and continuous innovation to help in answering the following research question: How do knowledge management processes associate with continuous innovation in the UAE financial sector? Pearson Correlation test was carried out between the mentioned variables and the results of the correlation test shows the following:

The correlation result shows that all the six knowledge management processes show positive correlation with all the and continuous innovation expect the organizing variable which show a negative correlation with the continuous innovation at $p<.01$, the strength of the relation ranges from .617 to .759. As per Cohen (1988) guidelines all the significant association indicates large correlation between the dependent and independent variables . Consequently, it can be concluded that the following research hypotheses are accepted :

- H1: Creating knowledge process will significantly associated with continuous innovation in the UAE financial sector.
- H2: Capturing knowledge process is significantly associated with continuous innovation in the UAE financial sector.
- H3: Organizing knowledge process is significantly associated with continuous innovation in the UAE financial sector.
- H4: Storing knowledge process is significantly associated with continuous innovation in the UAE financial sector.
- H5: Disseminating knowledge process is significantly associated with continuous innovation in the UAE financial sector.
- H6: Applying knowledge process is significantly associated with continuous innovation in the UAE financial sector

Based on the above result, it can be concluded that there is statistical evidence of significant relationship between knowledge management processes and continuous innovation where the strength of association is categorized as large. All the relationships were positive except for organizing where the relationship was negative. Therefore, knowledge management processes can predict continuous innovation in the financial sector in the UAE. Overall, there was a strong correlation between knowledge management processes and continuous innovation. Increases in knowledge management processes were correlated with increases in continuous innovation.

In order to answer research question: What is the role of the supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector? A Pearson Correlation test is carried out between supportive learning environment and continuous innovation to further asses the influence on the association between knowledge management processes and continuous innovation using multiple regression in the next chapter. The result suggests that supportive learning environment significantly shows positive association with continuous innovation with large association at .743 and $p<0.01$. In addition, supportive learning environment was found to be significantly correlated to knowledge management processes variable at $p<.01$ with correlation coefficient of .615 which is large.

8. Regression Analysis

8.1 Introduction

The previous chapter discussed in detail correlations tests between all the model variables used for this study. This chapter will take the analysis one step further and tests the quantitative research hypotheses using multiple regression analysis. A detailed analysis for each independent indicator for each variable including creating, capturing, organizing, storing, disseminating applying and supportive learning environment will be provided. In addition, the chapter using Multiple regression analysis, mediation test will be carried out to investigate   if supportive learning environment mediate the relationship between knowledge management processes and continuous innovation.

8.2 Testing process

Multiple regression tests are employed to investigate relationships between dependent and independent variables (Pallat 2016). While conducting the multiple regression test only one dependent continuous variable can be tested while several independent variables can be employed. For a better significance of results, correlation results can be used as basis for multiple regression. In addition, multiple regression analysis is employed to inspect how much research independent variables (knowledge management 6 processes; supportive learning environment) can predict dependent variable (continuous innovation).

There are several types of multiple regression analyses; such as standard, sequential and stepwise. Based on the research questions nature stepwise type will be used. Stepwise regression method is used to determine a set of independent variables that purportedly represent the best set of predictors of a precise dependent variable (Thompson 1995).

Several verifications are important to consider before performing multiple regression analysis (Tabachnick & Fidell 2013).

Multicollinearity: one of the model output of multiple regression analysis is a table labelled correlations. Two types of association should be looked at. First, the correlation between the independent variables and dependent variables should be above .3. For this sample all the correlation between the independent variables and dependent variables were high and above .3 ranging from 5.86 to 7.24. Second correlations between the predictors/ independent variables should not be too high. For this sample of the study, all the independent variables r values within the acceptable range. In addition, problem with multicollinearity might not be evident in the correlation matrix. Therefore, two main values usually found in Coefficients table should be considered: Tolerance and VIF. Tolerance is an indicator of how much of inconsistency of a particular independent is not explained by other independent variables in the model. Tolerance value of less than .10 can indicates possibility of multicollinearity . For this study sample, all the tolerance values for the variables were higher than .10. VIF (Variance inflation factor) on the other hand, which is the opposite of Tolerance value. VIF indicates if a variable or a predictor has a strong linear association with other variables or predictors (Filed 2009). VIF value of above 10 indicating multicollinearity. For this sample study all the VIF values were below 10.

Outliers, normality, linearity and homoscedasticity: multiple regression analysis provides two methods to check all of these assumptions. First, Normal Probability Plot of the regression standardized residuals which can show where points lies. A straight diagonal line from bottom left to top right would suggest that no major deviations from normality. For all the study variables and by inspecting the residuals scatterplot and the normal probability plot of the regression all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity. Second Residual scatter plots can help in showing outliers cases. It provide a visual examination of the assumption homoscedasticity between the predicted dependent variable scores (continuous innovation) and the errors of prediction. The values should not be more than 3.3 or less than -3.3. For this sample of study, all the points were within the range and no outliers were found. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity. Tabachnick & Fidell (2013) suggest that if outliers were found in large sample it should be ignored.

8.3 Multiple regression results

8.3.1 Knowledge Creating Model

8.3.1.1 Model Evaluation

A multiple regression was carried out to investigate if knowledge creating variable including its 6 indicators could significantly predict continuous innovation. Using stepwise method it was found that according to the table 8.1 that the combined effect the independent indicators CR5 (My organization frequently comes up with new ideas about our products and/or services) and CR6 (My organization develops a new method if a traditional method is not effective anymore) explain significant amount of the variance in continuous innovation, the variables explains 35.7% (R2 adjusted =0.345).

Data from ANOVA table shows that the model is significant ($F = 30.791$, $p < .0005$). Therefore, it could be concluded that only two indicators CR5 and CR6 of creating out of 6 are statistically significant and predict continuous innovation. Also, CR5 and CR6 attribute has positive influence on the continuous innovation.

Independent Variables Model	CR5& CR6		
	R2 adjusted	Sig.	F
Values	0.345	.000	30.791

Table 8.1 Model summary of CR5 and CR6

8.3.1.2 Evaluating each of the independent variables

While the ANOVA table indicate that the overall model is a significant predictor of the outcome variable, coefficients table can indicate the extent to which the individual predictor variables contribute to the model. With the reference to standardized Beta (which is the slope of the regressed line) coefficients in Table 8.2, CR5 shows high significant level at 99% confidence level. Whereas CR6 also indicates high level of significant level at 95% confidence level. Therefore, these two creating indicators contributed to the variance in continuous innovation at a confidence level of 99% and 95% respectively however the CR5 have grater variance than CR6 based on the Beta.

Independent Variables Model	CR5		CR6	
	Beta	Sig.	Beta	Sig.
Value	.470	.000	.192	.038

Table 8.2 Coefficient table of CR5 and CR6

8.3.1.3 Correlation between variables (Multicollinearity)

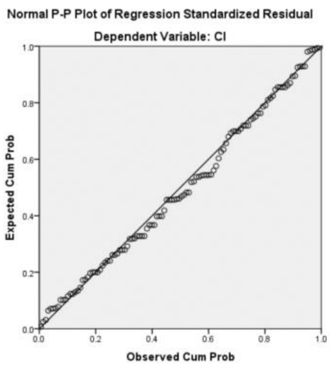
With reference to Table 8.3, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	CR1	CR2	CR3	CR4	CR5	CR6
Pearson Correlation	CI	1.000	.434	.308	.295	.490	.576	.450
	CR1	.434	1.000	.711	.452	.428	.517	.458
	CR2	.308	.711	1.000	.515	.429	.435	.447
	CR3	.295	.452	.515	1.000	.541	.504	.413
	CR4	.490	.428	.429	.541	1.000	.646	.436
	CR5	.576	.517	.435	.504	.646	1.000	.550
	CR6	.450	.458	.447	.413	.436	.550	1.000

Table 8.3 Correlation among creating 6 indicators

In addition, problem with multicollinearity might not be evident in the correlation matrix. Therefore, two main values usually found in Coefficients table should be considered: Tolerance and VIF (Tolerance value of more than .10 or a VIF value of above 10). CR5 and CR6 tolerance value was .697 which is not less than .10 and the VIF value was 1.434 which is well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

8.2.1.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.1, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.1 P-P plot for CR5 and CR6 indicators and continuous innovation

8.3.1.5 Scatterplot

Residual scatter plots provide a visual examination of the assumption homoscedasticity between the predicted dependent variable scores (continuous innovation) and the errors of prediction. The values should not be more than 3.3 or less than -3.3. With reference to Figure 8.2, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

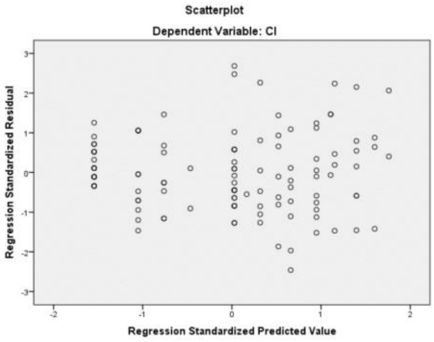


Figure 8.2 Scatterplot for CR5 and CR6 indicators and continuous innovation

8.3.2 Knowledge capturing

8.2.2.1 Model s Evaluation

Multiple regression analysis was conducted to see if knowledge capturing 7 indicators predicted continuous innovation in relation to general domain. Using Stepwise method it was found that according to the table 8.4 that CA1, CA2, CA4 and CA5 explain significant amount of the variance in continuous innovation, the indicators explains 52.9% (R2 adjusted =0.512).

Data from ANOVA table shows that the model is significant (F = 30.587, p < .0005).Therefore, it could be concluded that only four indicators CA1, CA2, CA4 and CA5 of capturing out of 7 are statistically significant and predict continuous innovation.

Independent Variables Model	CA1, CA2, CA4 and CA5		
	R2 adjusted	Sig.	F
Values	0.512	.000	30.587

Table 8.4 Model summary of CA1, CA2, CA4 and CA5

8.3.2.2 Evaluating each of the independent variables

The estimated standardized Beta coefficients in Table 8.5 indicate that CA2 shows high significant level at 99% confidence level. Whereas CA5 also indicates high level of significant level at 99% confidence level. In addition, CA1 and CA4 indicates high level of significant level at 95% confidence level. However if we look at the Beta values CA5 have grater variance than CA4, CA2 and CA1. Also, the Beta value for CA1 have lowest variance than the other indicators of capturing.

Independent Variables Model	CA1		CA2		CA4		CA5	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.171	0.41	.248	.005	.213	0.29	.286	.002

Table 8.5 Coefficient table CA1,CA2,CA4,CA5

8.3.2.3 Correlation between variables (Multicollinearity)

With reference to Table 8.6, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

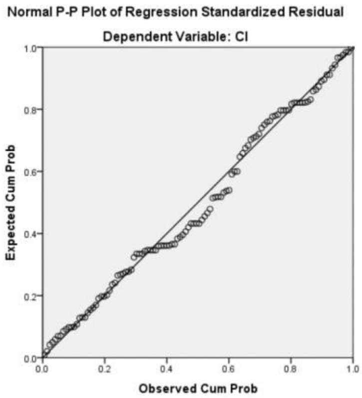
		CI	CA1	CA2	CA3	CA4	CA5	CA6	CA7
Pearson Correlation	CI	1.000	.472	.592	.462	.605	.603	.557	.497
	CA1	.472	1.000	.426	.653	.558	.269	.416	.393
	CA2	.592	.426	1.000	.526	.501	.575	.565	.558
	CA3	.462	.653	.526	1.000	.635	.400	.512	.376
	CA4	.605	.558	.501	.635	1.000	.603	.502	.385
	CA5	.603	.269	.575	.400	.603	1.000	.537	.475
	CA6	.557	.416	.565	.512	.502	.537	1.000	.481
	CA7	.497	.393	.558	.376	.385	.475	.481	1.000

Table 8.6 Correlation among capturing 7 indicators and continuous innovation

CA1, CA2 tolerance values were .633 and .587 which is less than .10 and the VIF values were 1.580 and 1.703 which is well below the cut off value. On the other hand, CA4 and CA5 tolerance values were .465 and .515 which is not less than 10 and the VIF values were 2.150

and 1.941 which is well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

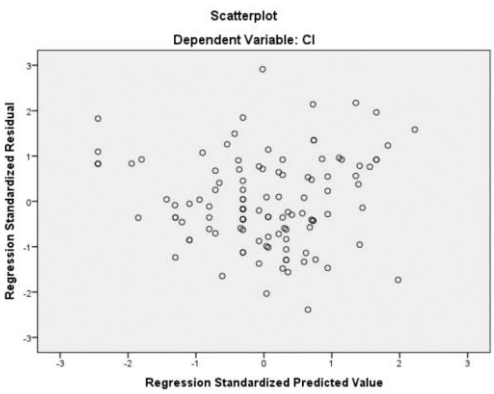
8.3.2.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.3, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.3 P-P plot for CA1, CA2, CA4 and CA5 and continuous innovation

8.3.2.5 Scatterplot



The developed model was test for homoscedasticity between the predicted dependent variable and the errors of prediction using the scatterplot in order to evaluate the assumption based on visual assessment. With reference to Figure 8.4, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

Figure 8.4 Scatterplot for CA1, CA2, CA4 and CA5 and continuous innovation

8.3.3 Knowledge organizing model

8.3.3.1 Model evaluation

Multiple regression analysis was conducted to see if knowledge organizing 6 indicators predicted continuous innovation in relation to general domain. Using Stepwise method it was found that according to the table 8.7 that ORG4, ORG5 and ORG6 explain significant amount of the variance in continuous innovation, the indicators explains 67.6% (R^2 adjusted =.442).

Data from ANOVA table shows that the model is significant ($F = 30.808$, $p < .0005$).Therefore, it could be concluded that only three indicators ORG4, ORG5 and ORG6 of knowledge organizing out of 6 are statistically significant and predict continuous innovation.

Independent Variables Model	**ORG4, ORG5 and ORG6**		
	R2 adjusted	**Sig.**	**F**
Values	.442	.000	30.808

Table 8.7 Model summary of ORG4, ORG5 and ORG6

8.3.3.2 Evaluating each of the independent variables

The estimated standardized Beta coefficients in Table 8.5 indicate that ORG4 shows high significant level at 99% confidence level. Whereas ORG5 also indicates high level of significant level at 99% confidence level. In addition, ORG6 indicates high level of significant level at 99% confidence level. However if we look at the Beta values ORG5 have grater variance than ORG4. Also, the Beta value for ORG6 have lowest variance than the other indicators of organizing.

Independent Variables Model	ORG4		ORG5		ORG6	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.383	0.000	.421	0.006	.238	0.003

Table 8.8 Coefficient table ORG4, ORG5 and ORG6

8.3.3.3 Correlation between variables (Multicollinearity)

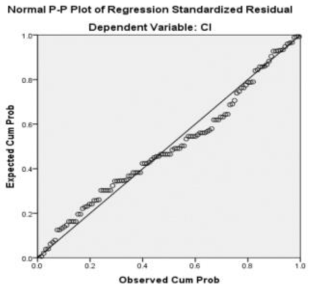
With reference to Table 8.9, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	ORG1	ORG2	ORG3	ORG4	ORG5	ORG6
Pearson Correlation	CI	1.000	.361	.461	.452	.571	.526	.469
	ORG1	.361	1.000	.575	.576	.333	.494	.404
	ORG2	.461	.575	1.000	.544	.466	.371	.415
	ORG3	.452	.576	.544	1.000	.415	.450	.513
	ORG4	.571	.333	.466	.415	1.000	.468	.323
	ORG5	.526	.494	.371	.450	.468	1.000	.449
	ORG6	.469	.404	.415	.513	.323	.449	1.000

Table 8.9 Correlation among organizing 6 indicators and continuous innovation

ORG4 tolerance value was .765 and the VIF was 1.307. Also, ORG5 tolerance value was .682 and the VIF was 1.465. On the other hand ORG6 tolerance value was .782 and the VIF was 1.278. All the values of the of Tolerance values of ORG4, ORG5 and ORG6 were not less than .10 and also all the values of VIF were well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

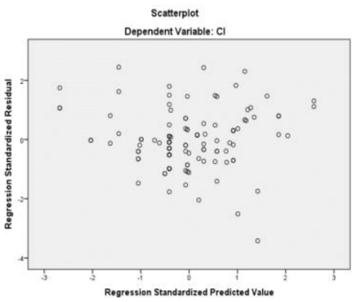
8.3.3.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.5, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.5 P-P plot for ORG4, ORG5 and ORG6 and continuous innovation

8.3.3.5 Scatterplot



The developed model was test for homoscedasticity between the predicted dependent variable and the errors of prediction using the scatterplot in order to evaluate the assumption based on visual assessment. With reference to Figure 8.6, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

Figure 8.6 Scatterplot for ORG4, ORG5 and ORG6 and continuous innovation

8.3.4 Storing model

8.3.4.1 Model summary Evaluation

A multiple regression was carried out to investigate knowledge storing variable 6 indicators could significantly predict continuous innovation. Using stepwise method it was found that according to the table 8.10 that ST2 and ST5 explain significant amount of the variance in continuous innovation, the variables explains 36.6% (R2 adjusted =.354).

Data from ANOVA table shows that the model is significant ($F = 32.022$, $p < .0005$). Therefore, it could be concluded that only two indicators ST2 and ST5 of storing out of 6 are statistically significant and predict continuous innovation.

Independent Variables Model	ST2 and ST5		
	R2 adjusted	Sig.	F
Values	.354	0.000	32.022

Table 8.10 Model summary of ST2 and ST5

8.3.4.2 Evaluating each of the independent variables

While the ANOVA table indicate that the overall model is a significant predictor of the outcome variable , coefficients table can indicate the extent to which the individual predictor variables contribute to the model. With the reference to standardized Beta coefficients in Table 8.11, ST2 and ST5 shows high significant level at 99% confidence level. Therefore, the these two storing indicators contributed to the variance in continuous innovation at a confidence level of 99% however the ST5 have grater variance than ST2 based on the Beta

Independent Variables Model	ST2		ST5	
	Beta	Sig.	Beta	Sig.
Value	.257	.003	.443	.000

Table 8.11 Coefficient table of ST2 and ST5

8.3.4.3 Correlation between variables (Multicollinearity)

With reference to Table 8.12, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables

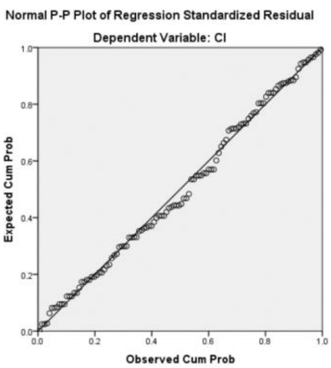
		CI	ST1	ST2	ST3	ST4	ST5	ST6
Pearson Correlation	CI	1.000	.424	.459	.506	.369	.560	.426
	ST1	.424	1.000	.443	.447	.511	.468	.354
	ST2	.459	.443	1.000	.597	.308	.454	.275
	ST3	.506	.447	.597	1.000	.544	.636	.472
	ST4	.369	.511	.308	.544	1.000	.491	.196
	ST5	.560	.468	.454	.636	.491	1.000	.575
	ST6	.426	.354	.275	.472	.196	.575	1.000

reliability is not existent and the assumption is not violated.

Table 8.12 Correlation among storing 6 indicators and continuous innovation

The tolerance value for ST2 and ST5 was 7.97 which is not less than .10. In addition, the VIF value for ST2 and ST5 was 1.260 well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

8.3.4.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.7, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.7 P-P plot for ST2 and ST5 indicators and continuous innovation

8.3.4.5 Scatterplot

Residual scatter plots provide a visual examination of the assumption homoscedasticity between the predicted dependent variable scores (continuous innovation) and the errors of prediction. The values should not be more than 3.3 or less than -3.3. With reference to Figure 8.8, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

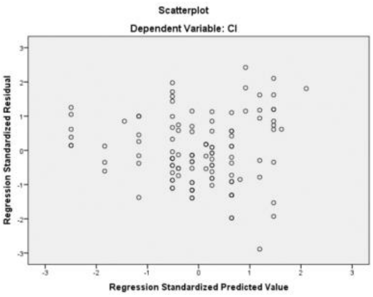


Figure 8.8 Scatterplot for ST2 and ST5 indicators and continuous innovation

8.3.5 Knowledge disseminating model

8.3.5.1 Model s evaluation

Multiple regression analysis was conducted to see if knowledge disseminating 6 indicators predicted continuous innovation in relation to general domain. Using Stepwise method it was found that according to the table 8.13 that DI2, DI4 and DI6 explain significant amount of the variance in continuous innovation, the indicators explains 42.5% (R2 adjusted =.409).

Data from ANOVA table shows that the model is significant ($F = 27.114$, $p < .0005$).Therefore, it could be concluded that only three indicators DI 2, DI 4 and DI 6 of disseminating out of 6 are statistically significant and predict continuous innovation.

Independent Variables Model	DI2, DI4 and DI6		
	R2 adjusted	Sig.	F
Values	.409	.000	27.114

Table 8.13 Model summary of DI2, DI4 and DI6

8.3.5.2 Evaluating each of the independent variables

The estimated standardized Beta coefficients in Table 8.14 indicate that DI6 shows high significant level at 99% confidence level. Whereas DI4 also indicates high level of significant level at 99% confidence level. In addition, DI2 indicates lower level of significant level at 95% confidence level in comparison to DI4 and DI6. However if we look at the Beta values DI6 have grater variance than DI2 and DI4. Also, the Beta value for DI2 is less than DI6 by more than 50% in term of value.

Independent Variables Model	DI2		DI4		DI6	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.172	.034	.264	.003	.410	.000

Table 8.14 Coefficient table DI2, DI4 and DI6

8.2.1.3 Correlation between variables (Multicollinearity)

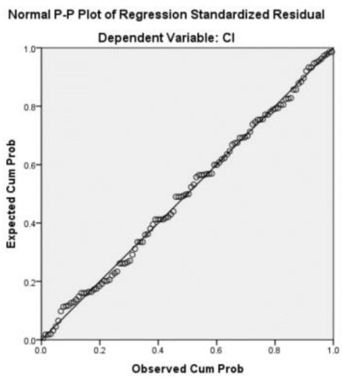
With reference to Table 8.15, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	DI1	DI2	DI3	DI4	DI5	DI6
Pearson Correlation	CI	1.000	.328	.373	.405	.505	.470	.554
	DI1	.328	1.000	.607	.294	.358	.428	.227
	DI2	.373	.607	1.000	.398	.433	.470	.211
	DI3	.405	.294	.398	1.000	.517	.330	.318
	DI4	.505	.358	.433	.517	1.000	.534	.406
	DI5	.470	.428	.470	.330	.534	1.000	.569
	DI6	.554	.227	.211	.318	.406	.569	1.000

Table 8.15 Correlation among disseminating 6 indicators and continuous innovation

DI2 tolerance value was .811 and the VIF was 1.233. Also, DI 4 tolerance value was .709 and the VIF was 1.410. On the other hand DI6 tolerance value was .834 and the VIF was 1.199. The results suggest that the DI6 has the highest tolerance value and the lowest VIF value. Whereas, DI4 has the lowest tolerance level and the highest VIF value. Nevertheless, All the values of the of Tolerance values of DI2, DI4 and DI6 were not less than .10 and also all the values of VIF were well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

8.3.5.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.9, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.9 P-P plot for DI2, DI4 and DI6 and continuous innovation

8.3.5.5 Scatterplot

The developed model was test for homoscedasticity between the predicted dependent variable and the errors of prediction using the scatterplot in order to evaluate the assumption based on visual assessment. With reference to Figure 8.10, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

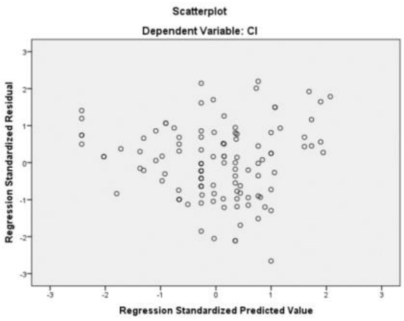


Figure 8.10 Scatterplot for DI2, DI4 and DI6 and continuous innovation

8.3.6 Knowledge applying model

8.3.6.1 Model summary Evaluation

Multiple regression analysis was conducted to see if knowledge applying 6 indicators predicted continuous innovation in relation to general domain. Using Stepwise method it was found that according to the table 8.16 that AP1, AP2 and AP6 explain significant amount of the variance in continuous innovation, the indicators explains 55.8% (R2 adjusted =.546).

Data from ANOVA table shows that the model is significant ($F = 46.284$, $p < .0005$).Therefore, it could be concluded that only three indicators AP1, AP2 and AP6 of applying out of 6 are statistically significant and predict continuous innovation.

Independent Variables Model	AP1, AP2 and AP6		
	R2 adjusted	Sig.	F
Values	.546	.000	46.284

Table 8.16 Model summary of AP1, AP2 and AP6

8.3.6.2 Evaluating each of the independent variables

The estimated standardized Beta coefficients in Table 8.17 indicate that AP1 shows high significant level at 99% confidence level. Whereas AP2 and AP6 also indicates high level of significant level at 99% confidence level. However if we look at the Beta values AP1 have grater variance than AP2 and AP6. Also, the Beta value for AP6 is less than AP11 by more than 50% in term of value.

Independent Variables Model	AP1		AP2		AP6	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.541	.000	.230	.001	.184	.008

Table 8.17 Coefficient table AP1, AP2 and AP6

8.2.6.3 Correlation between variables (Multicollinearity)

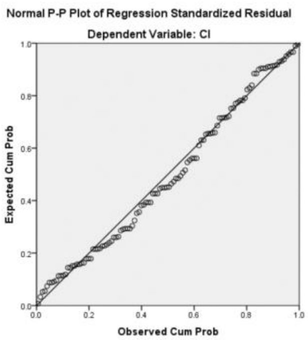
With reference to Table 8.18, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	AP1	AP2	AP3	AP4	AP5	AP6
Pearson Correlation	CI	1.000	.684	.485	.323	.451	.461	.414
	AP1	.684	1.000	.376	.164	.340	.429	.308
	AP2	.485	.376	1.000	.479	.383	.392	.278
	AP3	.323	.164	.479	1.000	.468	.358	.369
	AP4	.451	.340	.383	.468	1.000	.526	.413
	AP5	.461	.429	.392	.358	.526	1.000	.418
	AP6	.414	.308	.278	.369	.413	.418	1.000

Table 8.18 Correlation among apply 6 indicators and continuous innovation

Looking at the collinearity statistics, AP1 tolerance value was .814 and the VIF was 1.229. Also, AP2 tolerance value was .829 and the VIF was 1.206. On the other hand AP6 tolerance value was .875 and the VIF was 1.143. The results suggest that the AP6 has the highest tolerance value and the lowest VIF value. Whereas, AP1 has the lowest tolerance level and the highest VIF value. Nevertheless, All the values of the of Tolerance values of AP1, AP2 and AP6 were not less than .10 and also all the values of VIF were well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

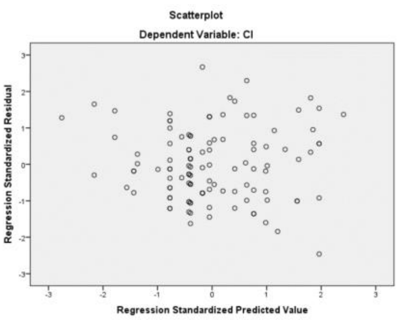
8.3.6.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.11, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity. Figure 8.11 P-P plot for AP1, AP2 and AP6 and continuous innovation

Figure 8.11 P-P plot for AP1, AP2 and AP6 and continuous innovation

8.3.6.5 Scatterplot



The developed model was test for homoscedasticity between the predicted dependent variable and the errors of prediction using the scatterplot in order to evaluate the assumption based on visual assessment. With reference to Figure 8.12, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

Figure 8.12 Scatterplot for AP1, AP2 and AP6 and continuous innovation

8.3.7 Supportive learning environment-mediator variable

8.3.7.1 Model summary Evaluation

Multiple regression analysis was conducted to see if Supportive learning environment 7 indicators predicted continuous innovation in relation to general domain. Using Stepwise method it was found that according to the table 8.19 that SI2, SI3 and SI7 explain significant amount of the variance in continuous innovation, the indicators explains 53.1% (R2 adjusted =.519).

Data from ANOVA table shows that the model is significant (F = 41.563, p < .0005).Therefore, it could be concluded that only three indicators SI2, SI3 and SI7 of Supportive learning environment out of 7 are statistically significant and predict continuous innovation.

Independent Variables Model	SI2, SI3 and SI7		
	R2 adjusted	Sig.	F
Values	.519	.000	41.563

Table 8.19 Model summary of SI2, SI3 and SI7

8.3.7.2 Evaluating each of the independent variables

The estimated standardized Beta coefficients in Table 8.20 indicate that SI2 shows high significant level at 99% confidence level. Whereas SI3 and SI7 also indicates high level of significant level at 95% confidence level.. However if we look at the Beta values SI2 have grater variance than SI3 and SI7. Also, the Beta value for SI3 and SI7 is less than SI2 by almost 50% in term of value.

Independent Variables Model	SI2		SI3		SI7	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.414	.000	.210	.015	.212	.030

Table 8.20 Coefficient table SI2, SI3 and SI7

8.3.7.3 Correlation between variables (Multicollinearity)

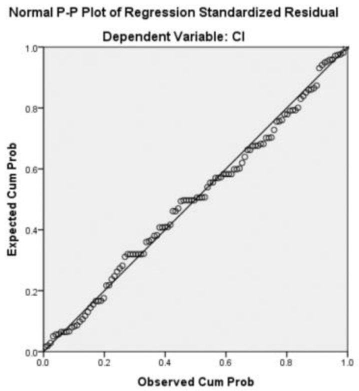
With reference to Table 8.21, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	SI1	SI2	SI3	SI4	SI5	SI6	SI7
Pearson Correlation	CI	1.000	.570	.675	.618	.629	.499	.544	.574
	SI1	.570	1.000	.744	.563	.518	.336	.374	.395
	SI2	.675	.744	1.000	.671	.740	.576	.570	.562
	SI3	.618	.563	.671	1.000	.682	.575	.533	.614
	SI4	.629	.518	.740	.682	1.000	.540	.508	.569
	SI5	.499	.336	.576	.575	.540	1.000	.505	.531
	SI6	.544	.374	.570	.533	.508	.505	1.000	.753
	SI7	.574	.395	.562	.614	.569	.531	.753	1.000

Table 8.21 Correlation among Supportive learning environment 7 indicators and continuous innovation

Looking at the collinearity statistics, SI2 tolerance value was .513 and the VIF was 1.948. Also, ST3 tolerance value was .468 and the VIF was 2.138. On the other hand ST7 tolerance value was .583 and the VIF was 1.716. The results suggest that the ST7 has the highest tolerance value and the lowest VIF value. Whereas, ST3 has the lowest tolerance level and the highest VIF value. Nevertheless, All the values of the of Tolerance values of AP1, AP2 and AP6 were not less than .10 and also all the values of VIF were well below the cut off value. Therefore, it did not violated the multicollinearity assumption.

8.3.7.4 Normal P-P plot of regression standardized residual



With reference to Figure 8.13, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.13 P-P plot for SI2, SI3 and SI7and continuous innovation

8.3.7.5 Scatterplot

The developed model was test for homoscedasticity between the predicted dependent variable and the errors of prediction using the scatterplot in order to evaluate the assumption based on visual assessment. It is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity (See Figure 8.14)

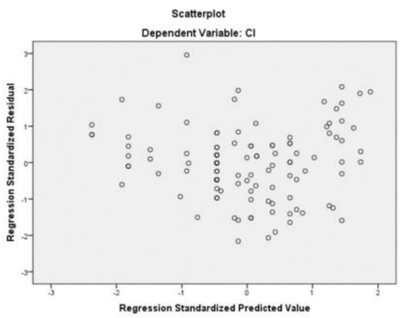


Figure 8.14 Scatterplot for SI2, SI3 and SI7and continuous innovation

8.4 The influence of each significant variables on dependent variable

Multiple regression outcome for significant variables

In the previous section, a step further was taken to compute the most significant indicators and code them again. This is has been done via computing only the significant indicators of each variable from the tests that have been conducted. Pallant (2005) argues that multiple regression test have a better outcome when including only significant variables. Table 22, show the significant computed variables.

Variable name	Original number of indicators	Original variable indicators	Significant variables indicators after computing	Retained number of indicators	Significant variables name after computing
CA (Capturing)	7	CA1,CA2 , CA3,CA4,CA5,CA6,CA7	CA1,CA2 ,CA4,CA5	4	S.CA (Significant Capturing)
SE (Supportive learning environment)	7	SE1,SE2,SE3,SE4,SE5,SE6,SE7	SE1,SE3,SE7	3	S.SE (Significant Supportive learning environment)
AP (Applying)	6	AP1,AP2,AP3,AP4,AP5,AP6	AP1,AP2,AP6	3	S.AP (Significant Applying)
ST (Storing)	6	ST1,ST2,ST3,ST4,ST5,ST6	ST2, ST5	2	S.ST (Significant Storing)

Table 8.22 Original number of indicators/variables and significant indicators/variables

8.4.1 The influence of each significant variable on dependent variable

8.4.1.1 Model summary Evaluation

A multiple regression was carried out to investigate the 7 significant variables including creating, capturing, and organizing, storing, disseminating, applying and supportive learning environment that could significantly predict continuous innovation. However, only 4 variables were retained in the test including capturing, applying, storing and supportive learning environment. Using stepwise method it was found that according to the table 8.23 that the model explain significant amount of the variance in continuous innovation, the model explains 71.9% (R2 adjusted =.709).

Data from ANOVA table shows that the model is significant ($F = 69.800$, $p < .0005$).

Therefore, it could be concluded that this model statistically significant and predict continuous innovation.

Independent Variables Model	S.CA, S.ST,S.AP, S.SE		
	R2 adjusted	Sig.	F
Values	.709	.000	69.800

Table 8.23 Model summary of significant variables

Equation:

$Y = b1x1 + b2x2 + b3x3 + b4X4 + c$. x is IV.

8.4.1.2 Evaluating each of the independent variables

While the ANOVA table indicate that the overall model is a significant predictor of the outcome variable, coefficients table can indicate the extent to which the individual predictor variables contribute to the model. With the reference to standardized Beta (which is the slope of the regressed line) coefficients in Table 8.24, All the variables shows high significant level at 99% confidence level. Looking at the Beta values, it is apparent that supportive learning environment followed by capturing rated the highest Beta values. Therefore, these two variables make the strongest unique contribution on explaining the dependent variable continuous innovation, when the variance explained by all other variables in the model is controlled for. In addition, applying rated lower than capturing and supportive learning environment. Whereas, storing rated the lowest Beta value. However, all of the variables shows high significant level at 99% confidence level.

Independent Variables Model	S.CA		S.ST		S.AP		S.SE	
value	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
	.279	.000	.188	.003	.255	.000	.314	.000

Table 8.24 Coefficient table of significant variables

8.3.7.3 Correlation between variables (Multicollinearity)

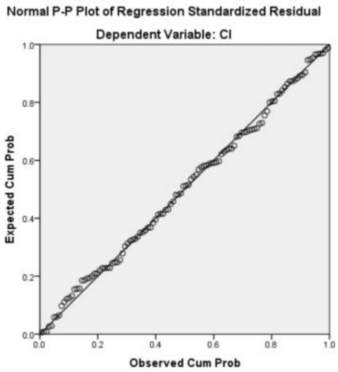
With reference to Table 8.25, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated. In, all the correlation between the independent variables and dependent variables were high and above .3

		CI	S_CR	S_CA	S_OR	S_ST	S_DI	S_AP	S_SE
Pearson Correlation	CI	1.000	.586	.724	.667	.592	.589	.702	.723
	S_CR	.586	1.000	.617	.590	.369	.581	.651	.372
	S_CA	.724	.617	1.000	.727	.453	.583	.649	.619
	S_OR	.667	.590	.727	1.000	.588	.580	.663	.516
	S_ST	.592	.369	.453	.588	1.000	.340	.477	.495
	S_DI	.589	.581	.583	.580	.340	1.000	.609	.463
	S_AP	.702	.651	.649	.663	.477	.609	1.000	.560
	S_SE	.723	.372	.619	.516	.495	.463	.560	1.000

Table 8.25 Correlation among significant variables and continuous innovation

Looking at the collinearity statistics, S.CA tolerance value was .479 and the VIF was 2.090. Also, S.SE tolerance value was .537 and the VIF was 1.864. On the other hand S.AP tolerance value was .515 and the VIF was 1.941 while S.ST tolerance value was .690 and the VIF was 1.450. The results suggest that the S.ST has the highest tolerance value and the lowest VIF value. Whereas, S.CA has the lowest tolerance level and the highest VIF value. Nevertheless, all the values of the of Tolerance values of S.CA,S.SE, S.AP and S.ST were not less than .10 and also all the values of VIF were well below the cut off value. Therefore, it did not violated the multicollinearity assumption

8.4.1.3 Normal P-P plot of regression standardized residual



With reference to Figure 8.15, by inspecting the residuals scatterplot and the normal probability plot of the regression it is clear that all the points lie in a reasonably straight diagonal line from bottom left to top right. Therefore, no major deviations from normality and no violation for linearity.

Figure 8.15 P-P plot for significant variables and continuous innovation

8.4.1.4 Scatterplot

Residual scatter plots provide a visual examination of the assumption homoscedasticity between the predicted dependent variable scores (continuous innovation) and the errors of prediction. The values should not be more than 3.3 or less than -3.3. With reference to Figure 8.16, it is clear that all the standardized residual as shown in the scatterplot is within the range. In addition, there is no clustering of the scores which indicate that the selected model has met the assumption of homoscedasticity.

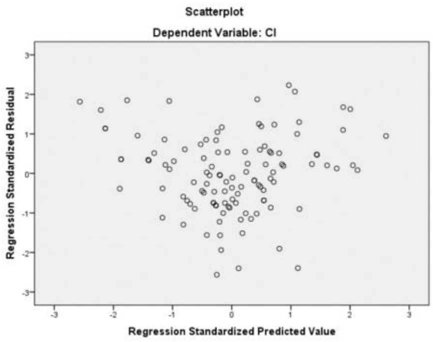


Figure 8.16 Scatterplot for significant variables and continuous innovation

8.4.2 Summary of the influence of knowledge management processes on continuous innovation

The above results indicates that there is a strong positive significant influence of knowledge management processes on continuous innovation. Two major types of analysis were done.

First on the indicator level of the knowledge management processes and continuous innovation. Second, only significant indicators were computed and second analysis was done. The results showed that only capturing, storing and applying were having a strong association with continuous innovation See Table 8.22. Out of the 7 variables including creating, capturing, and organizing, storing, disseminating, applying and supportive learning environment that could significantly predict continuous innovation. Only 4 variables were retained in the test including capturing, applying, storing and supportive learning environment.

These four variables contributed significantly where the amount of the variance in continuous innovation explains 70.9%. With a reference to Table 8.24, Based on the Beta it is also apparent that supportive learning environment will have the most influence on continuous innovation. In addition, followed by capturing make the strongest unique contribution on explaining the dependent variable continuous innovation. Whereas applying rated lower than capturing and supportive learning environment. Whereas, storing rated the lowest Beta value. Therefore, it can be concluded that for knowledge management processes capturing could significantly predict continuous innovation more than applying and storing as it contributed significantly where the amount of the variance in continuous innovation explains 27.9 % . Whereas, applying contributed significantly where the amount of the variance in continuous innovation explains 25.5%. On the other hand, storing contributed significantly where the amount of the variance in continuous innovation explains 18.8%. However, all of the variables shows high significant level at 99% confidence level.

8.5 Testing mediation

Mediation is defined as the presence of a variable in a causal relation such that the exposure causes the variable which then causes the outcome (MacKinnon et al. 2007). Mediation is a hypothesized causal chain in which one variable affects a second variable that, in turn, affects a third variable. The intervening variable, M, is the mediator. It “mediates” the relationship between a predictor, X, and an outcome Y (Frazier at el. 2004).

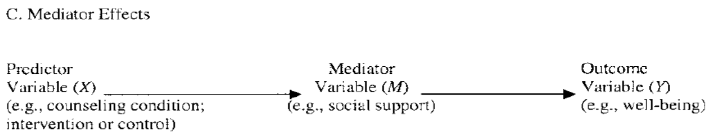


Figure 8.17 Mediator effect, adopted from (Frazier at el. 2004, pp.116).

8.5.1 Testing mediation approaches

Several approaches are used for mediational analyses such as regression eg.Baron & Kenny’s steps or structural equation modeling (SEM). Both of these methods use the similar logic of analyses. However, SEM is more preferred than multiple regression because it is more flexible than regression (Baron & Kenny 1986; Hoyle & Smith 1994; Judd & Kenny 1981; Kenny et al. 1998). For example, SEM model allows the researcher to include several predictors and outcome mediators variables. In addition, the SEM model can include potential causes of the mediator and outcome, including longitudinal data (Baron & Kenny 1986; Hoyle & Smith, 1994; Judd & Kenny 1981; MacKinnon, 2000; Quintana & Maxwell, 1999; Wegener & Fabrigar, 2000). SEM can also control for measurement error and provides information on the degree of fit of the entire model. Nevertheless, SEM requires large sample in order to carry out the test, at least 200 (Quintana & Maxwell 1999). Therefore, for the samples that are less than 200, only multiple regression can be performed for the mediational analyses (Holmbeck 1997). In the same line of thought, MacKinnon (2000) argues that regression is the most common method for testing mediation. For this study since the sample is less than 200, multiple regression will be used to carry out the mediational analyses.

8.5.2 Baron and Kenny's testing mediation approach

Kenny and his colleagues (Baron & Kenny, 1986; Judd & Kenny, 1981; Kenny el at. 1998), developed the most common method for testing mediation in psychological research using regression. In their landmark paper, Baron and Kenny (1986) define four causal steps approach in order to evaluate mediation. According to this method, there are four steps (performed with three regression equations) in establishing that a variable mediates the relation between a predictor variable and an outcome variable. With a reference to figure 8.18, the first step involving establishing a significant correlation between the predictor and the outcome which is Path c. The second step is to proof that the predictor and the mediator are related which is Path a. The third step is to show that the mediator is correlated to the outcome variable which is Path b and it is estimated controlling for the effects of the predictor on the outcome. The fourth step involves showing that strength of the relation between the predictor and the outcome is significantly reduced when the mediator is added to the model (compare Path c in Figure A with Path c' in Figure B in Figure 8.18).

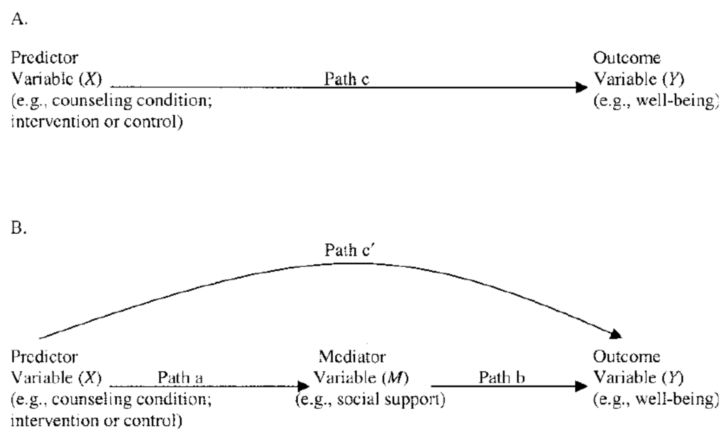


Figure 8.18 Diagram of paths in mediation models. adopted from (Frazier at el. 2004, pp.126).

Mediational analyses requires testing four equations by performing multiple regression for the first two steps and Hierarchical multiple regression for step 3 and 4. First Path c needs to be established and this is done by regressing the outcome variable on the predictor. In the second equation, Path a is established by regressing the mediator on the predictor variable in the mediational chain. In the third equation, however, Path b is created by regressing the outcome variable on both the predictor and the mediator. This provides a test of if the mediator is associated with the outcome (Path b) in addition to an estimate of the relation between the predictor and the outcome controlling for the mediator (Path c'), step 4.

8.5.3 Mediational analyses results

Mediational analyses can give two main results. First is maximum evidence for mediation, also called full mediation or complete mediation which means that the relation between the predictor and the outcome controlling for the mediator is zero. On another words, the mediator in the full mediation model accounts for the relation between the predictor and outcome. Research suggests that this is very rare, if ever happen. Second is partial mediation which suggests that the relation between the predictor and the outcome is significantly smaller when the mediator is in the equation (Path c') than when the mediator is not in the equation (Path c), but still greater than zero (Baron & Kenny 1986; MacKinnon at al.2000; Frazier at el. 2004).

8.5. 4 Testing mediation for this study

The main purpose of mediational analyses is to examine why an association between a predictor and outcome exists. Therefore, four variables including S.CA, S.AP, S.ST and S.SE were making a significant unique contribution to the predication of the dependent variable continuous innovation. Therefore, mediation test will be used for further investigation. Pallant

(2016) stresses the importance regarding the assumptions of multiple regression. By violating the assumptions, the analysis may be invalid. Therefore, the sample size, multicollinearity and the normal distribution were investigated. These are all part of the underlying assumptions.

8.5. 4.1 Mediation effect of knowledge capturing

To test the hypothesis that supportive learning environment-S.SE would mediate the relationship between the capturing-S.CA and the continuous innovation-CI, a regression analysis and test for mediation was conducted based on Baron & Kenny (1986). Four main hypotheses needed to be tested as showed in Figure 8.19 and illustrated in Figure 8.21:

H1A: Capturing will influence supportive learning environment

H2A: supportive learning environment influence continuous innovation

H3A: Capturing influence continuous innovation

H4A: when supportive learning environment is controlled, the influence of capturing on continuous innovation decreased

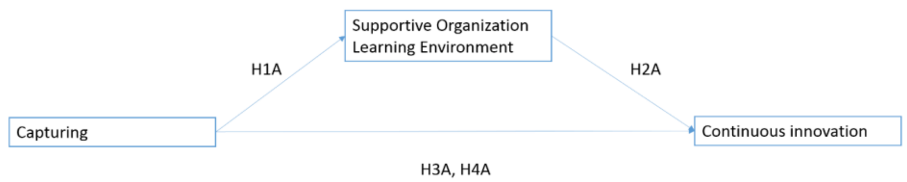


Figure 8.19: Theoretical Framework hypothesis for knowledge Capturing.

With reference to Figure 8.20, all the four steps are shown. In addition, Table 8.27 contains the analyses necessary to examine this mediational hypothesis. Following the steps outlined earlier for testing mediation.

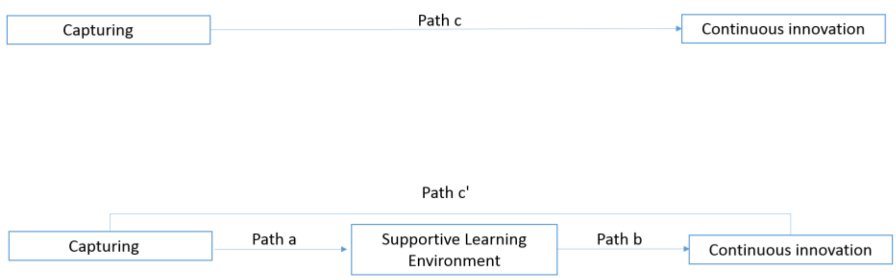


Figure 8.20 Diagram of paths in knowledge Capturing mediation model.

Testing steps in mediation model	Path	Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
Testing Step 1 (Path c) Outcome: Continuous innovation Predictor: Capturing	c	0.141	0.013	0.724
Testing Step 2 (Path a) Outcome: Supportive learning environment Predictor: Capturing	a	0.514	0.062	0.619
Testing Step 3 (Paths b and c') Outcome:Continuous innovation Mediator: Supportive learning environment Predictor: Capturing	b	0.105	0.017	0.445
	c'	0.087	0.014	0.449

Table 8.26 Testing Mediator Effects Using Multiple Regression

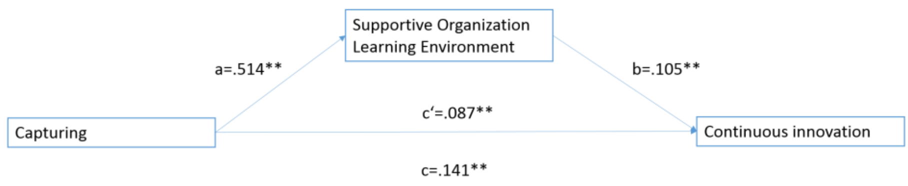


Figure 8.21 Illustration of paths in knowledge capturing mediation model.

In step 1 of the mediation model which test Path c, the mediator was excluded and capturing significantly predicted continuous innovation where the unstandardized regression coefficient (B = .141) associated with the effect of capturing on continuous innovation was significant (p < .001). Path c was significant, and the requirement for mediation in Step 1 was met. Therefore, H3A is accepted. The prediction model was statistically significant, F (1, 12) =123.488, p < .001. Capturing also accounted for a significant proportion of the variance in continuous innovation, (R2 = 0.520, Adjusted R2 = .520). On another words, the effect the capturing variable explains significant amount of the variance in continuous innovation, the variable explains 52.4%. Therefore, it could be concluded that capturing is statistically significant and predict continuous innovation.

In step 2, Path a is established by regressing the mediator on the predictor variable in the mediational chain. In this research case, path a is established by regressing SE on capturing which is Path a. The unstandardized regression coefficient (B = .514) associated with this relation also was significant at (p < .001). Therefore, the condition for Step 2 was met (Path a was significant). Capturing significantly predicted the mediator, supportive learning environment and consequently, H1A is accepted. The prediction model was statistically significant, $F(1, 12)=69.698$, $p < .001$. In addition, capturing accounted for a significant proportion of the variance in supportive learning environment (R2 = .38.4, Adjusted R2 = .520. On another words, the effect the capturing variable explains significant amount of the variance in supportive learning environment, the variable explains 38.4%. Therefore, it could be concluded that capturing is statistically significant and predict supportive learning environment. In addition, the model did reach statistical significance ($p>.001$).

In step 3 and step 4, Hierarchical multiple regression was performed to investigate the ability of knowledge capturing to predict continuous innovation, while controlling for the contribution of supportive learning environment. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations amongst the predictor variables (supportive learning environment and capturing) included in the study were examined and these are presented in Table 8.28. With reference to Table 8.28, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	S_SE	S_CA
Pearson Correlation	CI	1.000	.723	.724
	S_SE	.723	1.000	.619
	S_CA	.724	.619	1.000
Sig. (1-tailed)	CI	.	.000	.000
	S_SE	.000	.	.000
	S_CA	.000	.000	.
N	CI	114	114	114
	S_SE	114	114	114
	S_CA	114	114	114

Table 8.28 Correlation among predicators and dependent variable with the predicators

All predictor variables were statistically correlated with continuous innovation which indicates that the data was suitably correlated with the dependent variable for examination through multiple linear regression to be reliably undertaken. The correlations between the predictors variables (capturing and supportive learning environment) and the dependent variable (continuous innovation) were strong, ranging from $r = .723$, $p < .001$ to $r = .724$, $p < .001$.

As shown in Table 8.29, in the first step of hierarchical multiple regression, supportive learning environment was entered. This model was statistically significant $F(2, 111) = 122.512$, $p < .001$ and explained 52.2 % of variance in continuous innovation. After entry of capturing at Step 2 the total variance explained by the model as a whole was 64.4% ($F(2, 111) = 101.474$, $p < .001$). The introduction of capturing explained additional 12.4 % of variance in continuous innovation, after controlling for supportive learning environment (R squared change = .124, F change (1, 111) = 38.937, $p < .001$).

For the step 3, the coefficient associated with the relation between supportive learning environment and continuous innovation (controlling for capturing) also was significant where the unstandardized regression coefficient ($B = .105$) associated with this relation also was significant at ($p < .001$). Thus, the condition for Step 3 was met (Path b was significant). Therefore, H2A is accepted (See Table 8.31).

With reference to Table 8.31, for the Step 4 of the mediation analyses revealed that, controlling for the mediator (Supportive learning environment), capturing did significantly predict continuous innovation. The unstandardized regression coefficient (B = .087) associated with this relation and also was significant at ($p < .001$). Thus, the condition for Step 4 was met (Path c′ was significant). Therefore, H4A is accepted. In terms of evaluating the presence of mediation effects, the common practice is to subtract the value of the regression coefficient when the mediator is in the model from the regression coefficient when the mediator is not in the model (i.e., path c from condition one minus path c from condition four) (Judd & Kenny 1981; MacKinnon et al. 2002). In terms of evaluating condition four for this study, the difference between the unstandardized regression coefficient from condition four (B = .087) and the coefficient from condition one (B = .141) is .054, which, supports the argument for a partial mediation effect.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.723[a]	.522	.518	.07543	.522	122.512	1	112	.000
2	.804[b]	.646	.640	.06519	.124	38.937	1	111	.000

a. Predictors: (Constant), S_SE

b. Predictors: (Constant), S_SE, S_CA

Table 8.29 Model summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.697	1	.697	122.512	.000[b]
	Residual	.637	112	.006		
	Total	1.334	113			
2	Regression	.862	2	.431	101.474	.000[c]
	Residual	.472	111	.004		
	Total	1.334	113			

a. Dependent Variable: CI
b. Predictors: (Constant), S_SE
c. Predictors: (Constant), S_SE, S_CA

Table 8.30 ANOVA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.183	.019		9.891	.000	.147	.220					
	S_SE	.170	.015	.723	11.069	.000	.139	.200	.723	.723	.723	1.000	1.000
2	(Constant)	.135	.018		7.615	.000	.100	.171					
	S_SE	.105	.017	.445	6.190	.000	.071	.138	.723	.507	.349	.616	1.622
	S_CA	.087	.014	.449	6.240	.000	.060	.115	.724	.510	.352	.616	1.622

a. Dependent Variable: CI

Table 8.31 Coefficient table

8.5. 4.2 Mediation effect on Storing

To test the hypothesis that supportive learning environment-S.SE would mediate the relationship between the Storing -S.ST and the continuous innovation-CI, a regression analysis and test for mediation was conducted . Four main hypotheses needed to be tested as showed in Figure 22 and illustrated in Figure 8.24:

H1B: Storing will influence supportive learning environment

H2B: supportive learning environment influence continuous innovation

H3B: Storing influence continuous innovation

H4B: when supportive learning environment is controlled, the influence of Storing on continuous innovation decreased

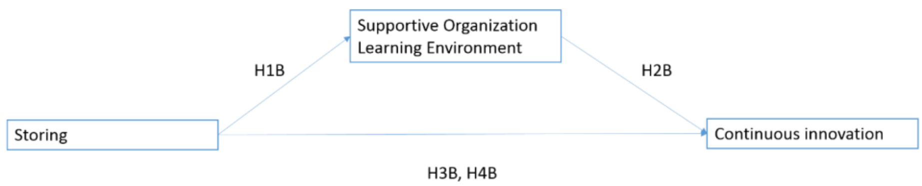


Figure 8.22 Theoretical Framework hypothesis for knowledge Storing.

With reference to Figure 23, all the four steps are shown. In addition, Table 32 contains the analyses necessary to examine this mediational hypothesis. Following the steps outlined earlier for testing mediation.

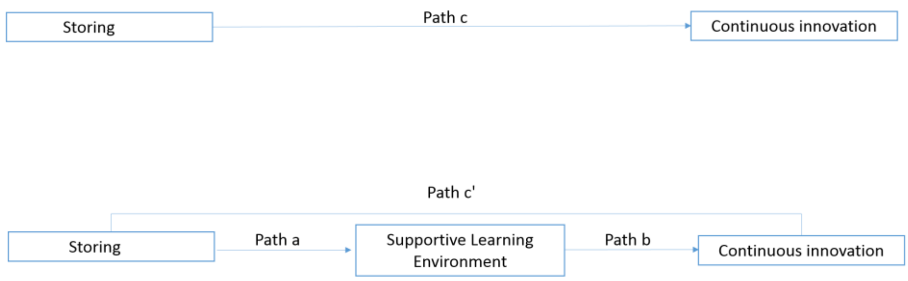


Figure 8.23 Diagram of paths in knowledge Storing mediation model.

Testing steps in mediation model	Path	Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
Testing Step 1 (Path c) Outcome: Continuous innovation Predictor: Storing	c	0.208	0.27	0.592
Testing Step 2 (Path a) Outcome: Supportive learning environment Predictor: Storing	a	0.741	0.123	0.495
Testing Step 3 (Paths b and c') Outcome:Continuous innovation Mediator: Supportive learning environment Predictor: Storing	b	0.134	0.016	0.569
	c'	0.109	0.024	0.310

Table 8.32 Testing Mediator Effects Using Multiple Regression

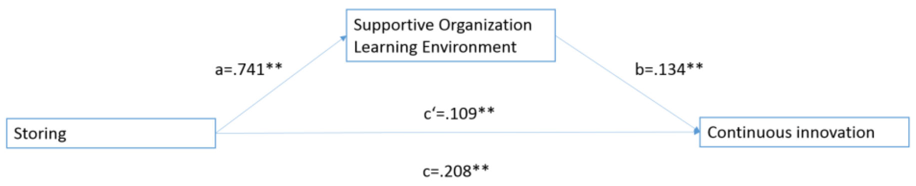


Figure 8.24 Illustration of paths in knowledge storing mediation model.

In step 1 of the mediation model which test Path c, the mediator was excluded and Storing significantly predicted continuous innovation where the unstandardized regression coefficient (B = .208) associated with the effect of Storing on continuous innovation was significant (p < .001). Path c was significant, and the requirement for mediation in Step 1 was met. Therefore, H3B is accepted. The prediction model was statistically significant, F (1, 12) =60.338, p < .001. Storing also accounted for a significant proportion of the variance in continuous innovation, (R2 = .350, Adjusted R2 = .344). On another words, the effect the Storing variable explains significant amount of the variance in continuous innovation, the variable explains 35%. Therefore, it could be concluded that Storing is statistically significant and predict continuous innovation.

In step 2, Path a is established by regressing the mediator on the predictor variable in the mediational chain. In this research case, path a is established by regressing supportive learning environment on Storing which is Path a. The unstandardized regression coefficient ($B = .741$) associated with this relation also was significant at ($p < .001$). Therefore, the condition for Step 2 was met (Path a was significant). Storing significantly predicted the mediator, supportive learning environment and consequently, H1A is accepted. The prediction model was statistically significant, $F(1, 12)=36.317$, $p < .001$. In addition, Storing accounted for a significant proportion of the variance in supportive learning environment ($R2 = .245$, Adjusted $R2 = .238$. On another words, the effect the Storing variable explains significant amount of the variance in supportive learning environment, the variable explains 24.5%. Therefore, it could be concluded that Storing is statistically significant and predict supportive learning environment. In addition, the model did reach statistical significance ($p>.001$).

In step 3 and step 4, Hierarchical multiple regression was performed to investigate the ability of knowledge storing to predict continuous innovation, while controlling for the contribution of supportive learning environment . Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations amongst the predictor variables (supportive learning environment and Storing) included in the study were examined and these are presented in Table 30. With reference to Table 33,, the correlations between the models are below the accepted threshold of .9.

Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	S_SE	S_ST
Pearson Correlation	CI	1.000	.723	.592
	S_SE	.723	1.000	.495
	S_ST	.592	.495	1.000
Sig. (1-tailed)	CI	.	.000	.000
	S_SE	.000	.	.000
	S_ST	.000	.000	.
N	CI	114	114	114
	S_SE	114	114	114
	S_ST	114	114	114

Table 8.33 Correlation among predicators and dependent variable with the predicators

All predictor variables were statistically correlated with continuous innovation which indicates that the data was suitably correlated with the dependent variable for examination through multiple linear regression to be reliably undertaken. The correlations between the predictors variables (Storing and supportive learning environment) and the dependent variable (continuous innovation) were strong, ranging from $r = .592$, $p < .001$ to $r = .723$, $p < .001$.

As shown in Table 8.34, in the first step of hierarchical multiple regression, supportive learning environment was entered. This model was statistically significant $F (1,112) = 122.512$, $p< .001$ and explained 52.2 % of variance in continuous innovation. After entry of Storing at Step 2 the total variance explained by the model as a whole was 59.5 % (F (2, 111)

= 81.521, p < .001). The introduction of Storing explained additional 7.3 % of variance in continuous innovation, after controlling for supportive learning environment (R squared change = .073, F change (1, 111) = 19.879, p < .001).

For the step 3, the coefficient associated with the relation between supportive learning environment and continuous innovation (controlling for Storing) also was significant where the unstandardized regression coefficient (B = .134) associated with this relation also was significant at (p < .001). Thus, the condition for Step 3 was met (Path b was significant). Therefore, H2B is accepted (See Table 8.36).

With reference to Table 8.36, for the Step 4 of the mediation analyses revealed that, controlling for the mediator (Supportive learning environment), Storing did significantly predict continuous innovation. The unstandardized regression coefficient (B = .109) associated with this relation and also was significant at (p < .001). Thus, the condition for Step 4 was met (Path c′ was significant). Therefore, H4B is accepted. In terms of evaluating condition four for this study, the difference between the unstandardized regression coefficient from condition four (B = .109) and the coefficient from condition one (B = .208) is .099, which, supports the argument for a partial mediation effect.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.723[a]	.522	.518	.07543	.522	122.512	1	112	.000
2	.771[b]	.595	.588	.06977	.073	19.879	1	111	.000

a. Predictors: (Constant), S_SE

b. Predictors: (Constant), S_SE, S_ST

Table 8.34 Model summary

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.697	1	.697	122.512	.000[b]
	Residual	.637	112	.006		
	Total	1.334	113			
2	Regression	.794	2	.397	81.521	.000[c]
	Residual	.540	111	.005		
	Total	1.334	113			

a. Dependent Variable: CI

b. Predictors: (Constant), S_SE

c. Predictors: (Constant), S_SE, S_ST

Table 8.35 ANOVA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.183	.019		9.891	.000	.147	.220					
	S_SE	.170	.015	.723	11.069	.000	.139	.200	.723	.723	.723	1.000	1.000
2	(Constant)	.142	.020		7.265	.000	.103	.181					
	S_SE	.134	.016	.569	8.191	.000	.101	.166	.723	.614	.495	.755	1.324
	S_ST	.109	.024	.310	4.459	.000	.061	.158	.592	.390	.269	.755	1.324

a. Dependent Variable: CI

Table 8.36 Coefficient table

8.5. 4.3 Mediation effect of Applying

To test the hypothesis that supportive learning environment-S.SE would mediate the relationship between the Applying -S.AP and the continuous innovation-CI, a regression analysis and test for mediation was conducted based on Baron & Kenny (1986). Four main hypotheses needed to be tested as showed in Figure 25 and illustrated in Figure 27:

H1C: Applying will influence supportive learning environment

H2C: supportive learning environment influence continuous innovation

H3C: Applying influence continuous innovation

H4C: when supportive learning environment is controlled, the influence of Applying on continuous innovation decreased

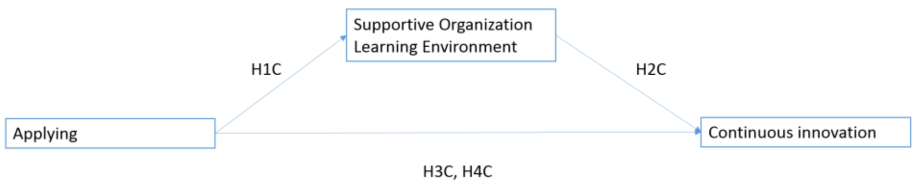


Figure 8.25 Theoretical Framework hypothesis for knowledge Applying .

With reference to Figure 24, all the four steps are shown. In addition, Table 37 contains the analyses necessary to examine this mediational hypothesis. Following the steps outlined earlier for testing mediation.

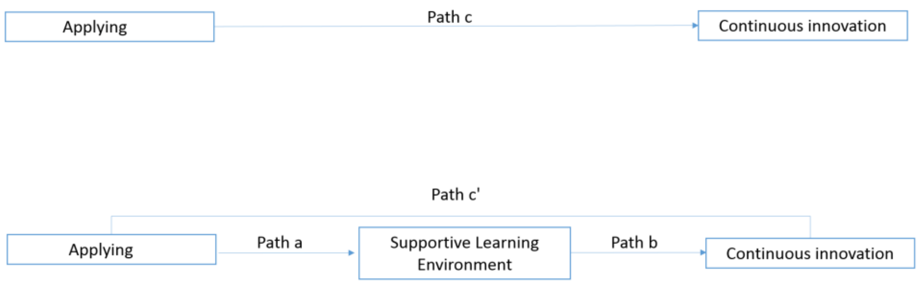


Figure 8.26 Diagram of paths in knowledge Applying mediation model.

Testing steps in mediation model	Path	Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
Testing Step 1 (Path c) Outcome: Continuous innovation Predictor: Applying	c	0.202	0.019	0.702
Testing Step 2 (Path a) Outcome: Supportive learning environment Predictor: Applying	a	0.687	0.096	0.560
Testing Step 3 (Paths b and c') Outcome:Continuous innovation Mediator: Supportive learning environment Predictor: Applying	b	0.113	0.016	0.481
	c'	0.125	0.020	0.432

Table 8.37 Testing Mediator Effects Using Multiple Regression

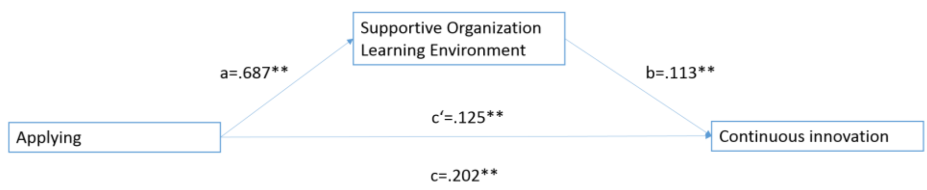


Figure 8.27 Illustration of paths in knowledge applying mediation model.

In step 1 of the mediation model which test Path c, the mediator was excluded and Applying significantly predicted continuous innovation where the unstandardized regression coefficient (B = .202) associated with the effect of Applying on continuous innovation was significant ($p < .001$). Path c was significant, and the requirement for mediation in Step 1 was met. Therefore, H3C is accepted. The prediction model was statistically significant, F (1, 12) =108.576, $p < .001$. Applying also accounted for a significant proportion of the variance in continuous innovation, (R2 = .492, Adjusted R2 = .488). On another words, the effect the Applying variable explains significant amount of the variance in continuous innovation, the variable explains 49.2%. Therefore, it could be concluded that Applying is statistically significant and predict continuous innovation.

In step 2, Path a is established by regressing the mediator on the predictor variable in the mediational chain. In this research case, path a is established by regressing supportive learning environment on Applying which is Path a. The unstandardized regression coefficient (B = .687) associated with this relation also was significant at ($p < .001$). Therefore, the condition for Step 2 was met (Path a was significant). Applying significantly predicted the mediator, supportive learning environment and consequently, H1C is accepted. The prediction model was statistically significant, $F (1, 12)=51.200$, $p < .001$. In addition, Applying accounted for a significant proportion of the variance in supportive learning environment ($R2 = .314$, Adjusted $R2 = .308$. On another words, the effect the Applying variable explains significant amount of the variance in supportive learning environment, the variable explains 31.4%. Therefore, it could be concluded that Applying is statistically significant and predict supportive learning environment. In addition, the model did reach statistical significance ($p>.001$).

In step 3 and step 4, Hierarchical multiple regression was performed to investigate the ability of knowledge applying to predict continuous innovation, while controlling for the contribution of supportive learning environment . . Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Additionally, the correlations amongst the predictor variables (supportive learning environment and Applying) included in the study were examined and these are presented in Table 38. With reference to Table 38,, the correlations between the models are below the accepted threshold of .9. Therefore, the impact of multi-collinearity on the independent variables reliability is not existent and the assumption is not violated.

		CI	S_SE	S_AP
Pearson Correlation	CI	1.000	.723	.702
	S_SE	.723	1.000	.560
	S_AP	.702	.560	1.000
Sig. (1-tailed)	CI	.	.000	.000
	S_SE	.000	.	.000
	S_AP	.000	.000	.
N	CI	114	114	114
	S_SE	114	114	114
	S_AP	114	114	114

Table 8.38 Correlation among predicators and dependent variable with the predicators

All predictor variables were statistically correlated with continuous innovation which indicates that the data was suitably correlated with the dependent variable for examination through multiple linear regression to be reliably undertaken. The correlations between the predictors variables (Applying and supportive learning environment) and the dependent variable (continuous innovation) were strong, ranging from $r = .702$, $p < .001$ to $r = .723$, $p < .001$.

As shown in Table 8.39, in the first step of hierarchical multiple regression, supportive learning environment was entered. This model was statistically significant $F(1,112) = 122.512$, $p < .001$ and explained 52.2 % of variance in continuous innovation. After entry of Applying at Step 2 the total variance explained by the model as a whole was 65.1 % ($F(2, 111) = 103.407$, $p < .001$). The introduction of Applying explained additional 12.8 % of variance in continuous innovation, after controlling for supportive learning environment (R squared change = .128, F change $(1, 111) = 40.783$, $p < .001$).

For the step 3, the coefficient associated with the relation between SE and continuous innovation (controlling for Applying) also was significant where the unstandardized regression coefficient (B = .113) associated with this relation also was significant at ($p < .001$). Thus, the condition for Step 3 was met (Path b was significant). Therefore, H2C is accepted (See Table 8.41).

With reference to Table 8.41, for the Step 4 of the mediation analyses revealed that, controlling for the mediator (Supportive learning environment), Applying did significantly predict continuous innovation. The unstandardized regression coefficient (B = .125) associated with this relation and also was significant at ($p < .001$). Thus, the condition for Step 4 was met (Path c′ was significant). Therefore, H4C is accepted. In terms of evaluating condition four for this study, the difference between the unstandardized regression coefficient from condition four (B = .125) and the coefficient from condition one (B = .202) is .077, which, supports the argument for a partial mediation effect.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.723[a]	.522	.518	.07543	.522	122.512	1	112	.000
2	.807[b]	.651	.644	.06479	.128	40.783	1	111	.000

a. Predictors: (Constant), S_SE

b. Predictors: (Constant), S_SE, S_AP

Table 8.39 Coefficient table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.697	1	.697	122.512	.000[b]
	Residual	.637	112	.006		
	Total	1.334	113			
2	Regression	.868	2	.434	103.407	.000[c]
	Residual	.466	111	.004		
	Total	1.334	113			

a. Dependent Variable: CI

b. Predictors: (Constant), S_SE

c. Predictors: (Constant), S_SE, S_AP

Table 8.40 ANOVA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.183	.019		9.891	.000	.147	.220		
	S_SE	.170	.015	.723	11.069	.000	.139	.200	1.000	1.000
2	(Constant)	.122	.019		6.563	.000	.085	.159		
	S_SE	.113	.016	.481	7.097	.000	.081	.144	.686	1.457
	S_AP	.125	.020	.432	6.386	.000	.086	.163	.686	1.457

a. Dependent Variable: CI

Table 8.41 Model summary

Commented [BH1]: can summarize the results in a table

8.6 Summary

This chapter so far presented the quantitative research hypotheses using multiple regression analysis. A detailed analysis for each independent indicator for each variables including creating, capturing, organizing, storing, disseminating applying and supportive learning environment was provided. Only significant indicators for each variable was computed and new multiple regression analysis was carried out. Results of regression models were presented and standardized Beta coefficients was used to compare between each independent variables.

In addition, one of the major aims of this chapter was to evaluate the hypothesis that supportive learning environment mediates the relationship between knowledge management processes (capturing, applying and storing) and continuous innovation. Mediation effects were evaluated using the Baron and Kenny (1986) method, which consists of four conditions that must be satisfied for one to state that mediation has occurred. All the four conditions were achieved for the three tests of mediation and all the study hypotheses were accepted.

9. Chapter Nine Discussion

9.1 Introduction

This chapter integrates the key findings and represents a detailed discussion of the results. In addition, this chapter primarily focuses on addressing the results of this study in comparison to previous research related to the similar topic investigation in order to find the similarities and differences. This chapter also includes a detailed description about the mediation results that is performed to test the research hypotheses.

9.2 Overview of the study

This study investigates the six knowledge management processes and continuous innovation association within the context of United Arab Emirates (UAE) financial sector. In addition, this includes the mediation impact of the supportive learning environment on association between knowledge management processes and continuous innovation.

Extensive literature search has been carried out in order to have a holistic view on how knowledge processes can influence innovation in organizations. Knowledge processes provide building blocks for new ideas which are necessary for innovative activities and success (Mitchell et al. 2001; Frost 2014). The literature examined the concepts of knowledge management processes, supportive learning environment and continuous innovation from theoretical perspective.

Innovation pertains to the implementation of improved products, services, processes, or methods in business practices (Rathinam 2017; Winter & Silveira Chavez 2017). The role of knowledge processes in innovation is to convert ideas and knowledge into usable and profitable opportunities (Rathinam 2017). Successful implementation of innovation can act as a potential means to improve organizational performance (Tidd & Thuriaux-Alemán 2016). Thus, understanding the capability of innovation in knowledge management processes enables sustainable organizational improvements (Rathinam 2017). In fact, the introduction of innovation within the context of knowledge management can be associated with the organization's learning, productivity, employee collaboration, and information dissemination (Winter & Silveria Chavez 2017).

One of the major outcome of the literature review that has been conducted for this study concluded that although many studies have been conducted to understand different knowledge management empirically and non- empirically, very few studies have looked on how to improve these knowledge management processes from organizational perspective (see chapter four). This led Iqbal et al (2010) to call for further investigation into knowledge management processes adaptation into organizations. He also argues that limited research has been conducted that can provide real insights for organizations that are willing to integrate knowledge management processes and people's personal knowledge. Similarly Bagher et al. (2016) suggest that more research is needed to understand how knowledge management processes can be integrated into organizations. Therefore, this study have looked to fill in this gap by implementing this study at organizational level across all the financial sector in the UAE.

The literature review of this study confirmed that knowledge management can markedly improve innovation in organizations (e.g. Kianto, 2011; Lai et al. 2014; Obediat et al. 2016; Turulja & Bajgorić 2018). Nevertheless, Chapman and Magnusson (2006) points out that the implications of this idea still remain very general as limited research has been conducted to investigate how knowledge management contributes to innovation. To elaborate on this, there are many theoretical assumptions about knowledge management and its role in innovation, however, limited empirical testing has been done (Bagher et al. 2016). Therefore, this study endeavors to close this gap. The expected outcomes and benefits of this thesis are to investigate and establish the relationships between knowledge management processes and innovation, and to similarly provide organizations with conclusions about appropriate practices of knowledge management processes that can enhance innovation.

The first objective of this study was to review existing literature and identify and classify knowledge management processes. Research have acknowledged that one of the major gaps in the knowledge management processes that most of the research focusses on only one knowledge management process, or two knowledge management processes in their studies such as knowledge creating, knowledge sharing and knowledge applying (Majchrzak et al. 2000; Malhotra et al. 2001; Malhotra & Majchrzak 2004; Haas 2006; Robert et al. 2008). Whereas other researchers such as Paul (2006) covered three knowledge management processes in his study. On the other hand, six other studies covered four knowledge management processes (Hung et al. 2010; Kianto 2011; Andreeva and Kianto 2011; Lee et al. 2013; Lai et al. 2014; Bagher et al. 2016). From reviewing the literature review, six processes of knowledge management were proposed in chapter 2. The second objective was to develop an instrument to measure knowledge management processes, supportive learning environment and continuous innovation which was achieved in chapter five. The research instruments were extracted from the literature review. The third objective was to review existing literature on innovation and continuous innovation which was done in chapter 3. The fourth objective to assess and evaluate the supportive learning environment contribution for knowledge management processes and continuous innovation association which was investigated in chapter 7 and chapter 8 and will be further discussed in this chapter. The fifth objective was to test the mediation of supportive learning environment on the association between knowledge management processes and continuous innovation which was proved in chapter 8. The following sections will summarize the findings of the thesis in relation to those objectives.

9.3 Study findings

9.3.1 Descriptive analysis for demographics

The study participants were assistant mangers and above in the financial industry in the UAE who were selected randomly from the seven UAE Emirates and their demographic analysis exposed the number, gender, positions , years of experience of participates in each Emirate and sector they belong to.

Most of the results showed that there are in line with the demographic representation of the UAE. As per Abu Dhabi statistical yearly book 2017 working female percentage is 42 percent of the work force of the total female population aged 15 years and above whereas male are accounting for 77% percent of the total male population aged 15 years and above. The study sample, however, suggested that 39% were female and 61% were male. The female percentage is the sample is very close to the UAE female representation of the working force. Therefore, the female sample is a representation of the UAE population. Whereas, the male sample is 16% less than the actual population workforce. The later might be attributed to the introduction of the mandatory army law in 2017 for males in which many of them where serving the army for a minimum of 9 months. In addition, the statistics also showed the male unemployment have increased since 2017 (Annual economic report 2017).

The later might be attributed that many financial institutions reduced their number of employees. For example according to the UAE Banks Federation's (UBF) annual report, in 2017 several banks in the UAE have reduced the number of operating branches which resulted in terminating over 600 employees. Data revealed that local and foreign banks reduced staff by

1.6 per cent in 2016 from 36,971 to 36,367 by end of December 2017. Local banks laid off 476 employees whereas foreign banks reduced 128 workers. Similarly, other financial institutions such as insurances and exchanges houses have reduced their physical infrastructure and employees because of consolidation, improving cost reduction strategies and shifting to alternate digital channels (UAE Banks Federation 2017). It is also expected that number of employees will reduce in the coming years as financial institutions are more focused on automation which can impact the jobs. Furthermore, many exchanges houses are moving to online and insurances are using mobile applications for their products and services (El Fadi, 2018). Nevertheless, the financial sector is still robust and has strong economic momentum in the country, and 2018 statistics showed better performance on the back of higher oil prices, VAT revenue and better growth across deposits and credits (UAE banks Federation 2017). As per the Central Bank, UAE economy grew 1.5 per cent in 2017 while the IMF expects faster growth in economy in the UAE 2 per cent in 2018 and 3 per cent in 2019.

In addition, the results suggested that the majority of the respondents were working in Dubai 45% followed by Abu Dhabi 21%. Given the federal nature of the UAE, Dubai and Abu Dhabi have more investment opportunities and cash flow. For example, UAE Sovereign Wealth Funds considered as a major player in the financial system and real investment stage. There are six government government-owned investment institutions (Abu Dhabi Investment Authority, Abu Dhabi Investment Council, Mubadala Development Company, International Petroleum Investment Company, Dubai World and Dubai International Capital). All of these institutions are responsible to invest Dubai and Abu Dhabi funds on the behalf of the Government (Annual economic report 2017).

In addition, the Abu Dhabi and Dubai are the key players in funding partially the federal government in the UAE. In fact, there is an agreed amounts to the federal budget provided by both emirates of Abu Dhabi and Dubai every year. In addition, Abu Dhabi by itself responsible to cover all the security and defense expenditures which is a federal responsibility. The federal government's own resources, based on fees and other revenue (including royalties and dividends from Etisalat, a public company) amount to about 75 percent of its total revenue (IMF 2017). Therefore, most of the financial institutions are operating in Dubai and Abu Dhabi which justify the sample of this study. Emirates of Sharjah, Fujairah, Ras Al-Khaimah, Umm Al-Qaywayn, and Ajman have less economic development than Dubai and Abu Dhabi. Therefore, they will require less financial institutions. Furthermore, it is a common practice that people working in Dubai and Abu Dhabi while living in neighboring emirates due to high rents and increasing education fees.

9.3.2 Inferential statistics

Several statistical processes took place in order to answer the research questions for this study. Several hypotheses were developed and results concluded either to accept or reject those hypotheses as shown in Table 9.2 and evidence of the tests of acceptance and rejections of the research hypotheses is illustrated in Figure 9.1.

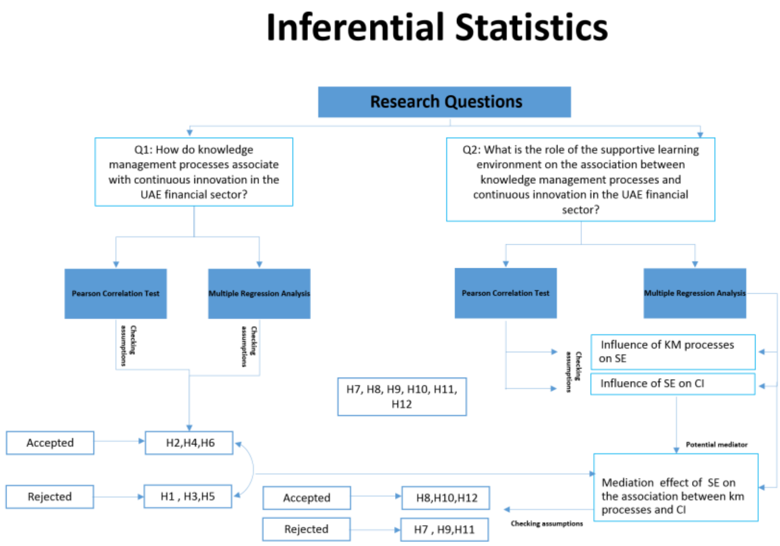


Figure 9.1 Updated analystical procsess for inferential statistics

Research questions	Research hypotheses	Hypotheses accepted /rejected
Q1: How do knowledge management processes associate with continuous innovation in the UAE financial sector?	H1: Creating knowledge process will associate with continuous innovation in the UAE financial sector.	Rejected
	H2: Capturing knowledge process will associate with continuous innovation in the UAE financial sector.	Accepted

	H3: Organizing knowledge process will associate with continuous innovation in the UAE financial sector.	Rejected
	H4: Storing knowledge process will associate with continuous innovation in the UAE financial sector.	Accepted
	H5: Disseminating knowledge process will associate with continuous innovation in the UAE financial sector.	Rejected
	H6: Applying knowledge process will associate with continuous innovation in the UAE financial sector.	Accepted
Q2: What is the role of the supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector?	H7: Supportive learning environment mediate the association between creating knowledge process and continuous innovation in the UAE financial sector.	Rejected

	H8: Supportive learning environment mediate the association between capturing knowledge process and continuous innovation in the UAE financial sector.	Accepted
	H9: Supportive learning environment mediate the association between organizing knowledge process and continuous innovation in the UAE financial sector.	Rejected
	H10: Supportive learning environment mediate the association between storing knowledge process and continuous innovation in the UAE financial sector.	Accepted
	H11: Supportive learning environment mediate the association between disseminating knowledge process and continuous innovation in the UAE financial sector.	Rejected
	H12: Supportive learning environment mediate the association between applying knowledge process and	Accepted

	continuous innovation in the UAE financial sector.	

Table 9.2 Verification of study hypotheses

Based on the inferential statistics, the research conceptual model was modified as shown in figure 9.2

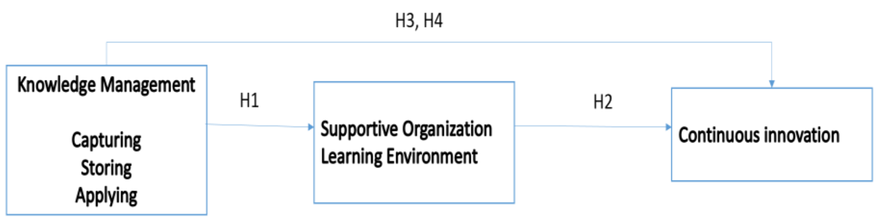


Figure 9.2 Updated research conceptual model

9.3.2.1 Knowledge management processes and continuous innovation

Innovation is generally defined as the development or creation of something new, whether an idea, concept, product, or service (Seaden 2003). Prior research suggests that explicit and tacit knowledge promotes innovation in organizations (Hall & Andriani 2003). It should be acknowledged that understating the role of knowledge in enhancing innovation efforts within the organizational context is important. Nevertheless, few studies have investigated the correlation between knowledge management and innovation. In addition, the literature suggests that the interest in tacit knowledge has also grown in the technological innovation field, with knowledge as a main driver for innovation (Dosi 1988; Senker 1995; Howells 1996). Thus, firms start to include innovation and knowledge into their research especially from projects and organization perspective.

In analyzing the significance relation among researches constructs, the correlation matrix statistical method was used. Both Pearson Correlation test and Multiple Regression Analysis were carried out to test if knowledge management processes and continuous innovation are related. Pearson Correlation test and Multiple Regression Analysis revealed that three knowledge management processes correlated with continuous innovation. Therefore, it was concluded that the research hypotheses H2: "Capturing knowledge process will influence continuous innovation in the UAE financial sector." H4 "Storing knowledge process will influence continuous innovation in the UAE financial sector"; and H6 "Applying knowledge process will influence continuous innovation in the UAE financial sector" are accepted.

9.3.2.1.1 Knowledge capturing and continuous innovation

Previous research found that knowledge capturing in business processes also entails to gathering of information from various databases and research (de Souza et al. 2018). For instance, marketing initiatives heavily involve capturing feedback from customers, as well as interacting with organizations, to determine subsequent actions (De Souza et al. 2018). The feedback from the customers serves as a database through which analytic warehousing and capture processes are highlighted (de Souza et al. 2018). Thus, knowledge capture is integral in knowledge management.

Research is important in any organization that focuses on innovation. Surveys are one of the most preferred research methodology in knowledge capturing (Williams et al. 2015). In further alignment with the research finding, Brunswicker and Vanhaverbeke (2014) asserted that R&D sources such as universities, research labs, or suppliers are critical in an organization's knowledge management capturing process in such a way that these provide a plethora of sources from which knowledge and information can be obtained. The later found to be in alignment with the research findings.

Similar research results has been confirmed by Andreeva and Kianto (2011) who concluded that in order to promote innovation in organizations, managers should pay close attention and facilitate the knowledge capturing. Additionally, researchers such as Cohen and Levinthal (1990) and Zahra and George (2002) studies suggested that it is very critical that organizations seek to capture useful knowledge and have the mechanisms to do so. In addition, these studies also concluded that organizations need to have the skills of know how to identify what is important and useful in external environment and capture this knowledge in order to be more innovative. The later findings were in line with this research.

The results of this research confirmed that capturing knowledge process will influence continuous innovation in the UAE financial sector are consistent with previous research, for example, an empirical evidence presented by Zhou and Uhlaner (2011) in which they found out that knowledge capturing increases innovativeness of the organizations. Their extensive study of 649 organizations suggested that senior management should focus on capturing the knowledge externally which in turn leads to better innovation. Similarly, Chang and Lee (2008) and Deng et al. (2008) also agreed with Zhou and Uhlaner (2011) findings. In addition, Darroch (2005) concluded that knowledge capturing have a positive impact on organizational innovation. In addition, Kianto (2011) found positive relationship between knowledge capturing and continuous innovation.

This research reinforce the views expressed by Parra-Requena el at. (2013) rich empirical study that has a sample of 166 firms concluded that the acquired knowledge must be developed in order to promote successful innovations. However, their study findings found that there is association between knowledge capturing and innovation. Nevertheless, their study also suggests that having the right capabilities in the organizations can help them to improve capturing knowledge from external networks. Consequently, it is critical that organization need to focus on developing the later in order to promote innovation.

In line with this thinking, Leiponen and Helfat (2010) suggest that innovation advantage is not only limited to organization's internal resources but rather to its capacity to identify valuable external knowledge and incorporate it into its own innovation process. Therefore, within this context knowledge capturing is critical and associates with innovation. Nevertheless, capturing knowledge from external sources does not translate to innovation, organizations should develop certain capabilities in order to integrate this knowledge and apply it in order to generate innovations. March (1991) argues that organizations usually face innovation obstacles when seeking to develop a new product, as this process requires exploration, using existing knowledge or external knowledge (Leonard-Barton 1992; Moorman & Miner 1997). An interesting argument about innovation is the use of external sources of knowledge. March & Stock (2006) argue that integrating knowledge from internal sources is critical and important to solve issues during the innovation process and new product development.

In a study focused on enhancing the potential of knowledge management, Frezatti et al. (2017) explored the relationship between the intensity of innovation and the use of interactive and diagnostic management controls of an organization. The sample consisted of 121 Brazilian companies. Based on the structural equation modeling, Frezatti et al. (2017) found that management control systems (MCS) are able to (a) enhance utility of external influences on the intensity of innovation, (b) confirm the use of MCS in an emergent country, and (c) highlight the role of interactive MCS on innovative control. These results showed that external knowledge – that is, information gathered from external resources of the organization – can have benefits on the internal improvement of organizations (Frezatti et al. 2017).

However, the findings of the Oerlemans et al. (1998) in the Netherlands and Freel (2003) in the UK do not support the previous research in which they found that capturing knowledge from external sources has limited impact on innovation unlike the internal resources. This was not the case in this research.

In further alignment with this research, Aboelmaged (2014) in which his study covered sample of 124 firms pointed out that managers need to facilitate dynamics of knowledge capturing such as having tools to capture knowledge, encouraging the employees to share new ideas and then utilize it for a better level of innovation performance. Lai et al. (2014) correlation and regression analysis of their study in investigating the knowledge capturing and innovation suggested that there is a strong association. Their findings also suggest that some employees fear sharing new ideas because they want to avoid uncertainty, a cultural characteristic which is rooted to some extent in the individual's national culture. Therefore, managers and supervisors should encourage employees for unconventional ideas in order to put those ideas into bigger context and the final value of the ideas can emerge to have better innovation performance. Drawing on these arguments, it can be concluded that H2: "Capturing knowledge process will influence continuous innovation in the UAE financial sector" is in line with the majority of the previous studies.

9.3.2.1.2 Knowledge storing and continuous innovation

Storing refers to the process in which knowledge is retained through various means. This research found that there is a strong association between knowledge storing and continuous innovation in the UAE financial sector. This notion is consistent with and builds on some of the earlier work in this area. For example, Alegre et al. (2011) study revealed that knowledge storing has a very strong association with innovation. They argued that mangers should focus on knowledge storing as an important practice in the organization. Therefore, managers should focus on integrating certain practices such as refining knowledge and documenting lesson learnt when formulating the organization's strategy. The later will help the employees to think in innovative ways in doing future work and have solid information about what was done in the past and expected risks.

Similarly, Basham (2007) further explained that how one visualizes intangible objects and boundaries could help in the orientation, compartmentation and organization of common world knowledge as well as to be able to see and interpret new ideas and create concept relationships with in the human mind. Therefore, tools and computer technology that allow knowledge organization and storage may be foundational to an organization's knowledge management processes. Effective organization and storing of knowledge also contributes to critical business decisions and task performance (Becerra-Fernandez & Sabherwal 2010). Within the context of an information society, people, enterprises, and public administration use information and communication technologies (ICT) to rationally manage information for the effective and efficient achievement of their goals (Zelazny 2015). Such technology is vital in highlighting the knowledge management competence of an organization in terms of organization of data (Migdadi & Abu Zaid 2016). Information systems aid in how organizations store and organize knowledge to be used for future projects and decision making (Christie Hui-chuan & Cates 2018). For instance, human resource department may use information system in segregating the different types of documents of one person (Karami et al. 2015).

Folder structures, meta-data, and file format can be used to design a simple information system for human resources. This way, not only is easy access provided for the personnel; this also lessens the amount of time needed to look for documents because key words may be use for searching such knowledge. All of these practices of knowledge storing can help in promoting innovation which is confirmed by this research findings and similar to other research studies (Andreeva & Kianto 2011; Lee et al. 2013; Lai et al. 2014). It is encouraging to compare these findings with that found by Gloet and Terziovski (2004) who found that knowledge storing contributes to innovation performance when a simultaneous approach of “soft HRM practices” and “hard IT practices” are implemented.

Whereas; in contrast to the research fining, Kianto (2011) study found that knowledge storing was correlated with all aspects of continuous innovation but negatively. The later might be attributed, as argued by Kianto (2011), to lack of technological advances that could help the organizations in storing of explicit knowledge in databases and manuals that can help in establishing innovation. Indeed, recent technological advances have revolutionized the way people communicate and do business (García et al. 2017). In this study knowledge storing is found to be positively correlated with innovation. The accessibility of information because of the Internet enables sharing of ideas, thoughts, storing, and innovations. Organizations can benefit from this open communication by adopting strategies that utilize the advantages of technology (García et al. 2017).

Bhatt (2001) argued that an organization can face major challenge to retain its competitive advantages, innovativeness, and creativity, if the needed knowledge has not been made easily available in right kind of a format and storage. Therefore, all the knowledge that has been captured should be stored and documented, else an organization is constantly in danger of accidentally losing the gained knowledge (Stein & Swass 1995). The process of storing knowledge can be linked to the organizational memory. The organizational memory can be found in many forms, such as written documents, electronic databases, codified knowledge in expert systems, documented organizational procedures and processes, and tacit knowledge located in individuals (Alavi & Leidner 2001). This study results correspond with the findings from previous work on the relationship between knowledge storing and innovation. For example, Storey and Kelly (2002) found that organizations that have proper storing of knowledge can have better innovation performance than the one who does not.

When experienced employees transfer knowledge to new employees, the new employees can then use that knowledge as a tool to apply to their work; additionally, newer employees lend “fresh” and innovative perspectives to organizations that can then be strengthened by the expert insight of experienced employees. The knowledge transfer can not happen if there is no proper knowledge storing system. Other researchers have highlighted the necessity of intellectual capital, which includes retained knowledge, within the structure of an organization due to its association with operational strategy and firm innovation (Kalkan et al. 2014). Conversely, lost knowledge from not having proper practices for knowledge storing, may negatively affect organizational innovation (DeLong 2004). Therefore, organizations need to construct appropriate strategies, knowledge structure, and culture that allow the right practices of knowledge storing. In addition, recognizing the critical role of senior management can lead to methods and procedures to promote knowledge storing in the organization (Akavan & Zahedi 2014).

It is critical that lesson learnt from previous projects are documented and retained in order to help them in innovation processes. This is because every aspect of the innovation process can be affected by the presence or absence of retained knowledge and insights which comes from knowledge storing; for example, the phase of innovation where an idea is generated can be informed by processes used in the past to generate ideas, or past ideas and solutions related to the problem an organization is currently trying to solve (Szymczyk & Kaminski 2014). Thus, the development of new innovations should always include an exploration of retained knowledge that may be relevant to the creation of new ideas, services, and/or products. The later findings are in line with this research in which more than 50% of the respondents agreed that their organizations document and keep things that are learnt in practice.

This study findings also agreed with the findings of Bagher at el. (2016). For their study 277 participants were part of their investigation. The obtained results showed that knowledge storing has a positive effect on organizational innovation. The results of this research also show that knowledge storing influences organizational innovation.

The findings suggest that knowledge storing has a significant and positive effect on innovation which are in line with the findings of Hung et al. (2010). The study of Hung et al. (2010) examined how knowledge management initiatives including knowledge storing, total Quality Management- TQM and innovation performance are associated. A survey was carried out for this study in which 223 managers from 1139 Taiwanese high-tech companies were part of the study. The study employed structural equation modelling technique. Findings were that knowledge management storing is positively associated with both TQM and innovation performance.

It can be concluded that the result of this study is in line with the findings of Lee et al. (2013) in their research entitled " Knowledge management: a key determinant in advancing technological innovation?". The study analyzed the relationship between knowledge management (KM) and technological innovation in the Malaysian manufacturing sector in which 162 manufacturing firms provided the empirical data needed. They found that knowledge storing has positive relationship with innovation.

In another study, March and Stock (2006) investigated the relationships among knowledge storing, knowledge interpretation, integration of prior knowledge, and new product development performance. Similarly, to the findings from this research, it was found that knowledge storing and interpretation activities have a positive influence a firm's new product development performance (March & Stock 2006). These studies demonstrated the positive impact of proper knowledge management of storing on innovation. Therefore, it can be said that the results of knowledge storing on continuous innovation is in synchronization with the previous studies found.

9.3.2.1.3 Knowledge applying and continuous innovation

Knowledge application is the utilization of available tacit or explicit knowledge in the decision-making processes or the performance of tasks (Becerra-Fernandez & Sabherwal 2010). Many researchers have acknowledged that this stage often requires the most decision-making and action to be taken by organizational leaders (Gover & Davenport 2001). Findings from this research confirmed this view and articulated that knowledge management processes incorporating capturing, storying and applying were deemed important in the UAE context. Prior research acknowledged that knowledge applying and innovation are linked. Indeed, the findings of the current study are consistent with those of Chen and Huang (2009) study of 146 organizations which indicated that knowledge applying is positively related to innovation performance. They have argued that strategic human resource practices are important to help in knowledge application elements such as designing performance appraisal systems that encourage knowledge practices and evaluate the employees based on them is a critical criterion for the appraisal. Designing reward and compensation systems which has elements of rewarding proactive knowledge behavior is critical (Hunter et al. 2002; Currie & Kerrin 2003).

This finding is in agreement with Andreeva's and Kianto's (2011) findings which showed that knowledge application is associated with continuous innovation. They elaborated that organizations need to focus on developing methods to analyze and evaluate knowledge to generate new patterns for future use which can impact innovation positively. Similarly, this study agrees with Lin et al. (2012) study in which they found that knowledge applying is positively related to innovation. This research finding also corroborates the ideas of Aboelmaged (2014), who suggested that that knowledge applying and innovation have strong association. However, he argued that application of knowledge should have four main central criteria in order to have a successful innovation including 1) IT strategy; 2) IT processes; 3) Project management and 4) technological complexity which are in line with this research findings.

The findings of this research are in line with results of other studies that show how knowledge applying is related to continuous innovation. Elaborating on the importance of innovation management and the applying of knowledge management, Tidd and Thuriaux-Alemán (2016) evaluated the use of eight functional groups of innovation management practices (IMPs) in different sectors. A total of 292 respondents were validated. Results of the survey analysis showed that the use of innovation management practices and innovation outcomes are positively related (Tidd & Thuriaux-Alemán 2016). Furthermore, external technology intelligence gathering, and technology portfolio management were considered to be universally and positively related to innovation management practices (Tidd & Thuriaux-Alemán 2016). These studies suggest the important role of management and application of innovation to properly utilize knowledge management within the organization especially the knowledge applying (Tidd & Thuriaux-Alemán, 2016; Rathinam 2017). The findings observed in this study mirror those of the previous studies of Rathinam (2017) and Tidd & Thuriaux-Alemán (2016) that have examined similar phenomena.

The findings of the current study are consistent with those of Ramírez and Kumpikaite (2012) who provided an empirical evidence of how knowledge management processes including creation, transferring and applying could influence business innovation and improve the organizational performance. For their study a sample of 160 organizations of 10 European countries (Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Poland, Spain and United Kingdom). Their study's results confirm that 1) knowledge management including knowledge applying have a positive effects on business innovation and organizational performance. In addition, Ramírez and Kumpikaite (2012) results suggested that knowledge applying could possibility have a greater impact on innovation if mangers provide proper training to their employees about proper usage of knowledge applying and how they have use it for better innovation.

This study produced results which corroborate the findings of a great deal of the previous work in this field. For example, Abdi and Senin (2015) carried out a study to the consequence of knowledge management on innovation. A total of 272 managers were chosen for their study in Iranian automotive industry. A Structural Equation Modelling (SEM) was used in order to analyze the results. Their study have used the six dimensions of knowledge management which are similar to the one which have been used for this research. These components are: knowledge creation process, knowledge capture process, knowledge organization process, knowledge storage process, knowledge dissemination process, knowledge application process. The study of Abdi and Senin (2015) suggested that knowledge management processes have influence on organizational innovation in Iranian automotive industry. Also, their results indicated that knowledge applying and knowledge storing have a greater influence on innovation.

However, the findings of the current study do not support the previous research of Byukusenge et al. (2016). The purpose of their study was to investigate if knowledge management three dimensions of knowledge acquisition, knowledge sharing and knowledge application can lead to innovation in Rwandan Small and medium enterprises (SMEs). The study found out that only knowledge sharing may lead to innovation whereas knowledge applying and knowledge acquisition have no influence on innovation in Rwandan SMEs.

In accordance with the present results, previous study by Cantner el al. (2009) have demonstrated that knowledge applying have direct positive impact on innovation. In addition, their study results suggested that organizations that apply knowledge have performed better in innovation compare to the organizations that did not apply knowledge.

In addition, this finding is in agreement with Obeidat el at.'s (2016) findings which showed there is a significant positive association between knowledge application and innovation. Obeidat el at. (2016) research examined the influence of knowledge management processes including: knowledge acquisition, knowledge sharing and knowledge application and knowledge management approaches including: social network, codification and personalization on innovation in Jordanian consultancy firms. A survey was carried out for their research with a sample of 216 participants in which descriptive statistics and multiple regression analysis were employed to test the research hypotheses. Drawing on these arguments, it can be concluded that H6: Applying knowledge process will influence continuous innovation in the UAE financial sector." is in accordance with findings reported in previous studies.

9.3.2.2 Supportive learning environment role on the association between knowledge management processes and continuous innovation.

This study investigated and tested the mediating effect of supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector. The findings from correlation analysis indicated that supportive learning environment was positively and significantly correlated with the continuous innovation variable. In addition, supportive learning environment has a strong positive association with knowledge management processes variable.

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The mediation testing findings indicate that mediating effect of supportive learning environment on the relationship between knowledge management processes and continuous innovation in the UAE financial sector satisfies the conditions of mediation as pointed out by Baron and Kenny (1986). The first condition is to establish that the independent variable, (capturing, storing and applying), influences the mediator, supportive learning environment. Result shows that capturing, storing and applying have a significantly positive relationship with supportive learning environment, which supports the first condition for mediating effect. Then, the relationship between the independent and the dependent variable shows that capturing, storing and applying have a significantly positive relationship with continuous innovation, also supporting the second condition. Lastly, the mediator, supportive learning environment was included in the models to examine whether it reduces the effects of the antecedents. Mediation occurs if the effects of the antecedents on the continuous innovation are reduced in the presence of the mediator. Results show that capturing, storing and applying has a significantly positive relationship with continuous innovation, and, supportive learning environment has a significantly positive relationship with continuous innovation. The significance of the direct effect of capturing, storing and applying on continuous innovation decreases when this study considers the indirect effect of capturing, storing and applying through supportive learning environment in a total effect model. These results reveal that supportive learning environment plays a mediating role between capturing, storing and applying and continuous innovation (Baron & Kenny 1986), supporting the partial mediation effect proposed in H8, H10 and H12. Indeed, all paths remained statistically significant supporting a partial mediation effect.

The study's conceptual model for examining the role of supportive learning environment in (capturing, storing and applying) and continuous innovation. The results of this study indicate that capturing, storing and applying are positively related to supportive learning environment, which in turn is positively related to continuous innovation. The present evidence capturing, storing and applying leads to increased supportive learning environment and the indirect path through supportive learning environment resulted in a higher level of continuous innovation. Therefore, the findings show support for the partial mediating role of supportive learning environment in the relationship between (capturing, storing and applying) and continuous innovation. The key point is that capturing, storing and applying works its beneficial effects on continuous innovation through the level of supportive learning environment.

Previously, empirical research have acknowledged that there is a strong association between knowledge capturing, storing, applying and continuous innovation (Huang & Li 2009; Hung et al. 2010; Andreeva & Kianto 2011; Martinez-Canas et al. 2012; Lee et al. 2013; Lai et al. 2014; Bagher et al. 2016). The conceptual framework and literature suggested that knowledge management processes contributing positively in increasing innovation. The research findings of this thesis clearly confirm and support this statement. The findings provide an answer to the first research question, knowledge management processes associate with continuous innovation in financial sector in UAE.

In addition, the finding of this research answered the second research question which was about the role of the supportive learning environment on the association between knowledge management processes and continuous innovation in the UAE financial sector. One of the major outcomes of this research found that supportive learning environment will partially mediate the relationship between the three knowledge management processes (capturing, storing and applying) and continuous innovation. Therefore, it is critical that top management provide the goals and essential support in all aspects of these knowledge processes and activities. In addition, the top management should provide the employees with all the resources to ensure successful implementation for the knowledge processes (Skyrme & Amidon 1997; Wong & Aspinwall 2005).

In addition, the top management should promote supportive learning environment in order to increase the effect of the relationship between knowledge processes and continuous innovation. Garvin et al. (2008) argue that organizational routines such as openness to new ideas and supportive learning environment can help in promoting knowledge capturing, storing and applying practices. For example, an interesting concept that linked supportive learning environment to storing is transactive memory systems which was originally introduced by Wegner (1986). This concept is used to describe a shared system that people in close relationships develop for encoding, storing and retrieving information from different sources. It has been argued that knowledge storing is more efficient in a group level than individuals. A interesting study carried out by Carley and Argote (2006) investigated the association between transactive memory and group performance in different types of environments . They have argued that organizations that have supportive learning environment have better transactive memory practices than the one who does not. In addition, Ranjbarfard et al. (2014) research findings declared that lack of supportive learning environment can act as a major barrier in knowledge storing, applying and capturing. This research finding is in line with previous research.

Hall and Andriani (2003) carried out a study in innovative organizations to investigate the relationship between inter-organizational innovation and knowledge gaps. Another study by Jang et al. (2002) found that relationship do exist between knowledge and innovation activities. However, the studies failed to understand the impact of this relationship on innovation success implementation innovation. Maybe introducing a mediator such as supportive learning environment can explain the research gap in Jang et al. (2002).

Knowledge management and its processes are potentially beneficial to innovation when used properly (Bagher et al. 2016; Frezatti et al. 2017). The success of an organization lies on its ability to utilize and integrate leadership, innovation, and knowledge management in its system and policy (Bagher et al. 2016). Uncertainty and the increasing technological change can easily influence the intensity of innovation within a firm (Bagher et al. 2016). In addition, the culture within an organization may influence utilization of knowledge management processes (Tahnnhuber et al. 2017), thereby affecting organizational innovation (Bagher et al. 2016; Frezatti et al. 2017). Specific knowledge management practices may contribute to enhanced organizational innovation (March & Stock 2006). If knowledge management is undertaken with the intent of enhancing organizational innovation, it is essential that the correct information is managed and retained. Thus, researchers have explored effective knowledge management processes that result in organizations having the most pertinent and readily-applicable retained knowledge available when it can be of use (Alavi & Leidner, 2001; Garvin 1997; Gover & Davenport 2001) such as during the innovation of new products.

The creation of innovative cultures is best done through context-specific means and deep investigation of existing organizational structures (Alexiev et al. 2016; Reichert et al. 2016). Building on recent research on how best to measure innovation within public sector organizations, Arundel et al. (2016) found that contextual limitation continued to prevail in the single-method of developing organizational cultures of innovation in learning environments (universities) and that context-specificity is key. The questionnaire developed by Arundel et al. (2016) used a hybrid methodology that combined a subject approach, consisting of general questions on innovative activities, and an object approach that asked series of focused questions on single most important innovations. The questionnaire was sent to 1,732 senior managers at 45 universities around the world, with a response rate of 37.8 percent being realized (Reichert et al. 2016). It was found that large differences exist across universities in how cultures of innovative inclusion and innovative thinking are created (Reichert et al. 2016). In addition to this, econometric analyses in the study presented that support for an inclusive innovation culture can enhance and increase the use of best-practice methods for innovating and can also decrease the likelihood under-performing innovation. Nonetheless, the study concluded that providing support for an inclusive innovation culture has no impact on new innovations (Reichert et al. 2016). The later study findings is not in line with this research findings.

The current competitive climate among organizations also reflects the importance of knowledge management and innovation (Tidd & Thuriaux-Alemán 2016; Murthy 2017). As such, Murthy (2017) proposed several frameworks through which firms can integrate innovation and intellectual property to sustain the organization’s competitiveness. Murthy (2017) elaborated on the innovation framework, which includes the following processes: (a) strategy, (b) leadership, (c) processes, (d) execution, and (e) culture. In essence, this framework ensures the legal protection of inventions in the company, and as such, organizations can fully enjoy the benefits of IP protection available (Murthy2017). These results reflect the critical role of knowledge management in protecting and sustaining innovation practices within the legal framework (Murthy 2017). This is especially important due to the increasing competition in the business paradigm. The work of Murthy (2017) is in line with this research findings.

9.4 Chapter summary

This chapter has so far presented the results of this research. This chapter started with presenting an overview of the study as this research has sought to investigate the six knowledge management processes and continuous innovation association within the context of United Arab Emirates (UAE) financial sector. In addition, this includes the mediation impact of the supportive learning environment on association between knowledge management processes and continuous innovation. The chapter also answers the research questions and validated the proposed research hypotheses.

This chapter then moved to discuss the results of association between knowledge management processes and continuous innovation. It was found that only three knowledge management were associated with continuous innovation including capturing, storing and applying. The study results were compared with the results of similar studies in the literature, it was found that the findings of this research are consistent with the studies in the literature. The chapter concluded with a discussion of the partial mediation effect of the supportive learning environment on the association between knowledge management processes (capturing, storing and applying) and continuous innovation.

Chapter 10: Conclusions and recommendations for future research

10.1 Introduction

This chapter starts by explaining the robustness of the methodology which is used to achieve the aims and objectives of this study. It then moves to represent in detail how each objective have been accomplished and linked to findings. After that, the research implications are covered in this chapter. Later, the chapter discusses the study's contribution to knowledge. This chapter concludes with the study limitations and future research recommendations.

10.2 Robustness of the methodology

The researcher took into consideration the importance of selecting a suitable research and data collection methods and followed a formal research strategy as presented in chapter five. The study methodology was based on extensive literature review and survey. Besides, literature review was used to synthesize existing knowledge in order to identify gaps of knowledge in the proposed research area and to confirm research questions and objectives. The knowledge gaps found in the literature in this study have been used to develop the research conceptual model and study hypotheses.

In addition, using the comprehensive literature review, the study questionnaire has been adopted from existing surveys. In addition, the questionnaire was self-administered in order to address the research questions and collect the primary data. In addition, a pilot study was carried out in order to refine the questionnaire in terms of understanding questions and statements. To do so, the questionnaire was validated by six people included industry's experts, PhD fellow students and academics in order to get their professional feedback and assure that the questions are clear and easy to understand.   In addition, the collected data were checked for errors, completeness and consistency. Finally, several robust statistical methods were used to prudently analyze and statistically test the research hypotheses. Appropriate statistical tools have been adopted to analyses the survey results including descriptive statics, Pearson correlation and Multiple Regression Analysis. There were a number of strengths in the research methodology such as: high reliability of the survey's scale, selection of survey respondents and methods used to analyze the data. In conclusion, the research methodology strengths could be summarized in the following:

- The theoretical background of this research was developed on an extensive and systematic literature review.
- Based on the existing literature gaps found, a comprehensive conceptual model was developed in which all the knowledge management six processes were included and identified their association with continuous innovation. In addition, the mediator choice was based on theoretical basis.
- The study constructs and variables were extracted from peer reviewed publications.
- Data was validated for consistency and reliability.
- Hypothesis testing was based on proven and validated methods
- The study also followed a systematic approach for data analysis and verification of scale validity and reliability. In addition, the assumptions for all the tests were also investigated and they were satisfied.

10.3 Accomplishment of research objectives

The first objective of this research *is to review existing literature review and identify and classify knowledge management processes*.

This objective is achieved through performing a comprehensive literature review that is narrowed down gradually. The review starts with knowledge management, its definition, types, sources, knowledge management cycle, strategies and processes. Then, this is narrowed down to review the previous studies that included the knowledge management processes. Therefore, six knowledge management processes were identified including creating, capturing, organizing, storing, disseminating and applying. In accomplishing this objectives this study has reached the following conclusions:

- knowledge is defined as per Nonaka (1994) and Huber (1991) in which they viewed knowledge as a justified belief that increases an entity's capacity in order to take effective action.
- Knowledge is classified as either explicit or tacit knowledge.
- There are five sources of knowledge as proposed by Davenport and Prusak (1998).
- Knowledge Creation Cycle is best understood by the pioneering research developed by Nonaka and Takeuchi (1995) called Socialization, Externalization, Combination, and Internalization (SECI) model.
- "Knowledge management is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning, and decision making". Gupta, et al.(2000, p17).
- Knowledge management processes including: (a) creating, (b) capturing, (c) organizing, (d) storing, (e) disseminating, and (f) applying. Each of these process are defined in Chapter 2.
- There are several critical success factors for knowledge management and its processes including but not limited to incentives, system of exchange knowledge, culture, collaboration, communication, technology infrastructure, top management support, content quality, budgetary support, strategic focus and top management involvement.

The second objective of this research is *to review existing literature on innovation and continuous innovation*. It starts with defining innovation, explaining the term newness to innovation and the difference between creativity and innovation. It then provides a detailed approach of innovation processes and types of innovation. The concept of continuous innovation, the difference between innovation and continuous innovation, the difference between continuous innovation and continuous improvement are explained. Then, the state of the theory on continuous innovation is also highlighted. In accomplishing this objectives this study has reached the following conclusions:

- Innovation definition is adopted from Gibbons et al. (1994): innovation could be defined as the application of new ideas for the organization, irrespective of whether these ideas are related to products, processes, services or organizational, administrative or commercial systems, capable of generating positive changes that increase the organization's competitiveness.
- A clear distinction has been made between creativity and innovation.
- Innovation has a clear process in the literature.
- Innovation has three types including product innovation, process innovation and organizational innovation.
- There are several factors that influence the organizational innovation including shared vision and leadership, appropriate structure, key individuals, effective team working, stretching individual development, extensive communication and ect.
- Several models of innovation have been reviewed and compared.
- Diffusion of innovation has been reviewed and discussed in details with a reference to Rogers (2003) model.

- Continuous innovation is “the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, or .exploitation and exploration” (Boer & Gertsen 2003; pp.806).
- The difference between innovation and continuous innovation is covered and acknowledged.
- The state difference between continuous improvement and continuous innovation is highlighted.
- Continuous innovation can be understood based on knowledge-based view (KBV).
- There are several factors affecting continuous innovation including but not limited to network structure, change facilitation, and top down and bottom up.

The third objective of this research is *to develop an instrument to measure knowledge management processes, supportive learning environment and continuous innovation*. Each one of these research components has it is own definition and own measurement that are extracted from literature as described in Chapter Five . In accomplishing this objectives this study has reached the following conclusions:

- Knowledge management processes has six processes including creating, capturing, organizing, storing, disseminating and applying. Creating knowledge process has six items based on Lawson (2002) and Andreeva & Kianto (2011) work. Capturing knowledge process includes seven items based on Lawson (2002) and Kianto (2011) work. Organizing knowledge process has six items based on Lawson (2002) and Kianto (2011) work. Storying knowledge process has six items based on Lawson (2002) and Andreeva & Kianto (2011) work.

Disseminating knowledge process includes six items based on Lawson (2002) and Park (2006) work. Whereas applying knowledge process has six items based on Lawson (2002); Park (2006) and Andreeva & Kianto (2011) work.

- supportive learning environment consists of seven items based on Garvin el at. (2008) work.
- Continuous innovation has 12 items based on Saunila (2016) and (2017) work.

The fourth objective of this research *is to critically investigate the relationship between knowledge management processes and the continuous innovation in the UAE financial sector*.

The research was carried out with the objective to empirically investigate the association between knowledge management processes and continuous innovation in the UAE financial sector. In accomplishing this objectives this study has reached the following conclusions: Significantly positive association between knowledge management processes and continuous innovation in the UAE financial sector.

- Only three knowledge management processes were associated with continuous innovation in the UAE financial sector including capturing, storing and applying.

The fifth objective of this of this research *is to examine the mediating impact of the supportive learning environment on the relationship between knowledge management processes and continuous innovation in the UAE financial sector*. Test the proposed conceptual model in which supportive learning environment, mediator can fill the gap between the association between knowledge management processes and continuous innovation in the UAE financial sector. In accomplishing this objectives this study has proved by the empirical results that supportive learning environment partially mediate the relationship between three knowledge management processes and continuous innovation in the UAE financial sector.

The sixth objective of this research *is to propose knowledge management model that could be used to enhance existing innovation practice in the UAE financial sector*. In accomplishing this objectives this study has developed a model based on the literature review and tested the model empirically in the UAE financial sector. Based on the results of this study, it was found that out of six knowledge management processes proposed in the original model, only three knowledge management processes were found to be associated with continuous innovation in the UAE financial sector including capturing, storing and applying.

10.4 Key research implications

This research provided empirical evidence for the association between knowledge management processes and continuous innovation in the UAE financial sector. In addition, it further demonstrated the statistical significance of the influence of the mediation effect of the supportive learning environment between the association between knowledge management processes and continuous innovation in the UAE financial sector.

The implication of this research finding is two fold, first it provides guidance for management in UAE financial sector on the most important knowledge management processes that can influence continuous innovation. Second, the research introduces a unique conceptual framework that combines all the six knowledge management processes and continuous innovation with the supportive learning environment in presence. Therefore, it can trigger researchers and academics to test and verify the model in different sectors for generalizability of study results.

10.4.1 Practical implications

This research found that knowledge management processes including capturing, storing and applying can positively enhance continuous innovation in the UAE financial sector. This finding suggests that supportive learning environment can enhance this association. According to Serrat (2017), the building of learning and knowledge structures is the key to success. This is true for both individual projects, as well as within ongoing organizational structures as a whole. Serrat (2017) argued that this knowledge should be continuously enriched, and done so through both internal and external learning environments within organizations. For this to happen in the modern workplace and employment structures, it is necessary to support and energize members of an organization's, people, knowledge, and technology that fosters learning should be present within entire organizational strata (Serrat 2017). Therefore, management should pay more attention on how to promote positive supportive learning environment which in turn can help strengthen the relationship between knowledge management processes including capturing, storing and applying can positively enhance continuous innovation in the UAE financial sector. To be a learning organization it is significant that personnel must be proficient in generating, attaining, sharing and communicating the knowledge (Garvin et al. 2008). It is essential for an organization to be flexible for learning that there should be encouraging learning environment, real and physical learning progression and leadership that strengthen the learning (Garvin et al. 2008).

From a practical and prescriptive point of view, the results provide evidence that organizations should manage carefully and stimulate knowledge management processes in order to reinforce innovation activities. Knowledge management can boost the innovation as well as output performance of organizations in UAE financial sector. Therefore, management should focus on how to structure the best knowledge management processes and how to implement them effectively and efficiently in order to promote innovation. In addition, the management should attempt to upgrade knowledge and technical management capabilities in order to promote innovation among employees.

Putting knowledge management processes into perspective, Kelloway and Barling (2000) argued that knowledge practices have a direct impact on innovation, employee development and organizational growth. Kong et al. (2011) on the other hand, suggested that organizations need to focus in enhancing knowledge to foster innovation. Lubit (2001) argued that tacit knowledge is a source of competitive advantage for organizations. He also elaborated that the availability of experts in organizations that have strong experiences that can transfer their knowledge to their junior employees is critical to foster innovation.

In addition, managers should encourage interaction with competitors and customers, required for knowledge capturing about organization's products, services, and processes which can help in promoting innovation. In addition, Human resources managers should also implement commitment-based practices, promoting trust and motivation and increasing knowledge management processes.

In addition, organizations should not only create specific informal learning activities, but should also adopt a supportive learning environment . A environment in which employees feel safe to experiment and learn from their mistakes, can in turn lead to more engagement in those specific informal learning activities and, thus, more innovative and have better knowledge management processes practices. For instance, organizations can indorse learning by incorporating incentives (material or non-material), such as a competition or a chance to work on skills that are not necessarily related to one's current job. Also, organizations need to give their employees time for learning and training.

10.4.2 Academic implications

The research introduces a unique conceptual framework that combines knowledge management processes, supportive learning environment and continuous innovation in the UAE financial sector. The study provides empirical evidence about the significant impact of knowledge management processes and its association with continuous innovation in the UAE financial sector. In addition, the study included supportive learning environment as a mediator to understand further the previously mentioned relationship. The results showed that supportive learning environment partially mediate the association between combines knowledge management processes and continuous innovation in the UAE financial sector.

10.5 knowledge contribution

This research has contributed to the existing body of knowledge in the following areas:

- It expended the literature review by comprehensively identify all the knowledge management processes including definitions and right measurement for each. Additionally, most previous studies explored the topic of knowledge management processes have included mostly three or four processes and very rare studies included the six processes of knowledge management.
- Expanded literature by developing new constructs for measuring knowledge management six processes including creating, capturing, organizing, storing, disseminating and applying. For example, all the knowledge management six processes have used only four indicators to measure each construct. The researcher however, expanded the literature by adding two additional indicators for each of the knowledge management processes.

- This study makes a major contribution to research on providing an empirical validation of an integrated model that illustrates intricate relationships between key knowledge management processes and continuous innovation in the UAE financial sector. As such, this study has significantly contributed to the extant literature where many calls have been made urging scholars to build rigorous integrative models that explain important insightful relationships among key knowledge management practices and specify how these impact innovation (e.g. Andreeva and Kianto 2011; Turulja& Bajgorić 2018).
- One of the key contributions of this study is the sector type as there was no research that was conducted specifically in the financial sector in the UAE. Hence, this research added to the existing knowledge by investigating the association between the knowledge management processes and continuous innovation in new sector that was not studied before.
- This thesis introduced and verified the significant influence of the supportive learning environment, mediator on the association between knowledge management processes and continuous innovation in the UAE financial sector. The empirical results have shown that supportive learning environment partially mediate the relationship between the knowledge management processes and continuous innovation in the UAE financial sector. Indeed, supportive learning environment showed a strong and significant mediation effects as well as direct impacts.
- The empirical model of this thesis has provided further evidence in support of the argument that knowledge management and innovation management should not be viewed as two mutually-exclusive concepts. Instead, the finding of this research suggested that innovation is a knowledge-based process driven by several knowledge management processes such as knowledge capturing and knowledge applying. This is

in congruence with previous studies that have sought to examine innovation from a knowledge-based view (Darroch & McNaughton 2002; Andreeva and Kianto 2011).

- This thesis proved that continuous innovation as a widely researched topic, calls for frequent reviews that can aggregate new conceptualizations. This thesis critically review have helped in shaping the concept of continuous innovation. The thesis proved that knowledge management processes play a critical role in diverse innovation outcomes.

- Finally, this thesis contributed to the concept of continuous innovation as for this study it covers business of the firm: its customers and their needs, services, organizing and business models. Therefore, this study replies to researchers who claim that continuous innovation was mostly empirically tested from incremental product innovation.

10.6 limitation of the study

While this research makes a sufficient number of contributions to the existing literature, the results of the study should be viewed in the light of some limitations which are presented below:

- Generalizability as the study sample was based on the financial sector and therefore, the study cannot be generalized on all the sectors. However, it should be noted that several results of this research were in harmony with previous studies. Nevertheless, it is not possible to assume that the findings can represent all the mangers in other sectors.
- The study was conducted from a particular country context UAE where the results were mainly reported from Dubai and Abu Dhabi. This might act as limitation as it might not represent the other five Emiratis. However, it should be acknowledgment as stated

previously that Dubai and Abu Dhabi take the control of the financial development in the UAE.

- Although the study investigated six knowledge management processes which were validated by previous research. However, only three knowledge management processes were found in association with continuous innovation including capturing, storing and applying. Maybe within the financial sector these processes might be more relevant than other processes.

10.7 Recommendation for future research

There are many opportunities for future research study in this area as follows:

- Further future studies can be undertaken in other contexts so as to provide necessary validation in terms of different economic contexts such as other Middle East countries or gulf to verify the six knowledge management processes in association with continuous innovation.
- Future research may be undertaken in other industries including service industries and production to verify the six knowledge management processes in association with continuous innovation.
- Future research on the topic could also address the relationship of knowledge management processes and continuous innovation with organizational performance. Furthermore, investigating the impact of control variables, such as market environment characteristics and organization age should be included in subsequent analyses.
- It would be remarkable for future research to study in detail the relationship between demographics and the study variables, as this study has only demonstrated the descriptive statistics of the demographics and have not done any further analysis.

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Appendix 1 : Questionnaire

Questionnaire Cover Letter

Dear Participant,

I invite you to participate in a PhD research questionnaire on the influence of knowledge management processes on organizational continuous innovation. In addition, the research will also test the organizational learning environment as a moderator for this relationship.

We estimate that it will take you approximately 20-25 minutes to complete the survey. All individual responses will remain confidential and study data will be integrated and analyzed as a whole. The research outcome will be reported in a summary form to protect confidentiality.

However, if you have any concerns or questions about the questionnaire or about participating in this research, you may contact me on 2014132010@student.buid.ac.ae.

Alternatively, you may communicate my director of studies, Professor H. Boussabaine on 04 279 1437 (halim@buid.ac.ae).

Thank you for your time and support. I look forward to sharing the results of this survey with all of the participants

Yours faithfully

Noora Alshamsi

PhD Candidate

British university in Dubai

E-mail: 2014132010@student.buid.ac.ae

The research directed by:

Professor H. Boussabaine

British University in Dubai

Tel: 04 279 1437

The Questionnaire

Part 1: Components of knowledge processes

1.1 Creating Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Creating Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization has mechanisms for creating and acquiring knowledge from different sources such as employees, customers and competitors.					
2. My organization has mechanisms for creating new knowledge from existing knowledge and uses lessons learnt from projects to improve successive projects.					
3. My organization has processes for the exchange of ideas and knowledge between individuals and groups.					
4. My organization rewards employees for new ideas and knowledge.					
5. My organization frequently comes up with new ideas about our products and/or services.					
6. My organization develops a new method if a traditional method is not effective anymore.					

1.2 Capturing Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Capturing Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization has explicit strategies for knowledge development and capture.					
2. My organization responds to employees ideas and documents them for further development.					
3. My organization has mechanisms in place to absorb and transfer knowledge from employees, customers and business partners into the organization.					
4. My organization has mechanisms for converting knowledge into action plans to design new products and/or services.					
5. My organization has policies in place to allow employees to present new ideas and knowledge without fear.					
6. My organization regularly showcases new ideas from employees to other staff.					
7. My organization pays attention to capture valuable and useful knowledge.					

1.3 Organizing Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Organizing Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization has a policy to review knowledge on a regular basis.					
2. My organization assigns tasks to employees to keep knowledge current and up to date.					
3. My organization has mechanisms for filtering, cross listing and integrating different sources and types of knowledge.					
4. My organization gives feedback to employees on their ideas and knowledge.					
5. My organization has processes for applying knowledge learned from experiences and matches sources of knowledge to problems and challenges.					
6. My organization has adequate storage infrastructure (physical/electronic) for proper organization of knowledge.					

1.4 Storing Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Storing Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization utilizes databases and uses information technology applications to store knowledge for easy access by all employees.					
2. My organization utilizes various written tools such as newsletter, manuals to store the knowledge they capture from employees.					
3. My organization has different publications to store and display the captured knowledge.					
4. My organization has mechanisms to patent and copyright new knowledge.					
5. My organization does a lot of work to refine and store the collected knowledge.					

6. My organization documents and keeps things that are learnt in practice.					

1.5 Disseminating Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Disseminating Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization has knowledge in the form that is readily accessible to employees who need it. (Intranets, internet, etc.)					
2. My organization sends out timely reports with appropriate information to employees, customers and other relevant organizations.					
3. My organization has libraries, resource center and other forums to display and disseminate knowledge.					
4. My organization has regular symposiums, lectures, conferences and training sessions to share knowledge.					
5. My organization is actively sharing information and knowledge within the units.					
6. My organization encourages employees to share with others what they have learned from their assignments.					

1.6 Applying Knowledge

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Applying Knowledge	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. My organization has different methods for employees to further develop their knowledge and apply them to new situations.					
2. My organization has processes to identify restricted knowledge.					
3. My organization has mechanisms to protect knowledge from inappropriate or illegal use inside and outside of the organization.					

4. My organization applies knowledge to critical competitive needs and quickly links sources of knowledge in problem solving.					
5. My organization has methods to analyze and evaluate knowledge to generate new patterns for future use.					
6. My organization always informs the employees about changes in procedures, instructions and regulations.					

2.0 Supportive Organizational Learning Environment

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Supportive Learning Environment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. In my organization, it is easy to speak up about what is on our mind.					
2. In my organization, employees are usually comfortable talking about problems and misperception.					
3. In my organization, employees are eager to share information about what does and doesn’t work.					
4. In my organization, differences in opinion are welcomed.					
5. In my organization, employees are open to alternative ways of getting work done					
6. In my organization despite the workload, people find time to review how the work is going					
7. In my organization , we are given the time we need for both formal and informal learning					

3.0 Organizational Continuous Innovation

Please rate your perception on each of the following statements in accordance to the organization in which you work with:

Organizational Continuous Innovation	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. In my organization we are encouraged to gain knowledge through external contacts (e.g. customers, competitors and suppliers).					
2. In my organization, proactive leadership such as encouragement of individual initiatives, performance evaluation and trust is highly evaluated.					
3. In my organization employees' ideas are evaluated.					
4. In my organization employees' work well-being (e.g. integrity, loyalty and openness to others) is measured.					
5. In my organization, employees' expertise is evaluated or measured.					
6. In my organization we support and reflect on internal processes and structures that support innovation.					
7. In my organization we have a clear measures for evaluating employee learning and development.					
8. In my organization the development of action plans are evaluated or measured.					
9. In my organization, we always identify areas of a business that need attention and improvement.					
10. In my organization we are encouraged to be creative and work with intrinsic motivation.					

11. In my organization we tolerate mistakes when we try out new ideas.					
12. In my organization we are encouraged to be proactive in leading and responding to change.					

Part 4: General Information

Please provide the required personal details through marking a tick next to the answer of your choice

Gender:

□ Male

□ Female

Job Position :

□ Assist manger

□ Manager

□ Senior manger

□ Assist Vice President

□ Vice President

□ Other, Please specify---------

Which emirate do you work in?

☐ Abu Dhabi

☐ Ajman

☐ Sharjah

☐ Dubai

☐ Fujairah

☐ Ras Al Khaimah

☐ Umm Al Quwain

Organizational Type:

☐ Government

☐ Semi-Government

☐ Private

Size of organization:

☐ Below 100

☐ 100-500

☐ Above 500

Years of experience:

☐ Below 5 years

☐ between 5-10 years

☐ Above 10 years

Type of Financial Sector :

☐ Bank

☐ Finance house

☐ Stock market

☐ Insurance

☐ exchange house

☐ Request for Information (a summary copy of the study will be provided)

Thank you for successfully completing this questionnaire.