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**THE IMPACT OF ORGANISATIONAL CONTEXT ON INNOVATION  
IN LIBYAN'S PUBLIC AND PRIVATE OIL SECTORS: THE ROLE OF  
SOCIAL CAPITAL AND KNOWLEDGE SHARING.**

By

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**BA, MSc, PGC**

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# **THE IMPACT OF ORGANISATIONAL CONTEXT ON INNOVATION IN LIBYAN'S PUBLIC AND PRIVATE OIL SECTORS: THE ROLE OF SOCIAL CAPITAL AND KNOWLEDGE SHARING**

By  
**Ibrahim Belkasem Alhaj**

## **Abstract**

It has been recognised that the oil sector in developing countries is facing challenges from a dynamic environment characterised by rapid technological change and increased demand. As innovation becomes critical to the survival of organisations, organisational context including organisational culture (OC), structure (OS) and information technology (IT) has been found to have an important influence on innovation, leading to increase social relationships among employees and flow knowledge within organisation through face to face employees interaction and information system.

Social capital and knowledge sharing are recognised as the most significant resources for competitive advantage and the key to enhancing innovation. It has long been argued that social capital, a concept represented by the value embedded in the social relationships of individuals and collectives constitute strategic resources for individuals and organisations. Social networks perceived by individuals are a key issue in generating and facilitating knowledge sharing among employees to enhance innovation within organizations. It has also been shown that knowledge management and the promotion of knowledge sharing among the members of an organisation are an important part of the learning process as they help to convert the tacit knowledge embedded in individuals into explicit knowledge through interaction. Prior literature has pointed out that organisational context is one of the most important factors affecting social capital and knowledge sharing and enhanced innovation in an organisation. However, there is a lack of models linking organisational context, social capital and knowledge sharing, and innovation within oil sectors in general within developing countries, particularly Libya.

Against this background, the thesis investigates the impact of organisational context on innovation. Using social capital and knowledge sharing, the integrative and comprehensive conceptual model are developed in order to reveal the direct and indirect impacts of organisational context on innovation. The model is then tested with a sample of 418 employees from two sectors; namely, public and the private. These were analysed through a

multivariate analysis using a variance-based statistical technique known as Partial Least Squares Structural Equation Modelling.

The findings of this thesis are three-fold. First, with respect to the direct effect of organisational context on innovation, the study finds that both public and private sectors' innovation are positively affected by organisational context. Second, regarding the indirect impact of organisational context on innovation, the study confirms its indirect nature through the social capital and knowledge sharing in both sectors. Third, the results show that there are significant differences between the public and private oil sectors in terms of the effect of organisational context on social capital, knowledge sharing and innovation, product and process.

These findings have both theoretical and practical implications in that the results have provided empirical evidence on the direct and indirect impact of organisational context and can serve as an indication in practice for both firm managers and policy makers who are looking to establish strategies for achieving innovation. These would benefit from expending their efforts on promoting social capital and knowledge-sharing practices among their employees.

## **Author's declaration**

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other university award.

### ***Working Papers:***

Alhaj, I. & Haddoud, Y. Organisational Context and Innovation: A Comparison Study between Libyan Public and Private Oil Sectors (In-Progress).

Alhaj, I. & Haddoud, Y. Examining Social Capital and Knowledge Sharing as Antecedents of Product and Process Innovation in Libyan Public and Private Oil Sectors: an application of the resource-based view (RBV) theory, (In-Progress).

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### **The following activities were undertaken in connection with the programme of the study:**

- Participated in the Plymouth University Postgraduate 2013, presented a poster on "Knowledge sharing Practices in Libyan oil sectors".
- Attended and completed the General Teaching Associates (GTA) Certificate, 2011, from Plymouth University.
- Attended Postgraduate Certificate in Research Methodology, 2013, Plymouth University.
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- Attended International Entrepreneur Conference 2014, Plymouth University.
- Attended leading with questions across cultures event, Plymouth University.
  
- Attended Research Students Skills Development Programmes held at the Plymouth University (Research Methods, Transfer Process, Presentation Skill, Endnote for beginners, Using NVivo for analysis, Using SPSS for analysis, Structuring your Thesis, Introduction to EndNote, Writing Literature Review, Writing Zone, Academic English and critical thinking, Introduction to R, Public engagement, Making Progress - Avoiding defeatism and self-sabotage, GIS an Introduction, Presenting to an Audience part 2, SPSS, Plagiarism, Introduction to Applying for research funding, Leadership and Management: Selection Interviewing).

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## **Dedication**

*I dedicate this thesis to*

*To the soul of Dr Ibrahim Elbeltagi who supported me*

*To my mother and father who consented extraordinary sacrifices to help me fulfil my aspirations.  
To my brothers and sisters,*

*To my wife*

*She is the inspiration for my writing and my life. Without having her as a wife, supporter, and friend in my life, I would not have been able to study long hours to finish my PhD. I appreciate all her sacrifices. Thank you from the bottom of my heart for being there for me*

*To my children: Yazen and Qaise*

*Yazen and Qaise are the source of my joy and happiness; without their smile I could not have overcome the stress and difficulties of my PhD.*

*A special dedication to my supervisors, Dr Mohamed Haddoud and Prof Kaled Hussainey*

*This work is dedicated to them.....*

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## List of Abbreviations

<b>Abbreviations</b>	<b>Full Term</b>
OC	Organisational Culture
OS	Organisational Structure
IT	Information Technology
SC	Social Capital
RSC	Relational Social Capital
CSC	Cognitive Social Capital
SSC	Structural Social Capital
RBV	Resource Based View
KBV	Knowledge Based View
DIKW	Data, Information, Knowledge, and Wisdom
EK	Explicit Knowledge
TK	Tacit Knowledge
KM	Knowledge Management
KS	Knowledge Sharing
KD	Knowledge Donating
KC	Knowledge Collecting
PDIN	Product Innovation
PSIN	Process Innovation
SEM	Structural Equation Modelling
PLS	Partial Least Squares

# **CHAPTER ONE: INTRODUCTION**

## **1.0 Introduction**

This chapter aims to provide an overview of this study, which focuses on an investigation the impact of organisational context (Organisational culture (OC), Organisational structure (OS) and information Technology (IT) on product and process innovation within the context of Libyan public and private oil sectors through the role of social capital and knowledge sharing. This chapter therefore is organised as follows: An explanation of the research background is given in section 1.1. Section 1.2, presents research gap and contribution, followed by the statement of the key aim and objectives of the study in section 1.3. The importance of the study is provided in section 1.4, research context is set out in section 1.5. Lastly, the structure of the whole thesis is presented in section 1.6.

## **1.1 Research Background**

The oil sector today is facing challenges from a dynamic environment characterised by rapid technological change and increased demand. At the same time, the development of innovative products and process has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004; Akhavan and Hosseini, 2016). Innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that innovation is power for firms and other organisations (Drach-Zahovy et al., 2004; Kamasak and Bulutlar, 2010). In the literature one of the factors considered essential for innovation is knowledge sharing (Kamasak and Bulutlar, 2010; Hu and Randel, 2014; Akhavan and Hosseini, 2016), and social capital (Baba and Walsh, 2010; Hu and Randel, 2014; Akhavan and Hosseini, 2016).

Knowledge is a critical organisational resource that provides a sustainable competitive advantage in a competitive and dynamic economy (e.g., Grant, 1996; Wang and Noe, 2010; Liu and Phillips 2011; Akhavan and Hosseini, 2016). To gain a competitive advantage it is necessary but insufficient for organisations to rely on staffing and training systems that focus on selecting employees who have specific knowledge, skills, abilities, or competencies or helping employees acquire them (e.g., Brown and Duguid, 1991). Organisations must also consider how to transfer expertise and knowledge from experts who have it to novices who need to know (Hinds et al., 2001). That is, organisations need to emphasize and more effectively exploit knowledge-based resources that already exist within the organisation (Spender and Grant, 1996; Davenport and Prusak, 1998; Damodaran and Olphert, 2000). Organisations need to manage knowledge in order to enhance performance and survival prospects (Ahmed and Shepherd, 2010). Therefore, in this highly competitive environment, organisations are increasingly recognising an urgent need to institutionalise knowledge sharing (KS) as a means of obtaining the best value from all available knowledge assets (Goh, 2007).

As one knowledge-centered activity, knowledge sharing is the fundamental means through which employees can contribute to knowledge application, innovation, and ultimately the competitive advantage of the organisation (Jackson et al., 2006). Knowledge sharing between employees allows organisations to exploit and capitalise on knowledge-based resources (Davenport and Prusak, 1998; Damodaran and Olphert, 2000; Cabrera and Cabrera, 2005; Wang and Noe, 2010). Previous studies have shown that knowledge sharing and combination is positively related to firm innovation (e.g., Hansen, 2002; Cummings, 2004; Arthur and Huntley, 2005; Collins and Smith, 2006; Lin, 2007d; Mesmer-Magnus and DeChurch, 2009). Other scholars (e.g., Liao et al., 2007; Liu and Phillips, 2011) provided evidence that employee knowledge sharing enhances firm innovation. Authors (e.g., Alavi and Leidner,

2001; Nonaka and Toyama, 2005; Wang and Wang, 2012; Choi and Park, 2014) have shown that knowledge sharing among members is essential in achieving high levels of innovation. According to the knowledge-based view, an organisation enhances its innovation if it owns and manages its tangible and intangible assets (Nonaka, 2005, Berggren et al., 2011, von Krogh et al., 2012).

Furthermore, resources bundles (either tangible or intangible) are seen to be inputs which help support innovation in firms (Yang et al., 2009). The growth of knowledge-intensive organisations has demonstrated that economic success relies more on knowledge and its valuable applications than on tangible resources (Yang et al., 2009). In this knowledge economy, organisations should understand the intangible assets which lead to competitive advantage and how these assets can be deployed to compete and face the challenges (Alwis, 2004).

Additionally, competitive advantage in public and private oil sectors depends not only on existing knowledge but also social capital. Social capital (SC) has become an important factor of competitive advantage and overcoming an environment of uncertainty (Johnson, 1999). This is in stark contrast to the past when enterprises' key resources were mainly physical assets such as land, buildings, etc. (Johnson, 1999). In the knowledge era, a firm's social capital is always more valuable than its financial capital. In general, an organisation's social capital can be three to four times more than its book value (Edvinsson and Malone, 1997). Moreover, social capital has been identified as affecting innovation because social capital inherent in the social relations within an organisation regarded as a potentially critical asset in maximising organisational advantage. A high levels of collaboration and good will among organisation members, increase knowledge and stimulate innovation (Nahapiet and Ghoshal, 1998; Perry-Smith and Shalley, 2003; Andrews, 2010). SC, which develops an appropriate environment, can support innovation (Wu et al., 2008). This environment supports

individuals as they try to solve problems by creating different ideas; The challenge in today's dynamic economy is how to increase social capital that facilitates the strong ties among individuals within social networks which can facilitate knowledge sharing and enhance the quality of information received (e.g., Hansen, 1999; Reagans and McEvily, 2003; Cross and Cummings, 2004), which lead to enhance product and process innovation (Akhavan and Hosseini, 2016).

In addition, with the advent of the knowledge economy, organisations attempt to enhance their social capital to support knowledge sharing and increase innovation within workplace. For example, previous KM studies identified social capital as a salient factor in facilitating knowledge sharing (e.g., Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005; Wasko and Faraj, 2005; He et al., 2009; Wei et al., 2011), which is expected to result in well informed innovation (Hansen, 2002; Cummings, 2004; Arthur and Huntley, 2005; Collins and Smith, 2006; Lin, 2007d; Mesmer-Magnus and DeChurch, 2009).

Several researchers (e.g., Chow and Chan, 2008; Yang and Farn, 2009; Chang and Chuang, 2011) emphasised the importance of social capital for encouraging knowledge sharing among employees, which in turn improved product and process innovation (Tsai, 2001, Dougherty et al., 2002; Jantunen, 2005; Michael and Nawaz, 2008; Mehrabani and Shajari, 2012). From the resource-based view, stronger social interaction ties (structural SC), social trust (relational SC), and shared goals and visions (cognitive SC) are critical organisational resources that may increase knowledge sharing (Kim et al., 2013), which leads to support innovation (e.g., Liao et al., 2007; Liu and Phillips, 2011; Hau et al., 2013).

However, effectiveness of both SC and KS between employees is a challenge for Libyan public and private oil sector, as there are so many unprecedented difficulties facing managers within organisations, along with the factors of organisational context such as organisational

culture and structure and information technology. For example, several researchers stress the effective of social capital and knowledge sharing are particularly relevant for organizations, as it is considered a significant source of competitive advantage in a competitive and dynamic economy (Kim et al., 2013; Akhavan and Hosseini, 2016). Therefore, in order to succeed in a competitive and dynamic economy, organisations need to create supportive organisational context, a necessary condition for increasing social capital assets (Kim et al., 2013) and sharing their knowledge assets (van den Hoof and Huysman, 2009; Wang and Noe, 2010), since both social capital and knowledge are one of their major organisational resources.

As innovation becomes critical to the survival of organisations and a key factor in achieving competitive advantage, organisational culture has been identified as the most important factor affecting innovation (Gudmundson et al., 2003; Tip et al., 2012). Other researchers (e.g., Lee and Tsai, 2005; Keskin, 2006; Jiménez-Jiménez and Sanz-Valle, 2011) also stressed that organisational culture is fundamental factor to supports the innovativeness of the firm. Organisational culture can be defined as a complex set of values, beliefs, assumptions and symbols that define the way in which a firm conducts its business (Barney, 1986; Büschgens, et al., 2013). Kim and Lee (2006) state that organisational culture can facilitate trust and social network used to increase knowledge sharing among employees within organisations, which is expected to result in well increased innovation at workplace (e.g., Hansen, 2002; Cummings, 2004; Arthur and Huntley, 2005; Collins and Smith, 2006; Lin, 2007d; Mesmer-Magnus and DeChurch, 2009). Authors (e.g. Valencia et al., 2010; Hogan and Coote, 2014) draw attention to the importance of organisational culture to product and process innovation. Numerous studies on organisation and knowledge management (KM) provided evidence that organisational culture enhances employee knowledge sharing within organisations (e.g. Huber, 1991; Young et al., 2012). It has shown that organisational culture is essential in maintaining high levels of knowledge sharing among members (Connelly and Kelloway,



2003; Bock et al., 2005; Collins and Smith, 2006). Moreover recent studies have addressed organisational culture as the key facilitator of firm' social capital (Gu and Wang, 2013, Petrou and Daskalopoulou, 2013). Van den Hooff and Huysman (2009) showed that the effectiveness of SC is dependent on the organisational culture, as the latter is crucial for creating a work environment that encourages communication and social interaction among employees within oil organisations.

In addition, competitive advantage in public and private oil sector depends not only on OC but also on organisational structure, how authorities and work roles are distributed in order to organise and control decision-making activities (Huang et al., 2011). Numerous studies have found organisational structure essential to increase innovation (e.g. Zaltman et al., 1973; Kimberly and Evanisko, 1981; Sciulli, 1998). Tesluk et al. (1997) emphasised the importance of SC including less centralisation and formalisations to product and process innovation. Moreover, Liao (2007) proposed that SC with having a less centralised and formalised is necessary for supporting innovation in oil organisations.

Furthermore, a functionally segmented structure likely inhibits knowledge sharing across functions and communities of practices (Lam, 1996; Tagliaventi and Mattarelli, 2006). Researchers have shown that knowledge sharing may be facilitated by having a less centralised organisational structure (Kim and Lee, 2006), creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005), use of fluid job descriptions and job rotation (Kubo et al., 2001), and encouraging communication across departments and informal meetings (Liebowitz, 2003; Liebowitz and Megbolugbe, 2003; Yang and Chen, 2007; Wang and Noe, 2010). In addition, organisational structure with a less centralisation and formalisation can facilitate employees' interaction and communications, which then enhances the social capital within organisation (Andrews, 2010).

Therefore, the value and encouragement for SC for organisation do indeed require the creation of a less of centralisation and formalisation of OS, in which members will be more willing to interact and communicate each other (Van den Hooff and Huysman, 2009; Andrews, 2010). In previous literature, a less of centralisation and formalisation of OS was one of the most frequently mentioned facilitators of SC (e.g. Yap et al., 1998; Sivadas and Dwyer, 2000; Gold et al., 2001; Janz and Prasarnphanich, 2003; Taylor, 2007). Wang and Noe (2010) believed that when there is a less of centralisation people are more willing to enhance their relationships, which provide strong ties among individuals within social networks. This can facilitate knowledge sharing and enhance the quality of information received (e.g., Hansen, 1999; Reagans and McEvily, 2003; Cross and Cummings, 2004; Wang and Noe, 2010).

Turning to the information technology, previous studies have identified information technology as a significant factor in reinforcing innovation (e.g., Liao et al., 2007; Lin, 2007a; Camelo-Ordaz et al., 2011; Yeşil et al., 2013). It argued that IT has been known to play a major role in forming innovation (Venkatraman, 1991; Duncan, 1995; Bharadwaj, 2000; Kaplan and Norton, 2004; Koellinger, 2008). Ollo-López and Aramendía-Muneta (2012) found that the use of IT seems to favor innovation in the companies, considering it as launching new products or services as well improving or introducing new processes. Other researchers observed that the IT infrastructure provides the resources that make feasible innovation and continuous improvement of products (Venkatraman, 1991; Duncan, 1995; Bharadwaj, 2000).

Authors argued that IT plays a supporting role to facilitate interaction and communication between individuals within organisations (Shneiderman, 2007; Van den Hooff and Huysman, 2009). Joshi et al. (2010) argued that IT enabled social integration that builds firms' social capital. These structures of social integration promote connectedness among members of

firms by creating seamless networks of people, devices and knowledge. Thus, IT allows the creation and share of knowledge. Moreover, It argued that IT plays a vital role in business, as it helps employees to access the knowledge they need when they need it, and provides the tools with which decision makers and users can leverage their knowledge in the context of their work (Bals et al., 2007; Chong and Chong, 2009).

Moreover, Yeh et al. (2006) emphasised the importance of IT in facilitating knowledge sharing, because IT can provide communication channels for obtaining knowledge, correcting flow processes, and identifying the location of knowledge carriers and requesters. Bose (2004) highlighted that information technology can facilitate KS by ensuring knowledge flow among employees throughout the organisation. IT is part of the agenda in many of today's leading organisations (Nielsen and Michailova, 2007). Therefore, oil sectors are always looking for a support from IT departments to utilise, facilitate and use their existing knowledge effectively and efficiently (Lin, 2007; Montazemi et al., 2012).

## **1.2. Research Gaps and Contributions**

There are several limitations identified and subsequently addressed in this study. These are summarised in the following sections: First of all, the empirical studies have argued that organisational context is an enabler of SC (Van Den Hooff and Huysman, 2009), KS (Kim and Lee, 2005- 2006; Liu, 2009; Van den Hooff and Huysman, 2009) and enhances innovation (Liao, 2007; Tip et al., 2012; Ollo-López and Aramendía-Muneta, 2012). SC is an enabler of KS (Marouf, 2007; Kim et al., 2013; Amayah, 2013), and an antecedent to innovation (Mura et al., 2013). In addition, KS is an antecedent to innovation (Andreeva and Kianto, 2011, Porzse et al., 2012, Ferraresi et al., 2012). Despite the extensive number of empirical studies argued that organisational context (OC, OS and IT), social capital knowledge sharing and innovation are important to organisations, there is a gap in the

literature regarding the impact of organisational context in supporting social capital, knowledge sharing and innovation, especially in public and private oil sectors, and no study has been conducted to consider all variables used in this study to date.

From a direct approach prospective, despite, the studies dedicated to organisational context (OC, OS and IT) and their impact on SC, KS, and innovation, the direct impact of organisational context is still questioned (McLaughlin et al., 2008; Tellis et al., 2009; Valencia, 2010; Nakata and Di Benedetto, 2012; Büschgens et al., 2013; Naranjo-Valencia et al., 2016). Researchers suggest that organisations need to pay close attention to organisational culture issues as a part of organisational context in developing organisational practices that will facilitate innovation, as there is no single universal set of practices that can be used to facilitate innovation (Valencia, 2010; Büschgens et al., 2013). It also indicated that more research is needed to understand organisational context such as organisational culture (Chennamaneni et al., 2012), which may also have a significant effect on knowledge sharing which effect innovation (Akhavan and Hosseini, 2016). Wang and Noe (2010) state that more research is needed to understand how KS can be promoted and how organisational culture as factor of organisational context can affect the dynamics of KS among employees and teams. Moreover, more studies are needed regarding KS in the emerging economies of Africa, the Middle-East and South America, as the majority of studies have been carried out in Western countries, although the effect of non-Western influences on KS in Chinese culture has been studied (Wang and Noe, 2010). It is argued that the extent of the differences between both public and private sectors, and how organisational context affect knowledge sharing practices in these types organisations are needed (Amayah, 2013). Scholars also indicated that that organisational structure as a part of organisational context has complex and contradictory effects on the impact of each dimension of social capital (Andrews, 2010) and knowledge sharing (Chen and Huang, 2007).

Other researchers also suggest a need to understand the precise role of information technology to facilitate knowledge sharing, which in turn influences organisational performance (Choi et al., 2010). Organisation context is very important to create a suitable climate, set values and, norms, and create a culture of change. It can enhance social capital and foster a shared vision and therefore develop innovation within organisation (Northouse, 2007, DuBrin, 2012). Thus, it will be useful to provide a better understanding of the relationships between organisational context (OC, OS and IT), SC, KS, and innovation, and determine methods that can be used by managers to enhance social capital and knowledge sharing activities among employees at workplace.

From an indirect approach prospective, the limitations of literature is the lack of mediating role of two groups of resources (SC and KS) in the relationship between organisational context and product and process innovation. Indeed, most of previous studies appeared to focus on one resource to illustrate the mediating factors, hence neglecting the other resources (e.g., Hu and Randel, 2014; Akhavan and Hosseini, 2016). Accordingly, in order to understand the role of two groups of resources such as knowledge sharing and social capital in facilitating innovation in Libyan public and private oil sector, further research is needed. The subject has not received significant attention in the literature and there are few empirical studies on this particular research issue (Subramaniam and Youndt, 2005; Xu et al., 2010; Zwain et al., 2011; Al-husseini and Elbeltagi, 2015). Therefore, this research has theoretical contributions to make, through applying RBV and KBV in a new context of SC and knowledge sharing through using two groups of resources (social capital and knowledge sharing) to support innovation in Libyan public and private oil sector. It also extends RBV by showing how social capital can support innovation and knowledge sharing, and by considering organisational context (OC, OS and IT) as a vital factor which affects knowledge

sharing, social capital, and innovation to make the strong tie, trust and social network (Social capital ) and best use of knowledge available in an organisation and create the best value.

Furthermore, it extends KBV in the context of knowledge sharing through showing the impact of organisational context (OC, OS and IT) in deploying and sharing knowledge assets in public and private oil sectors, giving a better understanding of social capital and knowledge as a competitive resource and linking it innovation. Hence, in this research, the comprehensive approach used to illustrate the direct and indirect impact of organisational context (OC, OS and IT) on innovation through social capital and knowledge sharing, provides greater implications to both academic and practical communities. Understanding the influence of these factors will enable managers, decision maker and developers to understand and consider organisational context that enhance social capital, knowledge sharing and innovation at workplace.

Thirdly, recent evidence has acknowledged some limitations in the link between social capital and knowledge sharing and innovation (see for example: Hu et al., 2014). Hence, the present study attempts to shed more light on such a link by exploring whether social capital or knowledge sharing approach to encouraging innovation is more effective. Additionally, to the author's best knowledge, the literature also remains silent whether organisational culture, organisational structure or information technology enhance social capital, knowledge sharing and innovation, product and process at workplace. This study examines whether organisational culture is more or less effective than organisational structure and information technology in promoting social capital, knowledge sharing and innovation, product and process at workplace.

Fourthly, the number of studies conducted in developed countries, hence such relationship in the developing context such as Libya remains unclear. Several researchers emphasised that

there is a great need to study organisational context (OC, OS, IT) (Wang and Noe, 2010; Amayah, 2013), SC (Van den Hooff and Huysman, 2009; Andrews, 2010), KS (Tsui, 2007; Xu et al., 2010; Hu et al., 2014), and innovation (Subramaniam and Youndt, 2005; Zwain et al., 2011; Al-husseini and Elbeltagi, 2014; 2015). According to Elgobbi (2008), the practice of KM within oil companies in Libya is in the developing stages. Given the importance of innovation in public and private organisations, particularly oil context, it is important to enhance the level of employees' skills and experience and improve the organization's performance. Therefore, testing the model developed in this study in the context of oil companies within developing countries like Libya brings additional nascent evidence from developing countries.

Lastly, although, it can be argued that both public and private sectors face immense pressures to innovation, the influence of organisational context on innovation may be different in public and private sectors due to the organisational and cultural environments. The literature also highlights that public organisations are seen conservative because of their ownership, limited competition than private sector (Majumdar and Ray, 2011; Willem and Buelens, 2007; Amayah, 2013) and so far, the literature remains silent about how organizational context affects social capital, knowledge sharing and innovation in the public and private sectors. Therefore by investigating these problems within oil sector will be useful for the managers and decision-makers of both public and private oil industries facing pressure to innovation, by enabling them to overcome the barriers that prevent the development of both product and process innovation between their employees and contribute to develop management strategies that will work best for each sector.

### **1.3. Research Aim and Objectives**

The overall aim of this research is to examine the direct and indirect effect of organisational context (OC, OS and IT) on innovation through the mediating role of social capital and Knowledge sharing in Libyan public and private oil sectors. In order to achieve the stated aim, the following objectives have been identified.

**RO1: To examine the direct relationship between organisational context and innovation.**

To address this objective, the study tests the effect of organisational context including organisational culture, structure and information technology on both product and process innovation in Libyan public and private oil sectors.

**RO2: To explore the indirect influence of organisational context on innovation through social capital.**

The study fulfils this objective by conducting a mediation test of the intervening roles of the social capital in the link between the organisational context (OC, OS and IT) and product and process innovation in Libyan public and private oil sectors.

**RO3: To assess the indirect effect of organisational context on innovation through knowledge sharing.**

Similar to the fourth objective, the study addresses this objective by testing the mediation effect of the intervening roles of knowledge sharing in the link between the organisational context (OC, OS and IT) and product and process innovation in Libyan public and private oil sectors.

**RO4: To examine the effect of social capital on knowledge sharing.**

Similar to the first objective, the study addresses this objective by testing the effect of social capital on knowledge sharing in Libyan's public and private oil sectors.



**RO5: To identify the differences between the public and private oil sector in terms of the relationship between organisational context (OC, OS, IT) and both product and process innovation in Libyan's sectors.**

The last objective is addressed by testing the model developed in this study in Libyan public and private oil sectors.

#### **1.4. Significance of the Research**

The justification of this study comes from the increasing interest in innovation in the world in general and Libya in particular. Innovation has been considered as a source of competitive advantage and has become a crucial factor for organisations in the current global market (Akhavan and Hosseini, 2016). It is noted that “Knowledge economy” and the “information age,” focusing on innovation as the core aspect of new economic models (Efrat, 2014). Likewise, oil sector are seen as the backbone of the Libyan economy and their role in supporting other sectors is well proven and acknowledged (Aгнаia, 1996; Twati and Gammack, 2006; Otman and Karlberg, 2007; Triki, 2010; Millad, 2013).

More importantly, innovation is believed to have a great impact on economic growth (Freeman, 2002; Thoenig and Verdier, 2003; Jaffe and Trajtenberg, 2005; Fagerberg and Srholec, 2008; Efrat, 2014). As a result, most organisations are now focusing on significant resources to promote innovation (Kamasak and Bulutlar, 2010; Hu and Randel, 2014; Akhavan and Hosseini, 2016). Promoting innovative products and process has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004). Indeed, innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that “innovation is power” for firms and other organisations (Drach-Zahovy

et al., 2004; Kamasak and Bulutlar, 2010). For this reason, exploring and understanding such a role is crucial for the national welfare of every economy.

In this sense, the present research is a threefold study. From one perspective, it identifies the social capital and knowledge sharing as critical resources affecting the firms' innovation, which will assist firms' managers and policy makers in focusing on the relevant type of resources to invest in. Oil sectors have often limited access to resources (Elgobbi, 2008). Similarly, organisations are investing in the right type of resources will significantly increase their social capital and knowledge sharing which make the best use of knowledge available in an organisation and create the best value, thus increase their competitive advantages (Wang and Noe, 2010; Akhavan and Hosseini, 2016). From other perspective, it extends KBV in the context of knowledge sharing through showing the impact of social capital in deploying and sharing knowledge assets in public and private oil sectors, giving a better understanding of knowledge as a competitive resource and linking it with KS, and innovation which will help policy makers, programme developers and practitioners to obtain more information regarding the importance of social capital in enhancing knowledge sharing.

The third perspective, this study provides a new conceptual framework that explores the factors that affect social capital, knowledge sharing and innovation. Thus, the conceptual framework will be useful to provide a better understanding of the linkages between organisational context (OC, OS and IT), social capital, knowledge sharing and innovation, and determine methods that can be used by public and private oil sectors to identify new ways to enhance social capital and leveraging knowledge sharing to support their innovation at workplace. Additionally, the research explores the effects of the organisational context (OC, OS and IT) and therefore clarifies the mechanism allowing policy makers to improve their practices and design them to meet firms' needs more effectively.

## 1.5. Research Context

This research focuses the influence of organisational context (OC, OS and IT) on innovation, product and process through social capital and knowledge sharing. The main emphasis of this study is on Libyan oil sector. This research identifies four key arguments in justifying for choosing Libyan oil sector: Firstly, to address the call made in literature conducting research particularly in developing context like Libya (Subramaniam and Youndt, 2005; Zwain et al., 2011; Al-husseini and Elbeltagi, 2014; 2015), and two setting public and private (Amayah, 2013), the present work tests the research model in Libyan public and private oil sectors. Secondly, the oil sector is the main resources of income of Libya (Aгнаia, 1996; Twati and Gammack, 2006; Otman and Karlberg, 2007; Triki, 2010; Millad, 2013). Thirdly, oil sector is seen as the backbone of the economy and their role in increasing countries' economic growth (Aгнаia, 1996; Otman and Karlberg, 2007; Triki, 2010). More importantly, Libyan oil revenues have made a major contribution into all economic activities for individuals, firms and governments (Aгнаia, 1996; Triki, 2010; Millad, 2013).

Fourthly, over the last few decades, the oil sector has suffered from facing challenges from a dynamic environment characterised by rapid technological change and increased demand. Compared to other emerging economies, Libya, as one of developing countries, has made remarkable strides towards economic reforms and is courageously facing the new trends of change and involvement in the global economy. In other words, Libya is working towards transforming its socialist-oriented economy to a more market-based economy (Twati and Gammack, 2006). It has now made many steps to privatise state-owned enterprises in addition to boosting the establishment of private companies, and trying to increase its attractiveness to foreign investors. It was seeking foreign involvement across all sectors of the economy, carrying out various regulatory changes to support the vast swathe of development. On the other hand, building a liberal economy necessitates fulfilling some

major conditions that are necessary for its proper operation (Sherif, 2010). Therefore, Libya fulfilled its commitments under Article VIII of the IMF's Articles of Agreement (IMF, 2003) with the key remaining challenges facing the Libyan government, such as this oil sector as the vital sector is facing challenges from a dynamic environment characterised by rapid technological change and increased demand. At the same time, the development of innovative products and process has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004). Indeed, innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that innovation is important for public and private organizations (Drach-Zahovy et al., 2004; Kamasak and Bulutlar, 2010). Moreover, social capital is important for oil sector, because social capital facilitates the individual interactions necessary for innovation (Zheng, 2010; Molina-Morales and Martínez-Fernández, 2010; Laursen et al., 2012; Mura et al., 2013).

Furthermore, Knowledge sharing has become a crucial factor for oil sector. Oil sector are searching for appropriate ways to manage and use their knowledge effectively and efficiently. Their challenge is how to facilitate the sharing of knowledge and maximise the value from all available knowledge assets in order to support innovation. Therefore, the primary concern of this research is to shed light on the impact of organisational context (OC, OS and IT) on social capital and knowledge sharing to enhance innovation in Libyan oil sector. The study extends the existing literature on social capital and knowledge sharing, and innovation by proposing and empirically testing a new conceptual model in Libyan oil sector. The main justification for choosing oil sector lies in the fact that there is still a dearth of social capital and knowledge sharing to support innovation on this vital sector.

For the reasons mentioned above, it is clear that Libyan public and private oil sectors constitute a fertile ground to study the organisational context (OC, OS and IT). The need to

boost innovation, product and process are crucial for both public and private oil sectors and it is recognised that the government are keen to take part in achieving this goal.

## **1.6 The Structure of the Thesis**

This thesis is organised and presented in eight chapters, described as follows:

### ***Chapter One: Introduction to the Thesis***

The chapter presents a general description of the study, introduces the study's background, the research gaps and contributions, the research aim and objectives and last the significance and structure of the thesis.

### ***Chapter Two: Literature Review***

The chapter begins by highlighting the importance of product and process innovation. This would provide a clear support for why this research is taking place. Next, it illustrates the theoretical foundations upon which this present study is built on. The RBV and KBV are defined and its application justified. This review is relevant to the present study as it allows the researcher to understand the determinants of innovation. Thereafter, the chapter thoroughly reviews the empirical literature investigating social capital and knowledge sharing as the resource factors affecting the innovation, including product and process innovation. Also, the chapter reviews the relevant literature and empirical evidence on organisational context. It investigates the empirical evidence on the impact of organisational context on social capital, knowledge sharing and innovation, product and process. Finally, the chapter highlights the limitations of the innovation literature and identify the research gap and select areas needing further research.

### ***Chapter Three: The Conceptual Framework***

The chapter presents the research model and states the hypotheses to be tested in this study. It begins by highlighting the theoretical foundations upon which this present study is built on. The RBV and KBV theories with a link to this study are defined and justified its application. This chapter reviews the empirical evidence supporting the direct and indirect relationship between organisational context and innovation. Then, the summary of hypotheses statement is presented.

### ***Chapter Four: Research Context***

This provides the background to the Libyan environment, by presenting a P.E.S.T. analysis and investigates how contextual factors which influence on an organisational behaviour and managerial practice within Libyan context. Whereas a more detailed discussion of Libyan context dimensions is beyond the scope of this study, some key literature will be covered in order to build clear an understanding of the influence of Libyan context on organisational behaviour and in particular social capital, knowledge sharing and innovation within organization.

### ***Chapter Five: Research Methodology***

The chapter defines the methodological perspectives of this thesis. It discusses and defends the philosophical assumptions, the paradigm of enquiry, the research approach and the research methodology chosen for this investigation. Third, it identifies the research methods used to collect the data and test the hypotheses. It also covers the research ethics, the variables' operationalisation and the statistical technique employed to analyse the data (the multivariate data analysis approach). The research methods are also justified and supported by key previous studies in the field.

### ***Chapter Six: Data Analysis and Findings***

The chapter presents the results obtained from both surveys. It starts with descriptive statistics to describe the samples and check the statistical assumptions, then move to assessing the measurement models to check the reliability and validity of the measures used in the survey. Thereafter, the structural models are evaluated and the hypotheses tested. Lastly, the chapter conducts a multi-groups analysis to identify differences emerging between public and private oil sectors.

### ***Chapter Seven: Discussion***

This chapter is a discussion chapter. To begin with, this chapter recalls the main findings of this research, then explains these findings and links them back to the literature. Here, the research questions proposed in the thesis are fully addressed and areas where the current study's results contradict previous works are systematically justified. Similarly, differences between public and private sectors are also explained and justified.

### ***Chapter Eight: Conclusion***

This Chapter summarises the results and conclusions of the thesis. Here, the research aim, objectives and questions are all linked to the findings obtained in this study, discusses the theoretical and managerial implications of the findings, the limitations acknowledged and areas for future research identified.

This chapter introduced the research background, the research gap and contribution research aim and objectives, and the significance of research, the context of the research and structure of the whole thesis. The next chapter is the first chapter of the literature review. It explores product and process innovation and the role of innovation on organisations' outcomes.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

The overall aim of this chapter is to review the literature on innovation and is divided into four sections. Section (2.1), reviews the literature on innovation and the importance of product and process innovation to organisations. This would provide a clear support for why this research is taking place. Section (2.2), illustrates the theoretical foundations upon which this present study is built on. The RBV and KBV are defined and its application justified. This review is relevant to the present study as it allows the researcher to understand the determinants of innovation. Thereafter, the section thoroughly reviews the empirical literature investigating social capital and knowledge sharing as the resource factors affecting the innovation, including product and process innovation. Section (2.3), reviews the relevant literature and empirical evidence on organisational context. It investigates the empirical evidence on the impact of organisational context on social capital, knowledge sharing and innovation, product and process. Furthermore, the section highlights the limitations of the innovation literature and identify the research gap and select areas needing further research. Finally, a summary of the whole chapter is given in section (2.4).

### **2.1 Innovation**

Today's organisations operate in a turbulent environment, facing rapid changes in information technology, market uncertainties, shortened product life cycles and fierce competition (Dinopoulos and Syropoulos, 2007; Madrid-Guijarro et al., 2009; Roy and Sivakumar, 2012; Elsetouhi et al., 2015). In such environments, innovation becomes a fundamental requirement to achieve sustainability, survival and growth (Gumusluog and Ilsev, 2009; Atalay and Anafarta, 2011; Bohlmann et al., 2012). It is argued that innovation has been the subject of several studies linking it to economic growth (Freeman, 2002;



Thoenig and Verdier, 2003; Jaffe and Trajtenberg, 2005; Fagerberg and Srholec, 2008; Efrat, 2014). Innovation is widely recognised for its importance as a critical resource for competitive advantage of firms (Tidd and Bessant, 2011).

According to Smith (2009) and Bohlmann et al. (2012), organisations' survival is based on the significance of innovation either in public and private sectors. Jimenez and Vall (2011), argued that organisations consider innovation of both product and process to be a critical variable to enhance organisational learning. Moreover, Cooper (2011) viewed that the goals of ambitious organisations can be achieved through innovation. Innovation plays a key role in terms of renewing and shaping the resources available to organisations, as well as their competences and routines (Matthews and Shulman, 2005; Gonzalez et al., 2013). Innovation allows organisations to react to internal weaknesses or external pressures and consequently becomes an important tool for decision-making (Gonzalez et al., 2013). In addition, it is argued that the development of innovative products and services has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004). Indeed, innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that "innovation is power" for firms and other organisations (Drach-Zahovy et al., 2004; Kamasak and Bulutlar, 2010).

It is clear that the impact of innovation on organisations outcomes has been extensively discussed in the innovation literature. This discussion has led to various debates concerning the influence of innovation on organisations' outcomes. This section therefore provides an overview on innovation' definitions in subsection (2.1.1). Subsection (2.1.2) articulates the types of innovation. subsection (2.1.3) presents the the importance of product and process innovation.

### **2.1.1 Definition of Innovation**

The term of innovation has been the subject of debate and study over many years and yet there is no one agreed definition. Scholars who study innovation have defined it in different ways and from different angles. For example, some researchers have conceived innovation as a consequence and tried to determine the contextual, structural and process conditions under which organisations would innovate (Damanpour and Gopalakrishnan, 1998; North et al., 2001; Sarros et al., 2011; Jiménez-Jiménez and Sanz-Valle, 2011). Others have conceived innovation as a process and tried to understand how it emerges, develops and becomes a part of routine activities of an organisation (Ettlie, 1980; Rogers, 1983; Dean, 1987; Van de Ven et al., 1989; Cooper and Zmud, 1990; Damanpour and Gopalakrishnan, 1998; Sarros, et al., 2011). Innovation as a concept has steadily expanded in the management literature after the work of Schumpeter. Schumpeter (1930) defined the term of innovation as the introduction of new goods, new methods of production, the opening of new markets, the conquest of new sources of supply and the carrying out of a new organisation of any industry. This definition addresses five important aspects of innovation. These aspects include a) product (either new to consumers or with improved quality for those that have already been available), b) process (methods of production either new to the world or new to the industry), c) new market, d) new sources of supply, and e) new forms of competition (De Jong, 2006; Poorkavoos, 2013). Some researchers such as Vaccaro et al. (2012) clarified innovation as a product, process, or distribution method perceived as new by the organisation. Such view supported by Daft (1978); Herkema (2003) and Palangkaraya et al. (2010), who defined innovation as the adoption of new ideas, behaviours, products, systems, processes, policies, and programmes that are new to an organisation. Similarly, Liao et al. (2008) presented a comprehensive definition, and explaining innovation as the generation/adoption of novel ideas, and behaviours regarding products, services, production, operating procedures, and management

strategies. White and Glickman (2007) described innovation as the introduction of new ideas, methods, and devices. Hobday (2005) stressed that innovation might be defined as a product or process new to the company, not simply to the world or the market. Similarly, Assink (2006) explained innovation as the adoption of ideas that are new to the adopting company or as the process of successfully creating something new that has significant value to the relevant unit of adoption.

Additionally, Nystrom (1990) found innovation to be new products/services, and processes that aim to improve the competitive advantage of the organisation and meet customers' changing demands. Du Plessis (2007) indicated that innovation refers to the creation of new thoughts, knowledge and ideas so as to make organisational outcomes possible. It argued that successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality (Mulgan and Albury, 2003). Albury (2005) defined innovation as creating and implementing new products/services, processes, procedures and methods of delivery that enhance the effectiveness of the organisation. Kamasak and Bulutlar (2010) and Nusair et al. (2012) described innovation as developing, generating, adopting, and implementing new ideas, methods, programmes, and policies so as to achieve the goals of an organisation effectively. Kim et al. (2012) stated that innovation refers to new applications of knowledge, ideas, methods, and skills which can generate unique capabilities and leverage an organization's competitiveness. Table (2.1) presents examples of the possible definitions of the multiple views on innovation drawn from the literature.

**Table 2.1: Definitions of innovation**

<b>Resaechers</b>	<b>Date</b>	<b>Definition</b>
Tushman and Nadler	1986	It is defined as the creation of any product, service, or process which is new to a business unit.
Van de ven	1986	Innovation is a process includes the generation, adoption, and implementation of new ideas and practices

Rogers (p. 12)	1995	Innovation is “an idea, practice, or object that is perceived to be new by an individual or other unit of adoption”.
Becker and Whisler	1967	Innovation is defined as the first or early use of an idea by one of a set of organisations with similar goals.
Zaltman et al.	1973	It is defined as any idea, practice, or material artefact perceived to be new by the relevant unit of adoption.
Damanpour and Evan	1984	Innovation is defined as the adoption of an idea or behaviour new to the adopting organisation.
Drucker	1985	Innovation is the specific tool of entrepreneurs; the means by which they exploit change as an opportunity for a different business or service. It is capable of being presented as a discipline; capable of being learned; capable of being practiced.
West and Farr	1990	They defined innovation as the intentional introduction and application within a role, group or organisation of ideas; processes; products; or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, organisation or wider society.
Nystrom	1990	Innovation to be new products/services, and processes that aim to improve the competitive advantage of the organisation and meet customers’ changing demands.
Europe Commission (EC)	1995	Innovation is a function of the successful exploration and exploitation novelty in the social and economic scopes.
Amabile	1998	Innovation meant the successful implementation of creative ideas within an organisation.
Vakola and Rezgui, and Wu et al.	2000 2008	Innovation is defined as an idea, a product or process, or a system that Innovation is perceived to be new to an individual
Mulgan and Albury	2003	Successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality.
Daft and Herkema	1978 2003	Innovation defined as the adoption of new ideas, behaviours, products, systems, processes, policies, and programmes that are new to an organisation
Poole and Van de Ven	2004	Innovation is defined often as developing and implementing a new idea in an applied setting.
Brown et al.	2004	Innovation is creating something new and implementing it successfully to a market.
Egbu	2004	Innovation can be viewed as a process of inter-linking sequences from idea generation to idea exploitation which are not bound by definitional margins and are subject to change.
Tidd et al.	2005	It is turning opportunity into ideas and putting these into widely used practice.
Trott	2005	Innovation is not a single action but a total process of interrelated sub processes. It is not only the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is all these things acting in an integrated fashion.
Hobday	2005	Innovation defined as a product or process new to the company, not simply to the world or the market
Albury	2005	Innovation defined as creating and implementing new products/services, processes, procedures and methods of delivery that

		enhance the effectiveness of the organisation
Assink	2006	Innovation defined as the adoption of ideas that are new to the adopting company or as the process of successfully creating something new that has significant value to the relevant unit of adoption
Fruhling and Siau	2007	It is as "an idea, practice, or object that is perceived as new to an individual or another unit of adoption."
White and Glickman	2007	innovation refers to the introduction of new ideas, methods, and devices
Chen and Tsou	2007	Innovation to be the intuition, adoption, and implementation of new ideas or activities used to develop products, services or work practices.
Du Plessis	2007	Innovation refers to the creation of new thoughts, knowledge and ideas so as to make organisational outcomes possible.
Oddane	2008	Innovation is a collective, open-ended activity aimed at the creation and implementation of new, appropriate products or processes in order to generate significant economic benefit and other values.
Liao et al.	2008	Innovation defined as the generation/adoption of novel ideas, and behaviours regarding products, services, production, operating procedures, and management strategies.
Grawe et al.	2009	innovation is the development of a new service which is perceived to be new and helpful to a particular focal audience.
Jiménez-Jiménez and Sanz-Valle	2011	Innovation defined innovation as the adoption of a new idea or behaviour.
Palangkaraya et al.	2010	Innovation defined as the introduction of new forms of production (processes and production) into the workplace.
Kamasak and Bulutlar	2010	Innovation can be defined as developing, generating, adopting, and implementing new ideas, methods, programmes, and policies so as to achieve the goals of an organisation effectively
Rujirawanich et al.	2011	Innovation is defined as the process of the introduction and implementation of a range of things (such as ideas, products, services, plans, rules, procedures, and so on) related and new to any parts of an organisation and any aspects of its operation, designed to benefit the organisation.
Vaccaro et al.	2012	Innovation explained as a product, process, or distribution method perceived as new by the organisation.
Kim et al.	2012	Innovation refers to new applications of knowledge, ideas, methods, and skills which can generate unique capabilities and leverage an organisation's competitiveness

In light of above discussion, and in line with the research objectives, this research defines innovation as accepting, developing, and implementing new products and processes by developing and using new technology, good financial management, and the continuous improvement of skills. Although the literature recognises a wide range of innovation types within the firm, most of the empirical works use the product process typology (Liao and Wu

2010, Gonzalez et al., 2013). The current study therefore classifies innovation into two types: product innovation, process innovation, which will be justified in section 2.1.3.

### **2.1.2 Types of Innovation**

The vast literature on innovation is consolidated here by reviewing, in brief, the classifications of the innovation. For example, a variety of scholars identified two types of innovation including: radical and incremental innovation (Subramaniam and Youndt, 2005, Marqués et al., 2006, Wu et al., 2008, Schilling 2010, and Zhou and Li, 2012). Radical innovation reflects the newness and degree of differentness in the product or process. It is crucial to long-term success, non-linear and discontinuous, as it involves the development and application of new technology (Tidd and Bessant, 2011). Thus, it puts the organisation at risk because it is more difficult to commercialise (Du Plessis, 2007). Incremental innovation, on the other hand, includes the extension or change of existing products or processes. It is usually categorised as market-pull innovation and provides opportunities to build on the existing know-how (Trott, 2008). The modifications are typically improvements to components, rather than major changes (Ahmed and Shepherd, 2010; Tidd and Bessant, 2011). Smith (2009) noted that this type of innovation can create an essential linear process of continuous change.

However, other researchers (e.g. Daft, 1978; Dewar and Dutton, 1986; West and Farr, 1990; Subramaniam and Nilakanta, 1996; Birkinshaw et al., 2008; Jaskyte, 2011) have distinguished between administrative and technological innovation. Administrative innovation includes the development and implementation of the organisation's activities, such as organisational structure, administrative processes, and changes in the social system that consists of organisational members and relationships among them (Walker, 2007; Schilling, 2010). It includes rules, procedures, management systems and staff development programmes (Trott,

2008; Jaskyte, 2011; Damanpour and Aravind, 2012). Smith (2009) noted that administrative innovation are indirectly related to the work activities of an organisation. Technological innovation, in contrast, is related to the implementation of organisational affairs through tools such as new equipment, methods, concepts, elements of processes, techniques, and systems. It is directly related to the primary work activities of organisations (Damanpour and Schneider, 2006).

Nevertheless, Damanpour et al. (2009) refined this view by adding a third type called ancillary innovation. In contrast to the previous two innovation types which are more closely under the control of the organisation's management, Ancillary Innovation according to Damanpour are organisation-environment boundary innovation. Examples include "career development programs, tutorial services, and adult continuing education programs". Conversely, Morris (2006) presented different classification of innovation types that compose what he named as "Permanent Innovation" (1) Incremental, (2) breakthrough products and technologies, (3) new business models, and (4) new ventures. On the other hand, some authors such as He and Wong (2004) argued that innovation can be achieved through exploration or exploitation. Exploration encompasses behaviour characterised by research, discovery, experimentation, flexibility, and risk-taking, and covers a longer period of time. Exploitation, in contrast, refers to refinement, implementation, efficiency, and production, and is short-term.

Additionally, Hamel (2006) saw innovation as encompassing process innovation such as customer services, and logistics, and management innovation such as strategic planning, project management and employee assessment. Koch and Hauknes (2005) supported this view by suggesting five classifications of innovation within service organisations including: product, delivery, process, system, and strategy. Koch and his colleagues explained product innovation as focusing on the features and design of products and services while Process

innovation refers to the development of policies, procedures, and organisational forms whereas, Delivery innovation includes new ways of providing a service and communicating with clients. System innovation, in contrast, includes developments in ways of communicating with others. Strategy innovation, however, encompasses changes in the mission, strategy, and rationales of the organisation.

Walker (2007) distinguished between total innovation (providing new services to new users), expansionary innovation, and evolutionary innovation, which refer to delivering a new service to existing users. Wang and Wang (2012) identified two types of innovation namely: speed and quality innovation. Innovation speed reflects firm quickness to generate novel ideas, new product launching, new product development, new processes, new problem solving as compared to key competitors (Wang and Wang, 2012). On the other hand, innovation quality reflects the newness and creativity of new ideas, products, processes, practices and management of certain company (Wang and Wang, 2012).

Previous studies also highlighted that innovation can be split into either: product or process innovation (e.g., Damanpour, 2009; Smith, 2009; Tidd and Bessant, 2011; Rujirawanich et al., 2011; Higón, 2011; Hameed et al., 2012; Ollo-López and Aramendía-Muneta, 2012). Process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. while product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. Tidd et al. (2005) and Tidd and Bessant (2011) classified innovation into product, process, position, and paradigm innovation. According to these authors, the position innovation includes changes in the context in which the products are introduced, while paradigm innovation encompasses the changes in the underlying mental models that reflect the work of the organisation. Such view supported by Wang and Ahmed (2004) and Trott (2008), who both divided innovation into product,



process, organisation, management, commercial which refers to the application of new marketing strategies such as the packaging of the firm's product, and channels for distributing products to the market, and behaviour, which includes changes in employee behaviour for the better. Zack et al. (2009) studied innovation as a product and service innovation.

Other researchers argued innovation can be classified according to different criteria for example, Johannessen et al. (2001), analysed six different types of innovative activity namely: developing new products; new services; new methods of production; opening new markets; finding new sources of supply; and new ways of organising. Ellonen et al. (2008), on the other hand, classified organisation innovation into product; market; process; behavioural; and strategic innovativeness. In a similar vein, Liao et al. (2012), innovation can be categorised into: Product innovation, Market innovation, Process innovation, Behavioural innovation, and Strategic innovation. Product innovation refers to the novelty and meaningfulness of new products introduced to the market in a timely fashion. Market innovation defined as the newness of approaches that companies adopt to enter and exploit the targeted market. Process innovation refers to promote the introduction of new production methods, new management approaches, and new technology to improve production and management processes. Behavioural innovation includes individuals, teams, and management enable the foundation of a creative culture, with internal receptivity to new ideas and innovation. Strategic innovation refers to an organisation's ability to manage.

In contrast, other researchers (e.g., Damanpour and Schneider, 2006; Valencia et al., 2010; Jiménez-Jiménez and Sanz-Valle, 2011) defined organisational innovation as a type of innovation that includes product, process and administrative innovation. Other authors (e.g Walker, 2006; Xue et al., 2012; Zhou and Li., 2012; Gonzalez et al., 2013), categorises innovation into three types: product, process and ancillary innovation. Such view supported

by Wu et al. (2012), who classifies innovation into three types: Product Innovation means creating new goods and/or services for consumers and includes three types: Total, offering new goods/services to new types of customers; Expansive, offering existing goods and services to the same users as before; and Evolutionary, offering new goods or services to the same type of users. Process Innovation, on the other hand, affects both management and the organisation and changes the relationships between organisation members, impacting the rules, roles, processes, structures, ways of communication and exchange between the organisation members, as well as between the environment and the members (Walker, 2006; Jafari et al., 2011; Huarng et al., 2012). Finally, collaborative innovation, which Walker calls ancillary following Damanpour (1987), are those where achievement of success is beyond the organization's control, since these are innovation based on the relationships between the organisation and the environment. Collaborative innovation are related to connections with other organisations (Gonzalez et al., 2013). Mura et al. (2013) saw innovation as prompting idea perspective. Elsetouhi et al. (2015) considered product, process and organisational innovation as a major construct of innovation. Table 2.2 subsequently illustrates these types drawn from the pool of literature.

**Table 2.2: Types of Innovation**

<b>Types of Innovation</b>	<b>Author(s)</b>
New products, New methods of production, New markets, New sources of supply, and New ways to organise business.	Schumpeter (1983)
Technological and Administrative innovation	Daft (1978); Subramanian and Nilakanta (1996); Birkinshaw et al. (2008); Jaskyte (2011)
Technological, Administrative and Ancillary innovation	Damanpour (1987) ; Damanpour et al. (2009)
Product innovation and Process innovation.	Damanpour (2009); Smith (2009); Sawsan and Elbeltagi (2015)
Product, Process, Position, and Paradigm innovation	Tidd and Bessant (2011)
Incremental and Radical innovation	Dewar and Dutton, (1986); Schilling (2005-2010); Subramaniam and Youndt (2005); Marqués et al. (2006) ; Wu et al. (2008); Zhou and Li (2012)
Exploitation or Exploration innovation	He and Wong (2004)
Product, Delivery, Process, System, and	Koch and Hauknes (2005); Hamel (2006)

Strategy	
Product, Process, Organisation, Management, Commercial	Wang and Ahmed (2004) ; Trott (2008)
Product innovation, Market innovation, Process innovation, Behavioural innovation, and Strategic innovation.	Liao et al. (2012); Ellonen et al. (2008)
Total innovation, Expansionary innovation, and Evolutionary innovation,	Walker (2007)
Administrative and Technological innovation	Huang and Li (2009)
Product, Process and Administrative innovation	Samson (1991); Gadrey et al. (1995); Goffin and Pfeiffer (1999); Edquist et al. (2001); Damanpour and Schneider (2006)
Innovation speed and innovation Quality	Wang and Wang (2012)
Product, Process and Ancillary / collaborative Innovation	Gonzalez et al. (2013)
product, process and organisational innovation	Elsetouhi et al. (2015)

### 2.1.3 The Importance of Product and Process Innovation

There has been an increasing evidence regarding the role of innovation in the success of the organisations (Martins and Terblanche, 2003; Hovgaard and Hansen, 2004; Patterson et al., 2009; Yesil and Sozbilir, 2013). Innovation is widely recognised for its importance as the main determinant of organisational success and competitiveness (Thornhill, 2006; Palangkaraya et al., 2010; Wonglimpiyarat, 2010; Yesil and Sozbilir, 2013). Innovation therefore is seen as one of the key competitive advantages that organisations must acquire in the twenty-first century (Gudmundson et al., 2003; Hovgaard and Hansen, 2004; Rujirawanich et al., 2011). Recently organisations are paying attention to their human resources to produce innovative behaviours and consequently innovation (Scott and Bruce, 1994; Carmeli et al., 2006; Patterson et al., 2009), because innovation derive from the ideas that come from the individuals in the workplace (Neely and Hii, 1998; Patterson et al., 2009). Firms depend on their employees with creative ideas and effort (Bharadwaj and Menon, 2000; Sousa and Coelho, 2011).

In addition, there is an acknowledgment that innovation is power for all organisations nowadays (Kamasak and Bulutlar, 2010). Some authors (e.g. Redmond and Mumford, 1993,

Drazin et al., 1999, Walker, 2007, Varis and Littunen, 2010), argued that innovative organisations play a great role in improving individual and organisational performance and solve problems by effecting change and creating opportunities for them. Innovation behaviour is viewed as an essential if organisations are to adapt and respond to rapid and unstable environmental and technological changes and survive in the present environment (Kellermanns et al., 2008; Trott, 2008; Cooper and Edgett, 2009). Other scholars such as Calantone et al. (2002) and Jimenez and Vall (2011) indicated that innovation is associated with organisational learning, and makes organisations keep abreast the developments happen in the environment, and helps them to absorb new and related knowledge. Therefore, organisations that have the capacity to be innovative will be able to respond to challenges and exploit new product and market opportunities more quickly than non-innovative organisations (Schilling, 2010). Still others consider innovation as a key role in supporting the growth of economic, providing organisations with opportunities to grow faster and gain profits (Tidd et al., 2005; Trott, 2008; Tidd and Bessant, 2011). Lagrosen (2005) argued that innovation can provide entry to new markets and enhance the effectiveness of organisations. Cooper (2011) recognised that the goals of ambitious organisations can be achieved through innovation.

With respect of product and process innovation, numerous prior studies (e.g Gudmundson et al., 2003; Hovgaard and Hansen, 2004; De Jong and Hartog, 2007; Rujirawanich et al., 2011) confirmed that both product and process innovation is seen as the core component underlying an organisation's long-term competitive advantage. In the context of European museums, Garrido and Camarero (2010) suggested that product innovation could enhance social performance. Additionally, a study by Pianta (2005) found that managers of organisations feel obliged to make decisions about product innovation in order to increase the quality and variety of their products. A survey of 121 managers of electronics companies in Thailand,

carried out by Ussahawanitchakit (2012), showed that product and process innovation have the ability to improve competitive advantage, profitability, and performance. Vicente-Lorente and Zuniga-Vicente (2012) revealed that the adoption of process innovation, such as new methods and the development of equipment, has had a positive impact on the workforce within industrial companies in Spain. For instance, Morales et al. (2006) found technological innovation, namely product and process, to be a bridge between leadership and performance within pharmaceutical companies in Europe and America.

Furthermore, several empirical studies have provided evidence of the important effects of product and process innovation on performance attributes such as profitability, growth, and effectiveness. Skerlavaja et al. (2010) stated that innovation can be understood through product and process. Menguc and Auh (2006) argued that product and process innovation make organisations proactive in exploring new opportunities in addition to exploiting their current strengths. Liao and Wu (2010) asserted that the two types of innovation that have gained the most attention and been studied empirically the most in the innovation literature are product and process innovation. It is one of the critical success factors for organisational growth and increased profits (Schilling, 2005-2010). Product innovation can respond to unstable environment and create new opportunities for developing effectiveness (Matzler et al., 2008). Organisations with greater product and process innovation capabilities can achieve a better response from the environment and more easily build the capabilities needed to enhance organisational performance (Schilling, 2005; Ahmed and Shepherd, 2010; Jimenez and Vall, 2011). Chen et al. (2012) noted that technical innovation that encompasses both product and process innovation has the ability to improve production and distribution processes. It is argued that, through these types, organisations can reduce the costs of production and become more efficient (Harrison and Samaon, 2002; Mansury and Love, 2008). Dannels (2002) and Bi et al. (2006) indicated that product and process innovation

enable organisations to realise competitive advantage. Tsai et al. (2001) claimed that the influence of product and process innovation can enhance the adaptability of organisations to environmental change and that they are present in organisations where problem solving and creativity thrive. Similarly, Liao et al. (2008) suggested that these two dimensions could determine an organisation's success or failure. They noted that product innovation is followed by process innovation, as part of an industry innovation cycle. Prior literature has reported that at the heart of all types of innovation are product and process (Trott, 2008).

### **2.1.3.1 Product Innovation (PDIN)**

Product innovation has been conceptualised in a variety of ways. For example, Hage and Hollingsworth (2000) defined product innovation as the systematic work process, drawing on existing knowledge gained from research and practical experiences, directed towards the production of new materials, products and devices including prototypes. Valencia et al. (2010) viewed PDIN as the process by which firms produce and develop new products that can lead to organisational success. Cooper and Edgett (2009) clarified PDIN as the novelty of new products introduced to the market in a timely fashion. PDIN can be defined as the development of new products that help the organisation to achieve its goals (Stefanovitz et al. 2010). Damanpour (2009) suggested that PDIN includes new products/services introduced so as to meet an external user or market need. Tasi (2001) saw it as the introduction of new products or services to the market in order to satisfy customers.

Other researchers (e.g., Damanpour and Schneider, 2006; Schilling, 2010) described PDIN as the changes that an organisation offers to the outside world. Trott (2008) argued that PDIN is related to the primary activities of the organisation and can create opportunities for the organisation in terms of expansion into new areas. PDIN allows the organisation to deal with turbulent environments and is considered an important driver of organisations' success in dynamic markets (Damanpour, 2009; Hung et al., 2010; Ooi et al., 2012).

The extant literature shows that there are different perspectives as regards the dimensions of product innovation. For example, Bornay-Barrachina et al. (2012) studied PDIN through the number of improvements and new products developed by a company. On the other hand, Murovec and Prodan (2008) discussed PDIN through the number of products, and the speed of innovation. Whereas, Prajogo and Sohal (2003) focused on the number, speed, and level of product innovation. While, Gumusluoglu and Ilsev (2009) conceptualised two elements of product innovation: the coefficient of innovation tendency, and the success of product innovation. The first criterion represented the ratio of sales generated by product innovation to total sales, whereas the latter was the ratio of sales generated by innovation to expenditure in producing those innovation. In contrast, Vicente-Lorente and Zuniga-Vicente (2012) studied PDIN using the number of product innovation introduced to the market. Alternatively, Ooi et al. (2012) considered the share of sales of products or new services adopted in the last three years as a major construct of PDIN.

Additionally, Tsai (2001) argued that PDIN consists of the profitability and diversity of the products. Ussahawanitchakit (2012) discussed that PDIN can be achieved through the new procedures, and processes within the organisation that influenced the speed and flexibility of production, and on the quality of the production. Correa et al. (2007) assessed PDIN by looking at the number of new and changed products introduced to the market. Pullen et al. (2012) studied PDIN as those products that were new to the developing organisation and new to the market. Conversely, Faems et al. (2005), among others, stated that the number of new products the organisation had promoted is the key attribute of PDIN dimension (Obendhain and Johnson, 2004, Jaskyte and Kisirliene, 2006, Skerlavaja et al., 2010).

### **2.1.3.2 Process Innovation (PSIN)**

The review of the literature shows that there is a variety of definitions of the process innovation. For example, some authors, such as Wong and He (2003), considered PSIN as the

development of new production processes using new equipment and the reengineering of operational processes. Boer and Duing (2001) suggested that PSIN is the change in the way the organisation produces and delivers its offerings. Perri 6 (1993) clarified PSIN as the introduction of new methods so as to facilitate the production of goods and services. PSIN can be described as the introduction of new production, methods, new technologies used to improve production, and new management processes (Wang and Ahmed, 2004). Bi et al. (2006) explained PSIN as the implementation of a new production or delivery method that encompasses changes in techniques, equipment and software. Jaskyte (2004) viewed PSIN as the creation of new modes of service and delivery. Ooi et al. (2012) suggested that PSIN covers organisational aspects that include the improvement of internal operations and capacities. Afuah (1998) demonstrated PSIN as the introduction of new items into an organisation's operations, such as input specifications, equipment, work, and information. PSIN can be defined as a change in the carrying out of an organisation's tasks and targets (Ahmed and Shepherd, 2010).

Broadly speaking, there are different types of process innovation. For instance, Gehlen (1980) suggested two classifications of process innovation; PSIN considered as new market and internal company organisation. Technology process innovation, on the other hand, includes human artifacts that cover instruments and machine. Perri 6 (1993) divided PSIN into practice-related process innovation, which include equipment, and labour administration, whereas technique-related process innovation, which refer to the use of new approaches and new communication methods between organisational members. Following this work, Perri 6 proposed that technique-related PSIN composed of two dimensions: intra-technique and inter-technique innovation. Technique-related process innovation discusses a new use for the same computer in the training of members, while inter-technique innovation that includes the introduction of new inputs.



Moreover, From Damanpour et al.'s (2009) point of view, PSIN can be classified into administrative and technical process innovation. Administrative process innovation includes the motivation and rewarding of employees, the enhancement of the structure of tasks, and the modification of an organisation's management processes (Daft, 1978; Birkinshaw et al., 2008). Technical process innovation contains new factors such as equipment, techniques, tools, and systems that are introduced into an organisation's production system. Further, Damanpour et al. (2009) argued that this type of PSIN not only allows increasing operational flexibility but also decreasing the costs of production. In like manner, Hamel (2006) saw PSIN from two different classifications: operational process innovation, which includes customer services, logistics and procurement, and management process innovation referred to strategic planning, project management and employee assessment.

With regards to dimensions of PSIN, the prior literature indicates that PSIN has been measured from different perspectives, for example, within private companies in China, Shu et al. (2012) adopted two measurements namely: improvements in manufacturing or operational processes and economies in resource consumption to represent INPS. In like manner, Jimenez and Vall (2011), discussed changes in process and the introduction of new processes in Spanish industrial organisations to study PSIN. On the other hand, Avlonitis et al. (1994) used two measures including the introduction of new machinery and methods to represent INPS. Conversely, Yang (2010) assessed PSIN based on the level of PSIN and the number of potential applications or the innovation. On the contrary, Ooi et al. (2012) discussed PSIN from the point of view of the production lead time and employee productivity. However, Vicente-Lorente and Zuniga-Vicente (2012) focused on the acquisition and improvement of new equipment and new methods to represent PSIN.

## **2.2. Determinants of Innovation: Knowledge Sharing and Social Capital**

This section considers the literature on knowledge sharing and social capital as the critical resources affecting the firms' product and process innovation. This review is relevant to the present study as it allows the researcher to understand the mechanism (indirect effects) whereby the organisational context increase product and process innovation. In this sense, it was acknowledged that the organisational context (OC, OS and IT) indirect effect takes place through the social capital and knowledge sharing. The section begins by discussing the theoretical foundations underpinning this approach and second identifies the critical resources affecting innovation, product and process in section (2.2.1).

Section (2.2.2) is a review of the literature on knowledge sharing. This section is structured as follows: subsection (2.2.2.1) describes the nature and definition of knowledge, types of knowledge, and knowledge management. Subsection (2.2.2.2) addresses knowledge sharing as the core research area of the study. The discussion starts with definition of KS, followed by a discussion of knowledge sharing processes. This section ends with a discussion of the importance of knowledge sharing on innovation. Section (2.2.3) reviews the literature on social capital and is split up into the following four sub-sections: Subsection (2.2.3.1) presents the definition of social capital. Subsection (2.2.3.2) discusses the components of social capital, and followed by discussion of the importance of social capital on innovation in subsection (2.2.3.3). Section (2.2.4) reviews the the importance of social capital on knowledge sharing. Section (2.2.5) discusses Knowledge sharing and social capital in public and private organisations.

### **2.2.1 Theoretical Basis**

Reviewing the literature on innovation and knowledge management has revealed that several studies were based on the fundamental premise that organisational resources and capabilities

are those that underlie and determine a firm's capacity for innovation. Within this perspective, organisational resources (tangible and intangible) are taken to provide the input that in turn is combined and transformed by capabilities to produce innovative forms of competitive advantage (Abu Bakar and Ahmad, 2010). The following sections describe the resource-based view (RBV) and the knowledge-based view (KBV) theories with a link to this research.

#### **2.2.1.1 A Resources-Based View Approach**

The origin of the resource-based view (RBV) of the corporation stems from Penrose (1959), when Edith Penrose was highlighting the competitive position of the firm can be achieved by resources (Wernerfelt, 1984; Newbert, 2007). Rubin (1973) argued that the firm was conceptualised as a set of resources clarified that:

*“The firm is viewed as a collection of particular resources, that is, resources worth more to the firm than their market value because of specialised experience within the firm” (P, 936).*

According to these perspectives, Wernerfelt (1984) was the first researcher who seeks to formalise the RBV and acknowledged that procuring resources may increase profits of the corporations which would be significant in improving product development. Newbert (2007) criticized the work of Wernerfelt as did not capture much attention owing to its abstract nature. Later, Prahalad and Hamel (1990) added value for the RBV through including the use of the corporation's core competence such as technologies, knowledge and inimitable skills, as the main component in achieving competitive products. In the meanwhile, Barney (1991) stated the terminology of sustained competitive advantage and suggested that the corporation's sustained competitive advantage can be achieved by valuable, rare, inimitable and non-substitutable resources.

On the other hand, Newbert (2007) critics work of Barney (2001) which constructed his argument based on the assumption that the effective exploitation would automatically

enhanced, once the corporations obtains the appropriate resources. However, it is debated that a competitive advantage cannot achieved by obtaining reasonable resources, it is rather the firm's competence to effectively allocate and use them that count (Mahoney and Pandian 1992). In this regard, the ability to fully exploit the resources (not just acquire them) are important for firms that seeking competitive advantages (Newbert, 2007). The firm's resources and capabilities and the competitive advantage represent the main concepts of the RBV. Barney (1991) and Barney (2001) have taken RBV approach and considers that corporation' resources comprise all tangible and intangible assets and capabilities controlled by the firm, which enable a firm to formulate and implement strategies that lead to its performance. It includes the assets, capabilities and knowledge.

Barney (2001) categorised the corporation resources into three groupings, including; physical, organisational and human capitals. First, physical capital implies the firm's technology, equipment, location and raw materials. Second, organisational capital on the other hand referred to firm's formal and informal planning, coordination systems and relationships. Third, human capital however, defined as training, experience and employees' relationships. With respect to the competitive advantage, it is argued that a corporation can be considered as having a competitive advantage when the latter implements unique strategy that is not reproduced by its competitors (Barney, 2001). This can be sustained when the firm is capable to retain its advantage even after rivals duplicated their efforts and resources.

Accordingly, SC can be considered as an organisational resource that is embedded in dyadic or network relationships involving resource exchange and KM activities (Nahapiet and Ghoshal, 1998; Hau et al., 2013), and knowledge can be considered as a resource that is always located in an individual or a collective, or embedded in a routine or process (David et al., 2000; Kim et al., 2013).

By linking the RBV rationale with SC literature, SC is a valuable organisational resource because it facilitates the individual interactions necessary for collective action (Leana and Van Buren, 1999). Knowledge is seen as socially constructed and embedded in the social context; some knowledge management scholars have even argued that SC is a key mechanism for achieving knowledge sharing (Chow and Chan, 2008; Van den Hooff and Huysman, 2009; Kim and Lee, 2010). Moreover, the social dynamics derived from interpersonal and group relationships are a primary determinant of KS and knowledge creation (Van den Hooff and Huysman, 2009). It argued that SC is an organisational resource that can facilitate employees' KS within organisations (Wernerfelt, 1984; Barney, 1991). Therefore, social dynamics among individuals are the most important factors in employees' contributions to organisational knowledge repositories (Nahapiet and Ghoshal, 1998; Van den Hooff and Huysman, 2009). Since KS is a sensitive behaviour, close interpersonal relationships are needed to encourage employees to collect and donate their knowledge. From the resource-based view, stronger social interaction ties (structural SC), social trust (relational SC), and shared goals and visions (cognitive SC) are critical organisational resources that may increase both KC and KD of organisation employees.

In addition, according to the resource-based view, organisations that are proficient in obtaining and applying knowledge are more likely to be unique and rare, making them difficult for rivals to replicate; such firms have the most potential for sustaining a high level of innovation. The goal of employees' KS behaviours is the transfer of all employees' experiences, knowledge, skills, information, and/or expertise to organisational capabilities (i.e. its assets). The more social capital that is transferred to organisational assets, the better innovation (Abu Bakar and Ahmad, 2010).

By linking the RBV rationale with KS literature, Edwards et al. (2009) viewed that knowledge can and should be managed emerges most obviously between those who advocate

a resource-based view of the corporation. The RBV offers a theoretical perspective in studies in which KS are embedded, facilitating the understanding and assessment of the full range of an firms' resources. According to the RBV, firms might create resources in one organisational unit and then use them in other units, meaning resource sharing or transfer within the boundaries of that firm. Along similar lines, organisational ability uses knowledge as a source of sustainable competitive advantage that can increase product and process innovation (Gopalakrishana and Bierlyb, 2001; Kandampully, 2002). Furthermore, according to Hinds et al. (2001) it is important for organisations to consider how share knowledge among employess, so the firms attempt to confirm and use knowledge-based resources that already available in the firm (Damodaran and Olphert, 2000; Davenport and Prusak, 2000; Cabrera and Cabrera, 2005). Therefore, in order to make the best exploit of knowledge exist in firm and develop the best value, this study aims to apply the RBV through SC to support KS, both SC and KS to encourage innovation and to investigate organisational context (OC, OS and IT) as a dimension affecting social capital, knowledge sharing and innovation.

#### **2.2.1.2 A Knowledge -Based View Approach**

The knowledge-based view (KBV) colloquially builds on Sir Francis Bacon's "knowledge is power". Grant (1996) argued that "if we were to resurrect a single-factor theory of value... then the only defensible approach would be a knowledge based theory of value, on the grounds that all human productivity is knowledge dependent, and machines are simply embodiments of knowledge" (p112). The knowledge-based view purports that knowledge is the key resource to sustained competitive advantage (Grant, 1996). In the new economy, knowledge has a strategic position in creating a firm's value; this encourages the researchers to develop the KBV. It assumes that knowledge is the main source of a firm's outcomes. Knowledge is a unique resource (Kogut and Zander, 1992; Nonaka, 1995). Other researchers (e.g., Conner and Prahalad, 1996; Grant, 1996; Zheng et al., 2010) argued that The KBV of

the organisation is at the centre of the RBV, indicating that the most important source of an organisation's sustainable competitive advantage is its ability to create and utilise knowledge (Prahalad and Hamel, 1990; Kogut and Zander, 1992; Nonaka, 1995; Grant, 1996). This view is supported by other researchers such as Nonaka (1991), who argued that successful firms are then those with the ability to consistently create new knowledge, disseminate it throughout the organization, and quickly embody it in new technologies and products. Moreover, knowledge is a key source for competitive advantage which is translated into innovation (Kandampully, 2002). Successful innovation relies on the amount of knowledge possessed by the firm. The KBV gives a new view for the implications of product and process innovation (Gopalakrishana and Bierlyb, 2001).

The KBV indicates that to access and utilise knowledge owned by employees, it is important to understand the organisational processes (Grant, 1996). It has developed the view of the firm as a bundle of resources from the RBV, focusing on the most strategically valuable and perhaps the only source of competitive advantage and one definition of a firm is "an institution where the issues of creating, acquiring, storing and deploying knowledge are the fundamental organisational activities" (Grant and Baden-Fuller, 1995; Grant, 1996). There have been few theoretical contributions on the nature and major assumptions to theoretically frame and empirically test the KBV.

Grant (1996) confirmed that the challenge of the KBV is effective coordination among organisational members, as their knowledge is specialised and needs to be integrated. The KBV is described as an emerging theory of the existence, organisation and competitive advantage of the firm, which is founded on the role of organisations in creating, storing and applying knowledge (Grant and Baden-Fuller, 1995). According to Minbaeva et al. (2003) this knowledge will have competitive effects when they are difficult to be replicated by competitors. It is argued that knowledge is embedded in and present throughout

organisational culture, policies, practices, systems and individuals (Michailova and Minbaeva, 2012).

Several researchers (e.g., Grant and Baden-Fuller, 1995; Grant, 1996), identified four main assumptions of knowledge in the KBV: Firstly, from the value added prospective, Knowledge is the key productive resource of the firm in terms of contribution to value added and strategic significance. Secondly, from different type of knowledge prospective, Knowledge comprises information, technology, know-how, and skills. Different types of knowledge vary in their transferability. Transferring tacit knowledge as compared to transferring explicit knowledge is costly and slow. Thirdly, from subject to economies of scale and scope prospective, Knowledge is subject to economies of scale and scope: initial creation of knowledge is more costly than its subsequent replication. Fourthly, from cognition prospective, Knowledge is created, acquired and stored by individuals. Due to the cognitive and time limitations of human beings, individuals must specialise in their ability to create, acquire and store more knowledge. Lastly, from knowledge application prospective, the creation of value for the organisation typically requires the application of numerous different types of specialised knowledge.

Knowledge-based view of the firm suggests that organisations are best viewed as ‘a social community specialising in speed and efficiency in the creation and sharing of knowledge’ (Kogut and Zander, 1996: 503). The social capital inherent in the social relations within an organisation can, therefore, be regarded as a potentially critical asset in maximising organisational advantage. Where there are high levels of collaboration and good will among organisation members, which increase knowledge and stimulating innovation (Nahapiet and Ghoshal, 1998; Perry-Smith and Shalley, 2003; Andrews, 2010).



By linking the KBV rationale with KS literature, the KBV treats KS through the organisational capacity to integrate knowledge within existing structures of the organisation and share the integrated knowledge between individuals (Michailova and Minbaeva, 2012). It stresses the significance of considering knowledge characteristics. For example, it is argued that identifying motivational factors and knowledge-related factors that create internal “stickiness” of knowledge in organisations and impede their internal sharing can explore the knowledge characteristics that influence the degree of knowledge sharing (Szulanski, 1996). Michailova and Minbaeva (2012) indicated that knowledge sharing does not happen automatically, it may require substantial organisational efforts aimed at enhancing close relationships among individuals. Accordingly, organisations should invest in systems which are symbolised by continuous social interactions, communication of ideas, sharing of knowledge and other acts associated with the social character of learning (Minbaeva et al., 2003). The KBV considers the organisation as a set of knowledge-assets and the role of the organisation is creating, organising and deploying these assets to create value from them (Grant, 1996). The knowledge-based view recognises that knowledge is a valuable resource of organisations (Nonaka and Takeuchi, 1995, Nonaka and Toyama, 2005). According to the knowledge-based view, when knowledge can be shared among organisational members through donating and collecting, the stock of knowledge will be made available, and this will help to generate new ideas, which in turn can improve product and process innovation (Liao and Wu, 2010, Ferraresi et al., 2012, von Krogh et al., 2012, Wang and Wang, 2012). Also, organisational context can be perceived as the organisation’s plan of deploying and sharing knowledge assets. Thus, to better understand knowledge as a competitive resource and link it with KS and innovation, this study aims to extend the KBV in the context of KS.

Overall, it is recognised that the integration of both social capital and knowledge sharing as the most important resource of organisations allows firms to increase their innovation (Kim

and Lee, 2010; Mura et al. 2013; Akhavan and Hosseini, 2016). The RBV and KBV have recently become recognised and was mentioned in several recent research articles (Kim and Lee, 2010; Kim et al., 2013). Therefore, based on this discussion, the inclusion of the relational resources in the proposed research can be supported and justified by the “RBV and KBV”. Having discussed the theoretical approach underpinning this study’s conceptual model, the next two sections reviews knowledge sharing and social capital factors and their affecting on innovation and tested in previous empirical studies.

### **2.2.2 Knowledge Sharing**

In order to study knowledge sharing, it is important to establish the deep understanding of the nature of knowledge and how those natures impact the way in which knowledge is shared. Hence, the following section will discuss the main concept of knowledge and knowledge management as a basis to study knowledge sharing in the organisation.

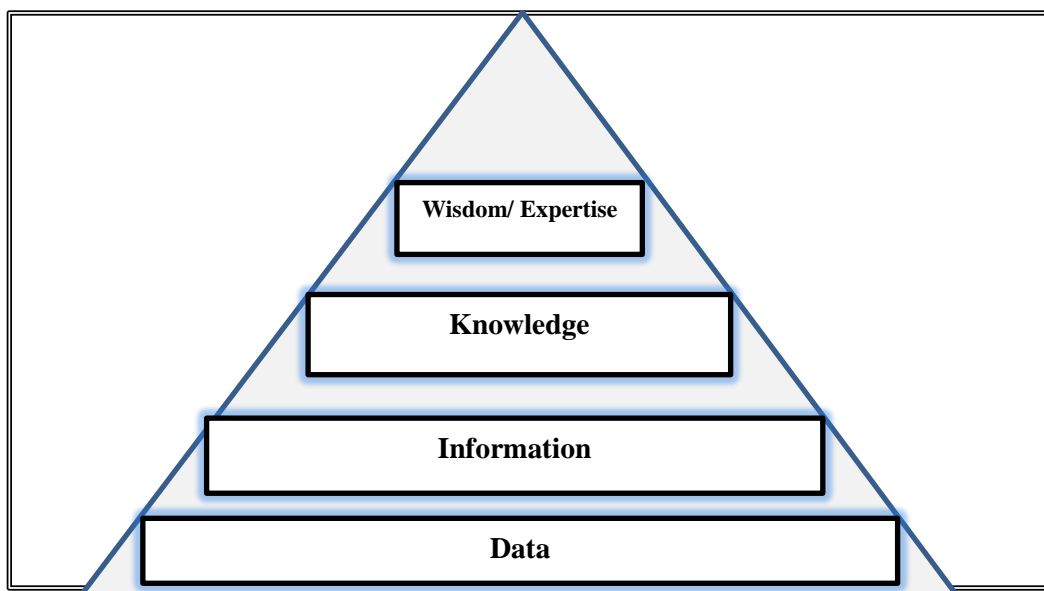
#### **2.2.2.1 Knowledge and Knowledge Management**

In recent years, the concept of knowledge in organisations has become increasingly popular in the literature (Alvesson and Karreman, 2001; Ipe, 2003), with knowledge being recognised as the most important resource of organisations (Spender and Grant, 1996; Nahapiet and Ghoshal, 1998). Although knowledge has always been an important factor in organizations, only in the last decade has it been considered the primary source of competitive advantage (Stewart, 1997; Lee and Choi, 2003; Wang and Noe, 2010) and critical to the long-term sustainability and success of organisations (Nonaka and Takeuchi, 1995; Ipe, 2003). The recognition of knowledge as the key resource of today’s organisations affirms the need for processes that facilitate sharing of individual and collective knowledge (Drucker, 1993; Berra-Fernandez and Sabherwal, 2001; Ipe, 2003).

### 2.2.2.2 What is Knowledge? The Knowledge Hierarchy

Addressing the question regarding the nature of knowledge is a difficult task (Davenport and Prusak, 1998; Bhatt, 2000; Marzec, 2013). The review of the literature has made a plethora of definitions and viewpoints in order to answer this question (Marzec, 2013). However, the term of a Knowledge Hierarchy presents a systematic and logical lens to illustrate and categorise these meanings. The origin of the Knowledge Hierarchy comes from Ackoff (1989) who suggested the DIKW hierarchy model- Data, Information, Knowledge, and lastly Wisdom. The knowledge hierarchy is widely used to conceptualise knowledge. The hierarchy represents the common notion of knowledge development in which data is converted into information and information is converted into knowledge, which eventually develops into wisdom (Hick et al., 2007). As depicted in Figure 2.1, each phase of the hierarchy is dependent upon the phase below it.

**Figure 2.1: The Knowledge Hierarchy**



Source: Based on (Newell et al., 2009, p.3)

Ackoff (1989) defined data as “symbols that represent properties of objects, events and their environment” (p3). Somewhat more pragmatically, Carayannis (1999) described it as text or facts such as those generated through MRP reports. Given its simplicity, data itself does not

represent knowledge. Turban et al. (2010) defined information as data that are organised and analysed in a meaningful way. Alavi and Leidner (1999) stated that knowledge is not radically different from information, but Pearlson and Saunders (2006) illuminated the difference and define Knowledge as a mixture of contextual information, experience, rules and values. David et al. (2000) viewed data as raw or unabridged descriptions or observations about states of past, present, or future worlds; information as patterns that individuals find or imbue in data; and knowledge as a product of human reflection and experience. Some authors distinguished between the two terms (e.g., Blackler, 1995; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998; Pemberton, 1998), whereas others used both terms synonymously (e.g., Kogut and Zander, 1992; Stewart, 1997). This research recognises the distinction between information and knowledge. Davenport and Prusak (1998) defined knowledge as “a fluid mix of framed experience, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information. It originates in and is applied in the minds of knowers” (p. 5). Nonaka and Takeuchi’s (1995) definition of knowledge is far broader in scope and is stated as “a dynamic human process of justifying personal belief toward the truth” (p. 58). According to these authors, information is the “flow of messages” (p. 58), and knowledge is created when this flow of messages interacts with the beliefs and commitments of its holders. They identified three characteristics that distinguished information from knowledge. First, knowledge is a function of a particular perspective, intention, or stance taken by individuals, and therefore, unlike information, it is about beliefs and commitment. Second, knowledge is always about some end, which means that knowledge is about action. Third, it is context specific and relational and therefore it is about meaning. The final phase of the hierarchy constitutes *wisdom /expertise*, for example fast and accurate advice, reasoning, and the justification of result (Carayannis, 1999).

### **2.2.2.3 Types of Knowledge**

The review of the literature has identified a plethora of knowledge classifications. For example, Hansen et al. (1999) suggested two classifications of knowledge; codified knowledge which is available in written documents and manuals, procedures, whereas non-codified knowledge that is acquired through experience. A similar view is that of Conklin (1997), who has divided knowledge into formal knowledge, which is gained from books and manuals and is easily shared, while informal knowledge is obtained through social interaction among employees at workplace. However, others, such as Nonaka, (1994); Nonaka and Takeushi (1995); DeLong and Fahey (2000); Alavi and Leidner (2001); Popadiuk and Choo, (2006) distinguished between individual knowledge which is created by and exists in the individual according to her beliefs, attitudes, opinions, and the factors that influence her personality formation, and social knowledge which is created by and resides in the collective actions of a group. It involves the norms that guide intra-group communication and coordination. Considering a particular context, collective knowledge could be related to cultural knowledge.

Further categorisation of knowledge was provided by Grant, 1996; Zack, 1999; Carayannis, 1999; Alavi and Leidner, 2001; Fernandez et al. 2004; Anand et al., 2010), who identified a number of different categories, including Declarative (Know-about), Procedural (Know-how), Causal (Know-why), Conditional (Know-when) and Relational (Know-with). Whereas, Zack (1999) and Blackler (1995), among others, saw knowledge from five different classifications: knowledge as Endbrain (conceptual skills and abilities), Embodied (acquired by doing), Encultured (acquired through socialisation), Embedded (organisational routines) and Encoded (sign and symbols). Christensen (2007), on the other hand, suggested four types of knowledge: professional, coordinating, object-based knowledge, and know-how knowledge.

In addition, Yahiya and Goh (2002) viewed knowledge as composed of two dimensions: individual knowledge, and organisational knowledge. Whereas the former category of knowledge relates to cognitive understanding, the latter pertains to knowledge which is formed by means of interaction with technology, techniques, and people. The individual knowledge, which is sometimes referred to as personalised knowledge, is problematic, due to its tacit nature, whereas that of organisational knowledge is relatively easy, due to its being explicit. Mathew's (2008) divided knowledge into three types; factual knowledge (It is based on knowing the facts), situational knowledge (It acquired about a particular situation) and social knowledge (It emphasizes on social issues for example social networks and relationships). From Lundvall and Johnson's (1994) point of view, knowledge can be classified into know what (about fact), know why (About the principles and laws), know how (about the skills and actions needed for task) and know who (about who knows what and how).

Other studies explored further properties of knowledge. For example, Uzzi and Lancaster (2003) and Marouf (2007) argued that knowledge can be classified into public and private knowledge: Public knowledge defined as the knowledge reported through standard instruments such as company reports, audited financial statements, regulatory filings, advertised bid and ask prices, price quotes, and other forms of prepared information accessible in the public domain. Private knowledge, on the other hand, defined as knowledge that is not publicly available or guaranteed by third parties. Rather, it is "soft" information that deals with idiosyncratic and non-standard information about the firm, such as unpublished aspects of a firm's strategy, distinctive competencies, undocumented product capabilities, inside management conflict, etc.

Despite the different perspectives on the types of knowledge given above, there is a common agreement among scholars and researchers that the distinctions of tacit and explicit

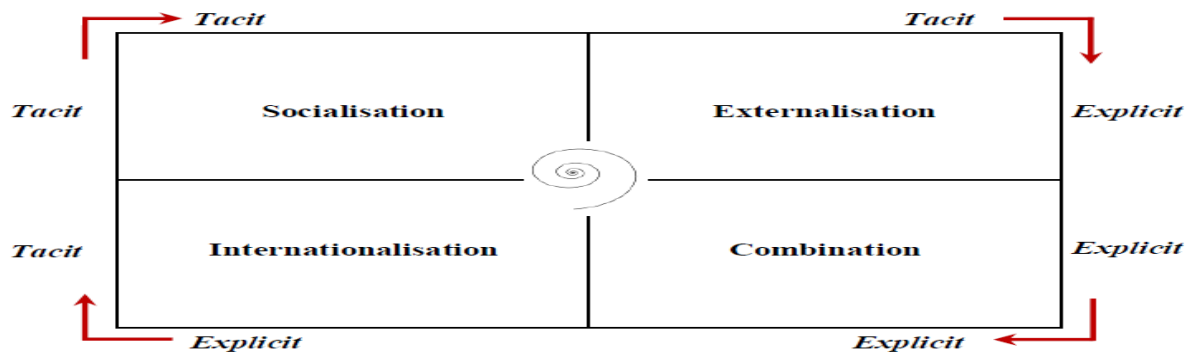
knowledge remain the most common and practical (Nonaka and Takeuchi, 1995 and Fernie et al., 2003), which are of particular interest to this research. The origin of this classifications stems from Polanyi (1967), and later used in organisational context by Nonaka and Takeuchi (1995). Tacit knowledge can be characterised as subjective, intuitive and difficult to be passed and communicated with others (Yahya and Goh 2002; Hislop, 2005). Tacit knowledge is a highly personal, intangible and embedded in the minds of people (Polanyi, 1967 cited in Nonaka, 1994). It is obtainable through learning and experience, social interaction among individuals and practical application and work practices, and can be also transferred and demonstrated by observing (Polanyi, 1967; Nonaka, 1991; Sanderson, 2001, Gibbert et al., 2002; von Krogh et al., 2012). The tacit dimension is based on experience, thinking, and feelings in a specific context, and is comprised of both cognitive and technical components. The cognitive component refers to an individual's mental models, maps, beliefs, paradigms, and viewpoints. The technical component refers to concrete know-how and skills that apply to a specific context (Nonaka et al 2000; Nonaka et al 2006; Popadiuk and Choo, 2006). Tacit knowledge is dynamic and internalized within its holders; it is embedded within actions, values, ideals and commitments (Nonaka et al., 2000). Tacit knowledge can be constituted great value to the organisations (Koulopoulos and Frappaolo, 1999; Marwick, 2001; Minbaeva and Michailova, 2004). It can be an essential source of sustainable competitive advantage in companies (Teece, 1996; Jashapara, 2003; Chen and Edgington, 2005). It is believed to be a product of learning from experience that leads to intellectual capital and performance (Sternberg and Wagner, 1993; Nonaka and Takeuchi, 1995; Armstrong and Mahmud, 2008). It acknowledged that tacit knowledge is vital to getting things done and is the key to organisational tasks, for example generating new knowledge, creating new products, and improving procedures, which in turn leads to innovation at workplace (Seidler-de Alwis and Hartmann, 2008).

The explicit dimension of knowledge, on the other hand, is the type of knowledge that can be formally and systematically stored, articulated, and easily disseminated among individuals within the workplace through certain codified forms and records such as protocols, checklists, guidelines, reports, files, or other tangible forms (Polanyi, 1967 cited in Nonaka, 1994; Choi and Lee, 2003; Uriarte, 2008; Von Krogh et al., 2012). Scholars believed that this type of knowledge is that it is easy to share and can be reused to solve similar problems (i.e. Kumar et al., 2013).

Tacit and explicit knowledge are complementary, which means both types of knowledge are essential to knowledge creation (Alwis and Hartmann, 2008; Kamasak and Bulutlar, 2010). According to Nonaka's knowledge creation (SECI) model, an enterprise creates knowledge through the interactions between explicit knowledge and tacit knowledge (Richtner and Ahlsrom, 2010). Explicit and tacit knowledge grow in both quality and quantity during this process of knowledge conversion (Esterhuizen et al., 2012). The conversion of tacit and explicit knowledge is a social interaction and communication between those individuals who would like to use and employ expertise and those individuals who have it (Jackson and Erhardt, 2004; Popadiuk and Choo, 2006). Knowledge conversion occurs in four modes: *socialisation, externalisation, combination and internalisation* (Nonaka, 1994; Nonaka and Takeuchi, 1995; Nonaka et al., 2000; Richtner and Ahlsrom, 2010). Figure (2.2) illustrates SECI model adapted from Nonaka and Takeuchi.



**Figure 2.2: The SECI Model**



Source: Nonaka and Takeuchi (1995; p, 62)

- Tacit to tacit (socialisation) is the process by which individuals acquire tacit knowledge by sharing experiences through observation, imitation and practice thereby creating tacit knowledge such as shared mental models and technical skills. Socialization is required for individuals to interact with one another (Richtner and Ahlstrom, 2010). On-the-job training, seminars, discussions, informal meeting are a common example of socialisation.
- The process of articulating tacit knowledge to explicit concepts is called externalisation. This is triggered by a dialogue among employees in an organisation where concepts or models are created to generate an understanding of what is going to be developed (Richtner and Ahlstrom, 2010). One example of externalisation is the use of metaphors in dialogues and concept creation.
- Explicit to explicit (combination) is the process of combining different kinds of explicit knowledge. The processes of adding, sorting and re-categorising explicit knowledge to create new knowledge. The creation of manuals, documents, and databases are examples of combination (Richtner and Ahlstrom, 2010).
- Explicit to tacit (internalisation) is the process of embodying explicit knowledge as tacit knowledge. Internalisation occurs as different employees share mental models and technical know-how. For explicit knowledge to be turned into tacit it is often

helpful if the knowledge is verbalised in manuals, oral stories or documents.

Internalisation is often referred to as the process of “learning-by-doing”.

Based on above discussion, it should be noted that knowledge sharing is most important for all knowledge conversion to succeed (Nonaka, 1994). Nonaka (1994) further explained that the key to success of knowledge sharing was ultimately organisational context support (Section 2.3.8, below details the importance of organisational context for knowledge sharing).

#### **2.2.2.4 Knowledge Management (KM)**

The field of knowledge management has traditionally been dominated by information technology and technology-driven perspectives (Davenport et al., 1998; Gourlay, 2001). However, there is increasing recognition of the role of individuals in knowledge management processes and a growing interest in the “people perspective” of knowledge in organisations (Earl, 2001; Stenmark, 2001). The key to successfully managing knowledge is now being seen as dependent on the connections between individuals within the organisation (Brown and Duguid, 1991; McDermott, 1999). Increasing empirical evidence also points to the importance of people and people-related factors as critical to knowledge processes within organisations (e.g., Quinn et al., 1996; Andrews and Delahaye, 2000).

As for knowledge management definition, despite the definition of KM concept has attracted much attention from both academicians and practitioners, no generally acceptable definition of the concept has yet been found. Several researchers (e.g., Yahya and Goh, 2002; Egbu, 2004) argue that defining the concept of knowledge management is very complex, because different perspectives can yield different dimensions and meanings. Table 2.3, summarises the definitions KM from the extant literature.

**Table 2.3: Definitions of Knowledge Management**

<b>Author (s)</b>	<b>Definition</b>
Davenport and Prusak (1998)	<i>KM draws from existing resources which organisations already have in place in terms of sound IS management, organisational change management, and human resources management practices.</i>
O'Dell and Grayson (1998)	<i>KM is “a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve Organisational performance”</i>
Swan et al. (1999)	<i>“... Any practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations”</i>
Skyrme (1999)	<i>“The explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use and exploitation, in pursuit of organisational objectives”</i>
Scarborough et al. (1999)	<i>KM as process of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations</i>
Beijerse (2000)	<i>The achievement of organisational goals by making the factor knowledge productive</i>
Mertins et al. (2001)	<i>“... All methods, instruments and tools that in a holistic approach contribute to the promotion of core knowledge processes”</i>
Bollinger and Smith (2001)	<i>KM as the activities used to generate, communicate and exploit usable ideas among organisational members for personal and organisational benefits.</i>
Newell et al. (2002)	<i>“... Improving ways in which firms facing highly turbulent environments can mobilize their knowledge base (or leverage their knowledge assets in order to ensure continuous innovation”</i>
Ipe (2003)	<i>KM is a set of procedures, infrastructures, and technical and managerial tools that facilitate the creation, sharing, and application of knowledge within an organisation.</i>
Jashapara (2004)	<i>KM as “the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation’s intellectual capital and performance.</i>
Massa and Tsesta (2009)	<i>KM as including people, process, technology and culture.</i>
Liao and Wu (2010)	<i>KM as a process of organising knowledge and making it available to decision makers.</i>
Yang (2011)	<i>KM as a process of creating, disseminating, and applying organisational knowledge such as to exploit new opportunities and enhance the performance of the organisation.</i>
Liao et al. (2011)	<i>KM refers to the process of creating, sharing and applying knowledge resources</i>
Zaied et al. (2012)	<i>KM processes, namely acquisition, conversion, storing, and protection, can enhance organisational performance.</i>
Hus (2012)	<i>KM as doing what is needed to get the most out of knowledge resources, including both explicit and tacit knowledge</i>

The current study however, finds the definition which is presented by Jashapara (2004), which represents the human resource process perspective, to be the most helpful. According to such researcher, knowledge management can be defined as “the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation’s intellectual capital and performance” (p. 12). Thus, this integrated approach emerges as a more relevant view for this study, given the nature of the phenomena under

investigation. Therefore, this study argues that both IT and human resource perspectives need to be embraced for an effective of knowledge sharing at workplace. Researchers (e.g., Lee and Choi, 2003; Jashapara, 2004; Anumba et al., 2005) noted that the integrated IT and human resource has found widespread acceptance in the literature which offers the greatest scope to deliver real benefits and values. As Jashapara (2004) and Lee and Choi (2003) argued that the effective knowledge management requires a symbiosis between explicit and tacit knowledge in line with both human resource practices and technology.

With respect to knowledge management process, over the last decades, a growing interest for the knowledge processes has been experimented. Many theoretical models have emerged to explain knowledge management processes. Table (2.4) summarises the knowledge management processes developed from literature.

**Table 2.4: The Knowledge Management Process**

<b>Authors</b>	<b>Knowledge Management Processes</b>
Nonaka and Takeuchi (1995)	<i><b>Socialization, Externalization, Combination and Internalization</b></i>
Leonard (1995)	<i><b>Knowledge acquisition, Knowledge collaboration, Knowledge integration and Knowledge experimentation.</b></i>
Spender (1996)	<i><b>Knowledge creation, Knowledge transfer and Knowledge use.</b></i>
Demarest (1997)	<i><b>Knowledge construction, Knowledge embodiment, Knowledge dissemination, Knowledge use.</b></i>
Teece (2000)	<i><b>Knowledge creation, Knowledge transfer, Knowledge assembly, Knowledge integration and Knowledge exploitation.</b></i>
Bhatt (2001)	<i><b>Knowledge creation, Knowledge validation, Knowledge formatting, Knowledge distribution, and Knowledge application.</b></i>
Gold et al. (2001)	<i><b>knowledge acquisition, knowledge conversion, knowledge application, and knowledge protection</b></i>
Lee and Hong (2002)	<i><b>Knowledge capture, knowledge development, knowledge sharing and knowledge utilisation</b></i>
Yahya and Goh (2002)	<i><b>Knowledge generating, Knowledge accessing, Knowledge representing, Knowledge embedding, Knowledge transferring and Knowledge using.</b></i>
Bock et al. (2005)	<i><b>Knowledge Capture, Knowledge sharing, Knowledge storage, and Knowledge use</b></i>
Cui et al. (2005)	<i><b>Knowledge Acquisition, Knowledge sharing and Knowledge application.</b></i>
Monavvarian (2007)	<i><b>Knowledge creation, knowledge capture, knowledge refinement, knowledge storing, and knowledge sharing.</b></i>
Cong et al. (2007)	<i><b>Knowledge identification and capture, knowledge stored, knowledge shared, knowledge application, knowledge creation.</b></i>
Uriarte (2008)	<i><b>Knowledge Creation, Knowledge generation, Knowledge transfer, and Knowledge application</b></i>
King et al. (2008)	<i><b>Knowledge Creation, Knowledge Acquisition, Knowledge Refinement, Knowledge Storage, Knowledge Transfer and Knowledge Sharing and Knowledge utilisation.</b></i>
Gowen et al. (2009)	<i><b>Knowledge Acquisition, Knowledge dissemination, and Knowledge responsiveness.</b></i>
Liao and Wu (2010)	<i><b>Knowledge Creation, Knowledge conversion and Knowledge application</b></i>

Andreeva and Kianto (2011); Awang et al. (2011)	<b>Knowledge Creation, Knowledge documentation and Knowledge storage, Knowledge sharing, and Knowledge application</b>
Liao et al. (2011)	<b>Knowledge creation, Knowledge sharing, and Knowledge use</b>
Mehrabani and Shajari (2012)	<b>Knowledge identification, Knowledge creation, Knowledge collection, Knowledge organisation, Knowledge storage, Knowledge dissemination, and Knowledge application</b>
Ferraresi et al. (2012)	<b>Knowledge Capture, Knowledge sharing, and Knowledge use</b>

All these studies have provided evidence demonstrating the importance of knowledge sharing which called by different name (See section 2.2.2.5) in KM process. The KM extant literature reveals that knowledge is a valuable organisational resource (Howell and Annansingh, 2013). A modern organisation must disseminate and share knowledge in order to survive (Sawhney and Prandelli, 2000; Alavi and Leidner, 2001; Shin, 2004; Howell and Annansingh, 2013). Knowledge sharing confers a competitive advantage (Barney, 1991; Grant, 1996; Liu and Phillips, 2011; Hua et al., 2013) that enhances an organisation's ability to meet customers' diverse and rapidly changing demands (Kim and Lee, 2006; Chen and Cheng, 2012). Other resaerchers noted that knowledge sharing (KS) is critical to a firm's success (Grant, 1996; Akhavan and Hosseini, 2016). Effectively encouraging employees to share useful knowledge across the organisation can increase and sustain a firm's competitive advantages (Grant, 1996; Liu and Phillips, 2011; Akhavan and Hosseini, 2016). KS is widely recognised to be a major focus area for knowledge management cycle and is critical process to the realisation of its success (Bock and Kim, 2002; Holsapple and Jones, 2004, Bock et al., 2005, Halawi et al., 2008, Chatzoglou and Vraimaki, 2009; Seba et al., 2012; Tong et al., 2013; Yesil and Dereli, 2013). The success of any KM initiatives depends on knowledge sharing and getting the right information to the right people at the right time (Chatzoglou and Vraimaki, 2009; Wang and Noe, 2010; Howell and Annansingh, 2013). Eisenhardt and Martin (2000) and Yang and Farn (2009) also indicated that sharing knowledge among employees in the workplace is considered as one of the most important issues for KM success.

Numerous studies on organisation and knowledge management (KM) provided evidence that the effective knowledge sharing can increase the accumulation of organisational knowledge and develop the capacity of the employees to do their jobs and increase their self-knowledge (Xiong and Deng, 2008). Knowledge sharing is an important channel for translating individual knowledge into the strategic resources of an organisation (Hendriks, 1999). Other researchers (e.g., Sawhney and Prandelli, 2000; Alavi and Leidner, 2001; Bartol and Srivastava, 2002; Van den Hooff and De Leeuw van Weenen, 2004; Cabrera and Cabrera, 2005; Howell and Annansingh, 2013) pointed out that the value of knowledge increases during knowledge sharing processes. Knowledge sharing between employees and across teams allows organisations to exploit and capitalise on knowledge-based resources (Cabrera and Cabrera, 2005). Consequently, this study focuses on KS processes, which will be discussed in following sections.

#### **2.2.2.5 Definitions of Knowledge Sharing**

The literature review highlights that Knowledge sharing as a concept is often used interchangeably or used to mean same with other concepts. For example, some authors have gone to the extent of using such a term interchangeably with *knowledge flows* (Gupta and Govindarajan, 2000; Schulz, 2001). While others described KS as *knowledge exchange* (e.g., Cabrera et al., 2006; Wang and Noe, 2010; Nguyen and Mohamed, 2011), whereas other researchers used to mean as *knowledge conversion* (Gold et al., 2001, Liao and Wu, 2010, Allameh et al., 2012) However, a number of studies have also utilised the concept of *dissemination* to explain knowledge sharing (i.e. Bhatt, 2001, Gowen et al., 2009, Mehrabani and Shajari, 2012), also as **Knowledge sharing** such as (Allee, 1997, Bock et al., 2005, Cui et al., 2005, Hsu et al., 2007; Massa and Tsesta, 2009, Huang and Li, 2009, Ling and Nasurdin, 2010, Awang et al., 2011, Andreeva and Kianto, 2011, Ferraresi et al., 2012; Howell and Annansingh, 2013), and others argued that the term of *Knowledge transfer* is sometimes

taken to be synonymous with knowledge sharing in the literature. (e.g. Yahya and Goh, 2002; Yang, 2007; Uriarte, 2008; Massa and Tsesta, 2009).

However, the two terms are different (Wang and Noe, 2010). In an attempt to distinguish between the two concepts, some authors (e.g., Argote and Ingram, 2000; Boyd et al., 2007; Kang et al., 2008; Rhodes et al., 2008; Wang and Noe, 2010; Berggren et al., 2011) argued that *Knowledge transfer* tends to be associated with the application of existing knowledge from one context to another. This implies that the owner is the main source of knowledge and the transfer of knowledge takes place in one direction, from owner to recipient. *Knowledge sharing*, on the other hand, is a broader concept that comprises the interaction, absorption, and creation of new knowledge, which postulates that KS happens in two directions, and among at least two participants (Boyd et al., 2007). The motivation behind presenting this review is to develop a clearer understanding by distinguishing knowledge sharing from other concepts. Therefore the current study use the term “knowledge sharing” when discussing this research.

Knowledge sharing, as a concept, has been the subject of debate and study over many years and yet there is no more agreed definition. Most researchers who study Knowledge sharing have a preferred meaning, related to their area of study. For example, some of the definitions describe KS as a process from one individual, group or organisation to another (Davenport, 1997, McDermott, 1999, Darr and Kurtzbery, 2000, Bartol and Srivastava, 2002, Argote et al., 2003, Ipe, 2003, Hooff and Ridder, 2004, Abdullah et al., 2009, Masrek et al., 2011). Another view about knowledge sharing given by several researchers (e.g., Bock et al., 2005; Lin, 2007; Xiong and Deng, 2008; Sohail and Daud, 2009), which defined knowledge sharing as a culture or behaviour may occur formally among members in a workplace or informally among employees through social interaction. On the other hand, other authors defined knowledge sharing as activities (e.g., Garvin, 1993; Dyer and Nobeoka, 2000; Lee, 2001;

Bartol and Srivastava, 2002; Lee et al., 2010; Jahani et al., 2011; Hitam and Mahamad, 2012; Kim et al., 2013). The table (2.5) summarises the possible definitions of the multiple views on knowledge sharing drawn from the literature.

**Table 2.5: Definitions of knowledge sharing from the Extant Literature**

<b>Authors</b>	<b>Year</b>	<b>Definitions</b>
Von Krogh	2000	<i>KS defined as being essentially a process of capturing a person and organisation's expertise wherever it resides and distributing it to wherever it can help produce the biggest returns for the individual and organisation.</i>
Dyer and Nobeoka	2000	<i>KS defined as the activities that help communities of people to work together, facilitating the exchange of their knowledge, enhancing organisational learning capacity, and increasing their ability to achieve individual and organisational goals.</i>
Darr and Kurtzbery	2000	<i>KS is the process of helping people to acquire knowledge by learning from others' experiences.</i>
Bartol and Srivastava	2002	<i>KS as the sharing of organisational ly relevant information, ideas, suggestions, and expertise with one another.</i>
Ipe	2003	<i>KS as the action of individuals in making knowledge available to others within the organisation.</i>
Argote et al.	2003	<i>KS is the process by which one unit is affected by the experience of another''</i>
Hooff and Ridder	2004	<i>KS is the process by which knowledge is exchanged and created at the same time.</i>
Bock et al.	2005	<i>KS refers to the behaviour of individuals in sharing their knowledge with each other within an organisation</i>
Kim and Lee	2006	<i>KS define as the ability of employees to share their work-related experience, expertise, know-how, and contextual information with other employees through informal and formal interactions within or across teams or work units.</i>
Lin	2007	<i>KS is a culture of social interaction that includes the exchange of knowledge, experiences, and skills among employees.</i>
Xiong and Deng	2008	<i>KS refers to the exchange and communication of knowledge and information between members.</i>
Sohail and Daud	2009	<i>KS represents the exchange and sharing of the events, thoughts, and experiences of people.</i>
Abdullah et al.	2009	<i>KS as a process where the individual exchanges his/her knowledge and ideas through discussions or other forms of social interaction in order to create new knowledge or ideas.</i>
Islam et al.	2010	<i>KS is the process of social exchange that occurs between individuals, from individuals to organisations, and from organisation to organisation.</i>
Wang and Noe	2010	<i>KS refers to the provision of task information and know-how to help others and to collaborate with others to solve problems, develop ideas, or implement policies or procedures.</i>
Lee et al.	2010	<i>KS refers to the interaction of tacit and explicit knowledge that is relevant to the task in hand.</i>
Masrek et al.	2011	<i>KS is described as a process by which individuals mutually exchange their tacit and explicit knowledge and jointly generate new knowledge.</i>
Jahani et al.	2011	<i>KS includes the activities by which knowledge is transferred from one person, group, or organisation to another.</i>
Hitam and Mahamad	2012	<i>KS is the exchange of knowledge, experiences, and skills among members through various departments in the organisation.</i>
Kim et al.	2013	<i>KS is the activity by which information, skills, and insights are exchanged among organisational members.</i>
Zhang et al.	2014	<i>KS is defined as individuals sharing work relevant experiences and information with other colleagues in organizations, teams, or classes.</i>



### **2.2.2.6 Knowledge Sharing Process**

According to Lin (2007) and Kim and Lee (2013) knowledge sharing process referred to how an organization's employees share their work-related experience, expertise, know-how, and contextual information with other colleagues. Broadly speaking, the extant literature shows that there are several types of knowledge sharing processes within an organization. Haas and Hansen (2007), for example, conceptualised knowledge sharing processes as knowledge direct contact between individuals, when one person advises another about how to complete a specific task (e.g., Hansen, 1999; Tsai, 2001; Reagans and McEvily, 2003; Cummings and Cross, 2003; Haas and Hansen, 2007), and knowledge obtain from written documents that may be available in paper or in electronic format (e.g., Hansen and Haas, 2001; Werr and Stjernberg, 2003; Haas and Hansen, 2007). Hendriks (1999) categorised KS processes into knowledge owners who have the knowledge and also called externalisation, and the knowledge receivers who receive the knowledge.

However other researchers such as Kim and Lee (2004; 2006); Bock et al. (2005) and Taminiau et al. (2009) distinguished between formal and informal Knowledge sharing process. Ardichili et al. (2003) suggested that KS consist of a supply of new knowledge and a demand for new knowledge. Such a view is supported by Reid (2003), who differentiated between knowledge seller and a knowledge buyer. Lin (2007) explained KS as the person carrying the knowledge (knowledge carrier) from the one asking for that knowledge (knowledge requester). Hsu et al. (2007) and Xue et al. (2010) supported this view by suggesting that KS processes as knowledge transmission (sending or presenting knowledge to a potential recipient). In addition, Gupta and Govindarajan (2000) defined KS processes as sourcing knowledge and absorbing knowledge. While, others such as Sandhu et al. (2011) and Chen and Hung (2010) explained KS processes as knowledge contributing and knowledge collecting.

Moreover, several researchers also made a distinction between explicit knowledge sharing behaviour and tacit knowledge sharing behaviour (Chow and Chan, 2008; Wang and Wang, 2012; Hau et al., 2013; Chung et al., 2014; Hu and Randel, 2014). Kankanhalli et al. (2005) and Wei et al. (2009), however, divided KS processes into knowledge seeking and knowledge contributors. Weiss (1999), for instance, divided KS processes into the connection of knowledge, which, consists of the knowledge seeker accessing a knowledge source and identifying the needed knowledge, and knowledge collection, which includes the accumulation, storage and recording of knowledge.

Furthermore, other authors such as Chen and Hung (2010) identified a three-dimension of knowledge sharing process that consists of knowledge contributing, collecting, and utilising. Wei et al. (2009) make a distinction between knowledge seeking and knowledge contribution. In line with such thinking, Ipe (2003) and Kuo and Young (2008), discussed knowledge sharing processes as involving both the transmission knowledge includes sending knowledge to the recipients, and the absorption of knowledge reflects the effectiveness of knowledge use. In contrast, Davenport and Prusak (2000) and Hussain et al. (2004) suggested the processes of knowledge sharing based upon a possession and acquisition of knowledge. Tong and Song (2011), on the other hand, illustrated differentiate between voluntary knowledge and solicited knowledge.

Drawing on the above discussions for different perspectives related to knowledge sharing processes, this study combines these perspectives in labelling the two central processes of knowledge sharing (knowledge collecting or receiving, and knowledge disseminating or donating), following the previous studies (e.g., Van den Hooff and De Ridder, 2004; Van den Hooff and Hendrix, 2004; Lin, 2007; Kim et al., 2013, Kim and Lee, 2013; Akhavan and Hosseini, 2016).

Knowledge collecting is defined as the process of consulting colleagues to encourage them to share their intellectual capital (Van den Hooff and De Ridder, 2004; Yesil and Dereli, 2013; Kim and Lee, 2013). That is, knowledge collecting occurs when individuals asking for advice from each other in order to gain intellectual capital (Kim and Lee, 2013; Kim et al., 2013). It also defined as the recipient of knowledge who must consult colleagues through observation, listening or practising so as to encourage them to share their intellectual capital (Hooff and Weenen 2004; De Vries et al., 2006). It implies that the person's willingness to ask for, accept, and adopt new intellectual capital and know-how. It also refers to collective beliefs or behavioural routines related to the spread of learning among colleagues (Kim et al., 2013). Knowledge collecting consists of processes and mechanisms for gathering information and knowledge from internal and external sources (Lin, 2007). Knowledge collecting represents a key aspect of organisations' success because the organisation with proficiency in gathering knowledge is more expected to be unique and rare (Lin, 2007). It is recognised that knowledge collecting takes place when individuals are willing to learn from others (De Vries et al., 2006; Kim and Lee, 2013).

On the other hand, knowledge donating is defined as the process of individuals communicating their personal intellectual capital to others (Van den Hooff and De Ridder, 2004; De Vries et al., 2006; Kim and Lee, 2013; Kim et al., 2013; Yesil and Dereli, 2013). This means that KD is the motivation of individuals to pass on their own intellectual capital to others (Kim et al., 2013; Kim and Lee, 2013). Additionally, knowledge donating refers to the owner of knowledge, and includes listening, talking and observing others, and providing them with information in order to help them develop their self-knowledge and solve job-related problems and improve work efficacy (Reid, 2003; Cummings, 2004; Lin, 2007). Knowledge donating aims to see individual knowledge become group and organisational knowledge over time (Lin, 2007). Thus, the organisation that creates an atmosphere that

encourages organisational members to exchange their knowledge within the group is likely to develop new ideas and enhance organisational outcomes such performance (Hooff and Weenen 2004; Nonaka et al., 2006; Von Krogh et al., 2012; Hislop, 2013). These two processes of KS promote trust and mutual respect as well as facilitate the flow of people's knowledge assets to be capitalised for performance development (Kamasak and Bulutlar, 2010). It is argued that knowledge donating and collecting are linked with organisational learning because learning from others can help generate ideas and enhance organisational performance (Senge, 2006; Seba et al., 2012; Kim and Lee, 2013).

It is clear that the processes of knowledge donating and knowledge collecting have attracted a significant amount of attention of scholars but perhaps not enough and not in all contexts. Therefore, in line with the objectives stated in Chapter 1 the researcher, however, finds the definition which is presented by Hooff and Weenen (2004) and Kim et al. (2013) to be the most helpful for this study. According to such researchers, KS can be defined as a two-dimensional process, with employees sharing and exchanging their tacit and explicit knowledge. Daily interaction creates new knowledge through the process of knowledge sharing, donation and collection.

#### **2.2.2.7 The Importance of Knowledge Sharing for Innovation**

A number of studies demonstrate that knowledge sharing has provided many advantages. In the context of innovation, organisations can enhance their products and services if employees share their knowledge, experiences, and skills within workplace (O'Dell and Grayson, 1998; Alavi and Leidner, 2001; Yang and Chen, 2007). Several researchers (e.g., Davenport and Prusak, 1999; Reid, 2003; Lin and Lee, 2005; Willem and Buelens, 2007; Hsu, 2008; Saenz et al., 2009; Tan et al., 2010; Camelo-Ordaz et al., 2011) demonstrated the importance of knowledge sharing factor to support innovation. As Nonaka (1994) suggested that innovation occurs when employees share their knowledge with the organisation and when this shared

knowledge generates new and common insights. It is also argued that innovation and effectiveness is more likely to be achieved in KM when KS is taken into consideration (Cummings, 2004; Zheng et al., 2009). Along similar lines, Sohail and Daud (2009) found that the outcome of KS is the generation of new knowledge and therefore the enhancement of organisational innovation. Such view supported by previous research who have also insisted that employees' knowledge sharing has positive impacts on firm innovation capability (e.g., Liao et al., 2007; Liu and Phillips, 2011).

Other studies found that there is a link between KS and an organisation's innovation capability (Liao, 2006; Lin, 2007; Saenz et al., 2009; Chen et al., 2010a; Yang, 2011; Mehrabani and Shajari, 2012). Through KS, organisations can develop their skills, and competence, and increase their value (Howell and Annansingh, 2013; Renzl, 2008). Various studies have shown that KS is positively associated with diminishing in production costs, faster completion of new product development projects, team performance, firm innovation capabilities, and firm performance (e.g. Cummings, 2004; Lin, 2007a; Mesmer-Magnus and DeChurch, 2009). In addition, according to Darroch (2005), the capability of a firm to generate innovative commercial ends depends on its ability to manage its knowledge resources (Akhavan and Hosseini, 2016). Furthermore, a firm that promotes employees to do and collect within teams and organisations is likely to generate new ideas and develop new business opportunities, thus facilitating innovation activities (Darroch and McNaughton, 2002; Lin, 2007a ; Akhavan and Hosseini, 2016).

Furthermore, knowledge sharing is one of the most important resources of organisations (Conner and Prahalad, 1996; Grant, 1996; Nahapiet and Ghoshal, 1998; Kamasak and Bulutlar, 2010), permits novel organisational outcomes, including the process of innovation (Kogut and Zander, 1996; Smith et al., 2005; Kamasak and Bulutlar, 2010). Several researchers acknowledged that the employees' knowledge sharing is important determinants

of firms' innovation, product and process (e.g. Cummings, 2004; Lin, 2007a; Mesmer-Magnus and DeChurch, 2009). As a result, knowledge sharing among employees is thought to be among the factors influencing innovation (Akhavan and Hosseini, 2016). Rahimi et al. (2011) found that the creativity of individuals within public organisations in Iran can be improved through knowledge creation, including socialisation, externalisation, combination, and internalisation. There is also increasing evidence that knowledge is a key building block for the innovation process, and in particular for innovation management (Nonaka and Takeuchi, 1995; Darroch and McNaughton, 2002). Akhavan and Hosseini (2016) reported that innovation are closely related to the knowledge sharing. Akhavan and Hosseini (2016) claims that knowledge sharing including knowledge colleting and knowledge donating do play a significant role in enhancing employees to start innovation. Authors (e.g., Skerlavaja et al., 2010; Wang and Wang, 2012) explained that knowledge sharing among employees is essential to assist the organizations' innovation. The authors further stressed that such firms need to encourage employees to sharing their knowledge to increase skills and know how to prompting innovation at workplace. Other researchers (e.g., Tsai, 2001; Dougherty et al., 2002; Jantunen 2005; Michael and Nawaz, 2008; Mehrabani and Shajari, 2012) reported that the knowledge sharing among employees allow firms to develop and implement an effective product and process innovation at workplace.

Several empirical studies indicated that knowledge sharing is one of the most important antecedents alongside other determinants, such as organisational climate, management support, reward system, and information and communication infrastructures, which significantly contribute to innovation capability at different organisational levels (e.g. Liao et al., 2007; Lin, 2007a; Camelo-Ordaz et al., 2011; Yeşil et al., 2013). For example, Hong et al. (2004) discovered in their empirical study that KS and new product development have a significant positive relationship. Furthermore, Lin (2007a) asserted that an atmosphere which

encourages knowledge donating among employees – transformation of individual knowledge into team or organisational knowledge which improves the stock of knowledge available to the organisation – is likely to generate new ideas and develop new business opportunities, thus facilitating innovation activities. Lin also insisted that knowledge collecting – internalisation and socialisation of knowledge which facilitates transformation of organisational knowledge into team or individual knowledge – significantly influences firm innovation capability. Liao and Wu (2010) and Liao et al. (2012) reported that promoting knowledge sharing and skills among employees make the level of innovation increased. The study revealed that knowledge sharing gives the employees more skills. Having such knowledge and skills would increase organisational learning which allow the employees to promote new idea product and process more effectively. In public organizations, Porzse et al. (2012) indicated that organisations perceiving the implemented KS among the most significant supportive are more likely to associate high level of product and process. Similar results were found in Iraq (Al-Husseini and Elbeltagi, 2012).

### **2.2.3 Social Capital**

In recent years, considerable attention has been given to facilitate social capital because SC is recognised as a valuable resource for successful innovation and performance (Arribas et al., 2013). Social capital constitutes a major source of innovation in many organisations (e.g., Nahapiet and Ghosal, 1998; Arribas et al., 2013). Organisations mainly depend on social capital or intangible assets to reinforce innovation. Therefore, social capital as a part of intellectual capital is an appropriate resource to create innovation (Subramaniam and Youndt, 2005). Social capital is acknowledged as a resources embedded in relationships (e.g. Putnam, 1995; Tsai and Ghoshal, 1998). Individuals who do better are expected to be better connected. According to Burt (2000) social capital can be viewed as an asset connected to a certain position in the structure of exchanges that certain people or groups are dependent on. These

people or groups trust the others and are obligated to support each other. Social capital is an important mechanism to give individuals access to crucial resources available in other people (Coleman, 1998). As key enabler for knowledge sharing (Chaminade and Roberts, 2002; Brachos et al., 2007; Kim et al., 2013), it encourages organisational members to form relationship, communicate with each other, and act together more effectively in achieving organisational goals (Nahapiet and Ghosal, 1998; Tsai and Ghoshal, 1998; Adler and Kwon, 2002). Moreover, Subramaniam and Youndt (2005) demonstrated that SC represents the informal interactions and information exchange among employees that develop a smooth and desirable work atmosphere. Therefore, SC is a result of the interaction and collaboration among employees within an organisation by sharing knowledge and experiences. Reiche et al. (2008) emphasised that SC provides an excellent atmosphere for increased employee flexibility in an uncertain environment. Groups can be more responsive largely because of the recurrent pattern of dynamic relationships among individuals (Oh et al., 2006). Therefore, Reiche et al. (2008) emphasised that SC provides an excellent atmosphere in which employees may perform their work. Cainelli et al. (2007) stated that SC should be interpreted as an important part of an investment. SC is considered to be the glue which holds employees together (Green and Brock, 2005). Firms should pay more attention to SC in order to gain more flexibility in turbulent environments. This could be achieved by considering informal relationships between employees as an important driver in the organisational structure (Oh et al., 2006).

### **2.2.3.1 Definitions of Social Capital**

It is important to note that although researcher on the concept of social capital has gained considerable attention from management field (Adler and Kwon, 2002; Lee, 2009; Nahapiet, 2011), the concept is still evolving (Inkpen and Tsang, 2005; Beugelsdijk, 2006). Theoretically, there is a lack of consensus on how to define social capital (Inkpen and Tsang,



2005; Isa et al., 2010), as is evident in the different uses and connotation in various scholarly perspectives found in the literature (Adler and Kwon, 2002; Inkpen and Tsang, 2005; De Carolis and Saporito, 2006; Isa et al., 2010). For example, Nahapiet and Ghoshal (1998, p.243) defined social capital as “the sum of actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit”. Thus social capital is not just possessed by an individual but a social unit, that is, an organisation.

Furthermore, according to Leana and Van Buren (1999), SC can be viewed as collective goal orientation and shared trust, which create value by facilitating successful collective action. Fukuyama (2001) conceptualised SC as an instantiated informal norm that promotes co-operation between two or more individuals. Adler and Kwon (2002) and Hitt et al. (2002) both defined SC as relationships between individuals and organisations that facilitate action and thereby create value. Similarly, Zhang et al. (2010) indicated that SC refers to a valuable resource derived from the network of relationships among individuals and organizations. Youndt et al (2004) stated that SC refer to the processes and procedures that are created by, and stored in, a firm’s technology system that speeds the flow of knowledge through the organization. From Subramaniam and Youndt’s (2005) point of view, SC represents the informal interactions amongst employees in developing a smooth and preferred work atmosphere through team members exchanging information.

Other researchers (e.g., Van den Hooff and Huysman, 2009; Kim and Lee, 2010; Kim et al., 2013) explained that SC as close interpersonal relationships among organisational members. Makela and Brewster (2009) defined SC as assets embedded in network relationships. Chen et al. (2012) described SC as the knowledge embedded in interactions among individuals and their network of inter-relationships, including internal relationships with employees and

external relationships with customers, suppliers, and so on. Some of the most frequently cited definitions are listed within Table 2.6.

**Table 2.6: Definitions of social capital**

<b>Author(s)</b>	<b>Definition of Social Capital</b>
Bourdieu (1986)	<i>SC defined as aggregate of actual or potential resources that are linked to the actors of a durable network.</i>
Coleman (1990)	<i>SC defined as “a variety of entities with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors within the structure” (p.302)</i>
Putnam (1995)	<i>SC refers to the features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.</i>
Fukuyama (1995)	<i>SC defines as ‘a set of informal values or norms shared among members of a group that permits cooperation among them’</i>
Walker et al. (1997)	<i>SC as features of social organisations such as networks, norms and social trust that facilitate co-ordination and co-operation to pursue shared objectives.</i>
Nahapiet and Ghoshal (1998)	<i>SC is related to “the sum of actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit”</i>
Lin (1999)	<i>SC defined as “...Investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental or expressive actions” (p 39).</i>
Leana and Van Buren (1999)	<i>SC defines as collective goal orientation and shared trust, which create value by facilitating successful collective action.</i>
Lin (2001)	<i>SC defined as “resources embedded in a social structure that are accessed and/or mobilized in purposive actions” (p. 29).</i>
Seibert et al. (2001)	<i>SC defined as “the overarching social capital construct is best thought of as both the different network structures that facilitate (or impede) access to social resources and the nature of the social resources embedded in the network” (p 221)</i>
Fukuyama (2001)	<i>“...social capital is an instantiated informal norm that promotes co-operation between two or more individuals” (p 7)</i>
Storberg-Walker (2002)	<i>SC as ‘resources of trust, relationships, and contact networks’ and psychological capital as ‘psychological capacities of confidence, hope, optimism, and resilience.</i>
Adler and Kwon (2002); Hitt et al. (2002)	<i>SC defined as relationships between individuals and organisations that facilitate action and thereby create value.</i>
Bresnen et al. (2003); fernie et al. (2003)	<i>SC defined as resources or assets embedded in the relationship of the Organisational members.</i>
Youndt et al. (2004)	<i>SC refer to the processes and procedures that are created by, and stored in, a firm’s technology system that speeds the flow of knowledge through the organization</i>
Mcfadyen and Jr (2004)	<i>SC define as the interpersonal relationships of a person, as well as the resources embedded in those relationships</i>
Subramaniam and Youndt (2005)	<i>SC represents the informal interactions amongst employees in developing a smooth and preferred work atmosphere through team members exchanging information.</i>
Lin (2005, p.2)	<i>SC as “resources embedded in one’s social networks, resources that can be accessed or mobilized through ties in the networks”</i>
Inkpen and Tsang (2005)	<i>SC as the aggregate of resources embedded within, available through, and derived from the network of relationships possessed by an individual or organization” (p151).</i>

Baron and Armstrong (2007)	<i>SC defines as „the features of social life - networks, norms and trust - that enable participants to act together more effectively to pursue shared objectives“.</i>
Maak (2007)	<i>SC refers to the relationships that make an organisation work effectively</i>
Wu et al. (2008)	<i>SC as the sum of actual or virtual resources which accrue to an individual stemming from a network of relationships</i>
Makela and Brewster (2009)	<i>SC views as assets embedded in network relationships</i>
Yang and Farn (2009)	<i>SC conceptualised as a set of resources embedded in the social relationship among social actors and can be regarded as a valuable asset that secures benefits for social actors ranging from individuals to organisations</i>
Lazarova and Taylor (2009)	<i>SC refers to the assets that reside in the relationships among people that can facilitate instrumental action</i>
Zhang et al. (2010)	<i>SC refers to a valuable resource derived from the network of relationships among individuals and organizations</i>
Chang and Chuang (2011)	<i>SC conceptualised as the sum of the assets or resources embedded in the networks of relationships between individuals, communities, networks, or societies. It exists through interpersonal relationships among individuals.</i>
Chen et al. (2012)	<i>SC contains the knowledge embedded in interactions among individuals and their network of inter-relationships, including internal relationships with employees and external relationships with customers, suppliers, and so on</i>
Oldroyd and Morris (2012)	<i>SC defined as the structure of relationship networks and information available to an individual.</i>
Kim et al. (2013)	<i>SC refers to close interpersonal relationships among organisational members.</i>
Mura et al. (2013)	<i>SC defined as the patterns of personal connections within the organisation</i>

Based on an extensive review of contemporary knowledge sharing and social capital literature, and with line with the objectives stated in Chapter 1, this research concurs with Kim et al. (2013), who defined SC as close interpersonal relationships among organisational members. This definition has been used by several researchers in KS context (e.g. Chow and Chan, 2008; Van den Hooff and Huysman, 2009; Kim and Lee, 2010; Hau et al., 2013; Akhavan and Hosseini, 2016). SC is a valuable organisational resource from the resource-based view because it facilitates the individual interactions necessary for collective action (Leana and Van Buren, 1999, Van den Hooff and Huysman, 2009; Kim and Lee, 2010; Kim et al., 2013; Akhavan and Hosseini, 2016). Knowledge is seen as socially constructed and embedded in the social context; some knowledge management scholars have even argued that SC is a key mechanism for achieving knowledge sharing (Chow and Chan, 2008; Van den Hooff and Huysman, 2009; Kim and Lee, 2010; Kim et al., 2013). Moreover, the social dynamics derived from interpersonal and group relationships are a primary determinant of

knowledge sharing among employees at workplace (Van den Hooff and Huysman, 2009; Kim et al., 2013). This definition has also been used by several researchers in innovation context (e.g., Hu and Randel, 2014; Elsetouhi et al., 2015; Akhavan and Hosseini, 2016).

In addition, this study also considers three dimensions of social capital as the key drivers of forming employees' knowledge sharing among employees (Knowledge collecting and donating) and innovation: social ties (the structural dimension), social trust (the relational dimension), and shared goals (the cognitive dimension). These elements were used to measure the performance social capital. These factors have been also studied by several researchers and tested empirically in different contexts (e.g., Chow and Chan, 2008; Van den Hooff and Huysman, 2009; Kim and Lee, 2010; Hau et al., 2013; Kim et al., 2013; Akhavan and Hosseini, 2016).

#### **2.2.3.2 The Components of Social Capital**

The various definition of social capital in the wider literature, have resulted in the recognition of different dimensions of social capital as highlighted by researchers (e.g., Nahapiet and Ghoshal, 1998; Leana and van Buren, 1999; Flap and Volker, 2001). Traditionally, social capital has been understood as a unit-dimensional concept, but recent researchers have adopted a multi-dimensional perspective of social capital (Nahapiet and Ghoshal, 1998). Coleman (1990) suggested that social capital is a construct consisting of obligations, expectations, and trustworthiness of structures. Nahapiet and Ghoshal (1998) have identified three dimensions of social capital: the structural, the cognitive, and the relational. Leana and van Buren (1999) have described two components of social capital: strong associability and trust. Flap and Volker (2001) identified another dimension of social capital: the position that someone has in the network of relationships that influences the willingness and ability of others to have help.

Yli-Renko et al. (2001) indicated three forms of social capital in their study, namely social interaction, relationships quality, and network ties. Landry et al. (2002) observed to dimensions of social capital and suggested six indices to measure social capital, but ignored the cognitive dimension highlighted by Nahapiet and Ghoshal (1998). Yang and Farn (2009) suggested two dimensions to explain social capital, which are relational and cognitive capital.

Other researchers such as Mura et al. (2013) distinguished between two dimensions of SC: the structural capital which reflects the network of acquaintances an individual has within an organisation, and the relational capital which describes instead the strength of ties. Van den Hoof and Huysman (2009) suggested that social capital can be viewed across three interrelated dimensions: the structural, the cognitive, and the relational capital. Such view supported by Andrews (2010) and Kim et al. (2013), who categorised social capital into three dimensions, namely: structural, cognitive, and relational capital. Yu et al. (2013) also argued that SC can be decomposed into three distinct facets: structural capital, cognitive capital, and relationship capital. Hau et al. (2013) also divided social capital into three components: namely structural, cognitive and relational social capital. Akhavan and Hosseini (2016) studied social capital through structural, cognitive and relational social capital. A summary of the dimensions of social capital is presented in Table (2.7).

**Table 2.7: Dimensions of Social Capital**

Author (s)	dimensions	Structural	Cognitive	Relational
Nahapiet and Ghoshal (1998)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Leana and van Buren (1999)	Two dimensions of social capital are associability and trust.	✓		✓
Flap and Volker (2001)	One dimension of social capital is network structure but includes the position of the actor in the network	✓		
Yli-Renko et al. (2001)	Three dimensions of social capital are social interaction, relationships quality, and network ties	✓		✓
Landry et al. (2002)	Two dimensions of social capital are the structural and relational	✓		✓

Cabrera and Cabrera (2005)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Wu et al. (2008)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Lazarova and Taylor (2009)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Yang and Farn (2009)	Two dimensions of social capital are relational and cognitive social capital		✓	✓
Van den Hoof and Huysman (2009)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Andrews (2010)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Mura et al. (2013)	Two dimensions of social capital are the structural and relational	✓		✓
Kim et al. (2013)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Hau et al. (2013)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓
Akhavan and Hosseini (2016)	Three dimensions of social capital are structural, cognitive, and relational	✓	✓	✓

For the discussion on social capital, the framework offered by Nahapiet and Ghoshal (1998) is used for the purpose of identifying its dimensions. These dimensions of social capital appear more appropriate for this study since they encompass not only the network between the actors (structure) but also the embedded nature of the networking in their thinking (cognitive) as well as in their deeds (relational), which accrue from the previous capitals. Thus, these three dimensions have been selected because of their comprehensiveness. The literature seems to suggest that these dimensions of Nahapiet and Ghoshal (1998) have been adopted by many researchers (e.g. Bresnen et al., 2003; Inkpen and Tsang, 2005; Wasco and Fajaj, 2005; Chiu et al., 2006; Van den Hoof and Huysman, 2009; Kim et al., 2013; Hau et al., 2013; Díez-vial and Sánchez, 2014). While the discussions in the following sub-section focus on

the elements of social capital, the difficulty in distinguishing the three dimensions of social capital as the overlap will also be highlighted (Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005).

#### **a) Structural Social Capital**

Structural social capital can be conceptualised as the overall pattern of relationships among social actors (Nahapiet and Ghoshal, 1998, Yang and Farn, 2009). Bolino et al. (2002) suggested that the structural social capital can also be considered as the extent to which actors in a social network are connected. Structural dimension is considered an essential element in identifying the efficiency of the network processes and member contribution. It relates to the social connections or network ties amongst colleagues (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). The network structure should be organised so that the resources flow efficiently between actors; this assists innovative information exchange (Butler and Purchase, 2008). Nahapiet and Ghoshal (1998) suggested that structural dimension of social capital is associated with the knowledge sharing and associated activities.

Wu et al. (2008) defined SSC as social interactions or network ties. Chang and Chuang (2011) explained SSC as the overall pattern of relationships found in organizations. It describes the impersonal configuration of linkages between people or units and the extent to which people in an organisation are connected with one another. Lazarova and Taylor (2009) clarified SSC as the existence of linkages between employees, their configuration (including density, connectivity and hierarchy) and the degree to which they are appropriable by the actor for other purposes than for which they were created. Smedlund (2008) defined SSC as the corresponds to networks and forms the context in which norms and beliefs are formed.

Aslam (2013) indicated that SSC refers to the pattern of connections between the members of the network. Important aspects of this dimension are ties between the members of a social

network; network structure based on density, connectivity and hierarchy; and multipurpose use of networks. Other researchers (e.g., Chow and Chan, 2008 and Van den Hooff and Huysman, 2009) illuminated SSC as social and network relations whose connections define who can be reached and how; factors in this dimension measure the network pattern, density, connectivity, and hierarchy. Yu et al. (2013) described SSC as the impersonal configuration of linkages among a social group of people. Cabrera and Cabrera (2005) indicated that SSC refers to the pattern of interactions among individuals. This includes the ties or connections among network members as well as the overall network configuration, which considers factors such as structural holes, centralisation and density of the network. Mura et al. (2013) stated that SSC reflects the network of acquaintances an individual has within an organisation. Kim et al. (2013) certified SSC as the social and network relations that govern who can interact and how relations can be achieved. Akhavan and Hosseini (2016) explained SSC as the connections among members; that is, with whom and with what frequency they share information.

It is clear from the discussion above that structural social capital has been studied from different perspectives. For example, Chua (2002) stated that social tie establishment and frequency of interaction are among the key attributes of SSC dimension. Hoffman and Michailova (2004), on the other hand, focused on information channel; moral infrastructure. According to Huysman and De Wit (2004) SSC dimension consists of network ties, network configurations and appropriable organization. Similarly, Inken and Tsang (2005) viewed SSC as network ties, network configurations, network stability. In the same line, Nahapiet and Ghoshal (1998) analysed structural social capital through network ties, network configurations, appropriable organization. Alternatively, Cabrera and Cabrera (2005) studied structural social capital structural holes, centralisation and density of the network. Wasko and Faraj, (2005), on the other hand, discussed structural social capital through centrality. In



contrast, Chow and Chan (2008) focused on network configuration (labeled “social network”) as a major construct of SSC. Van de Hoof and Huysman (2009), however, identified only social network to represent SSC. Chang and Chuang (2011) adopted social interaction as the critical resources of SSC dimension. Whereas, Lazarova and Taylor, (2009) assessed SSC through density, connectivity and hierarchy. However, Kim et al. (2013) provided a refined view and use factors such as network patterns, density, connectivity, and hierarchy as the main elements representing the structural social capital. Mura et al. (2013) considered the network of acquaintances an individual has within an organisation as a major construct of SSC. Hau et al. (2013) argued that SSC can be assessed by social tie. Others researchers (e.g., Amayah, 2013; Akhavan and Hosseini, 2016) viewed SSC, from social interaction ties prospective.

#### **b) Relational Social Capital**

The prior literature has defined relational social capital from different perspectives. For instance, Wu et al. (2008) indicated that RSC refer to assets that are rooted in relationships, such as trust and trustworthiness. Chang and Chuang (2011) found that RSC deals with the nature of the connections between individuals in an organization. From Chang and Chuang’s (2011) viewpoint the key facets of this dimension are trust, norms, obligations, expectations and identification. Nahapiet and Ghoshal (1998) and Tsai and Ghoshal (1998) defined RSC as the powerful relationships which are built on the trust between partners. Therefore, it concerns the quality of the relationships which depends on mutual trust and respect between the actors. The trust relationships support knowledge sharing practices and promote transaction values, reduce transition costs and improve the productivity and efficiency (Dyer, 1997; Zaheer et al., 1998; Doh and Acs, 2010). For Chow and Chan (2008) RSC refers to the level of trust between people developed during interactions: norms, obligations, trust, and identification raise awareness of actors toward their collective goals.

Lazarova and Taylor (2009) considered RSC as the assets that derive from interaction with others in the network and has been described as behavioural rather than structural embeddedness. The prospective see that the one core element of relational social capital is trust (Inkpen and Tsang, 2005). Cabrera and Cabrera (2005) noted that the relational dimension is the affective part of social capital. It describes network relationships in terms of interpersonal trust, existence of shared norms and identification with other individuals in the network. The relational dimension, therefore, deals with the nature or quality of network connections. Yu et al. (2013) defined RSC as the affective nature of the net-working relationships where the situated members have a strong identification toward this particular social group, perceive an obligation of participation, and abide by cooperative norms. Yang and Farn (2009) and Van den Hoof and Huysman (2009) explained RSC as the assets created and leveraged through ongoing relationship that influence social actors' behaviour. This dimension bears some resemblance to Adler and Kwon's (2002) concept of 'goodwill' and can be manifested by trust, norms, obligations, and identification (Nahapiet and Ghoshal, 1998).

Aslam (2013) described RSC as assets which are created through, and can be benefited from, by relationships. It is based on relationships that the people have which can affect their behaviour e.g. respect and friendship. It also describes the degree of trust ensuing from social interaction (Chow and Chan, 2008). Along with the network of relationships, trust and norms are important sources of social capital (Adler and Kwon, 2002). Thus the key aspects of this dimension are trust, norms, obligations and expectations and identification (Nahapiet and Ghoshal, 1998; Chow and Chan, 2008). Smedlund (2008) explained RSC through embodies beliefs by forming the motivational element in the network enforced by norms. Shared beliefs ensure that actors are aiming for the same goal, and they can also be thought of as a shared vision of the participants. Nahapiet and Ghoshal (1998) bring in the concept of trust as a

source of social capital. Misztal (1996) and Nahapiet and Ghoshal (1998, p. 254) pointed out that trust can be defined as a belief in other individuals and especially in the belief that the “results of somebody’s intended action will be appropriate from our point of view.” Authors (e.g., Levin and Cross, 2004; Chen and Huang, 2007) observed that trusting relationships improve willingness of individuals to exchange and absorb other’s knowledge, thereby leading to greater knowledge sharing. Kim et al. (2013) defined RSC is the affective component of SC, describing network relationships in terms of interpersonal trust, shared norms, and identification with other individuals in the network. Akhavan and Hosseini (2016) described RSC as the kind of personal relationships people have developed with each other.

Prior literature has reported different factors of relational social capital. For instance, Nahapiet and Ghoshal’s (1998) considered trust; norms; obligations and expectations; identification as a major constructs of RSC. Such view supported by Bolino et al. (2002) who stated that the critical resources of this dimension are trust, norms, obligations, expectations and identification. Other researchers such as Kim et al. (2013) noted that relational dimension of social capital includes trust, shared norms, and identification. Van den Hoof and Huysman (2009) posited social trust, norms and sanctions, obligations and expectations, identity and identification as the major constructs representing RSC. Inken and Tsang (2005) argued that one core element of RSC is trust. Similarly, Chow and Chan (2008) focused on Trust (labeled “social trust”) to represent RSC. Chiu et al. (2006), on the other hand, view RSC from trust, identification and reciprocity perspective. Cabrera and Cabrera (2005) adopted trust, norms and identification to assessed RSC. Mura et al. (2013) stated that RSC consists of the strength of ties among individuals within an organisation. Chang and Chuang (2011) argued that the key facets of this dimension are trust, identification and reciprocity. Akhavan and Hosseini (2016) among others studied RSC through a trust, reciprocity, and identification (Chiu et al., 2006; Shan et al., 2013).

### **c) Cognitive Social Capital**

According to Wu et al. (2008) and Van den Hoof and Huysman (2009) cognitive social capital refers to those resources providing shared representations, interpretations, and systems of meaning among parties. Chang and Chuang (2011) argued that the cognitive dimension of social capital concerns the extent to which people in a social network share a common perspective or understanding. The critical resources of this dimension may be shared language and codes. Wasko and Faraj (2005) defined cognitive social capital as resources that make possible shared interpretations and meanings within a collective. Smedlund (2008) stated that the cognitive dimension corresponds to norms and defines the common rules of the game that the collaboration between actors is based on.

Nahapiet and Ghoshal (1998) regard cognitive social capital as the common understanding among social actors through shared language and narratives. It is embodied in attributes like shared vision or shared value that facilitates individual and collective actions and common understanding of proper actions and collective goals. Boland and Tenkasi (1995) suggested that higher cognitive social capital gives partners a common perspective that enables them to develop similar perception and interpretation toward events. It relates to the actors' shared interpretations of goals and values. Shared expectations direct and rule the employees' behaviour to achieve the network's aims. It reinforces cooperation between members (Andrews, 2010; Hughes and Perrons, 2011). Chan and Chow (2008) stated that the cognitive dimension refers to resources increasing understanding between parties. Wasko and Faraj (2005) claimed that knowledge sharing required shared understanding; for example, shared culture and goals were important factors. Yu et al. (2013) stated that the cognitive capital is derived from the shared representations, interpretations, and meaning among the members who are located in the social group.

Lazarova and Taylor (2009) described cognitive social capital as the resources providing shared representations, interpretations, and systems of meaning among parties. Its two key dimensions are the shared goals (defined as the degree of “common understanding and approach to the achievement of network tasks and outcomes,” (Inkpen and Tsang, 2005: 153) and shared culture among organisational members (the set of institutionalised norms of behaviour (Inkpen and Tsang, 2005). Aslam (2013) defined cognitive dimension as a resources that allow the formation of shared interpretations and meanings within a network or organisation. It is argued that it is embedded in the properties such as common language or vision that support a common understanding of shared goals and norms of action in a social setting. Cognitive social capital of individuals is the outcome of frequent interactions while sharing the same practices, which lead the individuals to learn skills, knowledge and common conventions (Wasko and Faraj, 2005). Kim et al. (2013) cognitive social capital clarified as the resources providing shared goals, vision, and values of organisational members. Akhavan and Hosseini (2016) argued that CSC is embodied in attributes such as a shared code or a shared paradigm that facilitates a common understanding of collective goals and proper ways of acting in a social system.

The literature review highlights several elements regarding the cognitive social capital. For example, Nahapiet and Ghoshal (1998) identified three element of cognitive social capital, namely shared codes, language and shared narratives. This view supported by several researchers such as Huysman and De Wit (2004) and Van de Hoof and Huysman (2009) who studied cognitive social capital by three elements such as shared codes and language and shared narratives. Inken and Tsang (2005) postulated shared goals; shared culture as the major elements representing the cognitive social capital. Wasko and Faraj (2005) represented cognitive social capital as self-rated expertise; tenure in the field. Cabrera and Cabrera (2005) argued that the cognitive dimension of social capital can be achieved by a shared language

and shared narratives among network members. Shared language and narratives increase mutual understanding among individuals and this helps them to communicate more effectively. Kim et al. (2013) proposed that shared goals, vision, and values are three elements of social capital. Chow and Chan (2008) focused on shared goals to evaluate cognitive social capital. Such view also supported by several researches (e.g., Hau et al., 2013; Lazarova and Taylor, 2009). While Chiu et al. (2006) studied shared language element for cognitive social capital. Similarly, Chang and Chuang (2011) explained cognitive social capital dimension through shared language among employees within workplace. Akhavan and Hosseini (2016) and Fathi et al. (2011) considered shared goals as a major construct of cognitive capital dimension. The table 2.8 shows literature involving social capital components.

**Table 2.8: Literature Involving Social Capital Factors**

Literature	Structural dimension	Relational dimension	Cognitive dimension	Nature of research
Nahapiet and Ghoshal (1998)	Network ties, network configurations, appropriable organization	Trust; norms; obligations and expectations; identification	Shared codes and language; shared narratives	Knowledge exchange and creation
Tsai and Ghoshal (1998)	Social interaction	Trust and trustworthiness	Shared vision	Resource exchange and value creation
Yli-Renko et al. (2001)	Social interaction; relationship quality; customer network ties	-	-	Knowledge acquisition and exploitation
Seibert and Liden (2001)	Weak ties; structural holes	Contacts in other functions; contacts at higher levels	-	Career success
Chua (2002)	Social tie establishment; frequency of interaction	Trust; empathy; willingness to help; openness to sharing/ criticism; group identity	Shared language; shared narrative	Knowledge creation
Liu and Besser (2003)	Social ties	Generalised trust; norms or expectations	-	Knowledge sharing
Requena (2003)	Social relations	Trust; commitment; communication; influence	-	Quality of life in the workplace
Huysman and De Wit (2004)	Network ties; network configurations; appropriable organization	Mutual trust; norms; obligations and identification	Shared codes and language; shared narratives	Knowledge sharing

Lang (2004)	Bounded solidarity	Generalised trust; reciprocity	Value introjection	Knowledge integration
Wasko and Faraj (2005)	Centrality	Commitment and Reciprocity	Self-rated Expertise and Tenure in the Field	Knowledge Contribution
Cabrera and Cabrera (2005)	structural holes, centralisation and density of the network	trust, norms and identification	language and narratives	Knowledge sharing
Inken and Tsang (2005)	Network ties, network configurations, network stability	Trust	Shared goals; shared culture	Knowledge transfer
Wasko and Faraj (2005)	Centrality	Commitment; reciprocity	Self-rated expertise; tenure in the field	Knowledge contribution
Chiu et al. (2006)	Social interaction	trust, identification and reciprocity	shared language	knowledge sharing
Chow and Chan (2008)	Network configuration (labeled “social network”)	Trust (labeled “social trust”)	Shared goals	Knowledge sharing
Lazarova and Taylor (2009)	density, connectivity and hierarchy	Trust	Shared goals	Organisational performance
Yang and Farn (2009)	-	Trust	Shared Value	Knowledge sharing
Van de Hoof and Huysman (2009)	social network	trust, norms and sanctions, obligations and expectations, identity and identification	Language, codes and narratives.	Knowledge sharing
Chang and Chuang (2011)	Social interaction	trust, identification and reciprocity	shared language	knowledge sharing
Kim et al. (2013)	network patterns, density, connectivity, and hierarchy	trust, shared norms, and identification	goals, vision, and values	Knowledge sharing
Hau et al. (2013)	Social Tie	Social trust	Social goals	Knowledge sharing
Mura et al. (2013)	The network of acquaintances an individual has within an organisation.	The strength of ties among individual within an organisation.	-	Innovation
Yu et al. (2013)	Network density and Betweenness centrality	Cooperative norms and Affective commitment	Cognition commonality and Shared cognition	Knowledge sharing
Díez-vial and Sánchez (2014)	structural holes	trust	shared culture	Knowledge exchange
Akhavan and Hosseini (2016)	social interaction ties	Trust, reciprocity, and identification	shared goals	Knowledge sharing

### **2.2.3.3 The Importance of Social Capital for Innovation**

Mura et al. (2013) recorded an increase in innovation of organisations due to three dimensions of social capital including structural, relational and cognitive social capital. Laursen et al. (2012) posited that innovation are much higher through enhancing social capital. They suggested that these findings imply that social capital is highly recommended. Another study conducted by Pullen et al. (2012), within private Dutch medical device companies shows that network characteristics, namely cultural capital, strategic capital, social capital and resource capital, can introduce new product innovation. Researchers (e.g., Nahapiet and Ghoshal, 1998; Perry-Smith and Shalley, 2003) provided empirical evidence supporting hypothesis of positive relationship among social capital and innovation. Their study was later supported by researchers (i.e. Andrews, 2010) who investigated the effect of social capital including structural, relational and cognitive social capital and innovation. The author argued that there is positive relationship among social interaction among employees and innovation. They explained this positive effect by the fact that innovation was achieved by a high level of collaboration and good will among organisation members. SC is a valuable resource for successful innovation and performance (Arribas et al., 2013).

Moreover, several researchers (e.g., Subramaniam and Youndt 2005; Carmona-Lavado et al., 2010) argued that social capital appears to be the bedrock of innovative capabilities. Given that innovation is fundamentally a collaborative effort, social capital assumes a central role in generating innovation. Such view supported by Luk et al. (2008), who argued that social capital has positive effect on organisational innovativeness. Recently, a study conducted in Egyptian banks with 198 managers, has brought evidence on the impact of intellectual capital including social capital, human capital and customer capital on firms' product, process and organisational innovation. The study found that the social capital increases the firms' product and process and organisational innovation (Elsetouhi et al., 2015).



Furthermore, Pérez-Luño et al. (2011) added that the high level of social capital of the organisations is likely to affect their innovation. Thus the authors argued that social capital including structural, cognitive, and relational social capital would be very beneficial for innovative firms. Similarly, Gu et al. (2013) revealed that dimension of social capital including structural and cognitive capital and relational capital has a significant impact on innovation. Other researchers (e.g., Tsai, 2006; Cainelli et al., 2007) confirmed the importance of social capital in determining the innovation at workplace. In a recent study on Iran organizations, Akhavan and Hosseini (2016) reported that social capital including social interaction ties (as a structural capital factor), trust, reciprocity, and team identification (as relational capital factors) does affect innovation capability by increasing their knowledge sharing. Zheng (2010) also found that in structural holes; and tied strength and centrality do influence innovation.

#### **2.2.4 The Importance of Social Capital for Knowledge Sharing**

There has been a large increase in the number of studies on how social capital impact upon organisational knowledge. This is due to the growing awareness of the benefits of social capital in generating and sharing knowledge in organisations (Nahpiet and Ghoshal, 1998; Adler and Kwon, 2002; Levin and Cross, 2004; Inkpen and Tsang, 2005; Hau et al., 2013). Prior literature has also reported that employee social capital has been known to play a major role in forming their knowledge sharing intentions (Chow and Chan, 2008; He et al., 2009; Chang and Chuang, 2011; Hau et al., 2013). Subramaniam and Youndt (2005) argued that an organization's social capital enhances the quality of group work and the richness of information exchange among team members. Social capital is epitomised in how it facilitates interactions and the exchange of ideas. Thus, social capital most likely assists in the iterative process of knowledge reinforcement by enabling groups not only to efficiently draw upon

prevailing knowledge, but also to refine the evolving body of this knowledge. SC increases the depth and efficiency of the exchange of mutual knowledge and this is considered to be a key factor in the SC process (Weber and Weber, 2007). It has been argued that social capital is critical for collective work (Kim et al., 2013) and effective interpersonal coordination (Bolino et al., 2002; Thompson, 2005). In short, the social capital perspective advocates a view that individual potency within a social structure is predicated on developing a network of relationships. Such view supported by Cainelli et al. (2007), who stated that SC should be interpreted as an important part of an investment. SC is considered to be the glue which holds employees together (Green and Brock, 2005).

Furthermore, several empirical studies have provided evidence of the important effects of social capital (structural, cognitive, relational capital) on knowledge sharing among employees at workplace. For instance, Chang and Chuang (2011) investigated the effects of social capital, namely structural (social interaction), cognitive (shared language) and relational capital (trust, identification and reciprocity) on knowledge sharing among employees. The findings revealed that social capital is positively related to knowledge sharing among employees at workplace. Kim et al. (2013) revealed that the social capital, such as structural, cognitive and relational capital, has had a positive impact on knowledge sharing in Seoul, Korea. A survey of 541, employees of service companies, carried out by Van De Hoof and Huysman (2009), showed that social capital have the ability to improve knowledge sharing process within workplace. A pilot study of 78 companies in Spain, conducted by Díez-Vial and Montoro-Sánchez (2014) examined the relationships among social capital including structural holes trust shared culture and knowledge sharing. The results show that the three dimensions of social capital play a significant role in increasing knowledge sharing among employees.

Moreover, numerous studies have examined other factors that affect KS, including social trust (i.e. relational SC), one of the most frequently mentioned facilitators of KS (Chiu et al., 2006; Kim and Lee, 2010). Chow and Chan (2008) emphasised the importance of social networks (i.e. structural SC), social trust (i.e. relational SC), and shared goals (i.e. cognitive SC) for encouraging organisational knowledge sharing behaviour. According to Van den Hooff and Huysman (2009), in KS processes, SC is assumed to affect knowledge collecting and knowledge donating in three ways: (i) by providing access to people with relevant knowledge or needs; ii) by providing a common interest and an atmosphere of mutual trust and appreciation of the value of others' knowledge; and vi) by sharing the ability to understand, interpret, and assess each other's knowledge.

Additionally, Brachos et al. (2007) highlighted the importance of top management recognitions. As such, they should frequently and constantly urge their employees to share knowledge, and should provide relevant organisational context in which this can occur. In support of this, Nahapiet and Ghoshal (1998) asserted that organisations can provide an institutional environment conducive to the development of social capital. They further argue that the combination and exchange of knowledge is facilitated when individuals are connected together (Structural capital), have the ability to understand and apply knowledge (cognitive), and have strong and positive relationship with one another (relational capital). It argued that since knowledge sharing consists of social interactions between employees (Lin, 2007a; Chow and Chan, 2008) and such interactions are influenced by the relationships between individuals (Nahapiet and Ghoshal, 1998), employee social capital has been known to play a major role in forming their knowledge sharing intentions (Chow and Chan, 2008; He et al., 2009; Chang and Chuang, 2011; Hau et al., 2013) Moreover, scholars, indicated that the research on social capital and KS has recognised the pivotal role of social capital in

affecting the behaviour and attitudes of employees in sharing knowledge (Wasko and Faraj 2005; Chang and Chuang, 2011).

### **2.2.5 Knowledge Sharing and Social Capital in Public and Private Organisations**

Knowledge management and sharing in the public sector is currently attracting an increasing level of interest (Seba et al., 2012). Early studies of knowledge sharing in the public sector compared the public sector with the private sector and, in particular focussed on aspects of culture. For example, Liebowitz (2003) argued that knowledge sharing in the public sector is difficult because most people view knowledge as closely coupled with power, and related to their promotion prospects. In addition, Chiem (2001) pointed to the different approach to rewards for knowledge sharing between the private and public sectors and the negative effect that bureaucracy has on knowledge sharing in the public sector. Cong et al. (2007) and Cong and Pandya (2003) demonstrated that there is a lack of implementation of KM strategies in the public sector. On the other hand, there is recognition that the public sector does not completely lack advantages for knowledge sharing (Chiem, 2001). For example, other researchers such as Seba et al. (2012) argued that knowledge sharing in the public sector can be viewed as a social good can act as an incentive and this does not easily exist in the private sector. It argued that the private organisations have good systems of knowledge management than the public organisations (Seba et al., 2012).

A several scholars also argued that public sector organisations differ from private organisations in a number of ways (Milner, 2000; Willem and Buelens, 2007; Amayah, 2013). First, organisational goals in public organisations are typically more difficult to measure and more conflicting than in private organizations, and they are affected differently by political influences (Pandey and Wright, 2006). Second, public organisations can be very different from one another, based on ownership of the organization, funding, and control (Willem and

Buelens, 2007). Other differences include fragmented authority and less incentive for efficiency (Heffron, 1989; Willem and Buelens, 2007; Amayah, 2013).

A number of models of the factors that influence individuals' willingness to share knowledge have been proposed and tested in the public and private sector. For example, Seba et al. (2012) found that organisational structure, leadership, time allocation, and trust could be barriers to knowledge sharing in the Dubai police force. A survey of 461 respondents of public academic institution in the Midwest, carried out by Amayah (2013), showed that organisational culture, trust, social capital, organisational climate, and organisational structure had a significant main effect on knowledge sharing behaviour. Bock and Kim (2002) found that KS among employees in Korean public organisations was related to their positive attitude towards KS. Lin and Lee's (2004) research concerned perceptions of senior managers towards knowledge sharing. Mosakhania (2010) demonstrated that KS is positively related to anticipate reciprocal relationships, perceived self-efficacy, and organisational climate within public organisations in Iran. Tong et al. (2013) studied the effects of organisational culture, KS and job satisfaction in large public sector firms in Hong Kong. organisational culture considered as power distance, uncertainty avoidance, individualism, and masculinity while, KS including donating and collecting whereas job satisfaction encompassed the work itself, payment, supervision, promotion, and co-workers. The result uncovered that knowledge donating and collecting acted as a lever between organisational culture and the job satisfaction of the employees.

Furthermore, Kim and Lee (2004) model the effects of IT application and reward systems on employee knowledge sharing in large public sector firms in South Korea. The findings indicated the importance of KS and suggested that managers need to acknowledge these factors in government services. Another survey of 355 managers working in service organisations in Malaysia, carried out by Islam et al. (2010) pointed out that organisational

climate including supportive and innovative atmosphere and decentralisation had positive relationship with knowledge sharing behaviour, whilst Hock et al. (2009) studied the impact of trust on employee knowledge sharing, in public organisations. The findings indicated that trust can enhance knowledge sharing among employees at workplace. Based on quantitative research of 486 employees within private hotels in Korea, conducted by Kim et al. (2013), showed that social capital, including structural, rational, and cognitive capital had positive impact on knowledge sharing. A pilot study of 137 students within public universities in Saudi Arabia conducted by Mustafa and Abubakar (2009) showed that a learning culture and IT use can increase knowledge sharing among students.

However, a numerous of studies of the factors that affect knowledge sharing have been also proposed and tested in private organisations within a variety of organisational context. For example, in a study of 50 private sector organisations, Lin (2007) found that motivational factors such as reciprocal benefits, knowledge self-efficacy, and enjoyment in helping others significantly affect employee knowledge sharing attitudes and intentions. A study of 242 participants within Malaysian private organisations, conducted by Hitam and Mahamad (2012), revealed that KS practice increased through the implementation of IT and reward systems. A research by Li et al. (2010) pointed out that organisational factor such as friendly relationships, innovation, and fairness to contribute to knowledge sharing between individuals within private companies in China. Within private companies in Malaysia Abodulah et al. (2009) study indicated that culture, reward systems, IT and trust enhance KS between employees at workplace. Moreover, Renzl (2008) examined trust in management along with KS practices. The findings suggested that managers should support trust relationships in order to improve the flow of useful knowledge within private companies. Results from 486 employees of private hotels in Korea showed that knowledge donating and collecting act as levers between social capital, namely structural, rational, and cognitive

capital, and organisational performance (Kim et al., 2013). Sohail and Daud (2009) showed that the knowledge and working culture play a vital role in increasing and facilitating KS among teaching staff within Malaysian private universities. Kim and Ju (2008) indicated that reward system was the strongest factors affecting KS in a study of trust, openness in communication, collaboration, and communication channels among employees in South Korean organizations. Liao's (2006) findings demonstrated that KS act as a bridge between dimensions of learning in an organisation namely commitment to learning, a shared vision, open-mindedness, communication, and trust and firm innovation within Taiwanese private companies. Kim and Lee's (2005) considered the impact of organisational context and information technology on employee knowledge sharing capabilities, in ten organisations in South Korea.

In additional, McAdam and Reid (2000) investigated KM strategies in both public and private organisations. The result revealed similarities and differences between the sectors in terms of different dimensions of KM, including, knowledge construction, embodiment, dissemination, and use. Much of the argument of McAdam his colleague is supported by Ramachandran et al. (2009), who did a comparative study between public and private organisations in the Malaysian context, the study demonstrated that the practice of KM processes, namely creation, capture, organisation, storage, dissemination, and application of knowledge was better in private than public. Several researchers (e.g., Kogut and Zander, 1996; Alvesson, 2000; 2001; Robertson et al., 2003; Robertson and Swan, 2003) emphasised the importance of social identification in a group or in the organisation to leverage knowledge sharing. The assumed lower level of identification in government institutions will cause lower levels of knowledge sharing in these organisations compared to other public sector organisations. Kim and Lee's (2006) model on the effects of organisational culture and structure and IT on employee knowledge capabilities in ten organisations in South Korea, the findings showed

that organisation culture and structure and IT are positively related to employee knowledge sharing capabilities at private organisations.

Amayah (2013) stated that more research is needed to ascertain the extent of the differences between both public and private sector, and how organisational context including organisational culture, structure and IT affect knowledge sharing in these types organisations. Wang and Noe (2010) indicated that more research is needed to understand how KS can be promoted and how organisational culture as factor of organisational context can affect the dynamics of KS among employees and teams. Moreover, more studies are needed regarding KS in the emerging economies of Africa, the Middle-East and South America, as the majority of studies have been carried out in Western countries, although the effect of non-Western influences on KS in Chinese culture has been studied. It also indicated that more research is needed to understand organisational context such as organisational culture (Chennamaneni et al., 2012; Akhavan and Hosseini, 2016), which may also have a significant effect on KS. Chen and Huang (2007) argued that in the knowledge management literature, little has been done in investigating the role of organisational structure in the knowledge sharing as one the knowledge management process. This deficiency is serious because organisational structuring of the workflow is the primary mechanism available to the firm for implementing, executing, and controlling knowledge management activities. It is demonstrated that in many organisations technology has failed to have much impact on the way knowledge is transferred and shared. Furthermore, Choi et al. (2010) argued that little is known of the precise role of information system on KS, which in turn influences organisational performance. Additionally, Kostova et al. (2008, p.997) pointed out that “organisations have complex internal context. In the complex environment of organisations units, particular coordination mechanisms and tools to facilitate KS are required (Ghoshal and Bartlett, 1995; Gupta and Govindarajan, 2000; and Sia et al., 2010). Other researchers also suggested a need to understand of the precise role



of information technology to facilitate KS behaviour, which in turn influences organisational performance (i.e. Choi et al., 2010).

Turning to social capital, several studies have focused on some of the factors that affect social interaction in different sectors. For instance, a survey of 541 of senior executives in private organizations, carried out by Gold et al. (2001) found that organisational culture, structure and information technology facilities social capital at workplace, which allows employees to share their knowledge. In a study of 100 public sector organisations, Andrews (2010) found that organisational context including organisational structure significantly affect employee social capital interaction and communication. Hooff and Huysman (2009) revealed that organisational culture; structure and information and communication systems in public organisation is needed to enhance social capital, which allows employees to share their knowledge at workplace.

Furthermore, a survey of 490 of Chinese enterprises, within public organisations, carried out by Song-zheng and Xiao-di (2008) also provided evidence of the importance of organisational culture on social capital including structural, relational and cognitive social capital. Most social capital studies, however, are conducted in public sector organisations (Kim et al., 2013). Thus, there is a growing interest for further research on social capital in the private sector (Andrews, 2010). In their review of the literature on social capital in public organisations, Andrews (2010) identified a number of questions that are yet to be investigated in empirical research. This includes whether the relative importance of social capital differs in other organisational settings (private organisations). It argued that public servants engage in social capital than their private counterparts (Brewer, 2003; Andrews, 2010). Andrews, (2010) indicated that the degree of social capital extant within the public organisations may

therefore be unrepresentative of that found in those operating within other sectors or industries.

### **2.3. Organisational Context**

Organisational culture, organisational structure and information technology are the key dimensions of organisational context (Gold et al., 2001; Kim and Lee, 2006; van den Hooff and Huysman, 2009). Organisational context (OC, OS and IT) has become the main elements to increase knowledge sharing (Kim and Lee, 2006; Wang and Noe, 2010), social capital (Van den Hooff and Huysman, 2009; Andrews, 2010; Gu and Wang, 2013) and innovation, product and process (Liao, 2007; Valencia et al., 2010; Higón, 2011; Gonzalez et al., 2013; Hogan and Coote, 2014). Organisations are increasingly realising the importance of the organisational context (Kim and Lee, 2006). However, the academic literature dedicated to organisational context and their impact on the organisations' innovation remains relatively limited and inconclusive (Valencia et al., 2010; Büschgens et al., 2013). Several authors have claimed that further in depth research investigating the relationship between organisational context and KS (Chen and Huang, 2007; Wang and Noe, 2010), SC (Andrews, 2010) and innovation (Chennamaneni et al., 2012; Akhavan and Hosseini, 2016) are necessary.

This section reviews the relevant literature and empirical evidence on organisational context and identifies areas of further research. The section first provides an overview on definitions of the three key infrastructures of organisational context, types of each element. Second, it presents the dimensions of each element; third, it investigates the empirical evidence on the impact of organisational context on social capital, knowledge sharing and innovation, product and process. Then, the section identified research gaps and research questions that the study attempts to address.

### **2.3.1 Definitions of Organisational Culture**

The term 'organisational culture' is given to the roles of internal practices within an organisation and involves various components. Based on the nature of these components, the definitions of organisational culture varied. As a result of reviewing most organisational culture definitions, there is no single, widely accepted definition for organisational culture. Normally, organisational culture is about what people believe in and what they can share with others (O'Reilly and Chatman, 1996). Consequently, every definition has a meaning that is interrelated to the organisational culture's elements and reflects the author's perspective of interpreting these elements. Deshpande and Webster (1989, p. 4), defined organisational culture as "the pattern of shared values and beliefs that help individuals understand organisational functioning and thus provide them norms for behaviour in the organisation". They focus on social relationships within an organisation which create unwritten rules to encourage organisational functions. Hofstede (2001, p. 9), also defined organisational culture as "the collective programming of the mind that distinguishes the members of one organisation from another". Hofstede considers organisational culture as a unique character of an organisation's employees' beliefs, values and assumptions and to behave accordingly. Continually, Kilmann (1984, p. 84), mentioned that what culture means to an organisation is what personality means to an individual, which is "a hidden yet unifying theme that provides meaning, direction and mobilisation".

Additionally, Schein (1984, p. 3), introduced a definition that makes organisational culture more visible as "the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems". This definition has been simplified by Martin (2002), when identifying

organisational culture as a mix of long term understanding of how to do work which consists of several demonstrations, and which could be visible, such as work learning procedures and clothing, or invisible, such as norms and beliefs. Nevertheless, some authors went further describing organisational culture by identifying organisational culture elements such as Tunstall (1983, p. 15), who defined organisational culture as “... a general constellation of beliefs, morals, customs, value systems, behavioural norms, and ways of doing business that are unique to each corporation, that set a pattern for corporate activities and actions, and that describe the implicit and emergent patterns of behaviour and emotions characterising life in the organisation”.

Moreover, Owens and Steinhoff (1989, p. 10), stated that the definition of organisational culture has two themes (i) norms: an important way in which organisational culture influences behaviours is through the norms or standards that the social systems institutionalise and enforce (ii) assumptions: underneath these behavioural norms lie the assumptions that are the bedrock beliefs on which norms and all other aspects of culture are built”. In addition, Schall (1983, p. 560), provided an explanation for organisational culture based on communication patterns as that cultures “are created, sustained transmitted and changed through social interaction – through modelling and imitation, instruction, correction negotiation, story-telling, gossip, remediation, confrontation and observation – all activities based on message exchange and meaning assignment that is, on communication”. Sorensen (2002) described OC as a normative order that serves as a source of consistent behaviour within the organisation. Malaviya and Wadhwa (2005), on the other hand, saw OC as the spiritual model shared by a group of organisation members that is related to beliefs, including norms, practices, management processes, assumptions, customs, and organisational memory. Zheng et al. (2010) viewed OC as shared assumptions, values, and norms. Naranjo-Valencia et al. (2011) indicated that OC can be explained as the values, beliefs and hidden

assumptions that organisational members have in common. Chen and Cheng (2012) defined OC as values and beliefs jointly held by a group of members of the organisation that will affect their knowledge-sharing behaviour. Büschgens et al. (2013) explained OC as a complex set of values, beliefs, assumptions and symbols that define the way in which a firm conducts its business. Jacobs et al. (2013) considered OC as a set of norms and expectations, values, beliefs and attitudes which are common to a group. Table 2.9 shows the definitions of OC from the extant literature:

**Table 2.9: Definitions of Organisational Culture**

<b>Author(s)</b>	<b>Definition</b>
Tunstall (1983, p. 15)	<i>OC defined as “ a general constellation of beliefs, morals, customs, value systems, behavioural norms, and ways of doing business that are unique to each corporation, that set a pattern for corporate activities and actions, and that describe the implicit and emergent patterns of behaviour and emotions characterising life in the organisation”</i>
Hofstede (1984)	<i>OC can be defined as the values, attitudes, beliefs and behaviours that represent an organisation’s working environment, organisational objective, and vision</i>
Schein (1984, p. 3)	<i>OC “the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems”.</i>
Deshpande and Webster (1989, p. 4)	<i>OC refer to “the pattern of shared values and beliefs that help individuals understand organisational functioning and thus provide them norms for behaviour in the organisation”</i>
Denison (1990, p. 2)	<i>OC refers to the ‘underlying values, beliefs, and principles that serve as a foundation for the organization’s management system as well as the set of management practices and behaviours that both exemplify and reinforce those basic principles’</i>
Hofstede (1991)	<i>OC refers to a set of shared values, belief, assumptions and practices that shape and guide members’ attitudes and behaviour in the organisation</i>
Schein (1992, p. 15)	<i>OC is described as, “provide group members with a way of giving meaning to their daily lives, setting guidelines and rules for how to behave, and, most important, reducing and containing the anxiety of dealing with an unpredictable and uncertain environment.”</i>
Hofstede (2001, p. 9)	<i>OC explained as “the collective programming of the mind that distinguishes the members of one organisation from another”</i>
Sorensen (2002, p. 71)	<i>OC defines as “a normative order that serves as a source of consistent behaviour within the organization”</i>
Martins and Terblanche (2003)	<i>OC can be observed through norms, actions and rules, which are developed through communications and relationships among the organisation’s members</i>
Michailova and Minbaeva (2012);	<i>Organisational culture, systems, policies and practices to accumulate, integrate and share organisational knowledge within the organisational boundaries</i>

Minbaeva et al. (2003)	
Schein (2004)	<i>OC defined as a collection of values or beliefs about the organisation shared by the members of the organisation</i>
Park et al. (2004)	<i>OC define as the shared, basic assumptions that an organisation learnt while coping with the environment and solving problems of external adaptation and internal integration that are taught to new employees as the correct way to solve those problems</i>
Malaviya and Wadhwa (2005)	<i>OC is the spiritual model shared by a group of organisation members that is related to beliefs, including norms, practices, management processes, assumptions, customs, and Organisational memory</i>
Schein, (1990); Song-zheng and Xiao-di (2008)	<i>OC is described as a pattern of basic assumptions and beliefs, developed by a given social group throughout its history of internal integration and external adaptation, that has worked reasonably well in the past to be considered by the group as valid and important enough to be passed on to new members as the “correct” way of interpreting the organization’s reality</i>
Zheng et al. (2010)	<i>OC refers to shared assumptions, values, and norms</i>
Braunscheidel et al. (2010)	<i>OC is described as the shared values, rules and assumptions which guide employees’ behaviour in a firm</i>
Miron et al. (2004) and Naranjo-Valencia et al. (2011)	<i>OC can be explained as the values, beliefs and hidden assumptions that organisational members have in common.</i>
Chen, and Cheng (2012)	<i>OC refers to values and beliefs jointly held by a group of members of the organisation that will affect their knowledge-sharing behaviour.</i>
Huang (2012)	<i>OC defined as a pattern of basic assumptions that a community develops in order to coincide externally and integrate internally.</i>
Barney, (1986); Büschgens et al. (2013)	<i>OC can be defined as a complex set of values, beliefs, assumptions and symbols that define the way in which a firm conducts its business.</i>
Jacobs et al. (2013)	<i>OC is defined as a set of norms and expectations, values, beliefs and attitudes which are common to a group</i>

In light of above discussion, it is believed that members’ conduct is influenced by organisational culture. This is because organisational culture is a rather vague and broad concept; scholars have suggested that it is better to study organisational culture in a special context and relative to a specific research aim and questions. This study, follow Braunscheidel et al. (2010) who defined organisational culture as the shared values, rules and assumptions which guide employees’ behaviour in an organisation. This definition refers to studies related to the knowledge sharing (Taylor and Wright, 2004, Bock et al., 2005; Kim and Lee, 2006; van den Hooff and Huysman, 2009), and social capital such as interaction

between individuals (Gold et al., 2001; van den Hooff and Huysman, 2009), and innovation at workplace (Arrow, 1962; Badaracco, 1991; Leonard and Sensiper, 1998; Gold et al., 2001).

### **2.3.2 Dimensions of Organisational Culture**

The review of the literature identified several important dimensions of organisational culture. For example, Chen and Cheng (2012) divided organisational culture into five dimensions namely: trial and innovation, cooperation and trust, fairness, social network, and open-mind and participation. Such view supported by Bock et al. (2005), Taylor and Wright (2004), who argued that organisational culture composed five dimensions including, trial and innovation, cooperation and trust, fairness, social network, and open-mind and participation. Trial and innovation means that employees perceive that the organisation and supervisors are there to encourage them to improve, be creative, to try new things and new ways of working and make mistakes (Taylor and Wright, 2004; Bock et al., 2005). “Cooperation and trust” means that the organisation’s members trust each other’s ability to complete their work and believe that the other group members will help them to sort out their problems (Chen and Cheng, 2012). Fairness” means that employees are fair and impartial regarding organisational matters (Bock et al., 2005). “Social network” means that the employees communication and interaction with one another in both formal and informal ways (Kim and Lee, 2006; Huang et al., 2009). “Open-mind and participation” means that employees acknowledge that organisation members may freely exchange views and managers seek and pay attention to the views of their employees (Taylor and Wright, 2004). Valencia et al. (2010) indicated that OC can be classified into ad hoc culture and hierarchy cultures.

Moreover, Kim and Lee (2005; 2006) studied three components of organisational culture including vision and Goals, trust and social network. organisational vision leads to the generation of a clear organisational purpose that assists in goal achievement (Kanter et al., 1992, Kim and Lee, 2006). Others have suggested that clear organisational vision and goals

engender a sense of involvement and contribution among employees (Dyer, 1997, O'Dell and Grayson, 1998, Kim and Lee, 2005, Kim and Lee, 2006), trust and openness in organisational culture promotes active knowledge sharing among employees, and that trustworthy behaviour enhances communication speed by empowering members of an organisation to freely share personal knowledge and concerns (Von Krogh, 1998, Kim and Lee, 2005, Kim and Lee, 2006), and social networks indicate communications, dialogue, and individual or group interactions that support and encourage knowledge-related employee activities (Levinthal and March, 1993, Leonard and Sensiper, 1998; Kim and Lee, 2005, Kim and Lee, 2006). Both formal and informal relationships and contacts are considered important for sharing varying perspectives and knowledge within organisations (O'Dell, and Grayson, 1998, Kim and Lee, 2005, Kim and Lee, 2006).

Additionally, other researchers (e.g Denison, 1990; Denison and Mishra, 1995; Denison and Neale, 1996; Fey and Denison, 2003), identified four different elements on studying organisational culture including: adaptability, consistency, mission, and involvement. Similar view was made by Zheng et al. (2010), who identified five dimensions adaptability, consistency, mission, and involvement. Zheng et al. (2010) defined adaptability as the degree to which an organisation has the ability to alter behaviour, structures, and systems in order to survive in the wake of environmental changes. Consistency refers to the extent to which beliefs, values, and expectations are held consistently by members. Involvement refers to the level of participation by an organisation's members in decision-making. Mission refers to the existence of a shared definition of the organisation's purpose. Chang and Lee (2007), on the other hand, argued that OC can be categorised into innovative culture and supportive culture. In a similar vein, Song-zheng and Xiao-di, (2008) and Liao et al. (2012) suggested three dimensions of OC including bureaucratic culture, innovative culture and supportive culture. Bureaucratic culture refers to hierarchical and compartmentalized. Innovative culture



provides a creative place to work, imbued with challenge and risk. Supportive culture described as trusting, encouraging, relationship-oriented, and collaborative. Al-adaileh and Al-atawi (2011) studied six elements of OC namely openness to change, innovation, trust, teamwork, morale, information flow, involvement, supervision, customer service, and rewards. Nguyen and Mohamed (2011) introduced three aspect of organisational culture construct including adaptability, mission, and hierarchy. Al-adaileh (2011) suggested that organisational culture can be studied through trust, a collaborative working environment, a shared vision, and managerial practices. Hogan and Coote (2014) identified values and norms as two dimensions to represent organisational culture.

Despite the importance given to organisational culture as a stimulant for innovation, empirical research remains somewhat limited. Some studies on the link between organisational culture and innovation look only at some elements of culture (Hage and Dewar, 1973; Laursen, 2002; Laursen and Foss, 2003; Cabello-Medina et al., 2005; Valencia et al. 2010) and they do not generally use the same culture typology (Obenchain, 2002; Lau and Ngo, 2004; Obenchain and Johnson, 2004; Chang and Lee, 2007; Valencia et al., 2010). Besides, these studies have been carried out on samples from non-Libyan contexts. Lastly, all of them, together with the academic literature, underline the need to research organisational culture and innovation empirically (Dorabjee et al., 1998; Mumford, 2000; Martins and Terblanche, 2003; Jamrog et al., 2006; Valencia et al., 2010).

### **2.3.3 Definitions of Organisational Structure**

Organisational structure is defined as the set of all the ways in which the work is divided into different tasks, achieving coordination (Mintzberg, 1983). Child (1972) defined this term as “the formal allocation of work roles and the administrative mechanisms to control and integrate work activities including those which cross formal organisational boundaries”. The structure reflects the formal scheme of relationships, communications, decision processes,

procedures and systems (Zerilli, 1978; Martinez-Leon and Martinez-Garcia, 2011), which allow an organisation to develop its functions and achieve its objectives. Organisational structure also reflects the way in which information and knowledge is distributed within an organisation, which affects the efficiency of their utilization. Consequently, it substantially influences the distribution and coordination of the company's resources, the communication processes and the social interaction between organisational members (Chen and Huang, 2007).

Moreover, several researchers such as (Donaldson, 1996, p. 57; Ambrose and Schminke, 2003) defined OS as “the recurrent set of relationships between organisation members”, it is one of the most ubiquitous aspects of organisations (Clegg and Hardy, 1996). Donaldson noted that structure includes—but is not limited to—power and reporting relationships such as those identified in organisation charts, behaviours required of organisation members by organisational rules, and patterns of decision making (e.g., decentralisation) and communication among organisation members. Further, it encompasses both formal and informal aspects of relationships between members. OS is normally described as the way responsibility and power are allocated, and work procedures are carried out among organisational members (Nahm et al., 2003; Hao et al., 2012). OC includes the nature of layers of hierarchy, centralisation of authority, and horizontal integration. It is a multi-dimensional construct in which concerns: work division especially roles or responsibility including specialisation, differentiation or departmentalisation, centralisation or decentralisation, complexity; and communication or coordination mechanisms including standardisation, formalisation and flexibility (Hao et al., 2012). OC is defined as how authorities and work roles are distributed in order to organise and control decision-making activities (Huang et al., 2011).

The review of literature indicated that the flexibility of organisational structure has attracted a significant amount of attention of scholars but perhaps not enough and not in all contexts. Therefore, In line with the objectives stated in Chapter 1 the current researcher, however, finds the definition which is presented by Nahm et al. (2003) and Hao et al. (2012), to be the most helpful for this study. According to such researchers OS is described as the way responsibility and power are allocated, and work procedures are carried out among organisational members (Nahm et al., 2003; Hao et al., 2012). organisational structure plays a fundamental role in a company's capacity to identify the knowledge sources needed, acquiring new knowledge, integrating it into the organisation and recognising its absorptive capacity (Gold et al., 2001; van den Hooff and Huysman, 2009; Martinez-Leon and Martinez-Garcia, 2011). Furthermore, previous studies have demonstrated that organisational structure facilitates social capital (van den Hooff and Huysman, 2009), it substantially influences the communication processes and the social interaction between organisational members (van den Hooff and Huysman, 2009). Other researchers argued that organisational structure with flexibility is importance for innovation (Bidault and Cummings, 1994; Chen and Huang, 2007).

#### **2.3.4 Dimensions of Organisational Structure**

Prior literature reported different types of organisational structure. The early distinction between the types of organisational structure can be traced back to Hage and Aiken, (1967), who identified three types of organisational structure: centralisation, specialisation and formalisation. Egbu (2000) noted that centralisation and formalisation are related to organisational structure. Whereas Sciulli (1998), among others, have taken a centralisation and formalisation to represent OS (e.g Oldham and Hackman, 1981), such scholars described centralisation as the extent to which decision-making power is concentrated at the top management. In the other words, it relates to the amount of employee participation in

decision-making. Most previous studies suggested that a decentralised organisational structure can support organisational effectiveness whilst only some consider that high centralisation may have a positive effect on organisational effectiveness (Zheng et al., 2010). On the other hand, formalisation is related to the extent to which a firm employs a set of procedures and rules to organise and support the behaviour of its employees (Liao et al., 2011). It is a technique which guides and forms the employees' behaviour. Consequently, different employees perform similar job activities. Therefore, high levels of centralisation and formalisation produce uniformity of behaviour, action and policing (Katsikea et al., 2011).

Still others, including Robbins and Coulter (2003) studied OS as centralisation, formalisation and specialisation. In a similar way, Andrews (2010) proposed three dimensions including decentralisation, formalisation and specialisation to explain organisational structure. Additionally, Kim and Lee (2005; 2006), in contrast, distinguished between centralisation, formalisation and performance-based reward systems. Other researchers (e.g., Lin, 2008; Ghorbani et al., 2011) classified OS into three dimensions including centralisation, formalisation and complexity. Similarly, Amayah (2013) explained organisational structure as centralisation and formalisation. Other authors categorised OS into three elements including formalisation, centralisation, and integration (e.g Germain, 1996; Sciulli, 1998; Andrews and Kacmar, 2001; Robbins and Decenzo, 2001). Much of the argument of such researchers is supported by Chen and Huang (2007), who categorised OS into three elements including formalisation, centralisation, and integration. Formalisation refers to the degree to which jobs within the organisation are standardised and the extent to which employee behavior is guided by rules and procedures (Andrews and Kacmar, 2001; Robbins and Decenzo, 2001; Chen and Huang, 2007). Centralisation refers to the locus of decision-making authority lying in the higher levels of a hierarchical relationship (Robbins and Decenzo, 2001; Tsai, 2002; Chen and Huang, 2007). While, integration refers to the extent to which various

subdivisions of an organisation work interrelatedly (Germain, 1996; Sciulli, 1998; Chen and Huang, 2007). In addition, Zin (2013) explained OS from complexity, centralisation, formalisation, and stratification perspective. Complexity structure refers to the amount of occupational specialisation and task differentiation in the organisation (Egbu et al., 2003), centralisation in terms of organisational structure deals with the amount of power distributed among employees in various positions. In a decentralised structure, decision making or authority is distributed among many managers (Zin, 2013) and involves all levels of employee participation in the decision-making processes. Decentralisation enables members to establish lateral ties on their own initiative, without first seeking approval from headquarters (Ryan et al., 2010), Stratification structure refers to the span of control of the number of status layers/ levels (subordinate) within an organisation (Egbu, 2000), and formalisation structure refers to the extent to which employees' behaviour or activities are bound by the company's formal rules, regulations and procedures (Banner, 1995; Egbu, 2000).

Furthermore, Zheng et al. (2010), on the other hand, identified two main types of organisational structure including: Centralisation and Decentralised. centralisation refers to the extent to which decision-making power is concentrated at the top levels of the organization. Decentralised structure, in contrast, encourages communication and increases employee satisfaction and motivation (Dewar and Werbel, 1979; Zheng et al., 2010), because in less centralised environments, free flow of lateral and vertical communication is encouraged, experts on the subject had greater say in decision-making than the designated authority. Gorry (2008) suggested three main types of organisational structure, which will determine the specific characteristics of knowledge sharing: dynamic structure, networking structure, and object oriented structure.

Additionally, Ragsdell (2009), in a study in the voluntary sector, found that two aspects of organisational structure, physical (e.g. office layout), and reporting, were seen to impact on the effectiveness of knowledge sharing. Hao et al. (2012) suggested six aspects to represent organisational structure characteristics including flexibility, openness and authority, communication, delegation and decentralisation and complexity. Martinez-Leon and Martinez-Garcia, (2011) proposed five elements to represent OC including specialisation, formalisation, autonomy, centralisation and indoctrination. Specialisation is a design parameter of the organisational structure. It can be horizontal and vertical. Formalisation refers to the standardisation of work processes by imposing operating instructions, job descriptions, rules and regulations (Robbins and Decenzo, 2001). Autonomy is defined as the amount of job-related independence, initiative, and freedom either permitted or required in daily work activities. Centralisation means the decision-making authority is situated in the higher levels of a hierarchical relationship (Robbins and Decenzo, 2001). Indoctrination is defined as programmes and techniques by which norms, rules and regulations are standardised so that the workers can be trusted to make decisions and take actions in keeping with the ideology of the organisation. Indoctrination is closely aligned with the socialization process (Martinez-Leon and Martinez-Garcia, 2011). Kim and Lee (2006) argued that centralisation, formalisation and performance-based rewards are the key attributes of organisational structure dimension. Centralisation is described as “degree to which power and authority are concentrated at the organisation’s higher levels” (Kim and Lee, 2006, p. 374). Formalisation is related to “the degree to which are manifest in written documents regarding procedures, job descriptions, regulations, and policy manuals” (Kim and Lee, 2006, p. 374). Performance-based rewards related to the utility of incentive systems for motivating employees to generate new knowledge, share existing knowledge, and help employees in other divisions or departments (e.g., Argote and Epple 1990; O’ Dell and Grayson 1998;

Kim and Lee, 2006). Other researchers considered flexibility as a major construct of organisational structure dimension (Gold et al., 2001 and van den Hooff and Huysman, 2009).

### **2.3.5 Definitions of Information Technology**

Defining the concept of information technology is not straightforward, because this subject has been studied by several disciplines and from different approaches. For instance, information technology is referred to the knowledge process and its applying methods, processing, transferring and making information in progress (Hamidi et al., 2011; Karami and pour, 2003). IT includes gathering, organising, storing, publishing and using the information in the form of sound , picture graphic, text, number, ... by using the computer and telecommunication tolls...( Raees and dana, 2002). Bharadwaj (2000) and Jean et al. (2008) defines IT capabilities as the ability to mobilize and deploy IT-based resources in combination or copresent with other resources and capabilities. IT investment, broadly defined, includes investments in both computers and telecommunications and in related hardware, software, and services (Dedrick et al., 2003; Dixit and Panigrahi, 2014). However, the operational definition of IT investment is generally confined to computer hardware and in most studies, IT investment is defined as an annualized value of the stock of computer investments including the depreciated value of previous investments that are still in service, or as annual spending (Dedrick et al., 2003; Dixit and Panigrahi, 2014).

Moreover, others authors (e.g., Huff and Munro, 1985; Kamal, 2006) defined IT as the broad range of technologies involved in information processing and handling, such as computer hardware, software, telecommunications and office automation, and includes such technologies as new systems development methodologies. From a more pragmatic and technological perspective IT is related to all technologies used to collect, store, process,

graphically display and transport data, and therefore encompasses computer equipment and system programs, application programs and communication facilities.

Other researchers have expanded the definition of information technology. For instance, Shaikh and Karjaluo (2015) use the broader term “information technology/systems” to refer to a set of systems, technologies, processes, business applications, and software. Similarly, a broader term “human” is used to denote the unit of analysis or a participant, which includes users, netizens, members, students, faculty members, consumers, customers, employees, workers, managers/executives, and so forth. Other scholars, argued that information technology can be defined as a family of technologies used to process, store and disseminate information, facilitating the performance of information-related human activities, provided by, and serving both the public at-large as well as the institutional and business sectors (Salomon and Cohen, 1999; Zhang et al., 2011).

Shneiderman (2007) indicated that refers to IT as tools that facilitate social interaction inside the firm by creating networking between groups and individuals. Other researchers defined information technology adoption/usage as the variety and amount of usage of the acquired technology (Gatignon and Robertson, 1985; Higón, 2011). Ollo-López and Aramendía-Muneta (2012) both viewed IT as the use of ICT systems and e-business software, automated data exchange with suppliers and customers, innovation activity and the role of ICT, ICT skills requirements, ICT investments, energy efficiency and emissions. Lopez-Nicolas and Soto-Acosta (2010) stated that information technology use is seen as consisting of three different orientations: informative, communicative and workflow.

Based on pervious discussion, this study follow definition of Kim and Lee (2006) who defined information technology as internet based network systems, groupware systems, intranets, databases, electronic data-management systems, and knowledge-management information systems. This definition has been selected because of their comprehensiveness.



Several researchers (e.g., Hendriks and Vriens, 1999; Roberts, 2000; Spiegler, 2003; Van den Hooff and Huysman, 2009) argued that the technical infrastructure includes the use of information and communication technologies (ICT) to aid in the exchange of knowledge. Although the contribution of ICT to knowledge sharing is the subject of much discussion, there is general agreement that ICT can play a supporting role. Different kinds of applications can provide insight into the social capital, aid in interaction between individuals and contribute to a shared identity, norms and values, as well as more understanding of what colleagues are doing (Van den Hooff and Huysman, 2009). Interaction between individuals is facilitates the innovation at workplace (Gold et al., 2001).

### **2.3.6 Dimensions of Information Technology**

Prior studies have documented several components of information technology. For instance, Perez-Lopez and Alegre (2012) measure IT from three dimensions including IT knowledge, IT operations and IT infrastructure. Kim and Lee (2005) measured IT from two dimensions including IT application usage and End-user. Such view supported by Kim and Lee (2006), who divided components of IT into IT application usage and End-user. IT application include Internet based network systems, groupware systems, intranets, databases, electronic data-management systems, and knowledge-management information systems, and End-user, on the other hand, reflect to the degree to which end-user ease is a focus of information system development. Regardless of the technology, IT system and software developers must create user-friendly products that promote their acceptance and use.

Gold et al. (2001) studied IT as dimension addresses the technology-enabled ties that exist within the firm (Leonard, 1995, Brown and Duguid, 1998, Davenport and Klahr, 1998, Davenport and Prusak, 1998, Leonard and Sensiper, 1998, Teece, 1998). Gold et al. (2001) also observed that the technological dimensions that are part of effective knowledge

management include business intelligence, collaboration, distributed learning, knowledge discovery, knowledge mapping, opportunity generation, as well as security (Leonard, 1995; Grant, 1996). Van den Hooff and Huysman (2009) supported this view by using ICT infrastructure as a major construct of IT. The technical infrastructure includes the use of information and communication technologies (ICT) to aid in the exchange of knowledge.

Bharadwaj (2000) studied IT as three types including IT infrastructure, Human IT resources and IT-enabled intangible resources. This perspective is also mirrored by Jean et al. (2008), who contends that IT can be viewed as IT infrastructure, Human IT resources and IT-enabled intangible resources. IT infrastructure includes electronic integration. Human IT resources, in contrast, including technical skills and managerial skills have been regarded as important IT. Technical IT resources refer to programming, systems analysis and design, etc. Managerial skills refer to collaboration with business units, project management and leadership skills. IT-enabled intangible resources, on the other hand, described as customer orientation, knowledge assets and synergy. Fernández-Mesa et al. (2014) viewed IT as IT knowledge, IT operations and IT objects. IT knowledge is the degree to which a company has a body of technical knowledge about objects, such as computer systems; second, IT operations represent the extent to which a firm utilises IT to manage market and customer information; third, IT objects include elements such as computer-based hardware, software and support personnel. This view is supported by other researchers (e.g., Perez-Lopez and Alegre, 2012; Perez-Lopez and Junquera, 2013; Mishra et al., 2013)

Some researchers have adopted electronic or virtual integration as a key IT resource. Kim et al. (2006), for example, conceptualise applied technological innovation, administrative innovation and inter firm systems integration as three key IT resources. Similarly, Arun et al. (2006) defined IT integration capability as a key IT resource. Other authors (e.g., Kim and

Umanath, 2005; Wang et al., 2006; Kim and Mahoney, 2006; Jean, 2007) all studied IT through electronic integration. Rai et al. (2006), on the other hand, saw IT infrastructure integration as element to represent IT. Sanders (2005) and Wu et al. (2006) can be viewed IT as IT alignment. Kim et al. (2005) stated that there are two sub-elements of IT: electronic coordination, electronic monitoring while other researchers measured IT from IT advancement prospective. Wagner et al. (2014), in contrast, focused on social media affordances to represent IT. Kaplan and Haenlein (2010) defined social media as “internet-based applications that build on the ideological and technological foundations of web 2.0, and that allow the creation and exchange of user-generated content” (p. 62). Kietzmann et al. (2011) stated that “social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content” (p. 241).

Moreover, Garrison et al. (2015) examined IT from three elements including; managerial IT capability, IT technical capability and relational IT capability. Managerial IT capability is defined as the extent to which IT managers have the necessary business acumen and technical skills to foresee emerging technologies and leverage them effectively in the alignment of business processes with organisational goals. IT technical capability refers to various features or aspects of a firm’s IT abilities. For example, technical capability may represent the physical assets (e.g., computers, network equipment, and databases) that provide a firm with functionality in terms of its accessibility and range of shared information. Relational IT capability includes relation-specific assets, knowledge sharing routines, complementary resources and effective governance.

Other scholars explained that IT consists of three elements including managerial IT skills, technical IT skills and IT infrastructure (Mata, et al., 1995; Byrd and Turner, 2001; Dehning and Stratopoulos, 2003). Ho et al. (2011) and Dixit and Panigrahi (2014) considered annual

IT investment and accumulated IT stock as a major construct of IT. Annual IT investment includes hardware, software, and costs related to maintenance, personnel, and training (Chari et al., 2008; Kobelsky et al., 2008). IT stock consists of accumulated hardware capital and the capitalised values of IT labour spending ( Hitt and Brynjolfsson, 1996; Dewan et al., 2007). Such view supported by Dewan and Ren (2011), who measure IT investment includes hardware, software, and costs concerning maintenance, personnel, and training.

Additionally, Zhang et al. (2011) measured information technology form three elements including ICT investment, ICT usage and ICT capability. Lopez-Nicolas and Soto-Acosta (2010) discussed IT use orientations through ICT informative orientation, ICT communicative orientation, and ICT workflow orientation. In ICT, informative orientation, technologies in a company are mainly employed to provide and distribute corporate or commercial information to diverse stakeholders (Huzingh, 2000). In this sense, ICT can be used as a corporate channel for information dissemination and data access across functional boundaries and organisational levels (Bafoutsou and Mentzas, 2002). Therefore, ICT informative orientation is defined as the use of ICT to provide one-way company electronic information directed to one or more stakeholders. ICT communicative orientation, besides allowing cost reduction in comparison to traditional communication tools, offers a unique and integrated opportunity for interacting with several business agents (both internal and external to the organisation). In this scenario, all these ICTs facilitate the exchange of information, collaboration and the possibility of establishing close relationships (Kalakota and Robinson, 2000). Thus, ICT communicative orientation is defined as the use of ICT for two way information exchange. In the new economy, work has shifted from the creation of tangible goods to the flow of information through the value chain (Basu and Kumar, 2002). The establishment and development of workflow technologies has played a fundamental role in this transition. ICTs, and especially Web technologies, provide great opportunities for the

automation of processes (Fischer, 2004). Thus, ICT workflow orientation involves the establishment of predefined electronic processes through corporate technologies.

Drawing upon above discussion, the framework offered by Van den Hooff and Huysman (2009), is adopted for the aim of identifying its dimensions. These dimensions of IT seem more appropriate for this research since they encompass not only the internet based network systems, groupware systems, intranets, databases, electronic data-management systems, and knowledge-management information systems (IT application), but also the degree to which end-user ease is a focus of information system development. Regardless of the technology, IT system and software developers must create user-friendly products that promote their acceptance and use (End-user focus). Therefore, this framework has been selected because of their comprehensiveness.

## **2.3.7 The Importance of Organisational Context for Innovation**

### **2.3.7.1 Organisational Culture and Innovation**

Owing to its increasing importance of organisational culture as a part of organisational context, prior studies have paid attention to identify the dimensions of OC and examine their roles and effects on innovation. For example, several studies have confirmed that organisational culture plays a key role in supporting innovation because employees can accept innovation if they believe that innovation is a basic value in the organisation. Hence, this belief can encourage a significant commitment towards innovation (Naranjo-Valencia et al., 2011). Other researchers' identification of the significant role of OC in facilitating innovation (Lynn, 1999; Egbu, 2000; Egbu and Botterill, 2001; Valencia et al., 2010; Chen and Cheng, 2012; Liao et al., 2012). Gudmundson et al. (2003) OC is also believed to be the most significant input to enhance innovation. Valencia et al. (2010) concluded that organisational culture is more likely to succeed in enhancing their product innovation.

Similarly, Tip et al. (2012) revealed that the organisational culture is critical to develop innovation.

Moreover, other studies illustrated that organisational culture is considered to be one of the key factors in enhancing innovation at workplace (Mayondo and Farrell, 2003; Obenchain and Johnson, 2004; Chang and Lee, 2007). Jung et al. (2003) examined the influence of organisational culture and product and process innovation. The authors concluded that product and process innovation can be achieved by to the organisational culture. Moreover, studies from developing countries reported a positive association between organisational culture and innovation (Jaskyte, 2004 and Miron et al., 2004). In Malaysia, Abdullah et al. (2014) showed that organisational culture has significant relationship with product innovativeness. Similarly, in Taiwan, Liao et al. (2012) found that OC shows were significantly and positively related to organisational learning and innovation through knowledge acquisition. In this respect, the authors concluded that OC shows have an effective impact on innovation indirectly. Latterly, Hogan and Coote (2014) explained that organisational culture shows facilitate the values and norms and thus increase the innovation at workplace. Recently, through an empirical study, evidence from Spain illustrated that organisational culture did increase product innovation of Spain organizations. However, the authors acknowledged that organisations need to pay close attention to organisational culture issues in developing organisational practices that will facilitate innovation, as there is no single universal set of practices that can be used to facilitate innovation (Valencia, 2010; Büschgens et al., 2013). It also indicated that more research is needed to understand organisational context such as organisational culture (Chennamaneni et al., 2012), which may also have a significant effect on KS behaviours which effect innovation (Akhavan and Hosseini, 2016).

### **2.3.7.2 Organisational Structure and Innovation**

Within the growing body of innovation literature, increasing attention is being paid to the role of organisational structure on innovation. For example, several researchers indicated that organisational structure has appeared to be one of the factors determining innovation (Liao, 2007). Zaltman et al. (1973) concluded that firms with high centralisation and formalisation are more likely to hinder the initiation of innovation. Similarly, Guan and Ma (2003) argued that there was a significantly negative relationship between centralisation and the adoption of innovation. Such result supported by researcher (e.g., Bidault and Cummings, 1994; Chen and Huang, 2007), who suggested that in organisations with high formalisation, there are explicit rules and procedures which are likely to impede the spontaneity and flexibility needed for internal innovation. Others scholars indicated that the characteristics of the organisational structure have been recognised as critical elements in influencing the productivity and innovation in companies (Germain, 1996; Drucker, 1999). In addition, Sciulli (1998) revealed that the organisational structure plays a significant role in determining the type of innovation. Tesluk et al. (1997) confirmed that that the organisational structure is important factor to facilitate innovation within organisations.

Moreover, other scholars indicated that organisational structure plays a crucial to enhance innovation at workplace (Meadows, 1980b; Liao, 2007; Zheng et al., 2010; Hao et al., 2012). In a similar vein, innovation literature shows that organisational structure is decisive in the development of innovation (Chen and Huang, 2007) and in providing the relationships of task and authority that predetermine the way people work (Hunter, 2002). Firms can implement, execute, and coordinate different organisational activities through the structural mechanism of workflow (Ouchi, 1979; Robbins and Decenzo, 2001; Chen and Huang, 2007). In organisations with high formalisation, there are explicit rules and procedures which are likely to impede the spontaneity and flexibility needed for innovation (Bidault and Cummings, 1994;

Chen and Huang, 2007). Gold et al. (2001) and Van den Hooff and Huysman (2009) stated organisational structure including flexibility plays a fundamental role in enhancing knowledge sharing and social capital which in turn improves innovation.

### **2.3.7.3 Information Technology and Innovation**

A number of studies argued that a crucial determinant of the product and process innovation is the information technology (e.g. Camelo-Ordaz et al., 2011; Yeşil et al., 2013). Koellinger (2008) suggested that the information communication technology plays a vital role in organizations. The authors explained that information communication technology act as tools that faculties improving processes or by enabling the firm to offer new products or services. Evidence from UK revealed that information technology and communication are important for product and process innovation (Higón, 2011). Gonzalez et al. (2013) studied the innovation of Spanish government firms. The authors confirmed that an information and communication technology plays a crucial role in organisations, as it helps firms to develop product, process and collaborative innovation at workplace. Furthermore, Kaplan and Norton (2004) concluded that the information technology improves innovation at workplace. Other studies acknowledged that IT activities in firms can add value to the organisations by: creation and sharing knowledge, which enhancing workplace learning (Lesser et al., 2001), and innovation at workplace (Von Krogh et al., 2012).

Additionally, several researchers (e.g., Koellinger, 2008; Higón, 2011; Xue et al., 2012; Kleis et al., 2012, Ong and Chen, 2013) confirmed that information technology can facilitate innovation within organisations. Other studies have also recognised that information technology can help organisations in reducing costs, improving product and service quality, enhancing dependability, or increasing flexibility (González-Benito, 2007; Dixit and Panigrahi, 2014). It noted that there is a relationship between IT and intangible output and proposed that the use of IT in innovation and knowledge creation processes is perhaps the



most critical factor in a firm's long-term success (Kleis et al., 2012; Garrison et al., 2015). Other researchers indicated that three prime payoffs from IT investments have been suggested: lower costs to produce goods and services, increased quality in output produced, and increased efficiency in turning acquired resources into goods and services for customers (Dehning and Stratopoulos, 2002; Dixit and Panigrahi, 2014).

### **2.3.8 The Importance of Organisational Context for Knowledge Sharing**

Owing to the fact that modern organisations have realised how critical knowledge is to the success of their operations, the Effective knowledge sharing has become an ongoing major concern. Wong (2005), for instance, argued that, because organisations have become more knowledge intensive, they tend to be more concerned with hiring 'minds' than 'hands', and those strategies which are aimed at leveraging the value of knowledge in organisations are increasing in number. However, Amayah (2013) said that knowledge sharing is not easy to promote for a variety of reasons. For example, researchers (e.g., Streatfield and Wilson, 1999; Von Krogh, 2000; Cross et al., 2001), knowledge cannot be managed, but knowledge sharing can be supported by acting on certain contextual and organisational factors that affect employees' willingness to share their knowledge.

#### **2.3.8.1 The Importance of Organisational Culture for Knowledge Sharing**

Several empirical studies have provided evidence of the important role of organisational culture on knowledge sharing among employees at workplace. For example, Kim and Lee (2004) analysed how organisational culture influence knowledge sharing capabilities in Korean public organisations. The researchers highlighted that organisational culture can facilitate KS by ensuring knowledge flow among employees throughout the organisation. A qualitative study conducted by De Long and Fahey (2000) in 50 organisations has discovered that supportive organisational culture plays a vital role to success knowledge sharing at

workplace. Another study which found organisational culture to be an important factor in knowledge sharing process is that of Kim and Lee (2006), who emphasised the role played by organisational culture in knowledge sharing, arguing that organisational culture is a key enabler for effective KS process. A study done by Ives et al. (2003) also investigated organisational elements, including organisational culture. They found that organisational culture helps employees to access the knowledge they need when they need it. Such a finding served to confirm Spender (1996), who asserted that organisational culture merely play an enabling role in the promoting of knowledge sharing at workplace.

Additionally, Abodulah et al.'s (2009) examined the relationship between organisational culture and knowledge sharing. The researchers suggested that organisations need to pay close attention to cultural issues in facilitating knowledge sharing between the employees of private companies in Malaysia. other studies also provided evidence of the important role of organisational culture in facilitating knowledge sharing among employees (Van den Hoof and Huysman, 2009). Al- Adaileh (2011) investigated the impact of organisational culture on Knowledge sharing. The researchers confirmed that both organisational culture helps employees to share their knowledge at workplace. Such view is consistent with Al-Adaileh and Al-Atawi (2011) who provided evidence that organisational culture is critical to the success of knowledge sharing practices in an organisation. Suppiah and Sandhu (2011) mentioned that organisational culture is regarded as the main reason for improving knowledge sharing among employees. Other empirical research also showed that organisational culture is a key factor to enhance knowledge sharing among individuals at workplace (DeLong and Fahey, 2000; McDermott and O'Dell, 2001; Al-Alawi et al., 2007; Abzari and Teimouri, 2008; Al-Adaileh, 2011; Wiewiora et al., 2013).

### **2.3.8.2 The Importance of Organisational Structure for Knowledge Sharing**

Owing to its increasing importance of organisational structure, prior empirical studies have provided evidence of the important effects of organisational structure on knowledge sharing behaviour. For example, researchers provided evidence that organisational structure plays a fundamental role in a company's capacity to identify the knowledge sources needed, acquiring new knowledge, integrating it into the organisation and recognising its absorptive capacity (Martinez-Leon and Martinez-Garcia, 2011). Empirical evidence also indicated that supportive organisational structure is the most important factor to enhance knowledge sharing (Grover and Davenport 2001; Kim and Lee, 2006; Teimouri et al., 2011; Al-Adaileh and Al-Atawi, 2011).

Moreover, Teimouri et al. (2011) conducted an empirical study on the effective organisational factors on knowledge sharing between employees of governmental organisations in Isfahan Province culture context. The results indicated that organisational structure is an important prerequisite for effective knowledge sharing between employees of governmental organisations in Isfahan province. Much of the argument of Teimouri et al. (2011), are supported by Er-ming (2006). Er-ming (2006) examined the influence of some organisational factors on the knowledge sharing of members in Chinese context, and discusses the implications of these factors for formulating organisational strategies that encourage knowledge sharing. The study concluded that organisational structure is able to enhance knowledge sharing.

Additionally, Islam et al. (2012) investigated the role of structure on knowledge sharing in Malaysian MNCs. The research provided evidence of the important effects of less formalisation and centralisation on knowledge sharing. Liu (2009) conducted an empirical study to explore the association between organisational structure on the performance of

knowledge sharing in two UK consultant firms and one China construction project. The researchers confirmed that organisational structure as the key facilitator of organisational knowledge sharing . A survey done by Al-Alawi et al. (2007) on various organisations in Bahrain in the public and private sectors confirmed that organisational structure as a salient factor in facilitating knowledge sharing among employees. Al-Alawi et al. (2007) highlighted that there are five key success factors for knowledge sharing such as trust, communication, information systems, rewards and organisational structure. It is argued that the flexibility of organisational structure is necessary for sharing knowledge among employees (Gold et al., 2001; van den Hooff and Huysman, 2009).

### **2.3.8.3 The Importance of Information Technology for Knowledge Sharing**

Previous KM studies identified information technology as a salient factor in facilitating knowledge sharing among employees (e.g., Spender 1996; Ives et al., 2003; Kim and Lee, 2004; Huysman and Wulf, 2006; Liu et al., 2009; Teimouri et al., 2011). Other researchers indicate that technology plays a vital role in business, as it helps employees to access the knowledge they need when they need it (Bals et al., 2007; Chong and Chong, 2009). Over the past three decades, many organisations have developed information technology-based systems (IT-based systems) designed specifically to facilitate the sharing, integration and utilisation of knowledge, referred to as knowledge management systems (KMSs). These systems are part of the agenda in many of today's leading Firms (Nielsen and Michailova, 2007). Prior studies also recognised that IT can help organisations in supporting knowledge sharing among employees (Van den Hooff and Huysman, 2009). Additionally, Other researchers saw IT's role as enabler of knowledge processes (Alavi and Leidner, 2001). Some studies provided evidence of a positive relationship between IT and knowledge sharing. For instance, researchers (e.g., Spender 1996; Ives et al., 2003; Kim and Lee 2004; Huysman and Wulf, 2006; Liu et al., 2009) highlighted that employees cannot share their knowledge

effectively unless organisations put more effort into providing information technology infrastructure. Other studies, which also use IT application usage and End-user focus, confirmed the important of information technology in supporting knowledge sharing among employees (Kim and Lee, 2005; 2006). Perez-Lopez and Alegre (2012) also provided evidence of the important effects of IT and knowledge management process (knowledge sharing), but they focus on IT knowledge, IT operations and IT infrastructure measure of IT.

### **2.3.9 The Importance of Organisational Context for Social Capital**

Most of the empirical studies investigating the factors affecting firms' social capital considered the organisational culture, organisational structure and information technology as the principal factors affecting companies' social capital.

#### **2.3.9.1 Organisational Culture and Social Capital**

With respect to organisational culture, several researchers acknowledged that organisational culture plays vital role to support the social capital (Gu and Wang, 2013). Likewise, Song-zheng and Xiao-di (2008) found that organisational culture is considered among the enhancing factors of the firms' social capital. A number of scholars provided evidence on the importance of organisational culture on social interaction among employees at workplace (Gold et al., 2001; Van den Hooff and Huysman, 2009). It is argued that organisations should have relevant organisational culture to enhance their social capital (Petrou and Daskalopoulou, 2013).

#### **2.3.9.2 Organisational Structure and Social Capital**

Besides organisational culture, a number of researchers found that organisational structure is essential factor of the firm's social capital (e.g., Dalton et al., 1980; Schmid, 2002). The investigators confirmed that organisational structure substantially influences the communication processes and the social interaction between organisational members.

Furthermore, empirical evidence also indicated that organisational structure with a less centralisation and formalisation is the most importance factor to enhance three element of social capital including structural, relational and cognitive social capital (Burt, 1997). Taylor (2007) found that for organisational structure including centralisation and formalisation also appeared to be a significant factor affecting the firms' social capital. Other researchers argued that organisational structure plays an vital role in supporting social capital (Gold et al., 2001; Van den Hooff and Huysman, 2009). The auothers further argued that the extent to which a structure is characterised by clear roles and responsibilities for knowledge sharing and reduced structural barriers to it, leads to more trust, identification, and reciprocity between employees. It might seem that a greater influence of organisational structure on social capital would result in positive influence on structural social capital – a more transparent structure leading to more insight into the location of knowledge and how to contact relevant people. However, clarity of roles and responsibilities and less formal divisions in the organisation may lead to a more “informal” climate, where trust, identification and reciprocity exist (Van den Hooff and Huysman, 2009).

Similar view were reported by three studies associated to the importance of organisational structure to social capital (Yap et al., 1998; Sivadas and Dwyer, 2000; Janz and Prasarnphanich, 2003). In a study on Taiwanese firms, conducted by Chen and Huang (2007) indicated that when the organisational structure is less formalised, more decentralised and integrated, social interaction is more favorable among employees within organizations. Evidence from public organisations also revealed that social capital can achieved by having a less centralisation and formalisation (Andrews, 2010). However, the scholars acknowledged that little is known of the precise role of organisational structure as a part of organisational context on social capital (Andrews, 2010).

### **2.3.9.3 Information Technology and Social Capital**

Another important factors, considered crucial for increase social capital is information technology. It argued that the firm's information technology has appeared to be one of the factors determining social capital. Gold et al. (2001) noted that information technology comprises a crucial element of the structural dimension needed to mobilize social capital, which allows employees to share their knowledge at workplace. Moreover, Joshi et al. (2010) found that information technology has a strong and positive effect on organisational social capital. The authors explained that such IT is usually built social integration which increased social capital. Similarly, Shneiderman (2007) argued that increasing social capital would require a level of social interaction inside the firm by creating networking between groups and individuals which can be gained through information technology. In their Dutch study, Van den Hooff and Huysman (2009) claimed that information technology was among the most important factors influencing the social capital including structural, relational and cognitive social capital.

Based on this review, it is clear that the literature review highlights several issues regarding the direct effect of organisational context and innovation. Firstly, it is clear that the literature review highlights that organisational context (OC, OS and IT) is very importance factors that can faculties product and process innovation. However, the effectiveness of such organisational context remains unclear. Despite, the empirical studies in the role of organisational context is well established, empirical evidence is still inconclusive. Among the reasons, are the that managerial practice requires an underlying structure in order to decide what organisational culture as a pat of organisational context should be implemented in order to foster innovation, and to assess if a specific culture is an effective and efficient coordination instrument. Hence, a framework is needed which allows to assess their relationship with organisational innovation (Valencia, 2010; Büschgens et al., 2013). Wang

and Noe (2010) also suggested that organisations need to pay close attention to organisational context in general and organisational cultural issues in specific in developing organisational practices that will facilitate KS, as there is no single universal set of practices that can be used to facilitate KS.

Moreover, in spite of the fact that the importance of developing capabilities of idea/knowledge generation has been highlighted, the mechanisms that lead to and coordinate the innovation process remain much more to be investigated (Jansen et al., 2006; Agbim, 2013). Prior research did not pay too much attention on the influence of organisational structure on the development of innovation (Agbim, 2013). Chen and Huang (2007) argued that in the knowledge management literature, little has been done in investigating the role of organisational structure in the knowledge sharing as one the knowledge management process. This deficiency is serious because organisational structuring of the workflow is the primary mechanism available to the firm for implementing, executing, and controlling knowledge management activities. Scholars also indicated that little is known of the precise role of organisational structure as a part of organisational context on social capital (Andrews, 2010). Chong and Chong (2009) helped employees in accessing the knowledge they need when they need it, and provides the tools with which users can leverage their knowledge in the context of their work. Therefore, organisations are always looking for support from their IT departments to utilise, facilitate and use their existing knowledge effectively and efficiently (Montazemi et al., 2012). Joshi et al. (2010) argued that IT enabled social integration that builds firms' social capital. These structures of social integration promote connectedness among members of firms by creating seamless networks of people, devices and knowledge. Thus, IT allows the creation and share of knowledge (Joshi et al., 2010). However, many organisations have found difficulty in implementing information system successfully. It is demonstrated that in many organisations technology has failed to have much impact on the



way knowledge is transferred and shared. Furthermore, Choi et al. (2010) debated that little is known of the precise role of information system on KS, which in turn influences organisational performance.

Additionally, Kostova et al. (2008, p.997) pointed out that “organisations have complex internal context. In the complex environment of organisations units, particular coordination mechanisms and tools to facilitate KS are required (Ghoshal and Bartlett, 1995; Gupta and Govindarajan, 2000; and Sia et al., 2010). Organisational context is very important to create a suitable climate, set values and, norms, and create a culture of change. It can enhance social capital and foster a shared vision and therefore develop innovation within organisation (Northouse, 2007, DuBrin, 2012). Thus, it will be useful to provide a better understanding of the relationships between organisational context (OC, OS and IT), SC, KS, and innovation, and determine methods that can be used by managers to enhance social capital and knowledge sharing activities among employees at workplace. Hence, the direct role of organisational context in enhancing social capital, knowledge sharing and firms’ innovation requires further empirical research that would justify their use and improve their efficiency.

Secondly, covering prior work in the area of this study highlights issues regarding the indirect approach. Exploring and investigating “How organisational context (OC, OS and IT) can facilitate SC and KS among employees to support the innovation, product and process” has not received significant attention in the literature and there are few empirical studies on this particular research issue. In this respect, the current study attempts to fill such a gap and explore the indirect links of organisational context on innovation through social capital and knowledge sharing. The following section (Section 2.3.10) provides further details on how this thesis intends to fulfil this research gap.

### **2.3.10. Identified Gaps in the Literature**

Having reviewed the different approaches adopted by prior studies to test the impact of organisational context in enhancing product and process innovation, it appears that scholars in the innovation literature tend to advocate the “direct and indirect effects” approach as the most updated and relevant approaches to evaluate the impact of organisational context. For example, despite the fact that the organisational context including organisational culture, structure and information technology has been the attention of several studies (Kim and Lee, 2006; Van den Hoof and Huysman, 2009; Amayah, 2013), their influences on innovation has mainly been examined by using a direct approach (e.g., Mayondo and Farrell, 2003; Jaskyte, 2004; Miron et al., 2004; Obenchain and Johnson, 2004; Jaskyte and Dressler, 2005; Chang and Lee, 2007; Pizarro et al., 2009; Zheng et al., 2010; Valencia et al., 2010; Hogan and Coote, 2014). Indeed, the review of literature (See section 4.0) revealed that most of these works have underlined the need to research the role of such organisational context in the innovation (product and process) empirically. However, given the fact that social capital (Wu et al., 2008; Baba and Walsh, 2010; Zheng, 2010; Molina-Morales and Martínez-Fernández, 2010; Laursen et al., 2012; Mura et al., 2013; Elstouhi et al., 2015) , and knowledge sharing among employees (Alavi and Leidner, 2001; Dougherty et al., 2002; Nonaka and Toyama, 2005; Michael and Nawaz, 2008; Cheng, 2012; Al-husseini and Elbeltagi, 2014; 2015), are two group of resources can support the promotion and implementation of innovation within organisation (Ichijo and Nonaka, 2007a; von Krogh et al., 2012; Kim and Lee, 2013; Al-husseini and Elbeltagi, 2014). Indeed, it appeared that the few studies looking at such role have stressed the motivational function of the organisational context and overlooked their social capital and knowledge sharing’ enhancement effect. Consequently, it is believed that despite the aforementioned studies, the indirect and mediating effects of organisational context on innovation are still not fully answered. The

following points highlight the limitations of these studies and identify the research gaps requiring further investigation.

Firstly, the empirical studies argued that organisational context (OC, OS, IT) is an enabler of social capital (Gold et al., 2001; Van Den Hooff and Huysman, 2009), knowledge sharing (Gold et al., 2001; Kim and Lee, 2005; 2006; Liu 2009; Van den Hooff and Huysman, 2009) and enhances innovation (Gold et al., 2001; Tip et al., 2012; Liao 2007; Ollo-López and Aramendía-Muneta, 2012). Moreover, it is argued that social capital is an enabler knowledge sharing (Marouf, 2007; Van den Hooff and Huysman, 2009; Amayah, 2013; Kim et al., 2013), and social capital antecedent to innovation (Mura et al., 2013; Elsetouhi et al., 2015), and also knowledge sharing is an antecedent to innovation (Andreeva and Kianto, 2011, Porzse et al., 2012, Ferraresi et al., 2012; Akhavan and Hosseini, 2016). Despite the extensive number of empirical studies revealed that organisational context (OC, OS and IT), social capital, knowledge sharing and innovation are important to organizations, there is a gap in the literature regarding the organisational context (OC, OS and IT) in supporting the SC, KS and innovation, especially in public and private oil sectors, and no study has been conducted to consider all variables used in this study to date.

From direct approach prospective, despite, the studies dedicated to organisational context (OC, OS and IT) and their impact on, SC, KS, and innovation, the direct impact of organisational context is still questioned. In this respect, Wang and Noe (2010) stated that more research is needed to understand how KS can be promoted and how organisational culture as factor of organisational context can affect the dynamics of KS among employees and teams. Moreover, more studies are needed regarding KS in the emerging economies of Africa, the Middle-East and South America, as the majority of studies have been carried out in Western countries, although the effect of non-Western influences on KS in Chinese culture has been studied. Furthermore, researchers suggest that organisations need to pay close

attention to organisational culture issues in developing organisational practices that will facilitate innovation, as there is no single universal set of practices that can be used to facilitate innovation (McLaughlin et al., 2008; Tellis, 2009; Valencia, 2010; Nakata and Di Benedetto, 2012; Büschgens et al., 2013; Abdullah et al., 2014; Naranjo-Valencia et al., 2016).

It also indicated that more research is needed to understand organisational context such as organisational culture (Chennamaneni et al., 2012), which may also have a significant effect on KS behaviours which effect innovation (Akhavan and Hosseini, 2016). Further research is needed to ascertain the extent of the differences between both public and private sector, and how organisational context affect knowledge sharing practices in these types organisations (Amayah, 2013). On the other hand, scholars say that little is known of the precise role of organisational structure as a part of organisational context on social capital (Andrews, 2010), knowledge sharing (Chen and Huang, 2007). Other researchers also suggest a need to understand of the precise role of information technology to facilitate KS behaviour, which in turn influences organisational performance (i.e. Choi et al., 2010). Organisational context is very important to create a suitable climate, set values and, norms, and create a culture of change. It can enhance social capital and foster a shared vision and therefore develop innovation within organisation (Northouse, 2007; DuBrin, 2012). Thus, it will be useful to provide a better understanding of the relationships between organisational context (OC, OS and IT), SC, KS, and innovation, and determine methods that can be used by managers to enhance social capital and knowledge sharing activities among employees at workplace.

Second, shortcoming is the mediating role of two groups of resources (SC and KS) in the relationship between organisational context and product and process innovation. Most of these studies appeared to focus on one resource to illustrate the mediating factors, hence neglecting the other resources (Hu and Randel, 2014; Akhavan and Hosseini, 2016).

Accordingly, in order to understand the role of two groups of resources such as knowledge sharing and social capital in facilitating innovation in public and private oil sector within developing countries, further research is needed; the subject has not received significant attention in the literature and there are few empirical studies on this particular research issue (Subramaniam and Youndt, 2005; Zwain et al., 2011; Al-husseini, 2014). Therefore, this research has theoretical contributions to make, through applying RBV and KBV in a new context of SC and knowledge sharing through using two groups of resources (social capital and knowledge sharing) to support innovation in Libyan public and private oil sectors. It also extends RBV by showing how SC can support innovation and KS, and by considering organisational context (OC, OS and IT) as a vital factor which affects knowledge sharing, SC, and innovation to make the strong tie, trust and social network (Social Capital) and best use of knowledge available in an organisation and create the best value.

Furthermore, it extends KBV in the context of KS through showing the impact of organisational context (OC, OS and IT) in deploying and sharing knowledge assets in public and private oil sectors, giving a better understanding of social capital and knowledge as a competitive resource and linking it innovation. Therefore, this research illustrates the direct and indirect impact of organisational context (OC, OS and IT) on innovation through social capital and knowledge sharing to provide greater implications to both academic and practical communities. Understanding the influence of these factors will enable managers, decision maker and developers to understand and consider organisational context that enhance SC, KS and innovation at workplace.

Third, recent evidence has acknowledged some limitations in the link between social capital and knowledge sharing and innovation (see for example: Hu and Randel, 2014). Hence, the present study attempts to shed more light on such a link by exploring whether social capital or knowledge sharing approach to encouraging innovation is more effective. Additionally, to

the author's best knowledge, the literature also remains silent whether organisational culture, organisational structure or information technology to enhancing social capital, knowledge sharing and innovation, product and process at workplace. In this study, it examined whether organisational culture is more or less effective than organisational structure and information technology in promoting social capital, knowledge sharing and innovation, product and process at workplace. For example, In their review of the literature on knowledge sharing in public organisations, researchers (e.g., Yang and Maxwell, 2012; Amayah, 2013) identified a number of questions that are yet to be investigated in empirical research. This includes whether certain factors are more important than others in enhancing knowledge sharing at workplace.

Fourthly, compared to developed countries, a limited amount of empirical studies - on SC, KS and innovation have been conducted in the developing world. It was claimed that: "more studies are needed regarding how organisational culture as a part of organisational context affect KS in the emerging economies of Africa, the Middle East and South America, as the majority of studies have been carried out in Western countries; non-Western influences on KS have been conducted on the Chinese culture (Wang Noe, 2010). Hence, more evidence from developing countries would bring further insights from this part of the world.

Fifth, the review of the literature indicated that public and private sectors are increasingly realising the importance of innovation. However, a comparison of the organisational context in private and public sectors in recent innovation literature suggests that the private or public nature of the organisations may have a significant influence on these factors. This is due to the organisational and cultural context. The literature also highlights that public organisations can be very different from private, based on ownership of the organisation, funding, and control (Willem and Buelens, 2007). Other differences include fragmented

authority and less incentive for efficiency (Heffron, 1989; Willem and Buelens, 2007; Majumdar and Ray, 2011; Amayah, 2013). Therefore, the academic literature dedicated to organisational context and their impact on affects SC, KS and innovation in the public and private sectors remains silent. Hence, the study will be useful for the managers and decision-makers of both public and private oil sectors facing pressure to innovation, by enabling them to overcome the barriers that prevent the development of both product and process innovation between their employees and contribute to develop management strategies that will work best for each sector.

Lastly, from a methodological perspective, not all the aforementioned studies have formerly tested the mediation effect of social capital and knowledge sharing in the link between organisational context and innovation, product and process. Thus, applying robust statistical analysis to test the expected indirect effect of organisational context would confirm and endorse it. In addition, specifically with respect to the organisational context mechanism in enhancing innovation, past studies lacked a thorough analysis and strong theoretical basis. Therefore, an enhanced theoretical base should be used to justify such effects.

Based on above discussion, this study has identified a lack of empirical studies on the relationships between organisational context (OC, OS and IT), SC, KS and innovation. No such studies have examined these relationships within the public and private oil sectors and within Libyan context. In order to fill this gap in the literature, this study aims to answer the following questions:

**RQ1:** What are the direct effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors?

**RQ2:** What are the indirect effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors via social capital?

**RQ3:** What are the indirect effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors via knowledge sharing?

**RQ4:** What is the role social capital in enhancing knowledge sharing in Libyan's public and private oil sectors?

**RQ5:** Are there differences between the public and private oil sector in terms of the relationship between organisational context (OC, OS, IT) and both product and process innovation in Libyan's public and private oil sectors?

Answering these questions will provide several contributions to the theoretical and empirical literature and addresses the limitations in SC, KS and innovation literature. These contributions are summarised in the following text:

- The model explores the direct and indirect impact of organisational context on innovation (product and process), hence the research delivers a more comprehensive insight regarding the direct and indirect effect of organisational context on innovation, product and process.
- By using the RBV and KBV theories the research provides a robust theoretical basis to explain the role of organisational context on enhancing innovation.
- Including the two sets of resources related to social capital and knowledge sharing concurrently would allow the study to compare the importance of each of them and identify the primacy of one over the other.
- Formerly testing the mediation effects of the social capital and knowledge sharing in the link between the organisational context and innovation would confirm and endorse the predicted indirect impact of such organisational context.
- By testing the model in two different setting (public and private), the study provides evidence on the applicability of such a model in contexts and addressing the calls for more research in public and private sectors.
- This study is differentiated from the existing empirical work by providing a model that examines the relationships among a wide range of factors that product and process innovation by using SC and KS in public and private oil sectors.
- The research utilised sophisticated statistical technique (WarpPLS, a variance-based structural equation modelling package, and the use of two advanced statistical techniques- reflective and formative approach) in testing measurement and structural models, which have been limited in previous literature.



- The study will make important contribution to the literature in organisational context (OC, OS and IT), SC, KS and innovation which will help public and private oil sectors to understand the factors that influence SC and KS to support both product and process innovation.
- The research attempted to minimise the paucity of the studies in the domain of organisational context (OC, OS and IT), SC and KS applications from the public and private sectors perspective.

## **2.4. Chapter Summary**

This chapter has reviewed the literature on the role of innovation in improving organisations outcomes. First, the innovation concept and types has been explored; in this regard it has been found that two main types of innovation, namely product and process innovation are importance to achieve organisations outcomes and economic growth. Second, the chapter examined the impact of innovation on organisations. It has been established that product and process innovation play a more effective role in improving organisations outcomes and economic growth (Efrat, 2014; Elsetouhi et al., 2015). It is argued that the development of innovative products and process has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004; Kamasak and Bulutlar, 2010). Indeed, innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that “innovation is power” for firms and other organisations (Drach-Zahovy et al., 2004; Kamasak and Bulutlar, 2010). In this respect, the chapter attempts to identify the critical resources required by firms to increase product and process innovation.

It considered the critical resources influencing the innovation, product and process. Based on the extended RBV and KBV theories, it was advanced that acquiring and exploiting the set of resources relevant to knowledge sharing and related to social capital constitute the foundations to achieve product and process innovation. Thereafter, the chapter clarified the

importance of social capital and knowledge sharing for both product and process innovation. It has been concluded that social capital and knowledge sharing improves innovation, product and process through the promoting knowledge sharing among employees and social interaction and networking. Noteworthy, reviewing this literature has revealed areas of ambiguity. In effect, it is believed that the collecting and donating knowledge sharing and structural, relational and cognitive social capital and their impact on product and process innovation should be further investigated. Furthermore, it was noticed that only few studies looked at the product and process innovation in developing countries and in both public and private organisations. Thus, one would suggest investigating factors affecting product and process innovation in developing countries. Having identified the critical resources (knowledge sharing and social capital) affecting the product and process innovation, the chapter examines the role of organisational context (OC, OS and IT) in enhancing these resources to support product and process innovation.

The chapter has first reviewed the literature on organisational context (OC, OS and IT) and their effects on knowledge sharing and social capital innovation, product and process. It was found that scholars in the innovation literature tend to advocate the “direct and indirect effects” approach as the most updated and relevant approaches to evaluate the impact of organisational context. For example, despite the fact that the impact of organisational context including organisational culture, structure and information technology on innovation has mainly been examined by using a direct approach, the review of literature (See sections 2.3.7, 2.3.8 and 2.3.9) revealed that most of these works have underlined the need to research the role of such organisational context in the innovation (product and process) empirically. Moreover, despite the extensive number of empirical studies revealed that social capital and knowledge sharing are significance resources can support the promotion and implementation

of innovation within organisation, the indirect effects of organisational context are still not fully covered. As acknowledged in section (2.3.10), among the main limitations of the current innovation literature were the lack of strong theoretical basis, a limited focus on social capital and knowledge sharing factors, a lack of comprehensiveness when considering the determinants of innovation as mediating variables, a lack of robust mediation tests and a limited in public and private oil sectors scope. Therefore, it is the purpose of this research to address the aforementioned limitations and bring more insight about the direct and indirect impact of organisational context and the mechanism whereby the organisational context affects innovation, product and process. The following chapter will discuss the model development process and the hypotheses.

## **CHAPTER THREE: THE CONCEPTUAL FRAMEWORK**

### **3.0 Introduction**

This chapter draws on the previous chapters to build the proposed framework exploring the role of organisational context in enhancing innovation, product and process through social capital and knowledge sharing. The chapter therefore is organised into sub-sections. A conceptual framework which briefly describe the RBV and KBV theories with a link to this study is given in section (3.1), followed by model development and research hypotheses in section (3.2). This section reviews the empirical evidence supporting the direct and indirect relationship between organisational context and innovation. Then, section (3.3) states the summary of hypotheses in order to answer the research questions. Lastly, a summary of the chapter is then given in section (3.4).

### **3.1 Conceptual Framework**

The following section is based on the previous chapters to develop the proposed research model exploring the impact of organisational context (OC, OS and IT) on product and process innovation and demonstrating the mechanism whereby organisational context act to enhance innovation on the theoretical basis of the RBV and KBV theories.

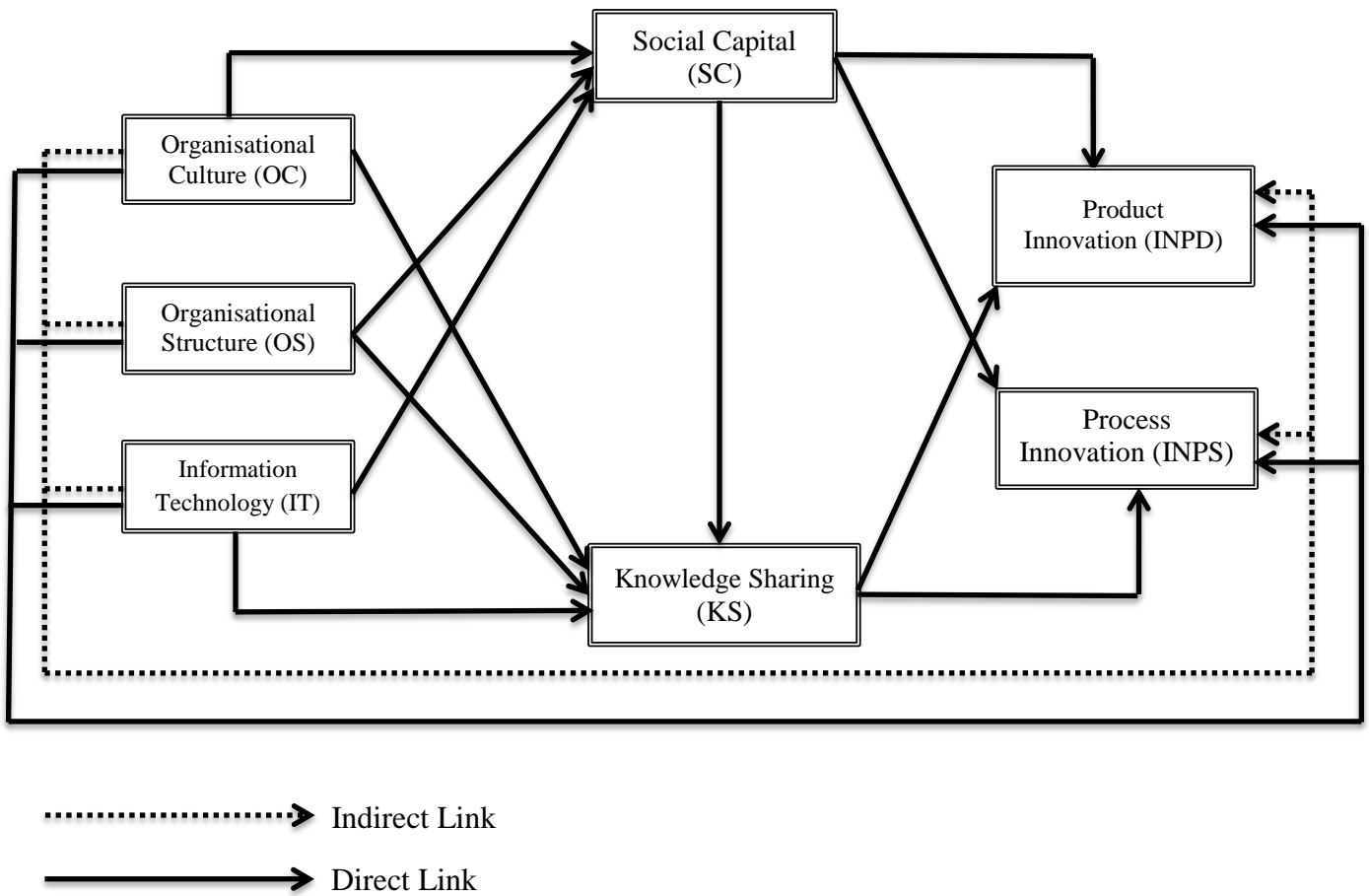
From the resource-based perspective, the findings on the determinant of innovation are in accordance with the importance of the firm's resources. Reviewing the innovation literature has clearly revealed that knowledge sharing and social capital are considered as key determinants of innovation (See section 2.2). The KBV on the other hand, focuses on knowledge as the most and possibly the only strategically important resource for competitive advantage which is translated into innovation (Kandampully, 2002). Successful innovation

relies on the amount of knowledge possessed by the firm. The KBV gives a new view for the implications of product and process innovation (Gopalakrishana and Bierlyb, 2001).

Therefore in order to build social interaction and make the best use of the knowledge available in organisations and create the best value, this study aims at using the resource-based view (RBV), and knowledge-based view (KBV) in the context of investigating the impact of social capital and sharing knowledge as an organisational resource to support innovation, and to investigate organisational context (OC, OS and IT) as a dimension affecting social capital and knowledge sharing and innovation. This organisational context including organisational culture, organisational structure and information technology act as a complement to organisations' limitations in facilitate, stimulate, and influence the emergence of social capital and knowledge sharing.

It is worth nothing that there is some studies adopted RBV to justify such relationships (Kim and Lee, 2010; Kim et al., 2013). Whereas, other studies used both RBV and KBV to justify such relationships (Abdelrahman, 2013; Elsetouhi et al., 2015). This study follow previous studies (e.g., Abdelrahman, 2013; Elsetouhi et al., 2015), which adopted both of two theories for an in-depth exploration of the phenomena under investigation. Therefore, from this perspective, the following theoretical framework is proposed in Figure 3.1. Broadly, Figure 3.1 posit that organisational context (OC, OS and IT) affect innovation, product and process indirectly through enhancing social capital and knowledge sharing as two group of resources. The models advance that the organisational context encourages the firm to increases product and process innovation, through developing their social capital and knowledge sharing.

**Figure 3.1: Conceptual Framework for Public and Private Oil Sectors**



### 3.2 Model Development and Research Hypotheses

As mentioned in chapter one, the aim of the study is to explore the direct and indirect influence of organisational context (OC, OS and IT) on innovation. Based on the discussion and the literature review, this study focuses on seven themes of these variables that are central to this research study: organisational context (OC, OS and IT), social capital, knowledge sharing and innovation, product and process. This section now reviews the empirical evidence supporting the eight hypotheses that were proposed to be tested and analysed.

## **3.2.1 The Relationship between Organisational Context and Social Capital**

### **3.2.1.1 Organisational Culture and Social Capital**

Organisational culture is a source of competitive advantage, and several empirical researchers have shown that it is a significant factor in social capital (Van den Hooff and Huysman, 2009). Organisational culture is a key organisational asset and is associated with social capital (Gu and Wang, 2013; Petrou and Daskalopoulou, 2013). A survey of 490 Chinese enterprises, carried out by Song-zheng and Xiao-di (2008), suggested that organisational culture has a positive effect on social capital, and social capital has a positive significant effect on organisational learning. Several studies imply a positive relationship between organisational culture and social capital (Van den Hooff and Huysman, 2009; Gu and Wang, 2013). Therefore, it is hypothesised that:

*H1a: There is a positive relationship between organisational culture and social capital.*

### **3.2.1.2 Organisational Structure and Social Capital**

Organisational structure is also likely to affect the social interaction among organisational members. For example, several researchers argued that organisational structure with low levels of formalisation could enhance the positive impact of social capital by placing fewer barriers on its development (Dalton et al., 1980; Schmid, 2002). Other research indicated that the value of social capital to individual employees is greater in loosely structured settings, where rules and procedures are few, and the prospect of defining one's social role is correspondingly increased. Thus, the benefits of each dimension of social capital for organisational performance may only be realised where an organisation's structure permit them to thrive (Burt, 1997; Andrews, 2010). A pilot study conducted by Andrews (2010), in public organisation in UK, found that organisational structure including decentralisation, formalisation and specialisation has complex and contradictory effects on the impact of each

dimension of social capital. A Survey of 541 respondents within in six different organisations: a cable provider, a mail service provider, an insurance company, a consultancy and both the Dutch national and the international branches of a heavy lifting and transport company, carried out by Van den Hooff and Huysman (2009) also provide evidence of the positive relationship between organisational structure and social capital including structural, relational and cognitive social capital.

Furthermore, using data collected from Taiwanese firms, Chen and Huang (2007) confirmed that innovative and cooperative climate is positively related to social interaction; that when the organisational structure is less formalised, more decentralised and integrated, social interaction is more favorable; and that social interaction is positively related to knowledge management. Other studies found that organisations that exhibit lower levels of centralisation and formalisation, and a higher degree of specialisation may garner greater benefits from the social capital inherent in relationships between members because there are fewer constraints on organisational members seeking to access and transfer resources. By contrast, centralised, formal and less specialised organisational structures may prevent the emergence of social capital by constricting its free development (Taylor, 2007). The empirical evidences echo the assertions of previous studies (e.g. Yap et al., 1998; Sivadas and Dwyer, 2000; Gold et al., 2001; Janz and Prasarnphanich, 2003) concerning the importance of structure design to social interaction among individuals. In light of the above discussion, this research proposes:

***H1b:** There is a positive relationship between organisational structure and social capital.*

### **3.2.1.3 Information Technology and Social Capital**

Literature proposes several models for explaining the relationship between information technology and social capital (e.g., Shneiderman, 2007; Van den Hooff and Huysman, 2009; Joshi et al., 2010). For instance, Gold et al. (2001) revealed that linkage of information and



communication systems in an organisation is needed to mobilize social capital, which allows employees to share and create their knowledge at workplace. Joshi et al. (2010) argued that IT enabled social integration that builds firms' social capital. These structures of social integration promote connectedness among members of firms by creating seamless networks of people, devices and knowledge (Joshi et al., 2010). Thus, IT allows the creation and share of knowledge. Shneiderman (2007) argued that IT including message boards, e-mail software, chat rooms, RSS technology facilitate social interaction inside the firm by creating networking between groups and individuals. Van den Hooff and Huysman (2009) provided evidence of the relationship among IT and social capital, Van den Hooff and Huysman (2009) further explained that the ability to provide organisational and technical infrastructures, management can facilitate, stimulate, and influence the emergence of social capital, which in turn influences knowledge sharing. Based on above discussion, the following hypotheses were constructed:

***H1c:** There is a positive relationship between information technology and social capital.*

## **3.2.2 Organisational Context and Knowledge Sharing**

### **3.2.2.1 Organisational Culture and Knowledge Sharing**

According to Fullwood et al. (2013), knowledge sharing plays an important role in the competitiveness of an organisation. It is believed that organisations will become more effective through creating, sharing, and reusing knowledge (Nguyen and Mohamed, 2011). KS refers to the interaction between implicit and explicit knowledge that is relevant to the task at hand (Lee et al., 2010). Much emphasis in the literature is placed on the part played by organisational culture in facilitating the sharing of knowledge among individuals. For example, Bollinger and Smith (2001) argued that organisational culture plays an important role by enabling organisational members to work together and share their knowledge.

Kim and Lee (2004) examined the relationship among organisational context including organisational culture and Knowledge sharing behaviour. The study revealed that organisational culture is the most critical factor for promoting a knowledge sharing among employees at workplace. A qualitative study conducted by De Long and Fahey (2000) in 50 organisations has discovered direct relationship between supportive organisational culture and successful knowledge sharing. In case study undertaken by Pan and Leidner (2003) in a multinational organisation, similar conclusion was made – organisational culture led to effective knowledge sharing practices. More recently, based on a quantitative study of 301 organisations, Zheng et al. (2010) also found that organisational culture has the strongest effect on the practices of KM including knowledge sharing which then influence the organisational effectiveness. In other words, a supportive organisational culture is a key prerequisite for knowledge sharing.

Previous literature uncover that organisational culture is proven to have strong influence over knowledge sharing (Andrews and Delahay, 2000; Al-Alawi et al., 2007). For example Von Krogh (1998) argued that organisational culture promote active knowledge sharing among employees and enhances communication speed by empowering co-workers to freely share personal knowledge and concerns. According to Cohen and Prusak (2001), organisational culture can lead to better knowledge sharing, shared goals, and lower transaction costs. Andrews and Delahaye (2000) and Kim and Lee (2006) also found that organisational culture were sufficient to encourage individuals to share knowledge with others in the same work environment. Roberts (2000) also found empirical support for the relationship between organisational culture and knowledge sharing. Other previous studies also provided the empirical evidences concerning the importance of organisational culture for knowledge

sharing (e.g., Connelly and Kelloway, 2003; Bock et al., 2005; Collins and Smith, 2006; Wang and Noe, 2010).

In addition, it is argued that tacit knowledge to be transferred successfully there must be suitable organisational culture (e.g. Ardichvili et al., 2003; Ardichvili, 2008). Researchers confirmed that organisational culture leads to greater openness between individuals (Garavan et al., 2007), encourages sharing of knowledge and willingness to collaborate with others (Liao, 2006; Sharratt and Usoro, 2003). Other researchers found positive relationship between supportive organisational culture and successful knowledge sharing (DeLong and Fahey, 2000; Janz and Prasarnphanich, 2003).

Moreover, other researchers argued that vision and goals as a part of organisational culture play an important role in facilitating employee knowledge sharing among employees (Gold et al., 2001). Kim and Lee (2005) reviewed the relationship between organisational culture including vision and goals, trust among employees and social network and knowledge sharing capabilities. The findings suggested that organisational culture had a significant effect on knowledge sharing among employees. Al-ALawi et al. (2007) focused on the link between organisational culture and knowledge sharing within the public organisations in the Kingdom of Bahrain. Their results uncovered the importance of organisational culture for knowledge sharing among employees at workplace. Liu (2009) conducted an empirical study to explore the association between organisational culture, organisational structure, IT technology, and no-IT approaches as four main independent variables on the performance of knowledge sharing in two UK consultant firms and one China construction project. The results indicated that there are significant relationships between some of the variables and the performance of knowledge sharing. Van den Hooff and Huysman (2009) revealed that organisational culture play a vital role in increasing and facilitating KS between employees within spanish

organisations. It acknowledged that an organisational culture conducive to knowledge sharing will help to shape the atmosphere to facilitate employees' sharing of knowledge (Yang, 2010), allow employees to perceive the importance of having the ability to share knowledge, and further help to improve employees' knowledge-sharing capabilities. A recent study by Al-Adaileh (2011) suggested that organisational cultural, namely trust, a collaborative working environment, a shared vision, and managerial practices, constitute an important part of promoting KS activities among employees at workplace. Al-Adaileh and Al-Atawi (2011) examined the impact of organisational culture, namely openness to change, innovation, trust, teamwork, morale, information flow, involvement, supervision, customer service, and rewards on knowledge exchange within the context of a Saudi telecommunication company. The findings indicated that organisational culture had positive relationship with knowledge sharing behaviour. Several studies imply a positive relationship between organisational culture and knowledge sharing (Huber, 1991; Young et al., 2012). Chen and Cheng (2012) surveyed 346 respondents in 12 international tourist hotels in China, and found that organisational culture including: trial and innovation, cooperation and trust, Fairness, social network, and open-mind and participation influence positively knowledge-sharing attitudes among individuals at workplace. Therefore, it is hypothesised that:

*H2a: There is a positive relationship between organisational culture and employees' knowledge sharing behaviour.*

### **3.2.2.2 Organisational Structure and Knowledge Sharing**

A number of scholars have highlighted the importance of an organisation's structure and its relationship with knowledge sharing (e.g., Meijaard et al., 2002; Willem, 2003; Kim and Lee, 2005; 2006; Al-Alawi et al., 2007; Lin, 2008; Wang and Noe, 2010). Both KM researchers and practitioners acknowledged that less hierarchical structures may afford greater opportunities for the free share of valuable knowledge (Miller, 1992; Andrews, 2010). Byrne

(2001) argued that organisational structure should play a part in encouraging knowledge sharing. Lin (2008) explored the effects of organisational structure characteristics, interactive relationships between organisation units and the methods to encourage knowledge sharing activities. A survey done by Al-Alawi et al. (2007) on various organisations in Bahrain in the public sector revealed that organisational structure is positively correlated with employees' knowledge sharing. Al-Alawi et al. (2007) concluded that a relationship must exist between structure and knowledge sharing. Other researchers also showed that organisational structure influenced knowledge sharing (Du et al., 2007; Yang and Maxwell, 2012).

According to Kim and Lee (2006), few studies have investigated how organisational structure impacts knowledge sharing in public and private sector organizations. Sharratt and Usoro (2003), found that “organisations with a centralised, bureaucratic management style can stifle the creation of new knowledge, whereas a flexible decentralised organisational structure encourages knowledge-sharing, particularly of knowledge that is more tacit in nature” (p. 189). Similarly, Tsai (2002) found that centralisation could reduce individuals' interest in sharing knowledge with other units within an organisation. Conversely, knowledge sharing will increase among organisational units when formalisation is low in the organisational structure (Lin, 2008).

In addition, various authors provided theoretical and empirical evidence on the relationship between organisational structure and the employees' knowledge sharing (Jennex, 2005; Grevesen and Damanpour, 2007; Al-Alawi et al., 2007; Gorry, 2008; Rowley et al., 2012; Seba et al., 2012). A study of 519 respondents in public sector organisations in Dubai, undertaken by Seba et al. (2012), who examined the relationship between trust, organisational structure, leadership, reward, time, information technology, and intention to knowledge share, and attitude towards knowledge sharing, the result indicated that organisational structure is fundamental factor for knowledge sharing. Mohammed (2007) investigated the impact of

interpersonal trust, communication between staff, information systems, rewards and organisational structure on knowledge sharing. The findings showed that organisational structure has positive effect on knowledge sharing among employees at workplace. Other researchers observed that vertical organisational structure (i.e. interactions with senior management) as well as horizontal organisational structure (i.e. interactions between employees within the organisations) both formally and informally can enhance knowledge sharing (e.g., De Long Fahey, 2000; Bartol and Srivastava, 2002; Jones, 2005; Yang and Chen, 2007).

Moreover, Creed and Miles (1996) noted that the hierarchical structure of many public organisations limits knowledge sharing activity and communication between employees or between employees and supervisors. In addition, Tsai (2002) argued that centralisation can reduce the initiatives that a unit might take in interunit exchange, thus reducing interest in knowledge-sharing activities with other units in the organization. O' Dell and Grayson (1998) also suggested that organisational structures should be designed to promote flexibility as a means of encouraging collaboration and sharing within and across organisational boundaries and stakeholders. For example, participatory management practices balance the involvement of managers and their subordinates in information-processing, decision-making, or problem solving endeavours (Wagner 1994). Additionally, Wang and Noe (2010), detected that organisational structure can increase knowledge sharing through the interaction among employees at workplace. On the other hand, based on qualitative research conducted by Seba et al. (2012) demonstrated that four key factors were identified repeatedly as potential barriers to knowledge sharing: organisational structure, leadership, time allocation, and trust.

Other researchers such as Du et al. (2007) and Yang and Maxwell (2012) concluded that organisational structure influenced knowledge sharing at workplace. A survey of 461 individuals working civil service employees at a mid-size public academic institution in the

Midwest, carried out by Amayah (2013) indicated that knowledge sharing will increase among individuals and organisational units when centralisation and formalisation are low in the organisational structure. Previous research showed that a functionally segmented structure likely inhibits knowledge sharing across functions and communities of practices (Lam, 1996; Tagliaventi and Mattarelli, 2006). Scholars have shown that knowledge sharing may be facilitated by having a less centralised organisational structure (Kim and Lee, 2006), creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005), use of fluid job descriptions and job rotation (Kubo et al., 2001), and encouraging communication across departments and informal meetings (Liebowitz 2003; Liebowitz and Megbolugbe, 2003; Yang and Chen, 2007). Overall, the results of these studies suggested that organisations should create opportunities for employee interactions to occur and employees' rank, position in the organisational hierarchy, and seniority should be deemphasised to facilitate knowledge sharing. Other researchers also provided empirical evidence that the flexibility of organisational structure has positive impact on knowledge sharing among employees at workplace (Gold et al., 2001; van den Hooff and Huysman, 2009). Therefore, it is hypothesised that:

***H2b:** There is a positive relationship between organisational structure and employees' knowledge sharing.*

### **3.2.2.3 Information Technology and Knowledge Sharing**

Technology is a powerful enabler of knowledge management processes success (Chua, 2004; Yeh et al., 2006; Theriou et al., 2011; Rašula et al., 2012). It is indisputable that information technology is one of the key factors that influence knowledge management process (McCampbell et al., 1999). Technology helps employees in accessing the knowledge they need when they need it, and provides the tools with which users can leverage their knowledge in the context of their work (Chong and Chong, 2009). It can be crucial for the process of

sharing knowledge (Berlanga et al., 2008), particularly explicit knowledge. It has been widely accepted that IT contributes to the integration of knowledge or even stimulating new knowledge (Davenport and Prusak, 1998). Organisations have made large investments in implementing IT that is specifically designed to support knowledge sharing among team members in the organisation (Bock et al., 2005; Wasko and Faraj, 2005). Tseng (2008) noted that using information technologies, people are able to retrieve and store knowledge in individuals or groups, which allows this knowledge to be shared with other divisions in the same organisation or business partners in the world. The technology mediated environment can help knowledge accumulation by processing and presenting information in flexible ways (Yu et al., 2009). Earlier, Ruppel and Harrington (2001) found that members in any community become more inclined to use IT if they are encouraged, are able, and have the opportunity to share knowledge with others. Technology like social media – Wiki, Weblogs, Twitter, Intranets, data warehouses, and electronic whiteboards, has been suggested as useful tools for building communities of practice (Cunningham and Leuf, 2000; Tseng, 2008; Hsu and Lin, 2008; Cole, 2009) and hence, enhance knowledge sharing. Robinson et al. (2010) suggested that IT performs a functional role in knowledge sharing, and also that technology skills and competences may either contribute, or impede knowledge sharing. More recently, Seba et al. (2012., pp. 7) concluded that appropriate, reliable, and easy to use IT resources will facilitate knowledge sharing, whilst a less effective IT infrastructure dominated by functional inadequacies or political agendas may act as a barrier to knowledge sharing. An empirical study conducted by Golden and Raghuram (2010), who examined knowledge sharing among teleworkers found interlink between IT and the element of trust. They concluded that high technology support implemented in the organisations is less important for employees with low trusting relationship. With the application of Nonaka's (1994) model, whilst adapting a process-oriented perspective, Choi and Lee (2003) also found that the well-



developed IT infrastructure in organisation is unsupportive for knowledge sharing if the trust-based culture in organisations is less effective. In other words, IT alone does not lead to the sharing of knowledge among employees in organisations as other “softer” factors like culture and trust are also critical for the success of knowledge sharing. Seba et al. (2012) suggested that in practice, leaders should play an active role in the selection of user-friendly IT in order to ensure that it builds upon or at least matches the existing knowledge sharing culture in organisations.

Moreover, other researchers (e.g., Spender 1996; Ives et al., 2003), examined the influence of organisational structure, culture, processes and strategy, and information technology on knowledge sharing behaviour. The results indicated that information technology influence employees’ willingness to share their knowledge at workplace. Cong et al. (2007), in their study in public organisations in China also concluded that advanced IT systems affect their willingness to share information. Sandhu et al. (2011) also identified other organisational barriers to knowledge sharing including: insufficient rewards, lack of interaction, lack of time and weak IT systems. Wong (2005) studied management leadership and support, culture, IT, strategy and purpose, organisational infrastructure, processes and activities, motivational aids, resources, training and education, and human resource management. The study revealed that IT and management support contributed more to successful KM application than the other factors. Kim and Lee (2006) examined the impact of organisational context and information technology including IT application usage and End-user focus on employee knowledge-sharing capabilities. The study found that both IT application usage and End-user focus are critical to enhance knowledge sharing capabilities among individuals at workplace.

Additionally, a pilot study carried out by Khalid et al. (2012) showed that IT and top management support had stronger impacts on knowledge donating and collecting than enjoyment of helping others, knowledge self-efficacy, and reward systems, in public

organisations in the UAE. Similarly, Lin et al. (2009) studied four constructs: culture, employee motivation, leadership, and IT. Culture included social networks, trust, a sharing culture, learning orientation, and rewards. Employee motivation consisted of reciprocal benefits, knowledge self-efficacy, enjoyment of helping others, and reputation. Leadership encompassed vision and goals, top management support, top management encouragement and an open leadership climate. IT consisted of technological infrastructure, databases, and a knowledge network. The study revealed that all dimensions of IT are critical for KS practice. Gold et al. (2001) and Van den Hooff and Huysman (2009) confirmed that ICT infrastructure was a crucial factor to facilitate knowledge sharing among individuals, based on a study conducted within the Spain context. A survey of 242 employees within Malaysian firms, conducted by Hitam and Mahamad (2012) found that the implementation of IT and reward systems can enhance knowledge sharing among employees. Based on the above discussion, It is, therefore, anticipated that:

*H2c: There is a positive relationship between information technology and employees' knowledge sharing.*

### **3.2.3 The Relationship between Social Capital and Knowledge Sharing**

According to social capital theory, employee willingness to share knowledge is influenced by social capital (Nahapiet and Ghoshal, 1998). This is because employees tend to share their in-depth and broad knowledge when social interactions are close and friendly. Previous KM studies identified social capital as a salient factor in facilitating knowledge sharing (e.g., Inkpen and Tsang, 2005; Wasko and Faraj, 2005; He et al., 2009; Wei et al., 2011; Hua et al., 2013). Chiu et al. (2006) provided empirical evidence about the positive impacts of social capital on knowledge sharing in virtual communities. In addition, Chow and Chan (2008) concluded that social capital (social networks and shared goals) has positive impacts on employees' intentions to share knowledge through their attitudes and subjective norms about

knowledge sharing. Yang and Farn (2009) indicated that social capital positively affects tacit knowledge sharing intentions. Chang and Chuang (2011) investigated the key antecedents to influencing knowledge sharing in a virtual community by integrating the theories of social capital and individual motivation. Thus, this study's research model considers social capital an important antecedent to employees' knowledge sharing intentions. Cabrera and Cabrera, (2005) confirmed that level of social capital may influence the relationship between one's willingness to share knowledge and knowledge sharing behaviours.

Furthermore, recent KM studies have addressed social capital as the key facilitator of organisational knowledge sharing (Inkpen and Tsang, 2005; Wasko and Faraj, 2005; Chang and Chuang, 2011). Wei et al. (2011) investigated the impact of the multi-level nature of social capital on knowledge sharing. They suggested that employees' network positions, such as distance and structural equivalence, affect their knowledge sharing.

Previous KM studies (e.g., Nahapiet and Ghoshal, 1998; He et al., 2009) have posited social ties, shared goals, and social trust as the major constructs representing the structural, cognitive, and relational dimensions of social capital, respectively. Moreover, employees' social ties, shared goals, and social trust have a combined effect on their knowledge sharing (He et al., 2009). Furthermore, several empirical studies provided evidence of the important effects of social capital on knowledge sharing. A survey of 190 managers within Hong Kong firms, carried out by Chow and Chan (2008) indicated that social capital, namely social network, social trust and shared goals were positively related to knowledge sharing. Based on a survey involving 343 participants in 47 knowledge-intensive teams, Yu et al. (2013) examined the effects of social capital measured by network density, cognition commonality, Cooperative norms, betweenness centrality, shared cognition and affective commitment on knowledge sharing behaviour. The results revealed that social capital has positive impact on an individual's explicit and tacit knowledge sharing.

Additionally, Hau et al. (2013) studied the impact of individual motivation and social capital on tacit and explicit knowledge sharing in seven firms in Korea Advanced Institute of Science and Technology. The analysis results confirmed that reciprocity, enjoyment, and social capital contribute significantly to enhancing employees' tacit and explicit knowledge sharing intentions. In a similar vein, a survey of 173 participants was carried out by Wasko and Faraj (2005) to examine the relationships among individual motivation, social capital and knowledge sharing. The findings revealed that the domination of social capital has positive effect on knowledge sharing. Yu et al. (2013) conducted a survey of 343 participants within 9 Chinese organisations to make a distinction between the social capital at the team-level and that of social capital at the individual level to examine their cross-level and direct effects on an individual's sharing of explicit and tacit knowledge. The findings showed that social capital at both levels jointly influences an individual's explicit and tacit knowledge sharing. Marouf, (2007) confirmed that social networks as the one of social capital elements have positive relationship with knowledge sharing behaviour.

A pilot study of 105 students of various universities in Lahore, conducted by Aslam et al. (2013) examined the relationships among social capital including structural dimension (Social interaction), relational dimension (trust, norm of reciprocity and identification) and cognitive dimension (shared language and shared vision) and knowledge sharing and performance. The results of the study showed a partial support for the argument that social capital leads to knowledge sharing. However not all dimensions of social capital are related to knowledge sharing. Analysis revealed that trust, shared vision and shared language significantly affect the knowledge sharing. A study conducted by Zaqout and Abbas (2012) found that explicit and tacit knowledge formed a bridge between trust, social networks, (ICT) and performance in Malaysian public organisations.

Moreover, a study conducted by Chang et al. (2011) showed that social capital including (social interaction, trust and shared vision) has statistically significant and direct effects on knowledge sharing in medical centre in northern Taiwan. Based on a survey of 14 top tier five-star hotels in Seoul, Korea and 486 employees, Kim et al. (2013) examined the effects of social capital including structural, relational, and cognitive SC) on organisation performance through knowledge-sharing (KS) processes (KS behaviours: knowledge collecting (KC) and knowledge donating (KD)). The findings of this research provided empirical evidence that structural, relational, and cognitive SC affected KC and KD, which in turn influenced organisational performance. Interestingly, whereas cognitive SC has the strongest effect on employees' KC, relational SC has the strongest effect on employees' KD. The impact of employees' KC on organisational performance appears to be stronger than that of KD. In China, Hu and Randel (2014) investigated the effect of social capital and extrinsic incentives on team innovation through the mediating role of knowledge sharing. The authors found a positive and significant relationship among social capital including structural, relational, and cognitive SC and knowledge sharing behaviour. More recent studies conducted by Akhavan and Hosseini (2016) also found a positive relationship between social capital including social interaction ties, trust, reciprocity, and identification and shared goals and collecting and donating knowledge sharing. With the findings of the previous studies in mind, the following hypotheses were formulated:

**H3:** *There is a positive relationship between social capital and employees' knowledge sharing.*

### **3.2.4 The Relationship between Social Capital and Innovation**

According to Laursen et al. (2012), organisations can achieve a high level of innovation through enhancing their social capital. Within firms, social networks are shown to play a vital role in sustaining potential breakthrough innovation (Baba and Walsh, 2010). Furthermore,

Zheng (2008) pointed out that SC can facilitate innovation by supporting the ties amongst employees, trust and group cohesion. SC, which develops an appropriate environment, can support innovation (Wu et al., 2008). This environment supports individuals as they try to solve problems by creating different ideas. It increases the conformity of members' thoughts and as they experience different forms of conflict and improved group cohesiveness (e.g., West and Farr, 1990; Jehn et al., 1999). Empirical studies suggested that the social capital inherent in the social relations within an organisation can, therefore, be regarded as a potentially critical asset in maximising organisational advantage. A high levels of collaboration and good will among organisation members increase knowledge and stimulate innovation (Nahapiet and Ghoshal, 1998; Perry-Smith and Shalley, 2003; Andrews, 2010).

Based on previous studies, social capital has an essential role in supporting innovation. For example, Zheng (2010) reviewed the relationship between SC including structural dimension; the relational and cognitive dimensions; and innovation. The findings suggested that the SC's structural factor, embracing ego network size; structural holes; and tied strength and centrality had a significant effect on innovation. The relational components, such as trust and cognitive norms, were associated positively with innovation whilst the cognitive dimension, such as shared vision, had no significant effect on innovation. SC arises as complementary driving forces for innovation and its dimensions have different effects on innovation (e.g., Tsai, 2006; Cainelli et al., 2007). Rodan and Galunic (2004) stated that network structure, which encouraged the members of a network to share knowledge, was of greater importance for innovation. Levin and Cross (2004) stated that strong ties amongst employees were important to generating new information because they were more accessible and willing to cooperate to get useful knowledge.

However, Granovetter (1973) stated that weak ties might be sources of new knowledge because strong ties tended to be connected to others which had the same knowledge. Firms,

which pay more attention to SC, produce a higher level of innovation (Laursen et al., 2012). Moran (2005) considered that the trust in the relationships reflected positively on the performance of innovation and the launch stage for product innovation (Hsieh and Tsai, 2007). SC which includes knowledge sharing supports creativity; this results in the firm's innovativeness (Song and Thieme, 2006). Social networks have an ability to reinforce potential breakthrough innovation (Baba and Walsh, 2010).

Furthermore, It argued that innovation requires the convergence of different knowledge pertaining to different members of an organisation which is provided by social capital (Song and Thieme, 2006; Zheng, 2008). Social capital facilitates innovation through motivating cooperation and coordination between different members/units in an organisation (Nahapiet and Ghoshal, 1998; Adler et al., 2002; Leana and Pil, 2006; Brooks and Nafukho, 2006; Goyal and Akhilesh, 2007). On the other hand, it corresponds to initiating new product strategies positively (Hsieh and Tsai, 2007). Moran (2005) highlighted the relational aspect of social capital through investigating the level of personal understanding and the concept of trust in communications and argues that when there are close relationships between members, they are more motivated toward new innovative ideas and could change ideas into successful project (Lavado et al., 2010). Therefore, innovation is essentially the output of shared efforts. In addition, social capital is known as a key factor in creating innovation in organisations (Rezazadeh et al., 2013).

Moreover, Molina-Morales and Martínez-Fernández (2010) found that, in Spanish manufacturing firms, there was a positive relationship between SC and process and product innovation. More specifically, radical product innovation was shown to be associated significantly with SC (Carmona-Lavado et al., 2010), whilst Subramaniam and Youndt (2005) found that SC had a significant effect on innovation capabilities. Most innovation literature confirmed that communication between individuals was a key factor for innovation. The

strong relationships encourage persons to create new ideas and provide more enthusiasm to turn these ideas into successful products or processes (Poolton and Barclay, 1998). The positive relationship between IC and innovation improves when the organisation has a higher level of SC (Wu et al., 2008). Gu et al. (2013) confirmed that, in R&D teams through psychological safety, innovation was associated positively with the dimension of social capital including structural and cognitive capital and relational capital. Based on empirical study conducted by Carmona-Lavado et al. (2010), who examined the relationship between organisation capital and social capital and innovation through the role of of innovation, the study showed that social capital has positive relationship with innovation. Mura et al. (2013) found that social capital to be bridge between knowledge sharing and innovation behaviour within four hospices and palliative care organisations. A survey of 143 companies of innovative manufacturing and service industries, within Spanish firms, carried out by Pérez-Luño et al. (2011) indicated that combining high levels of social capital with tacit knowledge had positive impact on innovation. Elsetouhi et al. (2015) provided empirical evidence of the positive relationship between social capital and innovation. In light of the above arguments, the researcher defines the following hypothesis:

**H4: *There is a positive relationship between social capital and innovation.*** This hypothesis is divided into the following sub-hypotheses:

**H4a: *There is a positive relationship between social capital and product innovation.***

**H4b: *There is a positive relationship between social capital and process innovation.***

### **3.2.5 The Relationship between Knowledge Sharing and Innovation**

Knowledge sharing between employees and within and across teams allows organisations to exploit and capitalise on knowledge-based resources (Davenport and Prusak, 1998; Damodaran and Olphert, 2000; Cabrera and Cabrera, 2005). Research has shown that knowledge sharing and combination is positively related to faster completion of new product development projects, team performance, firm' innovation (e.g., Hansen, 2002; Cummings,



2004; Arthur and Huntley, 2005; Collins and Smith, 2006; Lin, 2007d; Mesmer-Magnus and DeChurch, 2009).

Several researchers (e.g. Reid, 2003; Lin and Lee, 2005; Willem and Buelens, 2007) argued that organisations can create opportunities to generate new ideas and develop innovation, through KM processes, and particularly KS. According to Rodan and Galunic (2004), organisational members can create new ways to solve problems and engage in further innovative activities if they have ability to access to knowledge. Wang and Wang (2012) and Skerlavaja et al. (2010) stated that the innovation capability of the Organisation is resulted of the employees' knowledge, skills, and experience of value creation. Tsai (2001) concluded that when new knowledge is generated, innovation of ideas for new products improves. Scholars argued that organisations need to exhibit knowledge creation but more importantly KS (Alavi and Leidner, 2001). Some authors (e.g. Nonaka and Takeuchi, 1995; Nonaka et al., 2006; Cheng, 2012) recommended that when knowledge is embedded in employees, it is necessary for employees share their knowledge in order to develop new routines and mental processes that may help them to solve their problems.

Nonaka and Toyama (2005) and Lin (2007) pointed out that the ability of employees to share their tacit knowledge and convert it to explicit through process of collecting and donating knowledge are more expected to generate collective learning. It is noted that a positive knowledge sharing culture between organisational staff helped organisations to improve their product and process innovation capability (Tsai 2001; Dougherty et al., 2002; Jantunen 2005; Michael and Nawaz, 2008; Mehrabani and Shajari, 2012). Knowledge activities allow employees to reconfigure and utilise existing knowledge in new method in order to change and develop their tasks, which in turn generates new knowledge that can be used for product and process innovation (Al-Husseini and Elbeltagi, 2014; 2015).

The relevance of knowledge sharing for product and process innovation has been argued in several studies. For example, Cohen and Levinthal (1990) considered that the interaction among individuals who possess different knowledge improves the organisation's ability to innovate. Boland and Tensaki (1995) stated that the innovation capability of the organisation is the result of the interaction among individuals who possess different kinds of knowledge. Similarly, several authors argued that knowledge sharing among employees constitutes a fundamental step in the process of organisational knowledge creation, in such a way that if it is not effectively performed, it can constitute a serious barrier to the development of this process, and as a consequence, to innovation effectiveness (Ipe, 2003; Chang et al., 2007).

Recent empirical studies also support the relationship between knowledge sharing and innovation. Thus, Seidler-de Alwis and Hartmann (2008) found that those organisations that promote knowledge-sharing processes are more successful in innovation. Swan et al. (2007), in their study of the factors that affect innovation in the biomedicine sector found a positive relationship between knowledge sharing and innovation. Brachos et al. (2007) concluded that when the necessary factors for motivating individuals to share knowledge are present, innovation improves. A survey of 418 respondents working in five-star hotels in Busan, Korea was conducted by Kim and Lee (2013), found that there is the positive relationship between knowledge donating and collecting and employee service innovation. Using a sample of employees of Taiwan international tourist hotels, Hu et al. (2009) empirically demonstrated that the relationship between employees' knowledge-sharing and their service innovative is significant and strong. Park (2002) showed that knowledge sharing is positively and significantly related to innovation in a sample of employees in six Korean firms, including a banking firm. In line with Chi and Holsapple's (2005) conclusion that the critical function of knowledge sharing is to maintain an inter-organisational mechanism for ongoing innovation. Other studies on organisation and knowledge management (KM) recognised that

employee knowledge sharing enhances firm performance such as absorptive capacity and innovation capability (e.g., Liao et al., 2007; Liu and Phillips, 2011; Hau et al., 2013).

Additionally, Darroch and McNaughton (2002) suggested that KM processes, namely the acquisition, knowledge sharing, and responsiveness of knowledge, could accelerate radical and incremental innovation within companies in New Zealand. Meanwhile, Jantunen (2005) found that knowledge sharing does not have a significant relationship with innovation, while knowledge application plays an important role in supporting innovation. Moreover, empirical results, from a sample of 87 individuals working in R&D departments of Spanish innovative companies, indicated that there is a positive relationship between knowledge sharing and innovation performance (Camelo-Ordaz et al., 2011). Based on a survey of 172 employees from 50 large organisations in Taiwan, carried out by Lin (2007) to examine the relationships among knowledge-sharing processes and firm innovation capability, the results indicated that employee willingness to both donate and collect knowledge enable the firm to improve innovation capability.

Huang and Li (2009) examined the mediating role of knowledge management, by measuring, in Taiwanese firms listed in the China Credit Information Service Incorporation, knowledge acquisition, sharing, and application in the relationship between social interaction and innovation performance, including administrative and technical innovation. The results indicated that social interaction helps organisational members to accumulate social capital and increases knowledge sharing and application, which in turn develops innovation. Based on data from 198 employees of four hospices and palliative care organisations, carried out by Mura et al. (2013) pointed out that knowledge sharing behaviours can enhance innovation, in terms of propensity and capacity to promote and implement new ideas.

In addition, Liao et al. (2007) found that absorptive capacity, namely employees' ability and motivation, acted as a bridge between knowledge sharing process including donating and collecting and product and process innovation within industrial companies in Taiwan. The authors studied the moderating effect of organisational climate, comprising an innovative climate and a supportive climate, and organisational structure, namely formalisation, centralisation and integration, on the relationship between knowledge creation and sharing, and technological and administrative innovation. Chen et al. (2010a) identified a positive relationship between knowledge creation and sharing and innovation in a supportive climate that stimulates and encourages the transfer of knowledge into innovation, while organisational structure attenuated the relationship. A qualitative study conducted by Porzse et al. (2012) within professional services firms in Eastern Europe found knowledge to have a unique connection with innovation and suggested that collective organisational knowledge could stimulate innovation.

Furthermore, Ferraresi et al. (2012) showed that the KM processes of capturing, sharing, and application had a significant impact on innovation through strategic orientation within Brazilian companies. A pilot study of 209 employees within high technology firms in China, conducted by Wang and Wang (2012), found that innovation mediated the relationship between knowledge sharing and operational and financial performance. Wei and Xie (2008) found that KM process including knowledge sharing could improve innovation performance within industrial companies in China. Similarly, Kamasak and Bulutlar (2010) demonstrated that knowledge collecting had more effect on exploitative and explorative innovation inside and outside departments than did donating knowledge in the context of industrial companies in Turkey. Yang (2011) examined the interrelationships among internal KS, the external acquisition of knowledge, and product innovation within software firms in China. The

findings implied that external knowledge acquisition can enhance firms' product innovation more than internal KS

Additionally, Hung et al. (2010) indicated that knowledge creation, sharing, transfer, and application positively influence the level of innovation through total quality management (TQM). Aulawi et al.'s (2009) survey of 125 employees working in Indonesian telecommunications companies indicated that KS acts as a lever between social and technical factors and individual innovation capability. Al-Husseini and Elbeltagi (2012) conducted a mixed method study in the HEIs in Iraq to examine the effect of TL on product and process innovation through knowledge sharing. The findings of this study showed that knowledge sharing have a relevant moderation effect on the linkage between TL and both product and process innovation. In China, Hu and Randel (2014) investigated the effect of social capital and extrinsic incentives on team innovation through through the mediating role of knowledge sharing. The authors found a positive and significant relationship among knowledge sharing and innovation. Survey data collected from 230 employees in multiple companies, conducted by Akhavan and Hosseini (2016) concluded that there is a positive relationship between knowledge sharing on innovation.

Although, the previous studies have looked at the relationship between knowledge sharing and innovation, little research in this stream has been conducted on examining the role of knowledge processes and their impact on product and process innovation (Subramaniam and Youndt, 2005), and there is a need for research addressing the impact of knowledge sharing on product and process innovation (Xu et al., 2010) within developing countries and particularly the Libyan context. Accordingly, this study attempts to address this issue to investigate how different aspects of knowledge sharing process, such as knowledge donating and collecting, would impact on product and process innovation in the context of oil

industries. Drawing upon the above arguments, this study formulated the following hypothesis:

***H5: There is a positive relationship between knowledge sharing and innovation.***  
This hypothesis is classified into the following sub-hypotheses:

***H5a: There is a positive relationship between knowledge sharing and product innovation.***

***H5b: There is a positive relationship between knowledge sharing and process innovation.***

### **3.2.6 Organisational Context and Innovation**

The previous studies found that there was a positive relationship between organisational context including organisational culture, structure and IT and innovation. The next sections review the empirical studies supporting the impact of the aforementioned organisational context factors on innovation, product and process.

#### **3.2.6.1 Organisational Culture and Innovation**

Tesluk et al. (1997) suggested that organisational culture and climate were associated with innovative capability. Organisational culture sustains new product development through its effect on the generation of new products (Lohmüller, 2003). Gudmundson et al. (2003) examined the relationship between organisational culture, leadership styles and innovation in SMEs. The findings confirmed that there was a significant relationship between organisational culture, leadership and innovation. It explored, also, whether or not organisational culture is more important for both the initiation and implementation of innovation. Jaskyte and Dressler (2005) examined the relationship between organisational culture and organisational innovativeness. This was measured by administrative and technological innovation in non-profit service organisations in USA. Organisational innovativeness was related inversely to cultural consensus. It correlated positively with innovative value and aggressiveness value, and correlated negatively with the stability value. A survey of 523 organisational members working in Pakistani companies, carried out by Tip

et al. (2012), indicated the important role organisational culture plays in developing innovation. Other researchers (e.g., Lee and Tsai, 2005; Keskin, 2006; Jiménez-Jiménez and Sanz-Valle, 2011) also observed that organisational culture is fundamental factor to supports the innovativeness of the firm.

Lau and Ngo (2004) examined the mediating role of developmental culture in the relationship between the human resource (HR) system and product innovation. Based on the data from a survey of 332 firms in Hong Kong, the empirical findings confirmed that organisational culture had a direct effect on the development of new products. Furthermore, through organisational culture, the HR system had an indirect effect on the development of new products. Moreover, empirical results, from a sample of 223 Chinese enterprises, indicated that strategic human resource management had a positive impact on firms' product innovation and this relationship was stronger if firms had a developmental culture (Wei et al., 2011). A study of 420 employees working in Spanish organisations, carried out by Valencia, et al., (2010) revealed that organisational culture is considered to be one of the key elements in enhancing product innovation. Other researchers has also provided evidence of a significant relation between organisational culture and innovation (Mayondo and Farrell, 2003; Miron et al., 2004; Jaskyte, 2004; Obenchain and Johnson, 2004; Chang and Lee, 2007).

An empirical study of 23 companies and 449 employees working in banking and companies from insurance in Taiwan, carried out by Liao et al. (2012) revealed that organisational culture affects organisational learning and innovation through knowledge acquisition. This finding is in line with the view of Jung et al. (2003), who argued that organisational culture could enhance innovation including product and process innovation. The empirical study by Chang and Lee (2007) indicated that organisational culture including both innovative culture and supportive culture have a significantly positive effect on administrative and technical

innovation. A study of 100 principals of law firms in Australia, conducted by Hogan and Coote (2014) showed that organisational culture including values and norms has compelling influence on innovation. In Malaysia, Abdullah et al. (2014) showed that organisational culture has significant relationship with product innovativeness. Based on the above discussion, this study suggests the following hypothesis:

*H6a: There is a positive relationship between organisational culture and product innovation.*

*H6d: There is a positive relationship between organisational culture and process innovation.*

### **3.2.6.2 Organisational Structure and Innovation**

A small but growing number of empirical studies have examined organisational structure and innovation (e.g., Germain, 1996; Drucker, 1999; Chen and Huang, 2007). These studies suggest that the characteristics of the organisational structure have been recognised as critical elements in influencing the productivity and innovation in companies. For example, Chen and Huang (2007) suggested that organisational structure was associated with better organisational outcomes such as innovation. In addition, Tesluk et al. (1997) concluded that organisational structure has positive statistically significant direct effects on innovation. The previous studies also suggested that in organisations with high formalisation, there are explicit rules and procedures which are likely to impede the spontaneity and flexibility needed for internal innovation (Bidault and Cummings, 1994; Chen and Huang, 2007).

Moreover, Sciulli (1998) examined the role of organisational structure which included centralisation and formalisation in supporting the different types of innovation in the 229 Indiana retail banks. The results indicated that, compared to non-adopters, the adopters of product innovation had much lower levels of centralisation and formalisation. Also, compared to the non-adopters of incremental innovation, the adopters of incremental innovation had lower levels of formalisation. In addition, the adopters of radical innovation



had much lower levels of centralisation than non-adopters. Zaltman et al. (1973) proposed that high centralisation and formalisation hindered the initiation of innovation since centralisation reduced available information and restricted the channels of communication. Consequently, the greater participation allows more knowledge sharing which produces a greater diversity of ideas. In the same context, Kimberly and Evanisko (1981) found that, in hospitals, there was a significantly negative relationship between centralisation and the adoption of innovation. On the contrary and based on a survey of 195 Taiwan firms, Liao (2007) examined the effects of organisational structure measured by formalisation and centralisation on product innovation. The results showed that an organisational structure, which emphasised the lower levels of centralisation and formalisation, could enhance product innovation. Previous studies also demonstrated that organisational structure facilitates the communication processes and the social interaction between individuals (van den Hooff and Huysman, 2009), which in turn enhancing innovation at workplace (Gold et al., 2001). Other researchers confirmed that organisational structure with flexibility is essential for innovation (Bidault and Cummings, 1994; Chen and Huang, 2007). As a result, it is anticipated that:

***H6b:** There is a positive relationship between organisational structure and product innovation.*

***H6e:** There is a positive relationship between organisational structure and process innovation.*

### **3.2.6.3 Information Technology and Innovation**

Previous studies have identified information technology as a salient factor in facilitating innovation (e.g., Venkatraman 1991; Duncan 1995; Bharadwaj, 2000; Kaplan and Norton, 2004; Koellinger, 2008). Kaplan and Norton (2004) provided empirical evidence on the key role of technologies and organisational climate in reinforcing innovation. Furthermore, studies showed how the usefulness of communities of practice like IT activities in companies can add value to the organisation by: creation of higherquality knowledge, fewer surprises

and planned revisions, greater capacity in dealing with unstructured problems, more effective KS among business and corporate staff units, improved likelihood of implementing joint goals, and improved employee skills and learning Lesser et al. (2001), which in turn leads to changes of behaviour and innovation (Ichijo and Nonaka, 2007a; von Krogh et al., 2012). Higón (2011) surveyed employees working in SMEs in UK and found that ICT is positively correlated with product and process innovation. Koellinger (2008), using a sample of European firms, found that information communication technology are important enablers of innovation, either by improving processes or by enabling the firm to offer new products or services.

Moreover, Morikawa (2004) found that Japanese SMEs using IT were more likely to engage in innovative activities than firms without computer applications. Hempell and Zwick (2008) investigated to what extent the usage of IT fosters innovation activities by facilitating more flexible organisational structures in firms. The result showed that IT is a positively associated with product innovation. The researchers further stressed the importance of IT being part of the innovation process within a firm. A empirical study conducted by Ollo-López and Aramendía-Muneta (2012), found that the use of IT (IT skills requirements, IT investments, energy efficiency and emissions) favors innovation in the companies, considering it as launching new products or services as well improving or introducing new processes. Additionally, other researchers observed that the IT infrastructure provides the resources that make feasible innovation and continuous improvement of products (Venkatraman 1991; Duncan 1995; Bharadwaj, 2000). Several empirical studies indicated that information and communication infrastructures is one of determinants which significantly contribute to innovation capability at different organisational levels (e.g. Liao et al., 2007; Lin 2007a; Camelo-Ordaz et al., 2011; Yeşil et al., 2013). A case study conducted by Gonzalez et al. (2013), within Spanish local government showed that information and communication

technologies are key factor to enhance product, process and collaborative innovation.

Therefore, It is hypothesised that:

*H6c: There is a positive relationship between information technology and product innovation*

*H6f: There is a positive relationship between information technology and process innovation.*

### **3.2.7 The Mediating Effect of Social Capital in the Organisational Context-Innovation Relationship**

To establish the mediating role of social capital in the relationship between organisational context and innovation, it is important to first consider how organisational context is expected to relate to social capital. Several studies illustrated that there are relationship among organisational context and social capital. In Spain, Van den Hooff and Huysman, (2009), found a positive direct association between organisational culture, and social capital including structural, relational and cognitive dimensions. Still in Spain, Van den Hooff and Huysman (2009) studied the impact of organisational structure on the social capital, structural, the relational and cognitive dimensions. The authors found that organisational structure positively influence the firms in achieving their social capital. Andrews (2010) revealed that the positive relationship between organisational structure, in terms of decentralisation; the lower level of formalisation and specialisation, and social capital. Moreover, Joshi et al. (2010) conducted empirical study on the impact of information technology on social capital, and found clear and strong evidence that IT have effectively enhanced the firms' social capital. Equally, Shneiderman (2007) reported a positive effect of IT on social capital through facilitate social interaction inside the firm by creating networking between groups and individuals. Van den Hooff and Huysman, (2009) found positive impact of IT on firms' social capital in Spanish organisations.

Turning now to the relationship between social capital and innovation, researchers suggested that social capital including structural, relational and cognitive dimensions stimulates social interaction and communication among members, which encourages innovation at workplace (Gold et al., 2001; Zheng, 2010). This result confirmed by other researchers (e.g. Tsai, 2006; Cainelli et al., 2007), who indicated that social capital leads to increase innovation at workplace. Rodan and Galunic (2004) found that network structure, which encouraged the members of a network to share knowledge, was of greater importance for innovation. This result supported by Levin and Cross (2004), who stated that social capital, with its emphasis on strong ties amongst employees were important to generating new information because they were more accessible and willing to cooperate to get useful knowledge, which leads to increase innovation within organisation (Lee et al., 2010; Wang and Wang, 2012; Cheng, 2012; Choi and Park, 2014; Al-husseini and Elbeltagi, 2015). Similarly, social capital, with its emphasis on trust, also encourages performance of innovation and the launch stage for product innovation (Moran 2005). Laursen et al. (2012) emphasised the importance and influence of social capital on innovation, stressing that social capital will lead to facilitate innovation within organisations. Elstouhi et al. (2015) also found that social capital significantly increased innovation.

Based on above discussion, it should be noted that prior studies have paid attentions to empirically examine the effects of organisational context on social capital and the effects of social capital on innovation. However, there is no empirical research has examined the mediating effect of organisational context on the relationship among social capital and innovation. Accordingly, this study attempts to address this gap to investigate the existence of such links in developing countries such Libya and within the context of Libyan oil companies. These considerations lead to the following hypotheses.

**H7: The organisational context (OC, OS and IT) improves product and process innovation by enhancing its social capital.** This hypothesis is classified into the following sub-hypotheses:

*H7a: The organisational culture influences product innovation through enhancing its social capital.*

*H7b: The organisational structure influences product innovation through enhancing its social capital.*

*H7c: Information technology influences product innovation through enhancing its social capital.*

*H7d: The organisational culture influences process innovation through enhancing its social capital.*

*H7e: The organisational structure influences process innovation through enhancing its social capital.*

*H7f: Information technology influences process innovation through enhancing its social capital.*

### **3.2.8 The Mediating Effect of Knowledge Sharing in the Organisational Context- Innovation Relationship**

The relationships between organisational context (OC, OS and IT), and KS discussed in section (5.2.2), and those among KS and innovation discussed in section (5.2.5), implicitly suggest that organisational context (OC, OS and IT) affects innovation through its effects on KS. Enhancing both product and process innovation requires organisational context (OC, OS and IT) to encourage employees to share their knowledge at workplace (Kim and Lee, 2006). Knowledge sharing is essential because it enables organisations to enhance innovation performance (Calantone et al., 2002; Kim and Lee, 2013). Innovation is a process of defining problems and generating new knowledge to solve them (Nonaka et al., 2006; Damanpour et al., 2009; Ahmed and Shepherd, 2010). Tacit knowledge is embedded in different organisational members and has to be converted into collective knowledge (explicit knowledge). KS processes followed by individuals help them to convert the knowledge, generate new routines and mental models, and problem-solving activities (Nonaka, 1994; Nonaka and Takeuchi, 1995; Von Krogh et al., 2012; Kim and Lee, 2013).

To fully leverage the knowledge and exchange the skills and experiences that reside in individual minds, organisational context (OS, OC and IT) can encourage a KS culture

between individuals through organisational culture by clear understanding of organisational vision and goals and social networking among organisational members (Kim and Lee, 2006), through organisational structure by having a less centralised organisational structure, using a standardised reward system, creating a work environment that encourages interaction among employees such as through the use of open workspace, and encouraging communication across departments and informal meetings (Jones, 2005; Kim and Lee, 2006). When organisations have made large investments IT infrastructure in organisation to support knowledge sharing among members in the organisation (Bock et al., 2005; Wasko and Faraj, 2005; Kim and Lee, 2006)

According to the knowledge-based view, when knowledge can be shared among individuals through donating and collecting, the organisation memory will be made available, and this allow to implementation new ideas, that enables to improve both product and process innovation (Liao and Wu, 2010, Ferraresi et al., 2012, Von Krogh et al., 2012, Wang and Wang, 2012; Kim and Lee, 2013). Therefore, this study argues that organisational context encourages a knowledge sharing among employees through organisational culture, structure and information technology. Tacit knowledge is converted to explicit knowledge about working operations and administrative issues amongst individuals via knowledge sharing process (donating and collecting), and this will lead to innovative ideas for developing the product and process innovation within organisation.

Although organisational context including OC, OS and IT may affect innovation directly, previous research has suggested that the direct effects may be too complex to isolate (Srivastava et al., 2006b). Insufficient attention has been given to the mechanisms that may explain these relationships, and research is needed to address and understand the processes through which organisational context including OC, OS and IT influences work related to innovation. Therefore, the present study attempts to redress this gap in the literature by

examining the effects of organisational context (OC, OS and IT) on innovation through the mediating role of knowledge sharing, as shown in Figure 5.1. Based on the findings of previous studies discussed above, the final hypotheses is established as follows:

**H8: The organisational context (OC, OS and IT) improves product and process innovation by enhancing its knowledge sharing behaviour.** This leads to the following sub-hypotheses:

*H7a: The organisational culture influences product innovation through enhancing its knowledge sharing.*

*H7b: The organisational structure influences product innovation through enhancing its knowledge sharing.*

*H7c: Information technology influences product innovation through enhancing its knowledge sharing.*

*H7d: The organisational culture influences process innovation through enhancing its knowledge sharing.*

*H7e: The organisational structure influences process innovation through enhancing its knowledge sharing.*

*H7f: Information technology influences process innovation through enhancing its knowledge sharing.*

### 3.3 Summary of Hypotheses Statements

Based on the conceptualisation proposed in section 3.1, which was developed using the RBV and KBV to explain the role of organisational context (OC, OS and IT) in affecting innovation (product and process), through social capital and knowledge sharing, The following research hypotheses are proposed in order to answer the research questions stated in section 2.3.10, Table 3.1, summarised a set of these hypotheses.

**Table 3.1: The Study's Hypotheses**

No	Hypotheses
<b>H1:</b>	<p><b><i>There is a positive relationship between organisational context (OC, OS and IT) and social capital.</i></b> From the previous hypothesis, the following sub-hypotheses were constructed:</p> <p><i>H1a: There is a positive relationship between organisational culture and social capital.</i></p> <p><i>H1b: There is a positive relationship between organisational structure and social capital.</i></p> <p><i>H1c: There is a positive relationship between information technology and social capital.</i></p>

<b>H2:</b>	<p><b><i>There is a positive relationship between organisational context (OC, OS and IT) and knowledge sharing.</i></b> This leads to the following sub-hypotheses:</p> <p><i>H2a: There is a positive relationship between organisational culture and employees' knowledge sharing.</i></p> <p><i>H2b: There is a positive relationship between organisational structure and employees' knowledge sharing.</i></p> <p><i>H2c: There is a positive relationship between information technology and employees' knowledge sharing.</i></p>
<b>H3:</b>	<p><i>There is a positive relationship between social capital and employees' knowledge sharing.</i></p>
<b>H4:</b>	<p><b>There is a positive relationship between social capital and both product and process innovation.</b> This hypothesis is divided into the following sub-hypotheses:</p> <p><i>H4a: There is a positive relationship between social capital and product innovation.</i></p> <p><i>H4b: There is a positive relationship between social capital and process innovation.</i></p>
<b>H5:</b>	<p><b><i>There is a positive relationship between knowledge sharing and both product and process innovation.</i></b> This hypothesis is classified into the following sub-hypotheses:</p> <p><i>H5a: There is a positive relationship between knowledge sharing and product innovation.</i></p> <p><i>H5b: There is a positive relationship between knowledge sharing and process innovation.</i></p>
<b>H6:</b>	<p><b><i>Organisational context (OC, OS and IT) have positive direct effect on product and process innovation.</i></b> From the previous hypothesis, the following sub-hypotheses were constructed:</p> <p><i>H6a: There is a positive relationship between organisational culture and product innovation.</i></p> <p><i>H6b: There is a positive relationship between organisational structure and product innovation.</i></p> <p><i>H6c: There is a positive relationship between information technology and product innovation</i></p> <p><i>H6d: There is a positive relationship between organisational culture and process innovation.</i></p> <p><i>H6e: There is a positive relationship between organisational structure and process innovation.</i></p> <p><i>H6f: There is a positive relationship between information technology and process innovation.</i></p>
<b>H7:</b>	<p><b>The organisational context (OC, OS and IT) improves product and process innovation by enhancing its social capital.</b> This hypothesis is classified into the following sub-hypotheses:</p> <p><i>H7a: The organisational culture influences product innovation through enhancing its social capital.</i></p> <p><i>H7b: The organisational structure influences product innovation through enhancing its social capital.</i></p>



	<p><i>H7c: Information technology influences product innovation through enhancing its social capital.</i></p> <p><i>H7d: The organisational culture influences process innovation through enhancing its social capital.</i></p> <p><i>H7e: The organisational structure influences process innovation through enhancing its social capital.</i></p> <p><i>H7f: Information technology influences process innovation through enhancing its social capital.</i></p>
<b>H8:</b>	<p><b>The organisational context (OC, OS and IT) improves product and process innovation by enhancing its knowledge sharing.</b> This leads to the following sub-hypotheses:</p> <p><i>H8a: The organisational culture influences product innovation through enhancing its knowledge sharing.</i></p> <p><i>H8b: The organisational structure influences product innovation through enhancing its knowledge sharing.</i></p> <p><i>H8c: Information technology influences product innovation through enhancing its knowledge sharing.</i></p> <p><i>H8d: The organisational culture influences process innovation through enhancing its knowledge sharing.</i></p> <p><i>H8e: The organisational structure influences process innovation through enhancing its knowledge sharing.</i></p> <p><i>H8f: Information technology influences process innovation through enhancing its knowledge sharing.</i></p>

These hypotheses are tested in both organisational setting, namely public and private oil sectors. Thereafter, a comparison will be drawn in order to highlight any differences that would emerge. Indeed, several authors still call for comparative studies between public and private in developed and developing contexts (Amayah, 2013). Hence, more evidence from public and private oil sectors in developing country like Libya would bring further insights from this part of the world. Also, it recognised that testing a model in more than one context would provide a strong indication of its external validity and hence its applicability in various contexts.

### 3.4 Summary of the Chapter

The purpose of this chapter was to propose the conceptual frameworks to be tested in this study. In this regard, and based on the review of the previous empirical studies, the research models illustrating the role of organisational context including organisational culture,

structure and information technology in enhancing innovation, product and process using the RBV and KBV were suggested. Broadly speaking, the model attempts to explain how organisational context (OC, OS and IT) affect product and process innovation. The study uses data collected from public and private oil sectors. The rationale for testing the hypotheses in two different type of organisations is to allow for possible comparison and identify possible differences that would arise between those two setting and hence assess the applicability of the present models in various contexts. The study collects data from Libyan public and private oil sectors. In this sense, the following chapter provides an overview and justification regarding the Libyan public and private oil sectors.

## **CHAPTER FOUR: RESEARCH CONTEXT**

### **4.0. Introduction**

Having discussed the research model developed in this study, this chapter presents the Libyan context where this model is tested. The aim of this chapter is an attempt to review literature on contextual factors which influence on an organisational behaviour and managerial practice within Libyan context, by presenting a P.E.S.T analysis of Libyan environment. The extant literature in international HRM indicates that HR assumptions and practices differ significantly across countries (Brewster et al., 2004; Larsen and Mayrhofer, 2006; Scullion and Linehan, 2007). This evidence indicates that there must correspondingly be variation too in social capital, knowledge sharing and innovation among different national contexts and context of Libya being no exception. Whereas a more detailed discussion of Libyan context dimensions is beyond the scope of this study, some key literature will be covered in order to build clear an understanding of the influence of Libyan context on organisational behaviour and in particular social capital, knowledge sharing and innovation within organisation.

Therefore, this project will start by analysing the context. Three arguments are advanced for the importance of considering the importance of the context and its influence on managerial practice. Firstly, previous studies in Libya have shown that organisational behaviour and managerial practice are influenced by the social-cultural, historical traditions, political and economic context. For example, the study of Millad (2013), showed that the Libyan culture has negative perceptions of management development. This leads to management development initiatives being relegated to the side lines.

Secondly, from a divergence perspective (Brewster, 2001), it can be argued that national contexts have a considerable impact on managerial practices (Kabwe, 2011). For example, research has shown that managerial practices in Central an Eastern European countries are

still influenced by socialist attitudes and assumptions (Vaiman and Holden, 2011). In this light, it is highly likely that organisational behaviour and managerial practices in Libya are influenced by political instability and colonial legacy (Ali, 1990; Ramadan 2002; Maguire, 2007; Edwik, 2007; Kanan, 2010; Yuseif 2010; Braun and Jones, 2013; Bayoud, 2013).

Thirdly, there are also evident in the extant literature shows that the rapid technological advances in computational power and communication technologies have influenced the organisational behaviour and managerial practices (Bontis, 2004). In this light, it is highly likely that information technology have the power to share knowledge, skills, talents and the know-how of individuals in the workplace in order to increase innovation.

Therefore, this project focuses on the Libyan environmental conditions that have influenced its present managerial thinking and adoption of managerial practices. The main elements that are looked at are political, economic, sociological and technological factors, that are most likely to impede upon the development of management, and hence the improvement of knowledge sharing and innovation in Libyan organizations. The chapter starts by considering Libya's historical background and political changes.

#### **4.1 Historical Background and Political Changes**

It is worth noting the particularity of Libya if compared with the rest of North-African countries which shared several institutional characteristics and historical backgrounds. There are several factors have profoundly affected the evolution of Libya, for example its colonial legacy and the political changes. For most of its history, Libya was subjected to several foreign occupations. Libya is a young independent state born under the auspices of the United Nations, but at the same time it is a very old and established community of people with a long and ancient history (Aneizi, 1956). Historical and archaeological records reveal that Libya was conquered by the Phoenicians, Carthaginians, Greeks, Romans, Vandals, Byzantines, and

the last of which before the Second World War was the Ottoman Empire's long occupation (1551-1911) (Aneizi, 1956; Murabet, 1964; Rinehart, 1979; Abou-El-Haj, 1983; Bearman, 1986; Sicker, 1987; Joffe, 1989; Buru 1989; Vandewalle, 2006).

The modern Libyan history had started with the entry of the Italian army. In 1912, the Ottomans signed a treaty with Italy. Hence, control over the whole country's area was achieved by Italy only in 1934 (El-Nakhat, 2006). On 10th June 1940 Italy entered the Second World War on the side of Germany against Britain and France (Murabet, 1964; Rinehart, 1979). During the war years, in January 1943, British forces occupied Tripolitania and Cyrenaica (Rinehart, 1979; Buru, 1989). Thus, during the period after the end of the Second World War, Tripolitania and Cyrenaica were placed under British Army Administration, and Fezzan was placed at Free French Army Headquarters (Murabet, 1964; Rinehart, 1979; Najeh, 2006). Contemporary governments were formed by military administration (Buru, 1989).

Nevertheless, Libya was "*independent*" on December 24, 1951 and was the first country to achieve independence through the United Nations which approved the establishment of the United Kingdom of Libya, a constitutional monarchy under King Muhammad Idris (Najeh, 2006). In addition, Libya was consisting of three separate states Tripolitania, Cyrenaica, and Fezzan. During that time it was considered one of the poorest countries in the world (Murabet, 1964; Copeland, 1967; Bearman, 1986; Fisher, 2004; El-Nakhat, 2006; Vandewalle, 2006).

However, the Libyan political regime has been changed on September 1, 1969, when the monarchy was overthrown and abolished the existing constitution during the reign Kingdom by a group of army officers, and The Revolutionary Command Council (RCC) took power headed by Muammar Qaddafi, proclaiming the birth of the Libyan Arab Republic. Under a decree promulgated by the RCC in November 1976, provision was made for the creation of

the General National Congress of Arab Socialist Union. (Rinehart, 1979; Sicker, 1987; Joffe, 1989; Vandewalle, 1995; Vandewalle, 1998; Vandewalle, 2006)

Additionally, Qaddafi abolished the General National Congress of Arab Socialist Union on 2<sup>nd</sup> March 1977, and established the General People's Congress (GPC) and people's committees (Vandewalle, 1998). Thereafter, Al-Qadhafi declared that the formal name of Libya had become Socialist People's Libyan Arab Jamahiriya. Those events coincided with presenting "*Green Book*", as known "*The Third International Theory*" which presented in three parts (political, economic, and social programs). This book reflected Al-Qadhafi's thoughts which he claims is a radical alternative to capitalism and communism (Beuchot, 1982). This new political system was a combination of socialism and Islam. Hence, the Third Universal Theory was representing the Libyan political system until in mid-2011, when the Qaddafi regime was toppled (Bayoud, 2013), and replaced by a transitional government. Subsequently, the elected parliament started redrafts the majority of all state legislation, as well as policy formation practices abolishing Col. Gaddafi's Third Universal Theory as the de facto 'constitution' (El-Katiri, 2012; EL-Gayed, 2013; Brambilla, 2014).

Clearly, from the historical background of Libya, it is marred with political instability, foreign rule and hereditary systems. Arguably, this environment is likely to have a significant impact on economic growth and subsequently, the labour market, organisational behaviour and managerial practice (Aгнаia, 1996; Triki, 2010; Bayoud, 2013). In this vein, Libya was very poor until the discovery of oil in 1951; this point is later discussed in section (2.3). As noted by Ali (2011) and Bayoud (2013), political instability has a detrimental effect on human capital development, organisational behaviour and managerial practice as it stimulates anxiety and uncertainty surrounding the future and economic welfare and frustrates and distracts people from engaging in productive economic activity.

## **4.2 Economic Environment**

The Libyan economy is characterised by the properties of most developing countries; the economy is open and relatively small in size; income depends primarily upon the developed natural resources (Aгнаia, 1996); there is lack of skilled labour, and there is a high rate of population growth (Shernanna, 2012). In looking at the economic aspects of Libyan life, it is important to remember that before the discovery and exploration of oil in 1959, Libya was one of the poorest countries in the world (Vandewalle, 1998; Hokoma et al., 2008). Libyan people were engaged in agriculture and animal husbandry. Moreover, Libya was also dependent on aid from foreign states such as UK and USA to survive and overcome severe years of the fifties with very bleak prospects for economic development with no source of power and mineral resources (Otman and Karlberg, 2007). Also, the country was suffering from a lack of housing, education, health facilities as a result of the occurrence of many years of colonial rule (Aгнаia, 1996).

However, the exploration and the commencement of production in 1961, was a key turning point in Libyan economy (Ibrahim, et al., 2013; Gharbal et al., 2014). The wealth of the country increased rapidly and the increase in resources changed the situation for the better (Otman and Karlberg, 2007). The oil revenue increased from 4,097,000 Libyan pounds at the beginning of oil export to 116,861,000 Libyan pounds in 1963 (Ministry of Planning, 1963; Aгнаia, 1996). As a result of oil revenue, many ministries were established to deal with the future wealth and to direct this wealth towards different sectors, for example skills development through educational and training programmes (Aгнаia, 1996; Eljaaidi, 2012; Ibrahim et al., 2013; Bayoud, 2013; Braun and Jones, 2013). In addition, the country introduced economic and social development plans to build up the Libyan economy and to overcome the problems that affected the economic and social life of the country (Aгнаia, 1996; Otman and Karlberg, 2007).

With regard to GDP, oil production has made a considerable contribution to economic development for example; there were major advances in the Libyan economy; the average income per capita before 1950 was estimated at 20 Libyan pounds per annum and reached about 100 Libyan pounds in 1960; this rose to 600 Libyan pounds in 1970 and to 8,000 Libyan pounds in 1984 (Aagnaia, 1996). The development expenditure from 1970 to 1984 was equivalent to 18.5 bn Libyan pounds (\$ 62.5 bn), while the contribution of oil to GDP representing about 72% and 97% of exports (Mahmood, 2013). The GDP demonstrated Libya during the period from 1995 to 1999 had range of \$US 37.0 billion GDP (Sherif, 2010).

In terms of global ranking, this placed Libya 70 out of 191 countries in terms of GDP, 106 out of 191 countries in terms of population and 57 out of 191 countries in terms of GDP per capita (Sherif, 2010). Libya also place at the top of the list of GDP per capita among African Countries (Twati and Gammack, 2006; CIA, 2007; Yuseif, 2010; Sherif, 2010) In light of the above discussion, it is clear that, the Libyan economy is predominantly dependent on oil revenues. Therefore, high GDP is courtesy of its small population in relation to significant revenues from the oil sector which place Libya at this position among world countries (Gibson and Abusa, 2013; Mahmood, 2013).

With respect to the development process of Libyan economy, Libyan government implemented different development plans funded by the oil revenue. The aim of the first plan (1963-1969), was to build up the infrastructure and the oil/gas industries this plan necessitated the import of droves of foreign labour from neighbouring countries such as Egypt and other countries of the Arab countries and also European expertise because of the weak human capital which is a major constraint for Libya's economy (Braun and Jones, 2013). It is clear that the primary focus of the first development plan was raising living standards among Libyan citizens (Otman and Karlberg, 2007). The plan included in its aims the comprehensiveness of the development project, which was to be spread throughout all



sectors of the Libyan community. Most importantly, the plan acknowledged that national development would not be achieved fully without the efforts of well-qualified Libyan nationals. Thus, from the beginning, the Libyan government has sought to build economic and social development based on its own human resource, giving priority on education and preparing people for work (Aгнаia, 1997).

From political perspective, it is seen that it is very difficult to separate an assessment of Libya's economy from Libya's political ideology (Aгнаia, 1997). For instance, the second national plan (1969-1974), was directed at consolidating the country's financial and economic conditions. Unfortunately, this plan coincided with the Revolution of 1969 (Allan and Mcclachlan 1979, p.334; Benkato, 1981). This led to reconsideration of some of the projects in the plan and the structure of the Libyan economy had changed dramatically. One of the principles of revolution the issuing of laws requiring the nationalisation of foreign businesses such as banks; oil companies (Vandewalle, 1998). As result of nationalization of foreign companies and due to shortage of skills among Libyans, Libya had employed many Arab people from Egypt, Tunisia and Sudan (Birks and Sinclair 1980, p. 136).

After the 1973 oil crises, Libya's oil revenues increased from 'LD 2.4 billion Libyan Dinars to about LD 6.5 billion by 1980' (Giurnaz, 1985). As a result of these oil revenues, the development expenditure in all sectors have been increased (Aгнаia, 1996). Meanwhile, the Libyan government launched plan to diversify their economy and avoid dependence on oil revenues and achieve a greater degree of self-sufficiency and self-reliance, the development of human and physical resources and self-sufficiency in food. The objectives of the development plans were that the non-oil sector's growth rate would be 10.3 per cent annually, while the growth rate for the whole economy was targeted at 17.2 per cent (Secretariat of Planning, 1980, p. 57; Mohamed et al., 2012).

According to Table (4.1) and during the period 1965-1991, the ratio of total trade to GNP has varied from a maximum of 88.9 per cent to a minimum of 59.4 per cent, and the ratio of imports to GNP has also fluctuated from 19.4 per cent to 28.7 per cent for the same period. For an independent economy, the ratio should for the first index be lower than 45 per cent and for the second index lower than 20 per cent (Aгнаia, 1996). Therefore, international dependency is clear, and the Libyan economy is dependent on oil export and at the same time needs to use the oil revenues for supplying the items needed to develop other sectors, such as education, industry, agriculture, etc. Table (4.1) also illustrates that the main role in the export sector is played by the oil revenues, especially in the 1970s and 1980s, when the percentage of oil export to total export ranged between 90 per cent to 99.9 per cent. This implies that the plan has not succeeded (Otman and Karlberg, 2007). It is evident that the Libyan economy still heavily depends on oil as the main source of Libyan income and the country still faced a great difficulty in being unable to produce enough capital goods and consumer goods to achieve “self-sufficiency” and “self-reliance” (Aгнаia, 1996; Otman and Karlberg, 2007). Clearly, due to lack of national skilled labour was unable to implement of ambitious development projects, prompting the state to resort to foreign workers (Shernana, 2012; Naama, et al, 2008). Nevertheless, the government realised that education had to be more developed because of its effects on all other aspects of life (Aгнаia, 1996). Therefore, both the numbers of students and the number of schools were increased and many faculties in different subjects were opened (Aгнаia, 1996). Indeed, the most significant achievement during this plan period was the progress of educational services, which were geared towards promoting product and process innovation.

**Table 4.1: Libyan Economic Development, 1965-1991**

Year	Total export	Import	Total trade	GNP	Total trade GNP %	Import GNP %	Oil export	Oil export Total export %
1965	180.8	85.3	265.8	435.6	61.1	19.6	38.5	21.3
1969	772.8	241.3	1,014.1	1,053.3	96.2	22.9	223.3	28.9
1973	1,196.4	539.9	1,736.3	1,953.0	88.9	27.6	1,086.5	90.0
1977	3,378.2	1,117.1	4,495.3	5,750.0	78.2	19.4	3,290.0	97.0
1981	4,609.8	2,481.4	7,091.2	9,013.1	78.7	27.5	4,508.5	98.0
1985	3,645.6	1,632.9	5,278.5	8,050.0	65.6	20.3	3,645.1	99.9
1987	2,372.0	1,544.4	3,916.0	6,594.0	59.4	23.4	2,371.8	99.9
1991	2,672.4	1,814.6	4,487.0	6,315.6	71.0	28.7	2,615.2	97.8

Sources: Agnaia (1996).

It should also be taken into consideration the political reality. For example, the Libyan economic system has changed from capitalism to socialism by the end of 1981. The state intervention in the economy has increased and the government started expanding the public sector and cutting back the private sector. The government ownership structure of businesses started in early 1970s and reached its peak in 1980s where most of the private businesses were entirely replaced by People's Committees, with retail activity being controlled by the state – administered supermarkets. Additionally, Alvi (1994) argued that several economic and social changes happened in Libya after the second part of the Green Book (1978). For example, all wage earners had changed into partners through the institutions of mandatory profit-sharing and workers committees (Millad, 2013). Therefore, the domination of the government over economic activities has influenced on managerial practice (Agnaia, 1997).

However, as result of the Libyan economy crises in 1987, Libyan government has enhanced the role of private sector activities in the national economy as a development plan (Gannous, 1998). Moreover, the Libyan government issued a number of legislations, which will regulate the economic operation in Libya, to encourage and strengthen the role of the national sector in individual and corporate forms, companies and family activities (Gannous, 1998). This started by unifying the exchange rate, which stopped the parallel market and smuggling of currency and some private businesses have emerged and started to operate. As result of Libya's development plans, the contribution of the non-oil sectors showed remarkable

increases which account about 20% of GDP (Millad, 2013). Nevertheless, the oil sector was still the main drive of the country's economy (El-Fathaly and Palmer, 1980). Throughout this period government expenditures and development programs were also totally dependent upon these oil revenues (El-Fathaly and Palmer, 1980; Mohammed, 2012; Millad, 2013).

Nonetheless, the Libyan government in the new millennium has been embarked for the wholesale privatisation of the country's vital oil which were nationalised since Qaddafi rise to power 1969. This was coincided with the lifting of the United Nations (UN) sanctions in September 2003<sup>1</sup> (Otman and Karlberg, 2007). Libya, as one of developing countries, has made remarkable strides towards economic reforms and is courageously facing the new trends of change and involvement in the global economy. In other words, Libya is working towards transforming its socialist-oriented economy to a more market-based economy (Twati and Gammack, 2006). It is now make many steps to privatise state-owned enterprises in addition to boosting the establishment of private companies, and trying to increase its attractiveness to foreign investors. It was seeking foreign involvement across all sectors of the economy, carrying out various regulatory changes to support the vast swathe of development.

On the other hand, building a liberal economy necessitates fulfilling some major conditions that are necessary for its proper operation (Sherif, 2010). Therefore, Libya fulfilled its commitments under Article VIII of the IMF's Articles of Agreement (IMF, 2003) with the key remaining challenges facing the Libyan government, such as: the low level of skills and technical expertise, know-how talent; Libyan government tried to diversify of the economy, However, the Libyan economic is still depends on oil revenue. These revenues use to support other sectors such as education and health. This oil sector is facing challenges from a dynamic environment characterised by rapid technological change and increased demand. At

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<sup>1</sup> The international sanctions made Libya in international isolation from 1992- 2003.

the same time, the development of innovative products and process has become essential for achieving and retaining competitiveness in global markets (Miron et al., 2004). Indeed, innovation is crucial for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that “innovation is power” for firms and other organisations (Drach-Zahovy et al., 2004; Kamasak R., and Bulutlar, 2010). In the literature social capital and Knowledge sharing considered essential for long-term success of the firm involves the related concepts of innovation (Capon et al., 1992; Kamasak and Bulutlar, 2010). Knowledge, one of the most important resources of organisations (Conner and Prahalad, 1996; Grant, 1996; Nahapiet and Ghoshal, 1998; Kamasak and Bulutlar, 2010), permits novel organisational outcomes, including the product and process of innovation (Kogut and Zander, 1996; Smith et al., 2005; Liu et al., 2005; Leiponen, 2006; Lee et al., 2010; Choi and Park, 2014; Al-husseini and Elbeltagi, 2014; Al-husseini and Elbeltagi, 2015). Social capital is considered crucial factor for achieve innovation within organisations (Wu et al., 2008; Baba and Walsh, 2010; Zheng, 2010; Laursen et al., 2012; Mura et al., 2013; Elstouhi et al., 2015).

### **4.3 Oil Company Profiles**

Libya’s oil and gas industry is operated by the state-owned National Oil Corporation (NOC), which was established under Law No. 24 of 1970, replacing the General Libyan Petroleum Corporation established under Law No. 13 in 1968 (Twati and Gammack, 2006; NOC, 2014; NOC, 2015). This enabled the NOC to address the enormous and rapid development in the oil and gas industry in a more flexible manner, and to keep up to date with changes in the international industry, along with smaller subsidiary companies, which, when combined, accounted for around half of the country’s oil output. Of the NOC’s subsidiaries, the largest public-sector oil producers include Berega Oil Company, Ras Lanuf Oil Company, Waha Oil

Company, Zawia Oil Company, Sirt Oil Company, and Arab Gulf Oil Company. Several international oil companies are engaged in exploration/production agreements with NOC, such as Zueitina Oil Company, Eni Oil Company, Repsol Oil Operations, Vaba Oil Company (Twati and Gammack, 2006; Millad, 2013; NOC, 2014; NOC, 2015), and foreign international companies such as Total, Wintershal and OMV Oil Company (NOC, 2016). The oil and gas sector in Libya is divided into three sub-sectors: (1) The government sector, which is operated by the NOC; (2) The public sector, which is operated by companies owned by the NOC; and (3) The private sector, which operates on the basis of partnership with foreign international companies (Twati and Gammack, 2006; Millad, 2013; NOC, 2014; NOC, 2015). The table (4.2) below shows public and private oil companies in Libya.

**Table 4.2: Public and Private Oil Companies in Libya**

Companies	City	Public	Private	Joint-Ventures	Companies	City	Public	Private	Joint-Ventures
Sirte Oil Company	<u>Tripoli</u>	✓	-	-	Eni North Africa Compan	<u>Tripoli</u>	-	✓	-
Arabian Gulf Oil Company	<u>Benghazi</u>	✓	-	-	Amerada Hess Company	-	-	✓	-
Ras Lanuf Oil and Gas Processing Company	<u>Tripoli/ Benghazi</u>	✓	-	-	India oil Company	<u>Tripoli</u>	-	✓	-
Zawia Oil Refining Company	Zawia	✓	-	-	Total E&P Company	<u>Tripoli</u>	-	✓	-
Brega Petroleum Marketing Company	<u>Tripoli/ Benghazi</u>	✓	-	-	Petro Canada Company	-	-	✓	-
National Oil Wells Drilling and Work over Company	<u>Tripoli</u>	✓	-	-	Polish Oil & Gas Company	<u>Tripoli</u>	-	✓	-
Jowfe Oil Technology Company	<u>Tripoli/ Benghazi</u>	✓	-	-	OMV Company	<u>Tripoli</u>	-	✓	-
National Oil Fields and Terminals Catering Company		✓	-	-	OXY Company	<u>Tripoli</u>	-	✓	-
North Africa Geophysical Exploration Company	<u>Tripoli/ Benghazi</u>	✓	-	-	BP Exploration Libya Limited Company	<u>Tripoli</u>	-	✓	-
Taknia Libya Engineering Company	<u>Tripoli</u>	✓	-	-	STATOIL Company	<u>Tripoli</u>	-	✓	-
Petro Air Company		✓	-	-	Gazprom Company	<u>Tripoli</u>	-	✓	-
Zueitina Oil Company	<u>Tripoli/ Benghazi</u>	-	-	✓	Repsol Murzuq Company	<u>Tripoli</u>	-	✓	-
Mellita Oil & Gas Company	<u>Tripoli/ Benghazi</u>	-	-	✓	Petrobras Company	<u>Tripoli</u>	-	✓	-
WAHA Oil Company	<u>Tripoli</u>	-	-	✓	Chevron Libya LTD Company	<u>Tripoli</u>	-	✓	-
Mabruk Oil Operation Company		-	-	✓	Shell Company	<u>Tripoli</u>	-	✓	-
Harouge Oil Operation Company	<u>Tripoli/ Benghazi</u>	-	-	✓	RWE Company	<u>Tripoli</u>	-	✓	-
Akakus Oil Operation Company	<u>Tripoli</u>	-	-	✓	Sonatrach Company	<u>Tripoli</u>	-	✓	-
Nafusah Oil Operation Company		-	-	✓	Turkish Petroleum Corporation	<u>Tripoli</u>	-	✓	-
Medco Energy Company		-	✓	-	Wintershall AG Company	<u>Tripoli</u>	-	✓	-
Exxon Mobil Company		-	✓	-	ONGC Limited Company	<u>Tripoli</u>	-	✓	-
Tatneft Company			✓	-	-	-	-	-	-

Source: Based on (NOCs, 2016)

#### **4.4 Libyan Social Culture**

Another factor which is considered critical factor for organisational behaviour and managerial practice is culture aspect. According to Abuarroush, (1996) and Millad, (2013), culture and social environment have a vital impact on organisational behaviour and managerial practice of a country, Libyan environment being no exception. Libya is an Arabic country and the dominant religion is Islam. Libya shares a common language, religion, cultural values, and other social values with other Arabic countries (Aghila, 2000; Eljaaidi, 2012; Millad, 2013). Twati and Gammack (2006) and Nagi (2013), pointed out that the basic unit of Libyan society is the extended family, the tribe, the village, and the community plays a major role in all this. Since, Arabic culture is the most dominant force in Libyan individuals and groups, people's social values, beliefs and attitudes, state law, political and economic policies are all governed by Islamic rules in addition to many aspects of their life, such as marriage, divorce and trade relations (Al-Faleh, 1987; El-Fathaly and Palmer 1980; Vandewalle, 2006 cited in Abubaker, 2008).

The review of the literature showed that the most important influences on Arab society are religion and family (Tayeb, 1997; Hammoud, 2011). However, there is some controversy regarding the influence of religion on managerial practices. For example, Tayeb (1997) debates that it is very difficult to disentangle the effects of Islam on HRM from those of other social, economic and political factors which make up the character of a society as a whole. Abuznaid (1994) argued that religion has a great impact on human behaviour, social interactions and social relations. Islam as a religion and a way of life has an influence on the political, economic and educational system as well as other cultural aspects of Arab and Muslim societies. There is an immense impact by Islamic values, Islamic work ethics and Islamic principles on the management of human resources (Tayeb, 1997). Others argue that



there is widespread agreement on the influence of family on managerial practices (Al-Faleh, 1987; Ali and Shakis 1991; Atiyyah, 1993; Ali, 1995; Tayeb, 1997; Al-Ali, 1999; Altarawneh, 2005; Branine and Pollard, 2010; Hammoud, 2011).

Culture's framework attempts to explain the variations in managerial behaviour as essentially resulting from differences in national culture (e.g. Hofstede 1980; Turner and Trompenaars, 1993; Adler, 1991; 2008). Hofstede (1980) and Olie (1996) noted that the culturalist approach seeks to build an understanding of differences in work organisations, managerial behaviour and human resource practices founded on attributes of national cultural distinctiveness in terms of values, ideas and beliefs shared by individuals in a society (Hofstede, 1980). In this regard, a number of previous studies have found geographically based, typically national differences which are deep-seated values about what is good or bad, honest or dishonest, fair or unfair (Hofstede, 1980; Adler, 1991). According to Hofstede (1980), these cultural assumptions impact the way people in a country make sense of the world. Hence, it is expected to conclude that the implementation of knowledge sharing and innovation in oil industry in Libya cannot be properly carried out without an understanding how national culture influence on HRM, organisational behaviour, managerial practice and in particular social capital and knowledge sharing practices and innovation within organisation.

Bredillet et al. (2010) and Girgin (2005) argued that the socio-cultural approach has found widespread acceptance in the international human resource management literature based mainly on Hofstede's (1980) value-based behavioural dimensions and concepts of national culture which have made an attempt to account for the impact of culture on multinational corporations' behaviour. Whereas a more detailed discussion of Hofstede's cultural dimensions is beyond the scope of this study, some key literature will be covered in order to build clear an understanding of the influence of culture on organisational behaviour and in particular social capital, knowledge sharing and innovation within organisation.

Geert Hofstede's framework is a universal and common to all cultures across all countries and nations. It has been developed based on over 116,000 survey responses in IBM units in approximately 60 countries from the east and west, including 5 Arab countries (See Hofstede, 1980; Hofstede, 2005; Hofstede, 2011). Hofstede's research involves 160 managers and employees working for IBM, a US multinational firm (See Hofstede, 1980; Hofstede 2005). Despite working for the same multinational company, Hofstede's study found that there were highly significant differences among attitudes and behaviours of managers and employees. Further, the study of Hofstede (1980) also concluded that culture was the main determinant of the variations in work-related values, attitudes and behaviours among employees and managers within the same organisation, and of the same profession, age, or gender. Hofstede (1980) revealed a couple of four dimensions to measure culture in the areas of uncertainty avoidance, power distance, individualism, and masculinity. In a later work, Hofstede and Bond (1988) introduced a fifth dimension namely, long-term orientation. Recently, Hofstede et al. (2008) added the sixth cultural dimension, called indulgence versus restraint, focusing on happiness and life control, based on the work of Minkov (2007). According to Hofstede's (1980) and Hofstede (2009) typology, the Arab countries were classified as having high power distance, high uncertainty avoidance, low individualism, slightly higher than average on masculinity, high short-term orientation and strong restraint culture (Hofstede, 2009; Al Omoushet al., 2012). As was mentioned earlier, Libya shares some cultural characteristics with other Arab countries especially Egypt, it is possible to paint a picture of culture from Hofstede's six model dimensions (Nagi, 2013).

The first dimension, *Power Distance Index (PDI)*, refers to the extent to which the less powerful individuals of institutions and organisations within a country expect and accept that power is distributed unequally (Hofstede and Hofstede 2005, p. 46; Hofstede, 2001; 2011; Orr and Häuser, 2008), such as accepting the decisions made by their superiors and the extent

to which subordinates are allowed to participate in decision-making (Alves et al., 2006; Cheung et al., 2011). Countries with low power distance are not as much of comfortable with power differences such as class distinction or organisational ranking as a large power distance culture. For example, Western societies which are a small power distance, there is often a disregard for hierarchy and subordinates are more likely to express their opinions and participate in managerial decisions (Alves et al., 2006). Employees prefer a more democratic style of leadership with more independence in decision-making (Dickson et al., 2003). However people in countries that scored high in power distance, organisations are characterised by tall hierarchies, in which the relationships between superiors and subordinates are stricter than in low power distance organisations (Hammoud, 2011). Subordinates fear to disagree with their superiors. For example, in Libyan organisation which is a large power distance country is usually seen as being highly bureaucratic, over centralised, with all the power and authority at the top and the delegation of decision making is a sign of incompetence (Al-Faleh, 1987; Abuznaid, 1994; Sherif, 2010; Millad, 2013).

From the perspective of the power distance dimension, Hofstede's (2001; 2009) suggested that in high power distance cultures (where it is generally accepted that the existence of a high power differential between individuals is normal), knowledge flow are usually constrained by hierarchy. Therefore, in hierarchical cultures, top managers' need for control over the information flow, and the desire to restrict access to critical information by lower-level employees, could lead to significant organisational barriers to knowledge sharing.

On the other hand, organisations in countries characterised by a small gap between the superior and the employees has a positive effect on the knowledge-sharing process (Ardichvili, 2008; Albawardy, 2010), which effect on innovation within organisation (Shane, 1992; Efrat, 2014). The low level of formal distance enables information and communications to flow in both directions (top-down and bottom-up) (Rivera-Vazquez et al.,

2009). Therefore, it may be expected that the bureaucratic nature of Libyan organisations can constrain knowledge sharing among individuals within an organisation as well as it inhibits creativity.

The second element - *uncertainty avoidance* Index (*UAI*) – indicates to the degree to which the members of society feel threatened by uncertain, ambiguous, or unknown situations and thus try to shun ambiguous situations by trying to provide greater ambiguity and predictability (Hofstede, 1980; Hofstede, 2001; Adler, 2008; Orr and Häuser, 2008). People in countries that scored high in uncertainty avoidance tend to minimise the possibility of such situations and have a need for structure in organisations, resulting in explicit rules of behaviour, either written or unwritten (Hofstede, 1991; Marcus and Krishnamurthi, 2009).

Countries with high uncertainty avoidance such as Arab countries, Germany, Japan, and Greece to mention but a few, place considerable concern on strict laws with severe penalties for offenders, a high degree of security, and great respect for experts (Badawy, 1980; Hofstede, 2001; Hofstede, 2009). For instance, Arab managers develop strict rules and regulations to support its authority and control (Hammoud, 2011). Workers also prefer detailed and clear rules and regulations so they as to know exactly what is expected from them. Greek managers are risk-averse and as a result are expected to stay longer in the same company in pursuit of job security. In Japan, employment contracts are usually permanent, which clearly reflects the need for greater security through lifetime jobs. On the other hand, people in countries that scored low in uncertainty avoidance such as Denmark and Singapore, job mobility occurs continually (Adler and Gundersen, 2008) and they prefer unstructured situations (Francesco and Gold, 2005; Hofstede, 2001). People from societies which are low in UA such as the USA, individuals have strong feelings of personal competency and entrepreneurial behaviour is common and highly valued (Francesco and Gold, 2005).

Considering the examples above, it may be expected that countries with high level of uncertainty avoidance clearly prevents the knowledge sharing process in terms of creativity, proactivity and attitudes towards innovation (Oltra, 2005). Organisations with low uncertainty avoidance there are fewer written rules and rituals. People tolerate ambiguous and unstructured circumstances. Therefore, a high uncertainty avoidance of organisations is also likely to constrain knowledge sharing, which effect on innovation (Efrat, 2014).

Hofstede's third dimension is *Masculinity versus Femininity (MAS)*, describes the distribution of roles between the genders, and to how much a society values the traditional man and woman roles (Hofstede, 2001; Hofstede, 2011). Masculinity is concerned with the extent to which the dominant values in society are 'masculine' that is, assertiveness, the acquisition of money and things, and not caring for others, the quality of life, or people (Hofsted, 1980; Hofstede and Hofstede, 2005; Orr and Häuser, 2008; Hofstede, 2011). In societies scoring high in masculine, the tough values such as success, wealth, assertiveness and competition are almost universally associated with men's roles (Hofstede, 2001; Francesco and Gold, 2005). For example, in Germany and Austria were they have a high score on the masculinity index, considerable value is placed on earnings, recognition, advancement and challenge (Hofstede, 1991; Hofstede, 2001; Francesco and Gold, 2005).

Femininity culture, the opposite of masculinity, stands for a society in which emotional gender roles overlap (Hofstede and Hofstede, 2005; Bredillet et al., 2010). Feminine cultures are more attracted to harmonious relationships with other people. Both genders are supposed to be modest, tender, link with the quality of life, show more empathy for others, spend time on relationships and personal ties, and maintain warm relationships (Hofstede, 2001; Francesco and Gold, 2005; Hofstede and Hofstede, 2005; Bredillet et al., 2010). For example, individuals in Finland which ranks high in femininity value cooperation, a friendly atmosphere, employment security, and group decision making (Francesco and Gold, 2005).

Both of these dimensions contrasts countries support self-concept, personal achievement, and self-prompting (Ali and Lee, 2010; Dotan and Zaphiris, 2010; Rosen et al., 2010) (masculinity) with those more broadly emphasising quality of life (femininity). On the one side, feminine cultures focus more on equality (egalitarianism), women may drive trucks or practice law and men may become preschool teachers, nurses or house husbands (Adler and Gundersen, 2008). Women are expected to work outside the home. For instance, the Scandinavian countries such as Sweden and parents are likely to take maternity or paternity leave at their discretion (Hampden-Turner, 1991). On other side, societies with a strong focus on career success such as, Japan and Austria do not expect women to have a career outside the home; women have to care for children (Adler and Gundersen, 2008). The USA emphasises career success more than quality of life, however as much as they encourage women to work, they offer them limited company support for maternity leave and childcare (Adler and Gundersen, 2008).

On the other hand, research done by Hofstede (2009) showed that Libya was rated slightly higher than average (Score, 52) in terms of masculinity side. Such analysis suggested that women in the Arab societies are somewhat limited in their social rights; this may be due more to the prevailing religious beliefs rather than the societal culture (Hofstede, 2009). The prevailing religious beliefs in Islamic countries include recognition of the man as the sole breadwinner of the family, a code of modesty that rests on the dignity and reputation of the woman that enforces restrictions on interactions between men and women (Tayeb, 1997; Metcalfe, 2007; Nagi, 2013).

From the masculinity and femininity dimension viewpoint, it is likely that the feminine environment of cooperation makes employees feel secure sharing their knowledge with other colleagues (Rivera-Vazquez et al., 2009). It shows an atmosphere of understanding, not one of aggression and self-accomplishment (Hauke, 2006). Therefore, Ford and Chan (2003)

suggested that a culture that is high in masculinity may have less knowledge sharing among individuals in the organisation of competitiveness is individually based which effect on innovation at workplace (Efrat, 2014).

The next dimension is *Individualism versus Collectivism (IDV)*. This dimension reflects the degree to which individuals in a society are integrated into primary groups. Individualism refers to the existence of loose knit social networks in which people focus primarily on taking care of themselves and their immediate families (Francesco and Gold, 2005; Adler and Gundersen, 2008). In many western countries most people are comfortable to live away from members of their family and to have non-emotional links with the organisations they work for (Dowling et al., 2008). According to Adler and Gundersen (2008), one of the attributes of an individualist culture is that of free-will and self-determination. For instance, in the USA and UK, which is an individualistic country, individuals believe that each person should determine his or her own beliefs and behaviour. This attribute is also reflected in the way American firms manage their employees. For example, American Multinational Corporations favour individual incentives alongside a relatively large pay differential between the top and bottom income earners (Francesco and Gold, 2005; Dowling et al., 2008).

Collectivism on the other hand, is characterised by closely knit social networks in which people strongly distinguish between their own groups, such as relatives, clans and organisations (Hofstede, 2001; Francesco and Gold, 2005; Adler, 2008). Collectivists hold common goals and objectives, consequently, individuals from collectivist cultures expect members of their in-groups to look after them protect them and provide security in exchange for loyalty to the group (Hofstede, 1980; Adler and Gundersen, 2008). For example, in a study conducted among Arab managers by Sidini (2006), showed that the most of the sample regarded employee loyalty as being more important than efficiency. The collectivist dimension of culture affects the extent to which individuals prefer team working and shared

responsibility as well as the extent to which they accept leadership and individual responsibility (Leat and El-Kot, 2007; Brewster et al., 2007). A similar view is that of Beardwell and Holden (1997), who noted that Arab people are less likely to divulge information officially in written forms, as they have a tendency to develop extensive informal networks for exchanging information verbally, face to face, or by telephone. High context people are also more adept in interpreting non-verbal aspects of communication, and seeing the significance of what is implicit or not said pauses, silence, tone, and other subtle communication signals, such view also supported by study of Mailed (2013).

Additional examples also indicate that whether a society is individualist or collectivist will have an influence on organisational activities including the way rewards are determined (Francesco and Gold, 2005). The use of individual rewards in a collectivist culture may be demotivating. For instance, Francesco and Gold (2005, p.134) observe that “Western models of motivation are culturally individualistic; applying them to a collectivist culture is perhaps unsuitable”. This notion is also supported by Mailed (2013). The Japanese saying “the nail that sticks out gets hammered down” means that no individual should stand out from the group and therefore giving an individual reward to a Japanese employee could embarrass the recipient and thus be demotivating.

According to Mailed (2013), Libyan management culture starts with the family as the basic building block whereas Western management culture starts with the individual. This aspect shows differences in the approaches to managing people founded on the individualist and collectivist dimensions of culture. In this respect, Ford and Chan (2003) mentioned that in individualistic cultures there is a possibility that it is more difficult to share knowledge, as individuals view knowledge as a source of power and a tool for success for oneself. In addition, they state that knowledge sharing is much easier in collective cultures, especially if the group sees a benefit from it. Also, previous studies indicated that high- IDV societies



have a less tendency towards innovation (Efrat, 2014). Therefore, Libyan culture sounds like fertile ground for social capital, knowledge sharing, collective learning at workplace and innovation, for example employees' interactions with each other through social network in terms of sharing knowledge and experiences within organisation.

In addition to the original four cultural dimensions, Hofstede (1990) proposed the fifth cultural dimension, called *long-term orientation (LTO) versus short-orientation or Confucian* (see Hofstede and Bond, 1988; Hofstede, 1991; Hofstede, 2001). This dimension was identified as result of the first global management survey involving Chinese managers and employees (Hofstede, 2011). Countries with a long-term orientation culture such as East Asian countries followed by Eastern- and Central Europe focus on the future and prescribe to the values of long-term commitments and great respect for tradition. The long-term orientation dimension explains the motivation of members of a culture to work towards long-term goals (Hofstede, 2001). Values connected with long-term orientation are thrift and perseverance.

Societies with short-term orientations, on the other hand, do not reinforce the concept of long-term and traditional orientation. Organisations with a short-term orientation such as Arab countries focus on the past and on quick results (Hofstede, 2001; Hofstede, 2009). Values associated with short-term orientation include “fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations” and protecting one's 'face'. Reciprocation of presents and favours are valued more (Ford and Chan, 2003: p. 14). Since knowledge sharing is a process with a high payoff in the long term, it can be said that a long-term oriented culture is more willing to practise knowledge sharing (Ford and Chan, 2003; Peretz and Rosenblatt, 2006). Therefore, a short-term organisational can constrain knowledge sharing in organisations.

The sixth and latest cultural dimension proposed by Hofstede, called *indulgence versus restraint*, focuses on happiness and life control (Hofstede et al., 2008), based on the work of Minkov (2007), who studied the World values across 93 countries. This dimension is connected with a person's happiness, sense of freedom, and availability of leisure time. Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun, specially leisure, spending, consumption, and merry-making with friends. Furthermore, indulgence culture maintains a more relaxed atmosphere and deviance is more easily tolerated. In contrast, restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms, and where people are less able to enjoy their lives. The restraint societies maintain rigid codes of beliefs and behaviours, promising certainty and protecting conformity. However, a number of studies (e.g., Straub et al., 2001; Loch et al., 2003; Akour et al., 2006; Hofstede, 2009; Hofstede, 2011) concluded that, the Arab societies have a strong restraint culture compare with Western Europe countries. A strong restraint culture is also likely to influence the way of knowledge sharing within organisation.

Undeniably, there is evidence to show that national culture influence organisational behaviour and managerial practice (Al-Faleh, 1987; Ali, 1995; Al-Amaj, 2001; Metcalfe, 2007; Budhwar and Mellahi, 2007; Hansen and Lee, 2009; Zhang and Albrecht, 2010; Hammoud, 2011; Pruetipibultham, 2012). Although there were some differences among researchers in terms of interpreting the motives and the drives behind the Arab culture, they provide a common and clear picture of cultural features and their influence on managerial practices. Based on this evidence in the literature, it remains to be seen in this project how culture may impact on social capital, knowledge sharing and innovation within Libyan oil sectors.

## **4.5 Technological Environment**

Apart from Libyan environment factors, there are also other factor that might impact on organisational behaviour and managerial practice which is the technological dimension. It is widely acknowledged that the rapid advancement of technology has affected the economies of different countries particularly in developing world (Grosse and Kujawa, 1992; Virmani and Rao, 1997; Bennett, 1999; Hill, 2005; Triki, 2010). In this context, Lengnick-Hall and Lengnick-Hall (1988) pointed out that the rapid growth of technology has led to an economy where competitive advantage is increasingly based on the successful application of knowledge. Knowledge, with its intangible aspects, is becoming a defining characteristic of economic activities, as opposed to tangibles such as goods, services or production processes. The rise of the knowledge economy has seen a proliferation of information and communication technologies, coupled with greater organisational complexity, the growth of virtual and global organisations and rapid change. This in turn requires drastic change within HRM to respond to changing demands of the knowledge economy (Bontis, 2004; Kridan and Goulding, 2006; Sherif, 2010).

Developing countries still have a long way to go, despite rapid technological progress, in some of them, however technology does not spread quickly within all countries (World Bank Report, 2008). Internet markets in the Arab countries are in the developing stages (UNDP, 2013). They have yet to experience the substantial subscriber increases that Western Europe encountered when their internet service providers launched subscription-free services in 1998 (Afrough and Eibisch, 2004; Internet World Stats, 2004). This is to some degree due to the relative lack of adequate infrastructures in the region and low levels of competition (Bruno et al., 2004). These factors are largely influenced by negative attitudes towards the internet on the part of regional governments. Because the Arab governments dictate the rate and type of

economic progress in their countries, the benefits of the internet being recognised across the entire region are substantial.

The internet services in Libya are in the developing stages (UNDP, 2013). In terms of global ranking for technology adoption, the figures in table (4.3) show that Libya is ranked as fifth among Arabic countries, and 64<sup>th</sup> all over the world (UNDP, 2013). This indicates a change in the country's development of the internet and its technology infrastructure, which would influence in the economic development. For information and communication technology to be widely used and accepted in a society good telecommunication systems are essential, because without them the economic development would not occur or be effective (Twati and Gammack, 2006; Fujimoto et al., 2007; Elgobbi, 2008; Zoubi, 2011).

**Table 4.3: Information and Communication Technology**

Global Ranking of Technology Adoption	Research and Development			Innovation			Technology Adoption			
	Expenditure	Researchers	Graduates in science and engineering	Patents granted to residents and non-residents	Royalty and licence fees receipts	Electrification rate	Personal computers	Internet users	Fixed broadband internet subscriptions	Fixed and Mobile Telephone subscriptions
	% of GDP	Per million people	(%total)	Per million people	(\$ per capita)	(% of population)			(per 100 people)	
Years	2005-2010	2002-2010	2002-2011	2005-2010	2005-2011	2009	2002-2009	2010	2010	2010
36 Qatar	-	-	24.0	-	-	98.7	16.0	81.6	8.2	149.4
41 UAE	-	-	27.3	-	-	100.0	30.0	78.0	10.5	165.1
54 Kuwait	0.1	151.9	-	-	-	100.0	26.5	38.3	1.7	181.5
57 KSA	0.1	-	35.8	7.1	-	99.0	65.7	41.0	5.5	203.0
64 Libya	-	-	-	-	-	99.8	2.3	14.0	1.1	190.8
84 Oman	-	-	38.9	-	-	98.0	18.0	62.0	1.6	175.6
93 Algeria	0.1	170.1	28.0	6.3	0.1	99.3	1.1	12.5	2.5	100.7
94 Tunisia	1.1	1.862.5	-	-	2.4	99.5	9.7	36.6	4.6	117.6
112 Egypt	0.2	420.4	-	4.0	1.6	99.6	4.1	26.7	1.8	99.0

Source: Extract from UNDP (2013, p.186).

Undoubtedly, statistics above showed that technology in Libya is widely accepted, and the use rate of internet is modest among Libyan people, despite infrastructure being available (UNDP, 2013). However, Bontis (2004) argued that rapid technological advances in computational power and communication technologies have the power to transform the

nature of knowledge, skills, talents and the know-how of individuals in the workplace (Bontis, 2004; Elgobbi, 2008; Mohamed et al., 2012). In this vein, there are grounds for a study that looks into implementing social capital, knowledge sharing and innovation. If Libya has to develop competencies among its people which will increase product and process innovation within organisation through social capital and knowledge sharing, there is need to increase adoption and/or use of technology (Mohamed et al., 2012). The global information marketplace requires a different kind of worker, with competencies, attitudes, and the intellectual agility conducive to systemic and critical thinking within a technologically-oriented environment (Bontis, 2004; Mohamed et al., 2012).

#### **4.6 Conclusion**

This chapter has presented PEST analysis of Libyan context that has influenced its present managerial thinking and adoption of managerial practices. The chapter has reviewed political, economic, sociological and technological factors, that are most likely to impede upon the development of management, and hence the improvement of social capital, knowledge sharing and product and process innovation in Libyan organisations. With regard to the historical and political background of Libya, it was noticed that political instability, foreign rule and hereditary systems. Arguably, this environment is likely to have a significant impact on economic growth and subsequently, organisational behaviour and managerial practice and in particular social capital, knowledge sharing and innovation within organisation. As for economic part, the chapter has reviewed the development process of Libyan economy and its strategy and the initiatives it has adopted to reform the Libyan economy and oil companies. It was noticed that the country is heavily relying on the oil sectors and it has been also noted that the oil revenues have made a major contribution in other sectors such education, agriculture health services. Today, the oil sector in developing countries is facing challenges

from a dynamic environment characterised by rapid technological change and increased demand. The development of innovative products and process has become critical factor for achieving and retaining competitiveness in global markets. Indeed, innovation is essential for firms seeking to find their place in the market and ensuring long-term survival. In recent years, there has been widespread acceptance among scholars and practitioners that “innovation is power” for firms and other organisations. In the literature social capital and Knowledge sharing considered essential for long-term success of the firm involves the related concepts of innovation.

With regard to Libyan culture, it was noticed that national culture influence organisational behaviour and managerial practice. Although there were some differences among researchers in terms of interpreting the motives and the drives behind the Arab culture, they provide a common and clear picture of cultural features and their influence on managerial practices and organisational behaviour hence social capital, knowledge sharing and innovation within Libyan oil sector being no exception. From technology prospective, it was noticed that technology in Libya is widely reasonable, and the use rate of internet is modest among Libyan people, despite infrastructure being available. However, it is argued that rapid technological advances in computational power and communication technologies have the power to share the nature of knowledge, skills, talents and the know-how of individuals in the workplace which turn to increase innovation. In this vein, there are grounds for a study that looks into social capital, knowledge sharing and innovation. Having reviewed the literatures on innovation, both knowledge sharing and social capital, organisational context (OC, OS and IT), the conceptual framework and research context through chapters two, three and four, the following chapter considers the methodology and methods adopted in order to test and answer the proposed hypotheses and research questions.

## **CHAPTER FIVE: RESEARCH METHODOLOGY AND METHODS**

### **5.0. Introduction**

Research methodology serves to explain the explicit and implicit assumptions adopted by the researcher during the entire research process. The methodology serves as the foundation upon which the entire research is built. In order to choose the appropriate methodology and methods for conducting research, the research needs to be positioned within an appropriate research paradigm and a methodology that is compatible with the research paradigm selected (Creswell, 2003). The chosen research methodology then identifies, to a large extent, the research methods for data collection and data analysis (Creswell, 2003; Denzin and Lincoln, 2000). As observed by Howell (2013, p.1),

*“methodology impact on methods and have considerable influence on what knowledge is considered to be and the consequent outcomes of the investigation”*

This chapter therefore explores the philosophical assumptions, the paradigm of inquiry, the research methodology, the research design and the strategy of inquiry adopted in this study. It also discusses and justifies the methods employed in this study, the data collection procedure, the research ethics and the instruments used to measure the variables included in the research model. Research methods refer to the set of methods and techniques available to the researcher to conduct a research (Kothari, 2004). This can include instruments such as questionnaires and interviews (Bryman, 2012). Finally, a summary of the chapter is given.

### **5.1 Research Philosophy**

According to Saunders et al. (2012) research philosophy relates to the development of knowledge and the nature of that knowledge. This makes important assumptions regarding the way in which investigators perceived the world. These assumptions help us to determine

which methodology to adopt and in turn, determine the methods of collecting data (Johnson and Clark, 2006). Saunders et al. (2009, p.108) argued that:

*“the important issue is not so much whether our research should be philosophically informed, but it is how well we are able to reflect upon our philosophical choices and defend them in relation to the alternatives we could have adopted”.*

Particularly in the social sciences, there are different types of research philosophy including: positivism and phenomenology (Easterby-Smith et al., 1991). A phenomenological philosophy argues that reality is not external to the researcher; it is social constructed and shaped by people and thus subjective (Hussey and Hussey, 1997; Zikmund et al., 2012). According to this approach, the researcher should focus on constructions and perceptions hold by people from their experiences rather than on facts and measures (Easterby-Smith et al., 1991; Gray, 2009). This philosophy was introduced by Edmond Husserl who posited that people discover realities and develop understanding only through experiences and therefore their knowledge of the world depends on their interpretations (Miller and Brewer, 2003).

In contrast, positivism presumes that reality is external to humanity and therefore investigating it requires objective methods which are not influenced by sensations, perceptions or intuitions (Easterby-Smith et al., 1991; Hussey and Hussey, 1997). Positivist philosophy originates from Auguste Comte (1853) when the philosopher declared that the reality is external and objective and that knowledge cannot be real unless it can be observable and hence based on real facts. Generally, a positivist philosophical assumption implies that the researcher and the subject are independent and objective. The findings are measurable, generalizable and result from causal effects deduced from hypothesis testing (Easterby-Smith et al., 1991). In other words, for the positivism, the truth is found in the researcher's passive registration of the facts that establish reality (Johnson and Duberley, 2000). Similarly, positivist philosophy posits that knowledge can only be achieved and justified through experience, observation and experiment (Gray, 2009). Hence, by applying such a philosophy



on social sciences, it is claimed that the causal theory of human behaviour can result in developing models, regularities and laws that can predict the human behaviour (Rosenberg, 2005).

The present research aims to investigate the role of organisational context (OC, OS and IT) in enhancing innovation (product and process). The researcher seeks to determine the indirect influences of using social capital and knowledge sharing. Furthermore, it intends to collect findings from both public and private sectors. In this regard, it was identified that a positivist philosophical position would allow the investigator to meet the questions of this research stated in section 2.3.10.

Indeed, in the management and business research studies, the positivism research philosophy is considered as the main philosophical view. Despite, business researchers do not consider their research as positivist, “a quick scan of the majority of management journals, particularly those from the US, provides clear examples of positivist assumptions” (Johnson and Duberley, 2000: 83). Therefore, based on the aforementioned grounds, the positivist approach is deemed suitable for the present research. In this respect, the following section explains the paradigm of inquiry adopted by the research within the positivist philosophy.

## **5.2. Research Paradigm of Inquiry**

The term paradigm is characterised in the classical thesis of Kuhn (1979) as the basic beliefs about what constitutes *reality*, counts as *knowledge and* guides action in inquiry or research (Patton, 1990; Guba and Lincoln, 1994; Crotty, 1998; Lincoln and Guba, 2000; Bettis and Gregson, 2001; Denzin and Lincoln, 2003; Guba and Lincoln, 2005). A paradigm provides the philosophical, theoretical and methodological platform in conducting research and interpreting the world. A paradigm can be conceptualised as a *hypothesis* or *theoretical structure* or a *framework of thought* that acts as a *template* or example to follow in terms of

how we see the world. It also determines our perspective, and shapes our understanding of how things are connected (Henning et al., 2004; Nwanji and Howell, 2004). A paradigm describes the worldview of the researcher, defines the way research is conducted and the techniques for conducting the research (Burrell and Morgan, 1979; Fossey et al., 2002).

Research paradigm is categorised into four philosophical assumptions, including: ontological; epistemological; methodological and axiological assumptions about human nature (Burrell and Morgan, 1979). To other researchers (Kalof et al., 2008; Saunders et al., 2009; Creswell, 2009), there are two main philosophical dimensions to distinguish existing research paradigms: ontology and epistemology. Burrell and Morgan (1979) suggest that each paradigm contains assumptions that can be represented as objectivist and subjectivist. Consequently, different research paradigms are discussed to enable a justification of the theoretical assumptions used for the study.

Ontology is concerned with the nature of social reality. It is defined as: *“the science or study of being’ and develops this description for the social sciences to encompass claims about what exists, what it looks like, what units make it up and how these units interact with each other”* (Blaikie, 1993:6). This implies that ontology describes the kind of things that exist, the conditions of their existence and the relationships between these things (Blaikie, 2000, 2007). The terms “objectivity” and “subjectivity,” generally relate to a perceiving subject (normally a person) and a perceived or unperceived object. As such, object is something that presumably exists independent of the subject’s perception of it. The objectivist approach to research originates from the natural sciences and assumes that the social world has existence independently of people and their actions and activities (Eriksson and Kovalainen, 2008).

The epistemological approach, on the other hand, is concerned with the theory (nature) of knowledge and asks the questions, ‘what is knowledge and what are the sources of

knowledge' (Eriksson and Kovalainen, 2008). In other words, epistemology describes how and what it is possible to know and the need to reflect on methods and standards through which reliable and verifiable knowledge is produced. To Blaikie (2000:8) epistemology refers to "the possible ways of gaining knowledge of social reality, whatever it is understood to be. In short, claims about how what is assumed to exist can be known". As far as Hatch and Cunliffe (2006) are concerned, epistemology refers to: "knowing how you can know" and expand this by asking how knowledge is generated, what criteria discriminate good knowledge from bad knowledge, and how reality should be represented or described.

Research paradigms have been broadly divided into several different forms depending on the researcher's philosophical thinking (Saunders et al., 2007). According to Patton (1990, p.37), there are two basic paradigms in conducting research: the logical-positivist and phenomenology. However, studies show that there have been extensions and additions to these two 'basic' paradigms: positivism and phenomenology, for social science research (Howell, 2013). Some researchers have classified research paradigms into three forms: positivist, interpretive, and critical theory (Carr and Kemmis, 1986, Saunders et al., 2007); and others into five which includes: positivism, post-positivism, critical theory, constructivism and participatory action research (Schwandt, 1994; Heron and Reason, 1997; Lincoln and Guba, 2000; Lincoln and Guba, 2005; Howell, 2013). These philosophies are based on basic ontological and (the related) epistemological positions, and use different methodologies. Broadly speaking, positivism and post-positivism are considered as the traditional paradigm of research and often known as the scientific methods. While, these approaches uses quantitative and experimental methods to test hypothetical-deductive generalisations, phenomenological inquiry, also called an interpretive or constructive paradigms (Hassard, 1993; Johnson and Onwuegbuzie, 2004; Creswell, 2007; Easterby-Smith et al., 2008) uses qualitative approaches to understand human experience in context-specific

settings inductively and holistically. In such a view, the focus is more on the relationships between patterns rather than between outcomes and causes (Howell, 2013).

For the purpose of this research, the post-positivist approach is adopted. This research paradigm holds a critical realism view and a modified dualist approach where the independence concept is dropped yet the objectivity remains (Guba and Lincoln, 1994). Howell (2013) argued that post-positivism challenged positivism in its claim of positive knowledge. The post-positivist paradigm assumes that outcomes are the consequence of antecedents. Such relationships are generally expressed through hypothesis and research questions (Creswell, 2009). Eriksson and Kovalainen (2008) stated that post-positivism considers that the researcher and the researched cannot be separated. Howell (2013) indicated that the positivist approach explains, predicts and generalises relationships between causes and effects. Johnson and Duberley (2000) reported that neo-positivism (post-positivism) argues that to understand human behaviour and attitudes in a business context, the researcher must consider the people's interpretations and perceptions of reality.

This research's ontological position was critical realism, which posits that the reality can only be understood imperfectly and probabilistically as the human factor impedes its full understanding (Guba and Lincoln, 1994; Howell, 2013). The study considers the impact of organisational context (OC, OS and IT) on innovation (product and process). This reality is seen to be external to the researcher and thus can be observable and objectively measured through the operationalization of innovation. However, it is also believed that this reality cannot be totally understood in a positive way as the study recognises the effect of the managers' perceptions, attitudes and views toward their firms' innovation. Such an effect comes from the use of Likert scales which are based on managers' perceptions and beliefs, hence justifying the critical realism ontology. As for the epistemological position, the belief is that the researcher and what is researched are not totally separate as the former had already

developed a pre-existing knowledge from the review of literature; however the objectivity of the investigation can still be pursued with the quantitative measurement of the study's variables. The findings of this research are replicable but can still be fallible as a result of a different context. In fact, this assumption justifies the use of two different organisation' settings (public and private sectors) to approach the role of organisational context (OC, OS and IT).

### **5.3 Research Approach**

It is essential to follow the research paradigm with an appropriate research approach. Understanding these approaches supports the choice of appropriate research methodology. Research approaches can be divided into deductive and inductive (Veal, 2005; Saunders et al., 2007, p.117). Though, both approaches involve interplay of logic and observation, they are different in some context. Howell (2013, p. 43) recognised:

*“the difficulty in giving precise definitions of induction and deduction and the point where the former begins and the latter ends (and vice versa) and acknowledges the grey area between the two”.*

The main point of difference between these two approaches is the relation of hypotheses to the study. In the deductive (testing a theory) approach, the researcher develops a theory or hypotheses and designs a research strategy to test the formulated theory. Popper (2002) argues that, if you insist on strict proof (or strict disproof) in the empirical sciences, you will never benefit from experience, and never learn from it how wrong you are. For the inductive approach, known as building a theory, the researcher starts with collecting data in an attempt to develop a theory (Saunders et al., 2007). Singh and Bajpai (2008, p.11) noted that:

*“Two important functions that hypotheses serve in scientific inquiry are the development of theory and the statement of parts of an existing theory in testable form”*

Deductive research approach has its application mostly in the natural sciences and positivism paradigm where research is carried out to explain causal relationships. The deductive approach begins with theories or hypotheses that deal with a particular phenomenon under study, gathers data from the real-world setting and then analyses the data statistically to support or reject the hypotheses (Veal, 1997; 2005; Blanche and Durrheim, 1999). In other words, deductive approach is concerned with deducting conclusions from premises or propositions. Deductive research approach starts with a known theory and leads to a new hypothesis, which is to be confirmed or rejected as a result of the research (Popper, 2002). Researchers who adopt deductive approach to research use theory to guide the design of the study and the interpretation of the results. This process utilizes a highly structured methodology' and collects data that 'can be measured quantitatively.

Inductive approach is in direct contrast to the logico-deductive method that focuses on confirming or refining priori theories. The inductive approach emerged as a result of the rigid methodological procedures of deductive approach (Saunders et al., 2003). Mertens (2005) contends that inductive research is flexible because there is no requirement of pre-determined theory to determine data and information. Social constructivism employs mainly an inductive reasoning approach. In inductive research, the researcher begins with specific observations, attempts to make sense of the situation, and then continues toward general patterns. This process requires understanding the multiple relationships among dimensions that emerge from the data. The researcher utilises observed data and facts to reach tentative hypothesis and define the theory as per the research problem. To this end, inductive research interrogates data to discover meaning. This approach favours the qualitative approach where a theory is developed or inferred from the analysis of the data collected. Saunders et al. (2003) noted that the inductive approach gives the chance to have more explanation of what is going on. In

inductive research, the theory should be allowed to emerge from the data without imposing pre-existing theories or expectations on the data.

As mentioned in section 3.1, the study considered the impact of organisational context (OC, OS and IT) on social capital and knowledge sharing. Following the RBV, this is argued to be the mechanism whereby organisational context increase the innovation (product and process). In fact, the study tests the applicability of RBV and KBV with regard to social capital and knowledge sharing. Therefore, the present research adopted a deductive approach. Based on the RBV and KBV theories, the study attempts to test the effect of organisational context (OC, OS and IT) in enhancing social capital and knowledge sharing in order to be innovation. The rationale behind this approach is to bring to the innovation literature some theoretical foundations, in this respect it was argued that the innovation literature was lacking from a strong theoretical basis. The literature review demonstrates that organisational context (OC, OS, IT), SC, KS and innovation are significant to organisations. The empirical studies have argued that organisational context (OC, OS, IT) is an enabler of SC (Shneiderman, 2007; Song-zheng and Xiao-di, 2008; van den Hooff and Huysman, 2009; Andrews, 2010), KS (Kim and Lee, 2005; 2006; van den Hooff and Huysman, 2009) and enhances innovation (Jaskyte and Dressler 2005; Liao 2007; Valencia, et al., 2010; Higón, 2011; Ollo-López and Aramendía-Muneta, 2012; Hogan and Coote, 2014), and SC is an enabler of KS (Chang and Chuang, 2011; Yu et al., 2013; Kim et al., 2013; Hu and Randel, 2014), and SC antecedent to innovation (Wu et al., 2008; Zheng, 2010; Laursen et al., 2012; Mura et al., 2013; Elstouhi et al., 2015). In addition, KS is an antecedent to innovation (Andreeva and Kianto, 2011; Porzse et al., 2012; Ferraresi et al., 2012). In general, however, it was found that most of the reviewed studies did not have a clear theoretical foundation or framework about the causal links between the above variables. It has not yet been developed.

## **5.4 Research Methodology**

The chosen methodology is informed by a clear understanding of the research paradigm adopted for the study (Lincoln and Guba, 2000; Cresswell, 2003). There are several research methodologies which are products of different intellectual traditions in research. Saunders et al. (2007) outlines different choices of strategies for conducting research; experiment, survey, case-study, ethnography, and grounded theory. Though, these research strategies differ in their methodological frameworks, they seem to have similar methodological approaches to data collection.

The present research employed a survey methodology. Surveys allow for the gathering of large quantities of data from a population in an economically efficient way (Saunders et al., 2003). They further argue that this method has the advantage of allowing the analysis of data for easy comparison between the respondents. This approach is usually associated with the deductive approach (Saunders et al., 2009), and positivist philosophical positioning (Collis and Hussey, 2003). As noted by Bryman and Bell (2003), survey research constitutes a cross-sectional design in relation to which data are collected. In this strategy, data collection is predominantly by questionnaire or by structured interview on more than one case and at a single point in time. This allows the researcher to collect a body of quantitative data in connection with two or more variables and analyse quantitatively using descriptive and inferential statistics (Saunders et al., 2007) to produce models of the relationships. In this respect, the study investigated the effect of the organisational context (OC, OS and IT) on social capital and knowledge sharing which in turn affects the product and process innovation.

## **5.5 Research Design**

Research design is described as a plan of the research project to investigate and obtain answers to research questions (Cooper and Schindler, 2003). The research design helps to



clarify the boundaries of the study, which consists of defining the setting of the study, type of investigations to be used, the unit of analysis and further issues related to the research. Yin (2009) has the following to say a research design is aimed at building an understanding of the phenomenon under investigation is vital to the process of social science inquiry.

There are three research designs highlighted in the literature review namely; qualitative, quantitative, and mixed methods (Creswell, 2003; Bryman, 2008; Creswell, 2009; Creswell and Clark, 2011). According to the author the aforementioned approaches are complementary rather than contradictory as what is known as a quantitative study often means a study that is focusing more on the quantitative approach than on the qualitative one and vice versa. The review of the innovation literature has revealed that most empirical studies in both developed and developing countries used a quantitative approach through mail surveys including online ones (e.g., Mura, 2013; Hu and Randel, 2014). Similarly, in their review of social capital studies (e.g., van den Hooff and Huysman, 2009; Kim et al., 2013), organisational context studies (e.g., Kim and Lee, 2006; van den Hooff and Huysman, 2009), Similarly, in their review of Knowledge management and knowledge sharing studies in practically (e.g., Kim and Lee, 2006; Van den Hooff and Huysman, 2009; Kim et al., 2013). Van den Hooff and Huysman, (2009) noticed that quantitative methods were the most commonly used. Later, another review by Kim et al. (2013) confirmed the popularity of such methods within the Knowledge management and knowledge sharing empirical literature.

In accordance with the post-positivist paradigm approach of this study, the present study adopted a quantitative method research design. Broadly speaking, this approach was used to test the conceptual framework established in the research. This is associated with the post-positivism premise which allows the investigator to stand back, observe and measure the phenomenon under investigation yet by still taking into account the individual's perceptions and attitudes (through perception-based likert questions). In this respect, the post-positivist

approach maintains the premise of theory verification which in this case is the RBV and KBV. It is argued that the post-positivist paradigm is usually associated with the quantitative approach (Clark, 1998; Giddings and Grant, 2007). Researchers (e.g., Kothari, 2004; Johnson and Onwuegbuzie, 2004) explained that quantitative studies are generally used to test a theory by identifying the variables based on the previous studies, examining the research relationships and obtaining the findings and to compare them between two contexts or different groups or setting (public and private sectors), which are partly the aim of this research. Similarly, using a quantitative research design is the most appropriate approach that would provide generalisable findings across the two contexts (public and private) (Eriksson and Kovalainen, 2008).

## **5.6 The Use of Survey Method**

Scholars have identified several four primary research methods including postal questionnaires, internet questionnaires, telephone interviews and face-to-face interviews for collecting survey data in a positivist studies (Collis and Hussey, 2009). In this research, the researcher collected the survey data through internet questionnaires methods. The data of these questionnaires were analysed through the Partial Least Squares Structural Equation Modelling (PLS-SEM) technique to support or reject the relationships among variables proposed in the research. Several researchers recognised that the use of PLS-SEM has given more attention in business studies and particularly in studies examining cause-effects interactions among constructs and variables (Hult et al., 2009; Hair et al., 2011).

According to such researchers, A PLS-SEM technique adapted from previous works and more specifically, from 3- and 4-star business journals. It was noted that the PLS-SEM allows the investigator to be more flexible in terms of model specifications and is adequate for both

theory building and testing (Hair et al., 2011). Hohenthal (2006) also clarified that the use of SEM is appropriate to models including mediating variables.

The questionnaire survey examines the effects of organisational context including organisational culture, structure and information technology on product and process innovation through social capital and knowledge sharing. This allowed the researcher to first examine the direct relationship among organisational culture, structure and information technology on product and process innovation and hence answering the first research questions of the study. Further, it revealed the mediating effect of the organisational context (OC, OS and IT) on the product and process innovation through the social capital and knowledge sharing and hence answering the second and third questions. This answered the first three research questions of the study. Thirdly, identifying the differences between the public and private oil sectors in terms of the relationship between organisational context (OC, OS, IT) and both product and process innovation in Libyan's public and private oil sectors.

Based on purposes mentioned above, it is believed that the use of questionnaires is particularly relevant. According to Saunders et al. (2012) using this instrument provide useful data to expound the relationships between the investigated variables which appropriate with the main aim of this phase. The researcher can obtain comparable and standardised responses through using structured and self-administered questionnaires. Therefore, the differences in these responses could be attributed to meaningful variations rather than to differences in the way of asking the questions (also relevant to the post-positivist approach) (Bryman, 2012).

In addition, a questionnaires through mailed or telephone is consistent with the majority of empirical studies, hence confirming the suitability of such a method to the innovation literature (e.g Subramaniam and Youndt, 2005; Wu et al., 2008; Carmona-Lavado et al., 2010; Hu and Randel, 2014), knowledge sharing literature (Hass and Hansen, 2007; Willem, and

Buelens, 2007; van den Hooff and Huysman, 2009; Amayah, 2013; De Clercq et al., 2013) and both social capital and knowledge sharing literature (Chow and Chan, 2008; Kim et al., 2013; Mura et al., 2013).

## **5.7 Survey Population and Employees Selection**

Hair et al. (2007) stated that a sampling frame is a comprehensive list of the elements from which the sample is drawn. For a probability sample, the sampling frame is “a complete list of all the cases in the population from which your sample will be drawn” (Saunders et al., 2009). Researchers set up a sampling frame when it is unavailable. This list should be inclusive, correct, reliable and suitable for research and it should be as representative of the population as possible (Kotharia, 2004). The sampling frame in this study is a list of the public and private oil sectors registered in the National Oil Corporation (NOCs)<sup>2</sup> databases. The target population in this study comprises employees at these oil sectors (employees and managers). According to the annual report of NOCs (NOCs, 2016), there are 11 public oil sector and 23 private oil sector in Libya (See section 4.3).

It is necessary to determine an appropriate sample size before collecting and estimating the characteristics of a large population. Several researchers pointed out that sample size influenced by many factors that need to be taken into consideration namely: the availability of resources, accuracy, the confidence that is needed in the findings, time and likely categories for analysis (Bradley, 1999; Saunders et al., 2009; Sekaran and Bougie, 2011). Consequently, the decision regarding the sample size in this study was based on the factors mentioned above and on the selected statistical analysis method, Structural Equation Modelling (SEM). Like other statistical techniques, SEM requires an appropriate sample size in order to obtain reliable estimates (Hair et al., 2010), and not less than 200 is recommended

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<sup>2</sup> NOCs: Assume the responsibility of the oil sector operations

to be appropriate by different authors to guarantee robust SEM and to provide parameter estimates with any degree of confidence (Boomsma, 1985; Boomsma and Hoogland, 2001; Byrne, 2010; Gerbing and Anderson, 1993; Hair et al., 2010; Harris and Schaubroeck, 1990; Kline, 2005).

As mentioned in section (5.7), the populations for this country randomly selected from databases provided by the National Oil Corporation (NOCs). The criteria for selecting employees are as follows. Employees should come from different type organisation (public or private oil sectors). The organisations selected were from different sectors, this will allow the findings to be compared between both contexts and with previous studies (Amayah, 2013; Willem and Buelens, 2007). Hence, it would answer the call for investigating the effect of organisational context in different sectors made by researchers (e.g., Amayah, 2013). This technique resulted in a database of 9681 employees. The sample size was to be determined according to the Aaker and Day (1986) sample size equation, which is widely accepted by social science researchers, since it takes into account the degree of required confidence, the sample error, ratio of population characteristics available in the sample (50% in social sciences) and population size. According to Aaker and Day (1986), the sample size can be determined according to the following equation (El-Gohary, 2012; El-Gohary and Eid, 2013; Eid and El-Gohary, 2015):

$$S = Z \sqrt{\frac{p(1-p)}{n}} \sqrt{\frac{N-n}{N-1}}$$

Where:

Z = degree of required confidence (95%)

S = sample error (5%)

p = ratio of population characteristics available in the sample (50%)

N = population size

n = sample size

According to the equation above, a systematic random sampling method was used to produce a sample of 1500 employees. The questionnaires distribution and the response rate will be discussed in section 5.16.

## **5.8 Data Collection Procedure**

According to McDonald and Adam, (2003), avoiding the problems such as non-response and common method biases request the researcher to understand the characteristics of the different data collection methods. This section presents the methods of data collection appropriate to this study and explains the technique followed by the investigator for both questionnaires and personal interviews. However, it is worth noting that the pilot study was conducted before data gathering. This will be discussed in detail at a later point under section 7.15.

Self-completion techniques including mailed and online questionnaires were used in the survey of this study. This combination technique has been adopted in previous research (e.g., Hogan and Coote, 2014; Hu and Randel, 2014). It should be noted that the use of telephone survey was considered inappropriate method due to several disadvantages such as the risk that the respondent may terminate the conversation at any time, less credibility, the length of the questionnaire and the disadvantages of this delivery methods from which the risk of the interviewer bias (e.g., Jobber, 2001; Cooper and Schindler, 2003; Rea and Parker, 2012).

In this study the research adopted online survey. The use of online questionnaire has been deemed appropriate in Libya. It is important to recognise that posting a large number of questionnaires to Libya can be costly and time consuming because the researcher is based in the UK.

Several researchers (e.g., McDonald and Adam, 2003; Van Selm and Jankowsky, 2006; Rea and Parker, 2012) argued that internet surveys have a higher response speed compared with mailed ones and an economic advantage. It is stated that online surveys allow the researcher to avoid substantial costs which stem from the return of postal questionnaires both in terms of collation and data entry (McDonald and Adam, 2003). In this vein, Sills and Song (2002) stated that the internet has a significant advantage as a method for delivering surveys if the populations have easy access to internet, the cost, the ease and speed of delivering and collecting responses, the simplicity of data cleaning and analysis. Moreover, it is observed that using online surveys allow the researcher to follow up using reminder emails (Rea and Parker, 2012). Notwithstanding these advantages, there are also some disadvantages of internet surveys. According to Mann and Stewart (2000) such surveys uncover several issues such as the risk of losing sight of the respondents' characteristics and the lack of internet access in some organizations. With respect to data quality and missing items, scholars observed that no statistical differences among email surveys and postal (McDonald and Adams 2003).

According Rea and Parker (2012) and Hewson et al. (2003) there are two primary research methods of distributing online questionnaires including: The email surveys (sending via email-attached or included in the body) and the web based questionnaires (sending through a hyperlink to a web based survey). The email surveys are a relatively simple task of answering and returning the questionnaire. However, it can create issues related to the inconsistency of the responses' structure (Van Selm and Jankowsky, 2006).

Regarding to the web based questionnaires, researchers acknowledged that the web based questionnaires can be resolved the difficulties of the email surveys (Van Selm and Jankowsky, 2006). Indeed, scholars confirmed that web based surveys have several advantages namely: the possibility of including visual design presentations for the questions and time flexibility

for respondents, an easy point-and-click response system, benefitting from an electronic data transfer and collation and obtaining structured responses. Notwithstanding these advantages, there are also some disadvantages of web based surveys. According to Van Selm and Jankowsky (2006) this method has some issues associated to confidentiality. Therefore, it proposed that confidentiality can be assured to the respondents by informing them that their email addresses would not be associated with their survey responses and the survey data would only be treated at the aggregate level (Van Selm and Jankowsky, 2006).

In this research, the web based questionnaires was employed. The researcher has chosen an internet tool to distribute the surveys. Emails were sent including the hyperlink for the questionnaire. The body of the email represented as a covering letter (See Appendix C). Before sent email the researcher confirmed that: The survey contained a cover letter that clearly and briefly explained the purpose of the study, statement assuring full anonymity and confidentiality of respondents (Bryman, 2003; Saunders et al., 2012), the motivations and implications of the study (Bryman, 2003) and a target return date of two weeks is also confirmed (Rea and Parker, 2012). Moreover, Rea and Parker (2012) has proposed a two weeks reminders for the respondent in doing so later, after two weeks, a follow-up email was sent to the responses that did not reply (from the online sample). After four weeks, the researcher sent another reminder email to the non-respondents with a new covering letter stressing the importance and implications of the study (Rea and Parker, 2012).

## **5.9 Questionnaire Design and Measures**

Consistent with the positivistic approach of this study, closed or closed-ended questions with a proposed set of possible answers were adapted (Collis and Hussey, 2009). Bryman and Bell (2011) and Collis and Hussey (2009) indicated that this type of questions enable the researcher to obtain comparable data and considerably facilitates the coding, tabulation and



interpretation of data. A Likert scale was used to measure the responses. According to Madu (2003) Likert scale consists of a scaling procedure which allows the respondents to express their views and opinions on a scale ranging from low and negative answers to high and positive ones.

Indeed, Scholars (e.g., McNabb, 2013; Monette, 2013), indicated that there are indeed considerable advantages of using Likert scale tool. Firstly, according to Collis and Hussey (2009) and Monette (2013), Likert scale consists of an ordinal level which allows the researcher to employ powerful statistical tools (such as the SEM). Secondly, this type of scale enables the researcher to evaluate the responses' strength. Thirdly, Madu (2003) pointed out that Likert scale provides greater reliability than using the categorical system (Yes or No). Lastly, it was argued that Likert scale is easier and quicker for the respondent to answer and makes the researcher simple to construct (Ghuman, 2010).

In addition, several authors have shown that Likert scales can indeed be five, seven or ten-point's scales. Nonetheless, Madu (2003) argued that a marginal advantage in terms of reliability require using Likert scale with more than five points. In this respect, Dawes (2008: 75) conducted a study where 5-point, 7-point and 10-points were compared, the study of Dawes shows that "none of the three formats is less desirable from the perspective of obtaining data that will be used for regression analysis". Hence, five-point scale was used throughout the whole questionnaire in order to provides simplicity and consistency purposes.

## **5.10 Layout of Questionnaire**

As stated by Bryman (2008), introductory paragraph giving information about the research and assuring confidentiality is an important aspect in encouraging participants to complete a questionnaire. Accordingly, the survey contained a cover letter that briefly explained the purpose of the study, statement assuring confidentiality of respondents, and contact details in

case the participants should have any further inquiries. Besides the introduction, the questionnaire was consisted into four main sections and each section included sub sections as described below (See Table 5.1).

The first section of the questionnaire contained questions on the organisational context (OC, OS and IT); these questions allowed the researcher to measure the independent variable of the study which is the organisational context. This part was split up into the following three sub-sections: sub-section (A) is associated with organisational culture. This section comprised twelve closed questions. These questions relate to the respondents’ perceptions of their organisational culture . Section B is related to organisational structure. This section consists of ten closed questions. These questions relates to the respondents’ perceptions of their organisational structure. Section C is associated with information technology. This section contains six closed questions. These questions were developed to measure employee perceptions of the level of employees’ utilisation of IT application and the degree of perceived ease of IT application use.

**Table 5.1: The Questionnaire Structure**

Sections	Sub-sections	Variable(s) to be measured	Type of questions
1	A B, and C	Independent variable	Close-ended with 5-point Likert
2	D and E.	Mediating variables	Close-ended with 5-point Likert
3	F and G	Dependant variables	Close-ended with 5-point Likert
4	H	Demographic variables	Close-ended with multiple options

The second section of the questionnaire is concerned with the social capital and knowledge sharing. It was divided into four sub-sections namely D and E. Sub-section (D) comprised three dimensions; structural social capital, cognitive social capital and relational social capital.

Structural SC is “the degree of contact and accessibility of an employee with other colleagues”. It was measured using four closed questions. Relational SC, which is “the degree of employees’ willingness to be vulnerable to the actions of other colleagues”, was measured using a four closed questions, and cognitive SC, which is “the degree to which an employee has collective goals, missions, and visions with other colleagues”, was measured using three closed questions. Sub-section (E) is concerned with knowledge sharing. It included two dimensions knowledge donating and knowledge collecting. Eight close-ended questions with five-point Likert scales were used to allow the researcher to measure KC, which refers to the “collective beliefs or behavioural routines related to the spread of learning among colleagues”. KD was measured using an eight closed questions to assess “employees’ willingness to contribute knowledge, which includes working experience, ideas, skill, and contextual information, to colleagues”.

The third section of the questionnaire is concerning innovation. It contained questions on the product and process innovation; these questions allowed the researcher to measure the dependent variables of the study which are product and process innovation. It was divided to four sub-sections namely F and G. sub-section (F), is concerned with product innovation. it includes five close-ended questions with five-point Likert scales. Sub-section (G), is concerned with process innovation, it includes eight close-ended questions with five-point Likert scales. All the questions in this section allowed the researcher to measure what extent you agree with the following statements that can assess developing and implementing product and process innovation in your organisation.

Section four included only one section (H), and requested general information about the respondent demographics such as their gender, academic qualification and the type of organization. Most of the questions were close-ended with multiple options to choose from.

These demographics questions allow the research to provide information about the profile of the study sample.

With respect to the length of the questionnaire, it did not exceed 10 questions for each category of respondent over approximately five pages. According to Zikmund et al. (2012), the length of a mail questionnaire should not exceed six pages, if it does; an incentive would be then required to encourage the respondent to return the questionnaire. In this matter, incentives were proposed to the respondents from which a detailed report on the final findings of the study which could be of a great benefit for the Libyan public and private oil sectors' managers as it can act as guide for them on how to take the most from organisational context (OC, OS and IT), and how these can benefit their organisations. The final version of the questionnaire and the cover letter are available in Appendix A.

### **5.11 Translation of Questionnaire**

It is necessary for researchers, who apply their studies to a different language context, to translate the original questionnaire into the target language. In this scenario, Saunders et al. (2009) noted that translating the questionnaire into another language requires the researcher to be more carefully about grammar, syntax, and lexical, idiomatic, experiential and meaning. In this respect, it is extremely important to ensure that the questions have the same meaning to all respondents in both contexts (public and private oil sectors). Therefore, to ensure the questionnaire is translated in an appropriate way, researchers conducting international research often have their questionnaires back translated (Saunders et al., 2009). Saunders et al. (2009) defined back- translation as the process of translating the source questionnaire into the target questionnaire and then the final questionnaire was translated, also, into the original questionnaire by two different translators.

In this research, the questionnaire was sent by email to a translator in Libya to translate the English version into Arabic version, and then when this was completed, the new Arabic version was given to a native speaker translator in the UK to translate it back to English. Then, the researcher compared the two original questionnaires to create a final questionnaire.

## **5.12 Ethical Considerations**

Prior to the conduct of this study, it is important to take into account several ethical considerations (Boeij, 2010). Myers (2013) argued that ethical considerations are vital to protect both the investigator and participants. Research ethics is described as the adoption of a suitable behaviour in relation to the rights of the individuals or groups being studied or affected by the study Saunders et al. (2012). Others defined research ethics as the consideration of moral ethics and values in every step of a research study (McNabb, 2013). It is argued that when conducting research, research ethics allow the researcher to identify what is and is not permissible to do.

The literature review highlights that the researcher should follow four research ethics issues when conducting his/her research including: Thoroughness, truthfulness, relevance and objectivity. Thoroughness implies that researchers should be thorough in the research process and do not use shortcuts. Truthfulness on the other hand, implies that the investigator must not lie, deceive or use fraud. While relevance suggests the conducted research should be purposeful and relevant to the literature. Objectivity, whereas, means that investigators should not be biased and this is particularly important for positivistic studies (McNabb, 2013)

Furthermore, scholars identify additional ethical principles when publishing and communicating the research findings. For example researchers (e.g., McNabb, 2013; Kalof et al., 2008) indicated that protecting privacy, ensuring anonymity and respecting confidentiality of participants should be carefully considered in order to protect the right of

the participants. In this vein, the investigator guaranteed that the participants' identity could not be deciphered in the published findings in order to their protect privacy and ensure anonymity. Also, the researcher focuses on the participants' characteristics rather than their identity, when describing the sample of the study (McNabb, 2013). The researcher also removed all identifying information about the participants from research records and reports in order to respect the participants' confidentiality. The email invitations and the covering letter to reassure the participants were included all these ethical considerations. Furthermore, several researchers argued that it important to take into accounts informer consent when conducted the research (Kalof et al., 2008; Myers, 2013). Informer consent implies that the respondents should conduct the questionnaire voluntarily and the investigator should clearly explain the aim of the study, the risks and benefits of participation and what they are being asked to do. In this research, voluntary, and the purpose, risks and benefits of the survey participation were explained to all participants through the email invitations and questionnaires.

Overall, the aforementioned ethical aspects were all followed through providing a clear, explicit and precise covering letter highlighting all the aforementioned ethical aspects (See Appendix A). The ethical approval application is attached in Appendix B.

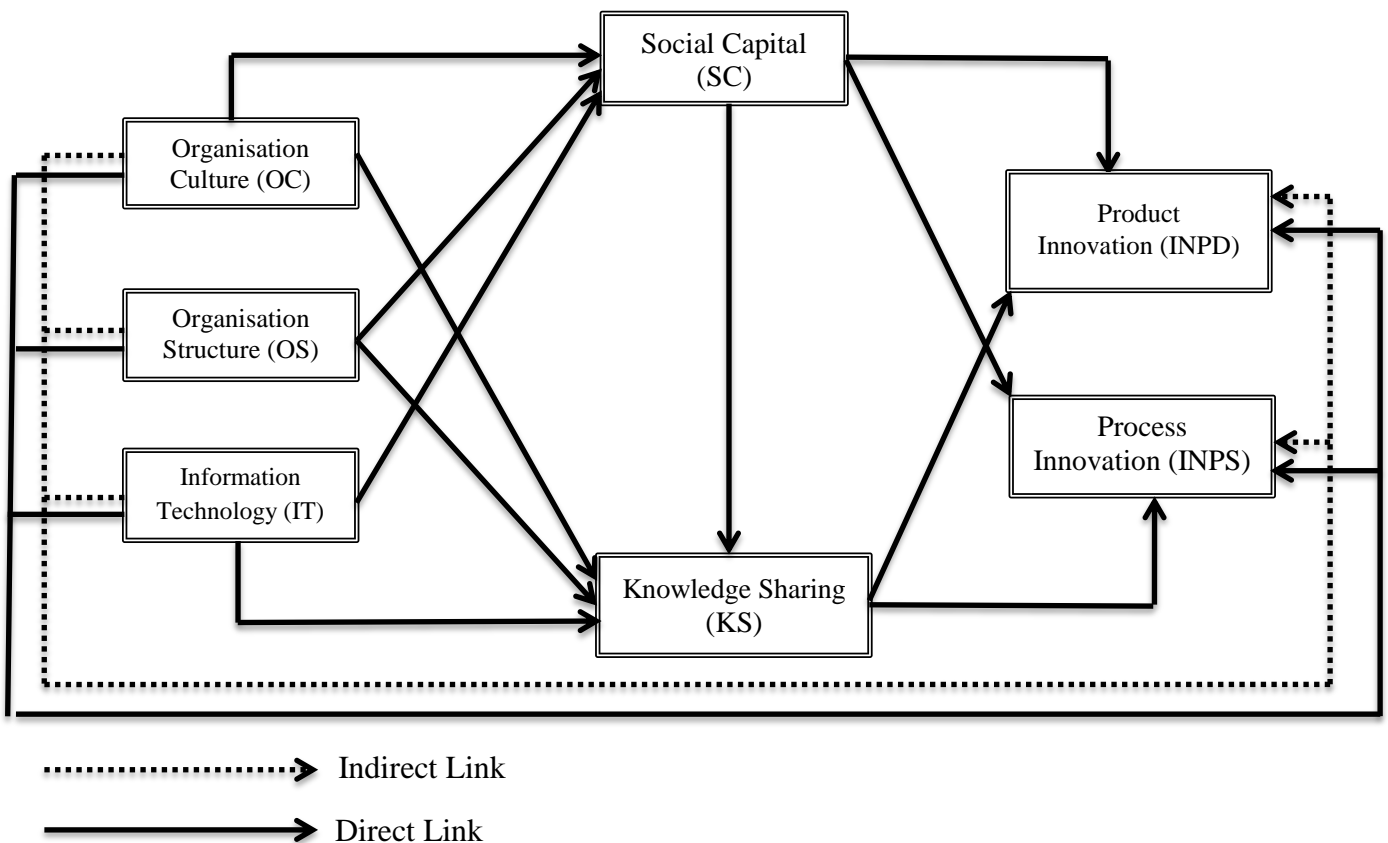
### **5.13 Measurement Variables**

Having clarified the research methods used in this study, this section considers the instruments chosen to measure the variables investigated in the present research. All these measurements have already been tested in a same context and published in highly ranked journals.

The aim of this study is to analyse the direct and indirect impact of organisational context (OC, OS and IT) on product and process innovation. This implies that the use of

organisational context would cause changes in the innovation through enhancing its social capital and knowledge sharing. Hence, the independent variable for this research is the organisational context (OC, OS and IT) as it is the variable causing changes, and the dependant variables are the product and process innovation as these are the variables affected by the organisational context (OC, OS and IT). With respect to the social capital and knowledge sharing, the latter are the variables through which the effect is explained and thus these are the mediating variables (Saunders et al., 2012). Figure 5.1 recalls the theoretical model proposed in this research (a combination of the proposed models in section 3.1).

**Figure 5.1: Theoretical Models for Public and Private Oil Sectors**



The following discusses the items selected to measure the aforementioned variables.

### 5.13.1 The Independent Variables

As highlighted and justified above and from Figure 5.1, the organisational context including organisational culture, structure and information technology are the independent variables. The respondents were asked to assess their perceptions about the statements regarding organisational context (OC, OS and IT), on a five-point Likert-type scale ranging from 1= strongly disagree to 5= strongly agree. This scale approximates an interval scale that is commonly used to assess psychometric attributes in social research (Saunders et al., 2009).

#### 5.13.1.1 Organisational Culture

Organisational culture is described as the shared values, rules and assumptions which guide employees' behaviour in an organisation (Braunscheidel et al., 2010). The original instrument of Gold et al. (2001) comprised of 12 items which have been proved valid and reliable. This scale was later used by other studies such as (Kim and Lee, 2006; Hooff and Huysman, 2009). These scales was chosen because they have received the most support from knowledge sharing, social capital and innovation studies and been subjected to the greatest empirical scrutiny. The items within each variable are listed in Table (5.2).

**Table 5.2: Items for “Organisational Culture” Variable**

Organisation Culture (OC) Items	Author/s
The management of our organisation expects everyone to actively contribute to the registration and transmission of knowledge.	Gold et al. (2001) and van den Hooff and Huysman (2009)
Employees are encouraged to innovate, to investigate and to experiment.	Gold et al. (2001) and van den Hooff and Huysman, (2009)
On-the-job training and learning are highly appreciated in this organization.	Gold et al (2001); van den Hooff and Huysman, (2009)
In this organisation employees are encouraged to ask others for help whenever necessary.	Gold et al. (2001) and van den Hooff and Huysman (2009)
Interaction between different departments is encouraged in this organization.	Gold et al. (2001) and van den Hooff and Huysman (2009)
Employees are encouraged to discuss their work with people in other workgroups	Gold et al. (2001)
The vision of this organisation is clearly communicated to the employees.	Cook et al. (1980); Gold et al. (2001); Kim and Lee (2006)



	and van den Hooff and Huysman, (2009)
Overall, organisational goals are clearly stated in this organization.	Cook et al. (1980); Gold et al. (2001); Kim and Lee (2006) and van den Hooff and Huysman (2009)
I can explain my organisation’s vision and goals to others	Cook et al. (1980); Gold et al. (2001); Kim and Lee (2006) and van den Hooff and Huysman (2009)
The management of this organisation stresses the importance of knowledge to the success of the organization.	Gold et al. (2001); van den Hooff and Huysman (2009)
Employees understand the importance of knowledge to organization’ success	Gold et al. (2001)
Employees are valued for their individual expertise	Gold et al. (2001)

### 5.13.1.2 Organisational Structure

Organisational structure is defined as the way responsibility and power are allocated, and work procedures are carried out among organisational members (Nahm et al., 2003; Hao et al., 2012). The original instrument emanates from Gold et al. (2001). This scale comprised of 10 items which have been proved valid and reliable. This scale was later used by other studies such as (van den Hooff and Huysman, 2009). These scales is very relevant to this particular study because they have received the most support from knowledge sharing, social capital and innovation researchers and been subjected to the greatest empirical scrutiny. The items within each variable are listed in Table (5.3).

**Table 5.3: Items for “Organisational Structure” Variable**

Organisation Structure (OS) Items	Author/s
The structure of our organisation impedes interaction and knowledge sharing.	Gold et al. (2001) and van den Hooff and Huysman (2009)
The structure of our organisation promotes collective behaviour over individual behaviour.	
The structure of our organisation facilitates the development of new ideas/ processes/products	
This organisation uses a standardised reward system for knowledge sharing.	
The employees in this organisation are approachable.	
Designs processes to facilitate knowledge exchange across functional boundaries.	
The structure of our organisation facilitates the flow of new	

knowledge across structural boundaries.	
The structure of our organisation facilitates the discovery of new knowledge.	
Bases our performance on knowledge creation	
Encourages employees to go where they need for knowledge regardless of structure.	

### 5.13.1.3 Information Technology

Information technology refers to the internet based network systems, groupware systems, intranets, databases, electronic data-management systems, and knowledge-management information systems. The original instrument comes from Van den Hooff and Huysman (2009). This scale consisted of 6 items which have been assessed valid and reliable. The researcher adopted this scale because they have received the most support from knowledge sharing, social capital and innovation studies and been subjected to the greatest empirical scrutiny. The items within each variable are listed in Table (5.4).

**Table 5.4: Items for “Information Technology” Variable**

Information Technology (IT) Items	Author/s
The information technology facilities within this organisation provide a positive contribution to my productivity and effectiveness.	Van den Hooff and Huysman (2009)
Our information technology facilities make it easier to cooperate with others within our organisation.	
The information technology facilities within this organisation provide a positive contribution to the development of my knowledge.	
The information technology facilities within this organisation provide important support for knowledge sharing.	
Information technology makes it is easier for me to get in contact with employees who have knowledge that is important to me.	
Information technology makes it is easier for me to have knowledge that is relevant to me at my disposal.	

### 5.13.2 The Dependant Variables

As highlighted above and from figure 5.1, it can be seen that changes in product and process are caused indirectly by the organisational context (OC, OS, and IT) and directly by social capital and knowledge sharing; hence, product and process innovation are dependant variables (Saunders et al., 2012).

Reviewing the literature has revealed that innovation, reflecting the acceptance or development of new ideas concerned with product and process. The measurement of innovation was developed from work done in previous studies and modified so as to be suitable for Libyan context. Five items measure product innovation, referring to the degree to which members of staff accept, develop, and implement new products such as research projects. A further eight items measure process innovation, reflecting the use of new approaches in service and delivery through the development and use of new technology, and the implementing of incentives and reward systems for members of staff. These scales was chosen because they have received the most support from innovation researchers and been subjected to the greatest empirical scrutiny (Obendhain and Johnson, 2004, Liao et al., 2007, Jaskyte, 2004, Liao and Wu, 2010). The items within each variable are listed in Table (5.5).

**Table 5.5: Items for “Product and Process Innovation” Variables**

Innovation Items	Author/s
<b><i>Product Innovation</i></b>	
Our organisation is always delivering new courses for employees	Perri 6 (1993)
Our organisation constantly emphasises development and doing research projects	Perri 6 (1993)
Our organisation often develops production manuals and methodologies	Daft (1978)
Our organisation often develops new programmes/services for employees	Perri 6 (1993); Skerlavaja et al.( 2010)
Our organisation is extending its programmes/services to new groups of employees not previously served by the organization	Perri 6 (1993); Booz and Hamilton (1980); Darroch (2005)
<b><i>Process Innovation</i></b>	
Our organisation is developing new training programmes for employees	Perri 6 (1993); Skerlavaja et al. (2010)
Our organisation encourages teamwork and relationships between employees	Perri 6 (1993)
Our organisation implements an incentive system (i.e. higher salaries, bonuses,--) to encourage employees to come up with innovative ideas.	Perri 6 (1993); Skerlavaja et al. (2010); Jaskyte (2011)
Our organisation often develops new technologies (internet,	Daft (1978)

databases,--) to improve the production process.	
Our organisation often uses new technologies to improve the production process.	Skerlavaja et al. (2010)
New multimedia software is implemented by this Organisation for production purposes and administrative operations.	Daft (1978)
This organisation implements a reward system (i.e. promotions, thank yous,--) for employees to encourage them to come up with innovative ideas.	Perri 6 (1993); Skerlavaja et al. (2010); Liao et al. (2007)
Our organisation is trying to bring in new equipment (i.e. computers) to facilitate work procedures.	McGrath (2001); Ibarra (1993)

### 5.13.3 The Mediating Variables

This research explores the indirect impact of the organisational context (OC, OS and IT) on product and process innovation. Based on the extended knowledge Based-View and Resources Based-View theories, the present research looks at the mediating roles of the social capital and knowledge sharing. Hence, these variables constitute the mediating variables.

#### 5.13.3.1 Social Capital

The literature indicated that social capital can significantly determine the product and process innovation. Social capital refers to close interpersonal relationships among organisational members (Kim et al., 2013). In this study, the following social capital includes three dominations namely: the structural, relational and cognitive social capital.

With respect to Structural SC, it is reflecting the degree of contact and accessibility of an employee with other colleagues. It was measured using four items adapted from Chow and Chan (2008) and Nahapiet and Ghoshal (1998). Relational SC, which is “the degree of employees’ willingness to be vulnerable to the actions of other colleagues”, was measured using a four-item scale derived from Chow and Chan (2008) and Nahapiet and Ghoshal (1998). Cognitive SC, which is “the degree to which an employee has collective goals, missions, and visions with other colleagues”, was measured using three items adopted from Chow and Chan (2008). The proposed items were measured on a five-point Likert scale

ranging from 1= strongly disagree to 5= strongly agree. These items were also modified so as to be suitable for Libyan context. This scale was chosen for this study because they have received the most support from innovation (Subramaniam and Youndt, 2005; Chen and Chang, 2006; Marqués et al., 2006; Wu et al., 2008; Elsetouhi et al., 2015), and knowledge sharing researchers (Kim et al., 2013) and been subjected to the greatest empirical scrutiny (Kim et al., 2013). The Cronbach’s alpha coefficient for structural, relational and cognitive constructs (0.892, 0.914 and 0.881 respectively). Hence, the total number of questions measuring SC in this study was 11 items, 4 items for structural SC, 4 for relational SC and 3 items for cognitive SC. Table (5.6) presents the items used.

**Table 5.6: Items for “Social Capital” Variable**

Social Capital (SC) Items	Author/s
<b><i>Structural Social Capital</i></b>	
In general, I have a very good relationship with my colleagues.	Nahapiet and Ghoshal (1998); Chow and Chan (2008) and Kim et al. (2013).
My colleagues know what knowledge I have at my disposal.	
I know what knowledge could be relevant to which colleague.	
Within my department, I know who has knowledge that is relevant to me at their disposal.	
<b><i>Relational Social Capital</i></b>	
I feel connected to my colleagues.	Nahapiet and Ghoshal (1998); Chow and Chan (2008) and Kim et al. (2013).
I know my colleagues will always try and help me out if I get into difficulties.	
I can trust my colleagues to lend me a hand if I need it.	
I can rely on my colleagues when I need support in my work.	
<b><i>Cognitive Social Capital</i></b>	
My colleagues and I always agree on what is important at work.	Nahapiet and Ghoshal (1998); Chow and Chan (2008) and Kim et al. (2013).
My colleagues and I always share the same ambitions and vision at work.	
My colleagues and I are always enthusiastic about pursuing the collective goals and missions of the whole organisation.	

### 5.13.3.2 Knowledge Sharing

Based on the review of knowledge management literature undertaken in this study, the knowledge sharing process related to found to donating and collecting be crucial for organisation' innovation were: product and process. Knowledge sharing means in this research as the exchange of knowledge, experiences, and skills regarding managerial and technical issues among employees, through various methods such as donating and collecting of knowledge, a definition stems from previous studies. Knowledge donating describes the motivation of employees to share on their own intellectual capital to others employees at workplace (giving). Knowledge collecting, in contrast, refers to asking others for advice in order to obtain intellectual capital (receiving). The employees were asked to assess their perceptions about the statements regarding knowledge sharing practice on a five-point scale ranging from "strongly disagree" to "strongly agree". The original instrument of Hooff and Weenen (2004) comprised of 12 items which have been proved valid and reliable. The coefficient of Cronbach's alpha in his work estimates for the donating and collecting of knowledge items were 0.83 and 0.90, respectively. This scale was later replicated by other studies such as (Lin, 2007; Liao et al., 2007; Behery, 2008; Van den Hoof and Huysman, 2009; Kamasak and Bulutlar, 2010; Tohidinia and Mosakhani, 2010; Alhady et al., 2011; Cheng, 2012; Abdallah et al., 2012; Kim et al., 2013; Tong et al., 2013). Four other items were developed from existing studies (Mogotsi, 2009; Carmeli et al., 2011) and additional modifications were developed to be suitable to the context of the study. The Cronbach's alpha coefficient for these was 0.88. Hence, the total number of questions measuring KS in the present study was 16 items, 8 for each dimension. Table 5.7 illustrates the proposed items.

**Table 5.7: Items for "Knowledge Sharing" Variable**

Knowledge sharing (KS) Items	Author/s
<i>Knowledge Donating</i>	
Knowledge sharing with colleagues is considered	Hooff et al. (2003); Hooff and

normal outside of my department.	Weenen (2004); Hooff and Ridder (2004); De Vries et al. (2006)
Knowledge sharing between colleagues is considered normal in my department.	
When I have learned something new, I tell colleagues outside of my department about it.	
When my colleagues within my department have learned something new, they tell me about it.	
I share knowledge about managerial and technical profession with my colleagues in the company.	
I share knowledge about managerial and technical issues with my colleagues in the company.	
When I have learned something new regarding managerial and technical profession, I tell my colleagues in my department about it.	Mogotsi (2009); Carmeli et al. (2011)
When colleagues outside of my department have learned something new, they tell me about it.	
<b><i>Knowledge Collecting</i></b>	
I share knowledge I have with colleagues within my department when they ask for it.	Hooff et al. (2003); Hooff and Weenen (2004); Hooff and Ridder (2004); De Vries et al. (2006)
Colleagues in my organisation share knowledge about managerial and technical skills with me.	
Colleagues within my department share knowledge with me, when I ask them about it.	
Colleagues within my department tell me what their skills are, when I ask them about it.	
I share my skills and know-how with colleagues outside of my department, when they ask me to.	
I share my skills and know-how with colleagues within my department, when they ask for it.	
I share knowledge I have with colleagues outside of my department, when they ask me to.	Mogotsi (2009); Carmeli et al. (2011)
Colleagues in my organisation share knowledge about managerial and technical issues with me.	

### 5.14 The Use of PLS –SEM

Structural equation modelling (SEM) is a collection of different statistical models that seeks to explain and test the relationships between one or more independent and dependent variables simultaneously (Byrne, 2010). SEM aims to test the causal relationships between different constructs with multiple measurement items and it has strong statistical procedures that can deal with complex models. When researchers attempt to explore such relationships, then SEM can be more appropriate.

In justifying the use of non-linear regression-based Partial Least Squares Structural Equation Modelling (PLS-SEM) utilising WarpPLS 5.0 (Kock, 2013) software, Scholars provide "Rules of Thumb for Selecting PLS-SEM". PLS can deal with studies investigate cause-effects interactions between constructs and variables (Hult et al., 2009; Hair et al., 2011). For estimating models with complex multivariable relationships including both observed and latent variables, PLS is again seen as the most viable choice. It is regarded as a suitable technique for estimation of a causal theoretical set of relationships linking latent and sometimes complex concepts often measured by observable indicators (Vinzi et al., 2010). Currently, The PLS-SEM technique has become increasingly popular in several disciplines across Business Studies. For example, Strategic Management, Information Systems, Organisational Behaviour, it is mentioned that more than 30 articles (as of 2008) using PLS were published in peer reviewed journals (Henseler et al., 2009).

Moreover, PLS has no need for a large sample size. Compare with covariance based techniques, researchers (e.g., Nijssen and Douglas, 2008; Henseler et al., 2009; Hair et al., 2014) agree that PLS can provide robust results and achieve higher statistical power when assessing research models with relatively small samples. This view supported by Reinartz et al. (2009) who argued that PLS provide more statistical power than other techniques at 100 observations. According to Hair et al. (2014) higher statistical power means that the PLS is more expected to explore the importance of a specific relationship when the latter is indeed significant in the population. Other researchers (e.g., Tenenhaus et al., 2005: 202) further suggested that there can be more variables than observations.

Furthermore, several researchers recognised that PLS has no need for normality distributed (Julien and Ramangalahy, 2003; Reinartz et al., 2009; Hair et al., 2012; Schmiedel et al., 2014). Indeed, when distributions are highly skewed, PLS can still provide correct estimations (Hair et al., 2012). In Peng and Lai's (2012) review and guidance notes of PLS,



they suggest that the researcher should consider using PLS-SEM, when the data distribution assumptions are violated.

With respect to the research focus criteria, it is acknowledged that PLS is most appropriate when (1) the objective of the study is to explain a target construct (Hair et al. 2014), when the aim of the research is of an explanatory nature (Henseler et al., 2009). Hair et al. (2011) illustrated that PLS-SEM is aimed at maximising the explained variance of the dependent latent constructs". Hair et al. (2011) further indicated that a concept and theory tests are between the main motivations for using SEM in business research. Additionally, It is also well acknowledged that estimate models with both reflective and formative indicators simultaneously can be achieved by PLS (Henseler et al., 2009; Peng and Lai, 2012) and researchers added that the robustness of results does not affect by model complexity (high number of constructs and indicators) (Henseler et al., 2009; Peng and Lai, 2012; Hair et al., 2014).

The present research attempts to explain the variances in firms' innovation (product and process) with regards to the organisational context (OC, OS, and IT) and social capital and knowledge sharing behaviour. Moreover, given the nature of the targeted population (oil sectors' employees and managers), the sample included in this investigation was relatively reasonable and the data non-normally distributed. Equally, given the nature of the issue investigated (product and process innovation) the study involves a large number of constructs including both reflective and formative variables. For all these reasons and based on the discussion above, it appears that the use of PLS-SEM to estimate the proposed conceptual model is the most appropriate statistical technique to use.

Several SEM-PLS software programmes exist, from which Smart PLS, PLS Graph and WarpPLS. In this study, the researcher used the WarpPLS 5.0. It is a MATLAB based

programme which conducts non-linear regression (Brewster, 2011; Kock, 2011). Unlike the Smart and Graph PLS programmes which only run linear regressions, the WarpPLS perform a warping at the path coefficient level using a distinctive robust path analysis technique. In a study comparing linear and non-linear regression programmes, Brewster (2011) acknowledged that non-linear programmes more effectively captures the reality when studying management and business issues. The author explained that very few management phenomena exist in a straight line cause and effect correlation. Hence, using a non-linear regression is more likely to spot relationships that could not be identified applying a linear regression.

### **5.15 Pilot Testing**

Before carrying out the main questionnaire of the study, it was considered necessary to conduct a pilot study (Sekaran and Bougie, 2011). Zikmund et al. (2012) defined the pilot study as a small-scale research that gathers data from a small sample drawn from the same population from which the final sample of the study is drawn. Scholar (e.g., Oppenheim, 2000; Kalof et al., 2008; Sekaran and Bougie 2011; McNabb, 2013) argued that a pilot testing assist to identify and eliminate potential problems related to the research questions and research instrument before deploying the questionnaire to the intended participants. While other researcher such as (Kothari, 2004), perceived pilot testing as a practice of the main questionnaire. Others, on the other hand, stated that the pilot testing helps to assess the validity of the instruments used to measure the variables, testing the validity ensures that the questionnaire can be administered without variability to the experimental group (Creswell, 2009).

### **5.15.1 Content Validity**

Content validity is “the extent to which a test represents the universe of items from which it is drawn and it is especially useful when evaluating the usefulness of tests that sample a particular area of knowledge” (Salkind, 2010). In this study, the face validity of the survey is established by two phases. In the first phase, the initial questionnaire was delivered or emailed to five lecturers/senior lectures / professors in Plymouth University’s management department. They had different specialisations such as human resource management; information technology; knowledge management (including my supervisors) and two oil managers. At the same time, it was checked by five doctorate students specialising in business management. The questionnaire was including sections at the bottom of each page asking for "Feedback" on: 1) the questions were clear and with no grammatical and spelling mistakes, 2) the questions had the meaning they intended to have, (3) the covering letter was explicit, brief and accurate and (4) the questionnaire was not exhaustive and 5) any other comments. The feedback gathered was compiled such as the questionnaire was found to be lengthy and exhaustive, some questions needed more precisions and some items were thought to be repetitive, the covering letter was found to be too long and containing redundant information. The feedback gathered was examined and ensured that the questions were appropriate for the respondents. This was done to confirm the clarity and validity of the questionnaire.

In the second phase, a revised version of the questionnaire was distributed to be completed by a small number of respondents selected among the population. Previous studies in the innovation, social capital and knowledge sharing literature have pre-tested their questionnaires with employees. The pre-tests were conducted with a number of employees ranging from 10 to 30. For instance, Kim and Lee (2006) pretested his questionnaire with 30 employees in public and private organisations. Huang et al. (2011) with 19 managers from

different organisations, Holste and Fields, (2009) with 15 responses. Hence, in light of these previous studies, the questionnaire was pretested with 15 participants from each context.

### **5.15.2 Construct Validity and Reliability**

Reliability is the characteristic of an inquiry which test whether scores are consistent and stable over time (Creswell and Plano-Clark, 2007), or in other words, if results are repeatable. Bryman and Cramer (2009) subsequently identify two forms on reliability external and internal. External reliability is the degree of consistency of the measure over time. Internal reliability on the other hand, questions whether the scales used are measuring a single idea (Bryman and Cramer, 2009). As for the validity, it addresses the extent to which items reflect the concept whereby these items are used to measure it (Cooper and Schindler, 2003; Collis and Hussey, 2009). Scholars suggested a number of statistical techniques which enable the researcher to assess the both the reliability and validity of the measures used in the research. These will be incorporated in detail into the analysis chapter. Nevertheless, at this phase of the study process, the researcher confirmed the validity of the measures and constructs through using instruments that have already been used in a same context and published in highly ranked journals. In this vein, researchers stated that the right direction step is increasing the use of measures with relatively well-known validity and reliability (Bryman, 2003). Therefore, almost all the indicators of the study have been used and assessed in past studies published in the *Journal of Public Administration Review*, *Academy of Management Journal*, *T Journal of Occupational Psychology Administrative Science Quarterly*, *Journal of Management Information Systems and Information and Management* among others. Table 5.8 clarified the journals used to collect the relevant measurements for this research with their grade based on the *Academic Journal Quality Guide* published by the Association of Business Schools (ABS, 2015). The following identifies the instruments used for each variable.

**Table 5.8: The Sources Used in This Study**

<b>Source</b>	<b>Journal</b>	<b>Grade</b>
Kim and Lee (2006)	<i>Public Administration Review USA</i>	4
Daft (1978)	<i>Academy of Management Journal</i>	4
Jaskyte (2011)	<i>Public Administration Review</i>	4
Mchrath (2001)	<i>Academy of management Journal</i>	4
Ibarra (1993)	<i>Academy Management Journal</i>	4
Cook and Toby (1980)	<i>Journal of Occupational Psychology</i>	4
Gold et al. (2001)	<i>Journal of Management Information Systems</i>	4
Hage and Michael (1967)	<i>Administrative Science Quarterly</i>	4
Nahapiet and Ghoshal (1998)	<i>Academy of Management Review</i>	4
Kim et al. (2013)	<i>International Journal of Contemporary Hospitality Management</i>	3
Chow and Chan (2008)	<i>Information and Management</i>	3
Skerlavaja et al. (2010)	<i>Expert Systems with Applications</i>	3
Chow and Chan (2008)	<i>Information and Management</i>	3
van den Hooff and Huysman (2009)	<i>Information and Management</i>	
Amayah (2013)	<i>Knowledge Management</i>	2
Darroch (2005)	<i>Journal of Knowledge Management</i>	2
Liao et al. (2007)	<i>Journal of Information Science</i>	2
Hooff and Ridder (2004)	<i>Journal of Knowledge Management</i>	2
Hooff et al. (2003)	<i>European Management Journal</i>	2
Perri 6 (1993)	<i>Non-profit Management and Leadership</i>	1
Hooff and Weenen (2004)	<i>Knowledge and Process Management</i>	1
Carmeli et al. (2011)	<i>The Journal of Technology Transfer</i>	1
De Vries et al. (2006)	<i>Communication Research</i>	

With respect of the construct reliability, at the pilot study phase, the researcher can assess whether the items for a specific construct are all measuring the same attribute (the extent of their correlation with each other). The reliability is assessed through calculating Cronbach's alpha coefficient is the most commonly used to measure of scale reliability (Bryman and Cramer, 2009; Li et al., 2011). The values of Cronbach's alpha range from 0 (observed items are not consistent) to 1 (they completely correlate). This means that internal consistency will be acceptable if Cronbach's alpha is high (George and Mallery, 2003). Hair et al. (2010) reported that Cronbach's alpha ought to be equal to or above 0.70 represents a satisfactory reliability. This view supported by other researchers (e.g., Field, 2009), who stated

Cronbach's alpha is the most important coefficient to check the constructs' reliability and reported the same threshold. However, According to such authors, if the Cronbach's alpha is less than 0.7 then the Corrected Item-Total Correlation values shown in the Item-Total Statistics should also be tested and would ideally be more than 0.3. The next table illustrations each variable used in the study with its Cronbach's alpha and its Corrected Item-Total Correlation values for the two groups in the two sectors.

**Table 5.9: Cronbach's Alpha for the Public and Private Oil Sectors' Data**

Constructs	Number of Items	Cronbach's alpha	
		Public	Private
OC	12	.945	.905
OS	10	.943	.953
IT	6	.882	.916
SC. S	4	.903	.750
SC. R	4	.833	.816
SC.C	3	.774	.872
<i>All items of Social capital (SC)</i>	11	.831	.829
KSC	8	.822	.868
KSD	8	.753	.800
<i>All items of Knowledge Sharing (KS)</i>	16	.888	.878
INPD	5	.915	.882
INPS	8	.931	.903

As it could be seen in Table 5.9, results from the construct reliability test for the study's variables illustrate that overall (with no exceptions) there is sufficient correlation among the items measuring each construct. In both public and private oil sectors every variable's reliability score exceeded 0.7, ranging from 0.750 to 0.953. Thus, although the items were largely derived from previous studies, the high alphas indicate that the variables are reliable. Such positive results are not surprising given the fact that none of the items used in this study is self-developed and these were all pre-tested in articles published by renowned scholars and published in highly ranked journals.

## 5.16. Response Rate

In the public oil sector, 218 usable questionnaires were returned out of 643 delivered, which records a response rate of 35%. However, 7 responses were discarded because they have missing data. Whereas, in private oil sector, 200 completed questionnaires were returned out of 617, a response rate of 33.2%. Nevertheless, 5 responses were also dropped because they have missing data. Table 5.10 illustrates that questionnaires were used for further data analysis.

**Table 5.10: Online Survey Administration Figures of Public and Private Oil Sectors**

Type of Sector	Sent Questionnaires	Delivered Questionnaires	Returns	Response Rate (%)
Public Sector	750	643	225 (218 Completed)	35%
Private Sector	750	617	205 (200 Completed)	33.2%

Although 35% and 33.2 % response rate may be considered as relatively reasonable, it is still within the 30-50% average return rates (Saunders et al., 2007). Saunders et al. (2007) argued that the assumption that the reasonable response rate for the delivery and collecting questionnaires by hand is between 30-50%. Furthermore, compare to other structural equation model tools, it is approved that the PLS-SEM can provide robust results at limited sample sizes (Henseler et al., 2009; Reinartz et al., 2009). This view supported by others researchers (e.g., Hair et al., 2011; 2014a; Peng and Lai, 2012). Hair et al. (2014a) confirmed that researcher can achieve the statistical power through determining the appropriateness of the sample size. This argument supported by Hair et al. (2014b), who recognised that the PLS-SEM provide higher statistical power than other statistical techniques.

Additionally, the literature review highlights several criteria regarding the sample size, for example, In Reinartz et al's. (2009) review and guidance of PLS-SEM, they suggest that PLS can produce reasonable levels of statistical power with 100 observations. The authors went further and confirmed that PLS can easily compensate the low sample sizes' effect by

increasing the number of indicators and using indicators with high loadings. A similar rule was argued by Pallant (2007), who stated that the statistical power should not be an issue, when the sample size is greater than 100. On the other hand, others researcher stated that running a robust PLS-SEM required 100 or 200 (respondents) to improve accuracy (Chin 2010). Whereas, Henseler et al. (2009: 292) confirmed that the minimum sample size required to run a robust PLS-SEM algorithm is that “the sample size be equal the larger of the following: (1) ten times the number of indicators of the scale with the largest number of formative indicators, or (2) tent times the largest number of structural paths directed at a particular construct in the inner path model”. However, Hair et al. (2014a) suggested the following table adapted from Cohen (1992) as guidance to identify the suitable sample size to provide significant results (See Table 5.11).

**Table 5.11: Sample Size Recommendation in PLS-SEM**

Maximum Number of Arrows pointing at a construct	Statistical Power of 80%			
	5% Significance level			
	Minimum R square			
	0.10	0.25	0.50	0.75
2	110	52	33	26
3	124	59	38	30
4	137	65	42	33
5	147	70	45	36
6	157	75	48	39
7	166	80	51	41
8	174	84	54	44
9	181	88	57	46
10	189	91	59	48

Source: Adapted from Hair et al. (2014a).

The sample sizes of this study were 218 and 200 (Public and private respectively). The number of observations is above the minimum required when applying the above cited rule of thumb. In fact, when taking into account Cohen’s statistical power rule, the maximum number of arrows pointing toward one construct is three (the present case), thus the minimum sample size required to achieve a statistical power of 80% with a significance level at 5% and detect an R square with at least between 0.50 - 0.75, would be 30 observations. As for the



abovementioned rule proposed by Henseler et al. (2009), Hair et al. (2011; 2014a) and Peng and Lai (2012), the larger of the above cited two options is the ten times the number of indicators of the construct with the largest number of formative indicators which is the variable social capital (SC) with three items, and hence the minimum sample size would be 30. Additionally, when considering the statistical power based on Table 5.11, the minimum sample size required to achieve a statistical power of 80% with a significance level at 0.05% and detect an R square with at least between 0.50 - 0.75, the researcher would need 30 observations. Therefore, it can be concluded that the sample sizes for both sectors are sufficient to run a robust PLS-SEM analysis.

### **5.17 Chapter Summary**

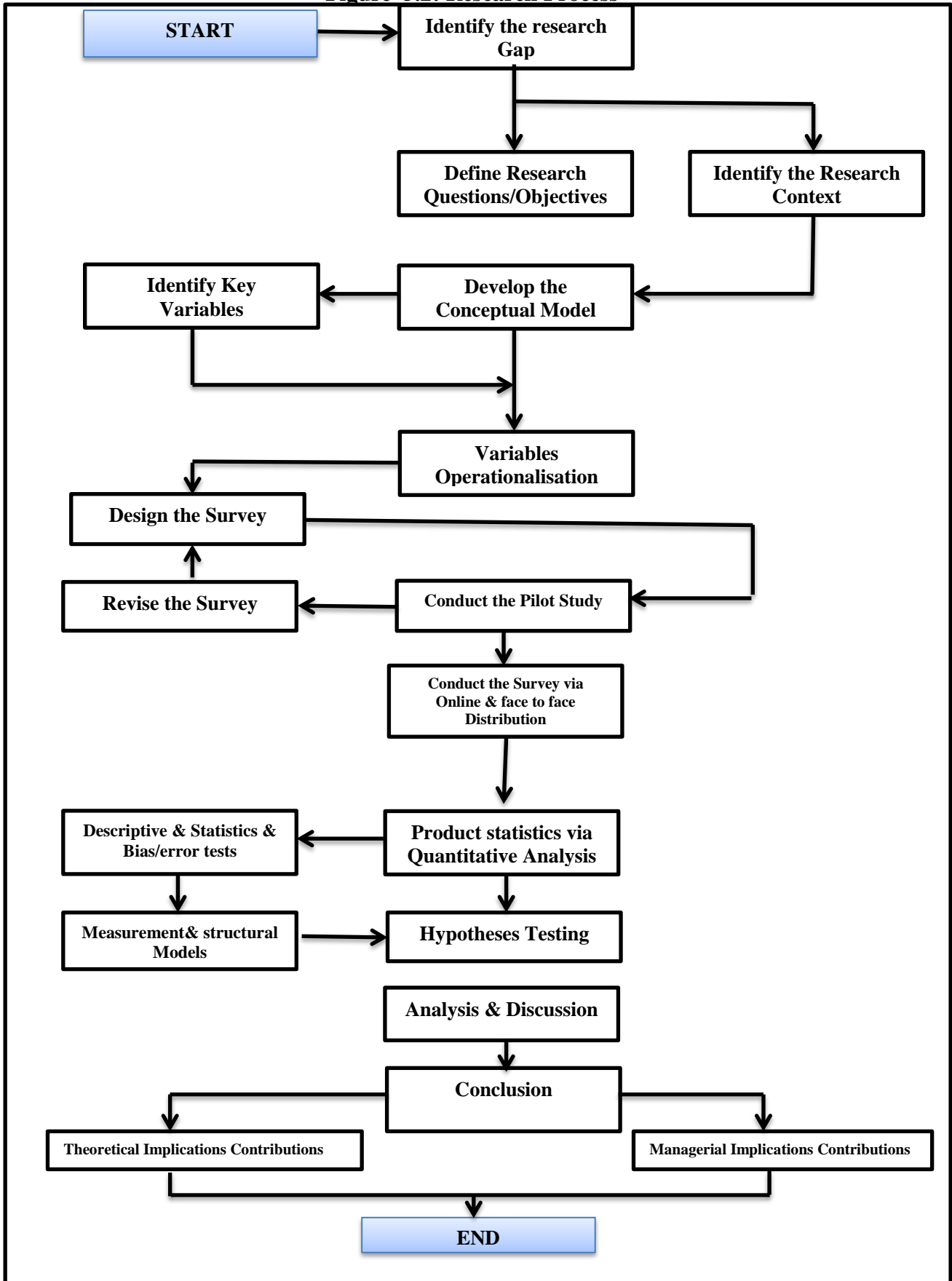
This chapter has presented the methodological steps followed in this study. These are illustrated in figure 5. 2. The chapter covered the philosophical assumptions underpinning the present research. It has been stated that the research adopted a post-positivist approach. Indeed, the researcher tested the impact of organisational context (OC, OS and IT) on innovation (product and process). This effect was seen to be external to the researcher and thus can be observable and objectively measured through the operationalisation of the intervening variables. However, it was also believed that this impact cannot be totally understood in a positive way as the author also recognised the effect of the employees and managers' perceptions, attitudes and views toward innovation.

Regarding to the use of theory, this study used an explanatory deductive approach. Using the RBV and KBV theories, the research examines the influence of organisational context (OC, OS and IT) in enhancing social capital and knowledge sharing in order to be more innovation. The rationale behind this approach was to bring to the social capital and knowledge sharing

and innovation literature some theoretical foundations. Eventually, and the research employed a survey methodology based on the basis of these philosophical perspectives.

Second, the chapter outlined the research methods and the variables' instruments used in this study. A positivistic survey including online questionnaires was used to address the research questions set by the researcher. These would identify the interactions between the different variables of the study and hence explain the mechanism through which organisational context (OC, OS and IT) work. The study was conducted in two selected context; namely public and private oil sectors and targeted a population sample of approximately 1500 employees from two sectors. The questionnaires were distributed using online questionnaires. Lastly, with respect to the item measurements used, these were extracted from past studies published in highly ranked journals which enhance their validity and reliability. The next chapter present the results of the quantitative survey conducted for both sectors. Since the two groups have same dependent variables and hence distinct models, public and private' data are analysed separately.

Figure 5.2: Research Process



## **CHAPTER SIX: DATA ANALYSIS AND FINDINGS**

### **6.0 Introduction**

The aim of this chapter is to present and examines the results emerging from the quantitative analysis of both public and private Libyan oil sectors' samples. Therefore, the chapter is divided into three main sub-sections. A preliminary descriptive statistics of the samples, comprising respondents' profile, data distributions, missing values and outliers, and common method bias are given in section (6.1). Using PLS-SEM (WarpPLS-SEM 5.0), both measurement and structural models are presented in section (6.2). The measurement model reviews how well the variables involved in the study are measured, on the other hand, the structural model assesses the causal relationships among these factors. Additionally, the measurement model is founded on the assessment of the reliabilities and validities of the first and second order constructs, the structural model in contrast, examines the Path coefficients, P values, R squares and effect sizes in order to support or reject the relationship hypothesised in chapter 3. Section (6.3), is an examination of direct and indirect effects (Mediation Test). Lastly, findings from the two types of organisations (public and private) are compared, and a conclusion summarising the main results of the investigations is reported. The results obtained in this chapter are based on the data collected from employees working in Libyan oil companies in different public and private oil sectors. The sample size of employees in the public oil sector was 218 and the private oil sector was 200.

### **6.1. Descriptive Statistics**

It is important to undertake a descriptive analysis (descriptive statistics) of the data samples, before proceeding the analysis itself. Zikmund et al. (2010) argued that a descriptive analysis enables the investigator to describe the basic characteristics of the investigated sample. In this

sub-section, sample characteristics, non-response bias, data distributions, missing values and outliers are assessed.

### 6.1.1. Sample Characteristics'

This section describes the demographic characteristics of the participants from both public and private oil sectors. Table (6.1) summarising these characteristics simultaneously to provide an overall insight while the following sub-sections reports these characteristics in further detail.

**Table 6.1: Demographic Statistics of the Sample from the Public and Private Oil Sectors**

Characteristic	Public N=218		Private N=200		Over Sample N=418	
<b>Employees' Gender</b>						
Group	Count	Percentage	Count	Percentage	Count	Percentage
Male	166	76%	122	61%	288	69%
Female	52	24%	78	39%	130	31%
<b>Employees' Age</b>						
Under 25	23	11%	16	8%	39	9%
25 - 30	61	28%	70	35%	166	40%
31 - 40	96	44%	97	48%	158	38%
41 - 50	30	14%	11	6%	41	10%
Over 50	8	3%	6	3%	14	3%
<b>Employees' Experience</b>						
Less than 1 year	34	16%	23	12%	57	14%
1 – 5 years	44	20%	33	17%	77	18%
6 – 10 years	63	29%	86	43%	149	36%
11 – 25 years	57	26%	36	18%	93	22%
Over 25 years	20	10%	12	6%	32	8%
Don't know	0	0	0	0	0	0
<b>Educational Qualifications</b>						
University degree (or equivalent)	98	45%	112	56%	210	50%
High diploma	18	8%	16	8%	34	8%
Master's	35	16%	20	10%	55	13%
PhD	5	3%	8	4%	13	3%
Others	62	28%	44	22%	106	25%
<b>Employees' Positions</b>						
Head of Dept.	15	7%	10	5%	25	6%
Administrator	41	19%	22	11%	63	15%
Technician	56	25%	65	32%	121	29%
Supervisor	32	15%	23	12%	55	13%
Operator	74	34%	80	40%	154	37%
Other	0	0	0	0	0	0

Overall, it seems that both public and private sectors share fairly similar characteristics in terms of gender, employees' experience and employees' educational qualifications and employees' position. While a more detailed discussion of sample characteristics' is beyond the scope of this study, some key points will be covered in order to build an understanding of the impact of sample characteristics on organisational behaviour and in particular knowledge sharing and innovation (product and process). In this respect, the following reviews these characteristics with further details.

#### **6.1.1.1 Employees' Gender**

Regarding the gender of the participants, as it can be seen from table 6.1a in the public oil sector, it was unsurprising to discover that the majority of the participants surveyed were male (76 per cent); this is logical as the nature of the oil industry and its requirements, which require individuals to work in the oilfields in addition to other jobs that mostly require males (Eltayeb, 2008). Only 24 per cent of the participants were female and these were mostly involved in administrative duties. Turning to private oil sector, table 6.1b shows that the percentage of male participants was (61%) and female (39%).

**Table 6.1a: Employees' Gender for Public Oil Sector**

<b>Group</b>	<b>Count</b>	<b>Percentage</b>
Male	166	76%
Female	52	24%

**Table 6.1b: Employees' Gender for Private Oil Sector**

<b>Group</b>	<b>Count</b>	<b>Percentage</b>
Male	122	61%
Female	78	39%

#### **6.1.1.2 Employees' Age**

The age of the respondents involved in this survey ranged from less than 25 years of age to over 50. As can be seen from table 6.1c, the largest group of participants in public oil sector

were from 31 to 40 years old; they constituted about 44% of the total sample. In addition, 28 % were from 25 to 30 years old, and 14% were from 41 to less than 50 years old, and 11% were under 25 years old, whereas only 3% of the respondents were over 50. As for private oil sector, table 6.1d shows that the largest number of respondents was from 31 to 40 year old (48%), followed by employees with 25 to 30 years (35%), whereas 8% of responses were under 25 years old, these were followed by respondents from 41 to 50, and over 50 years (6%, 3% respectively).

**Table 6.1c: Employees' Age for Public Oil Sector**

<b>Group</b>	<b>Count</b>	<b>Percentage</b>
Under 25	23	11%
25 - 30	61	28%
31 - 40	96	44%
41 - 50	30	14%
Over 50	8	3%

**Table 6.1d: Employees' Age for Private Oil Sector**

<b>Group</b>	<b>Count</b>	<b>Percentage</b>
Under 25	16	8%
25 - 30	70	45%
31 - 40	97	38%
41 - 50	11	6%
Over 50	6	3%

### **6.1.1.3 Employees' Experience**

With respect to how long respondents had worked for companies, this varied from less than 1 year to more than 25 years. Respondents with 6 to 10 years of work experience predominated in this survey, being 29 % of the total number, whereas 26 % had worked for their organisations from 11 to 25 years, respondents having from 1 to 5 years work experience coming third, at 20 % of the total surveyed, then came, respectively, 16 % who had less than 1 year of experience, and 10 % who had over 25 years of work experience with their organizations. In the private oil sector, the largest group included employees with 6 to 10 years' experience (43%), followed by staff with 11 to 25 years, 1 to 5 years and less than 1

year. Last, employees with over 25 years only accounted for 6%. Tables (6.1e and 6.1f), below indicates the work experience of respondents.

**Table 6.1e: Employees' Experience for Public Oil Sector**

Public Oil Sector		
Group	Count	Percentage
Less than 1 year	34	16%
1 – 5 years	44	20%
6 – 10 years	63	29%
11 – 25 years	57	26%
Over 25 years	20	10%
Don't know	0	0%

**Table 6.1f: Employees' Experience for Private Oil Sector**

Group	Count	Percentage
Less than 1 year	23	12%
1 – 5 years	33	17%
6 – 10 years	86	43%
11 – 25 years	36	18%
Over 25 years	12	6%
Don't know	0	0%

#### 6.1.1.4 Employees' Educational Qualifications

The next tables (6.1.g and 6.1.h) illustrates the employees' educational qualifications of both public and private oil organisations' respondents. It can be seen that in public oil sector, the proportion of respondents with a bachelor's degree was (45%), with a high diploma (8%), master's (16%), a doctorate (3%), and of respondents with others was (28%) Thus, the majority of the respondents held either a bachelor's degree or others. With regard to private oil sector, the majority of the surveyed respondents (56%) had a bachelor's degree, followed by respondents with others, with master's (10%), with a high diploma (8%), and respondents with a doctorate were the least represented (4%).

**Table 6.1g: Employees' Educational Qualifications for Public Oil Sector**

Group	Count	Percentage
University degree (or equivalent)	98	45%
High Diploma	18	8%
Master's	35	16%
PhD	5	3%
Others	62	28%



**Table 6.1h: Employees' Educational Qualifications for Private Oil Sector**

Group	Count	Percentage
University degree (or equivalent)	112	56%
High Diploma	16	8%
Master's	20	10%
PhD	8	4%
Others	44	22%

**6.1.1.5 Employees' Position**

The questionnaires were targeted at a variety of individuals and levels. Seven types of employees' position were identified in this study, these were classified as: head of department, administrator, technician, supervisor, operator and other. The following tables (6.1i and 6.5j) show the proportion of firms accordingly with their employees' position.

**Table 6.1i: Employees' Position for Public Oil Sector**

Group	Count	Percentage
Head of Dept.	15	7%
Administrator	41	19%
Technician	56	25%
Supervisor	32	15%
Operator	74	34%
Other	0	0%

**Table 6.1j: Employees' Position for Private Oil Sector**

Group	Count	Percentage
Head of Dept.	10	5%
Administrator	22	11%
Technician	65	32%
Supervisor	23	12%
Operator	80	40%
Other	0	0%

As it can be seen from Table 6.1i, in public oil organisations 34 % of the sample surveyed were operators, while 25 % were technicians, 19 % were administrators, 15 % of the total participants were supervisors, and 7 % were working in the head of department. Turning to the private oil sector, Table 6.1j shows that the highest proportion of employees was operator with (40%); these were followed by technician with (12.6%), supervisor (12% of the sample), these was followed by administrator (11%), and a head of department (5%) respectively.

### **6.1.2. Data Distribution**

Identifying how many times each score has happened requires assessing the properties of the distribution scores, this is called frequency distribution. It was reported that normal distribution means that the data should be distributed symmetrically around the centre of all scores (Field, 2009). According to Pallant (2011) investigators who use several of the statistical methods assume that distribution of values is “normal” which implying the highest frequencies in the middle and lesser frequencies around the ends (the well-known bell shape curve). However, when using the PLS-SEM, checking the normality of the data distributions is not important. The PLS-SEM does not make premise regarding the normality of the data distributions compare with other structural equation modelling tools (Hair et al., 2014). Several researchers (e.g., Reinartz et al., 2009; Ringle et al., 2009) stated that the data that have extremely non-normal distribution (skewness and/or kurtosis) can help “PLS-SEM to provide very robust estimations. In light of above discussion, in this research, there is no assumption about the normality of the data distribution and hence the normality does not need to be measured.

### **6.1.3. Testing for Non-Response Bias**

Sample surveys have the particularity to generate findings applicable to large populations is considered among the tools available to collect individuals’ perceptions and behaviours. However, such a value is based on the extent to which the non-response bias (also known as non-response error) could be reduced (Groves, 2006). The non-response error is defined as that:

*“The result of people who respond to a survey being different from sampled individuals who did not respond, in a way relevant to the study”* Dilman (2011: 11).

In this regard, it is debated that it would not be able to generalise the results of the study, if in a mail survey respondents differ significantly from non-respondents. Hence, in order to ensure the generalizability of the results, it is significant to test non-response bias (Armstrong and Overton, 1977). Several researchers observed that there are different techniques exist to measure the non-response error (e.g. Armstrong and Overton, 1977; Groves, 2006). However, the review the literature has revealed that the most commonly used method is comparing late and early respondents (Lambert and Harrington, 1990; Yaghi 2006; Wu et al., 2008; Hair et al., 2010; Leonidou et al., 2011; Obadia and Stottinger, 2014). The assumption behind such a method is that individuals responding at a later stage are expected to respond in a similar way to non-respondents. This method is called extrapolation (Armstrong and Overton, 1977).

Numerous studies argued that there are many prospective of using such a technique. For example, Armstrong and Overton (1977) used 53 of the 112 items (47%), others such as Lambert and Harrington (1990) chose 28 of 56 original questions; whilst Yaghi (2006) selected randomly 20 of the 74 items. Other researcher (e.g., Zheng et al., 2010) used 30 of the 15 randomly selected items. In the present study, using a t-test technique in the Statistical Package for the Social Sciences (SPSS), the investigator has compared the means of 30 late respondents (representing non-respondents) with 30 early respondents using 15 randomly selected items (Zheng et al., 2010). According to Pallant (2007), the t-test is used when there is a need to compare the scores of two groups (late and early respondents in this case). However, it is worth noting that although the t-test assumes the normality of the data distributions; this test can still be used with the present data. Indeed, Lumley et al. (2002) and Pallant (2007) argued that large samples (30+) would not cause a major problem in terms of non-normality.

The results showed that the significance value for Levene's test is higher than .05 and hence, it can be assumed that both groups share the same variances (See Appendix C). In this

situation, the t-values of the “equal variances test is assumed” are used. Moreover, it can be noted that the t-values “Sig. (2-tailed)” are non-significant (p values greater than 0.05) for almost all items assuming that there is no significant difference between the two groups. Hence, it can be summarised that both samples used in the current research are indeed representative of the whole population.

#### **6.1.4. Missing Data and Outliers**

In social science research, missing (or incomplete) pieces of data are a common problem. There are many reasons for the occurrence of missing data which, usually, are beyond the researcher’s control. It is indicated that missing data happens when a respondent either deliberately or accidentally fails to answer some items in the questionnaire (Field, 2009). Kock (2013) stated that the missing values are automatically replaced by the mean of the other values of that particular factor in the WarpPLS-SEM software. However, researchers recommended that the investigator should consider the removal of this observation, if an observation is missing more than 15% of the values (Hair et al., 2014a). Indeed, replacing the missing values with means will reduce the variability of the data and hence reduces the likelihood to obtain meaningful and significant data. Hence, with the current data for public and private samples, the investigator has removed all questionnaires with missing values higher than 15%. In this situation, the researcher omitted 12 cases. The number of responses was reduced from 430 to 418 usable questionnaires; these were more than enough for path analysis.

With respect to the outliers, these are participants who give scores that are very different to the rest of the participants; these can bias the mean and inflate the standard deviation (Field, 2009). It recognised that the shape of the relationship may significantly affected by outliers (Kock, 2013). Kock confirmed that, one outlier can change the sign of a linear relationship

(from positive to negative or vice versa) in extreme cases. Hence, other scholars (e.g., Field, 2009; Zikmund et al., 2010; Saunders et al., 2012) recommend the removal of outliers from the data set. Nevertheless, it is argued that the deletion of outliers is often a mistake as these can reveal the true nature of the relationship (Kock, 2013); the authors added that these should be removed only if they are due to measurement error. According to Kock, the investigator can deal with outliers effectively without removing them from the data set by using the WarpPLS-SEM software. Indeed, Kock clarified that the software may run the analysis by ranking the data and hence the value distances that typify the outliers are substantially reduced without decreasing the sample size.

As for the resampling algorithms, the review of literature determines two reasons to justify why the investigator has selected to employ the “stable1” algorithm offered by the software. First, it is acknowledged that like the “Jackknifing” method, this new algorithm can increase the statistical power through dealing effectively with small samples by generating low standard errors and medium to high effect sizes. Secondly, the p values that approximate the most stable p value given by the software’s other resampling methods (Jackknifing, bootstrapping and blindfolding) can be provided by using the stable algorithm. The stable algorithm could be seen as a combination of the traditional resampling methods cited above (Kock, 2013).

#### **6.1.5. Common Method Bias**

Common method bias assumes that a single factor explains the majority of variance. Researchers rely on the same respondent who provides information about all the variables (Podsakoff et al., 2012). Common method bias is a problem because it is considered to be a main source of measurement error which has a negative effect on the validity of the measure (Podsakoff et al., 2003).

In order to avoid common method bias, the questionnaire included many negatively worded statements. The researcher conducted a post-hoc test for common method bias using Harman's one-factor. All the items were entered into principal component factor analysis. In this test, bias would be existent if the single factor emerging from the factor analysis accounts for more than 50% of the variances in the model. As for the public oil sector' model, the first factor accounted for 25.225% of the variances in the public sample and 36.373% in the private oil sample, which is less than the critical 50% (See Appendix D). Hence, combined with the reverse method applied in the questionnaire design phase, the Harman's test provides support for the absence of common methods bias (Mattila and Enz, 2002; Lings et al., 2014).

Having presented the samples' characteristics, assessed for outliers, missing values and measurement errors, the following section tests the research model proposed in section 4.3. Through the PLS-SEM analysis, the hypotheses of this research will be supported or rejected.

## **6.2. The PLS-SEM Analysis**

Structural equation modelling (SEM) is defined as a statistical method that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon. This theory represents "causal" processes which generate observations on multiple variables (Byrne, 2010). SEM aims to test the relationships between one or more independent and dependent variables by assessing the extent to which the hypothetical constructs are suitable or fit with the obtained data.

As mentioned above, in structural equation modelling it is important to distinguish between two terminologies namely: Measurement model (also known as outer model) and structural model (known as inner model). Whereas the former is about the relationship between the latent constructs and their indicators (Loehlin, 2004; Henseler et al., 2009), the latter relates the latent constructs to each other (Jarvis et al., 2003; Loehlin, 2004). Hulland (1999) stated

that a PLS model is generally analysed and interpreted in a sequence of two stages, (i) the assessment of the measurement model and (ii) the assessment of the structural model. The underlying assumption behind such a distinction is the necessity to establish proper specification for the measurement model in order to obtain a meaningful analysis (Jarvis et al., 2003).

Measurement models are assessed through the reliabilities of individual indicators and latent constructs as well as the measures' convergent and discriminant validities (Hair et al., 2011). In an extensive methodological review of business studies articles, Hair et al. (2012: 424) reported that "the proportion of studies that do not report reliability and validity measures is disconcerting". The authors added that the lack of reliability and validity assessments will lead the structural model to be substantially biased and hence unreliable. Before proceeding to the measurement models, Table 6.2 illustrates the reflective variables included in the public and private first order model and their assigned codes.

**Table 6.2: Variables Included in the 1st Order**

<b>Variables</b>	<b>Codes</b>
<b>The Independent Variable1: Organisational Culture</b>	
<i>Organisation Culture</i>	<i>OC</i>
<b>The Independent Variable2: Organisational Structure</b>	
<i>Organisation Structure</i>	<i>OS</i>
<b>The Independent Variable3: Information Technology</b>	
<i>Information Technology</i>	<i>IT</i>
<b>The Dependent Variable: Innovation</b>	
<i>Product Innovation</i>	<i>PDIN</i>
<i>Process Innovation</i>	<i>PSIN</i>
<b>The Mediating Variable1: Social Capital</b>	
<i>Structural Social Capital</i>	<i>SSC</i>
<i>Relational Social Capital</i>	<i>RSC</i>
<i>Cognitive Social Capital</i>	<i>CSC</i>
<b>The Mediating Variable2: Knowledge Sharing</b>	
<i>Knowledge sharing Donating</i>	<i>KSD</i>
<i>Knowledge sharing Collecting</i>	<i>KSC</i>

### **6.2.1. Determining the Nature of the Constructs**

Prior to starting the estimations of the measurement model it is important to identify the nature of the constructs used in the study. Firstly, latent variables can be either reflective or formative (Mackenzie et al., 2011; Hair et al., 2012). In terms of definition, reflective indicators of a given latent variable are assumed to be equal and internally consistent, therefore interchangeable and removing one item would not affect the measurement. In such indicators, the direction of causality goes from the construct (latent variable) to the indicators (items) (Jarvis et al., 2003). These observed indicators are assumed to reverse variations in the latent variable; these variations are expected to be seen via the indicators (Henseler et al., 2009). According to Diamantopoulos (1999), reflective measures are the most commonly used indicators in business studies. Formative indicators, on the other hand, are assumed to be causing the latent variable and are usually uncorrelated which each other hence cannot be interchangeable and dropping one of the dimensions can have substantive influence on the construct's measurement (Jarvis et al., 2003). It is recognised that the PLS-SEM is suited to equally analyse both reflective and formative measurement models.

Secondly, a latent variable could be first order or second order. Second order latent variables (also known as higher order) are used when running the structural model. In present study, these higher order constructs are used for the mediating variables. Second order constructs are variables that “contain two layers of components” (Hair et al., 2014a: 39). The authors explained that a second order construct can be represented by a number of first order variables capturing different facets of the construct. As an example, a second order variable is employed for “Social capital”, this is represented by three first order variables capturing various facets from which the structural social capital, relational social capital, and cognitive social capital. Hair et al. (2014a) argued that the use of second order variables enhances the theoretical parsimony of the research and decreases the model's complexity. According to



Chin (1998), the decision to use second order variables should be founded on the conceptual model. In addition, Ruiz et al. (2008) stressed that the choice of second order models depends on whether the investigator focuses on the first order variables separately or the second order constructs.

In the present case, the researcher is looking to investigate the impact of organisational culture, organisational structure and information technology on the social capital and knowledge sharing (second order variables) rather than on the multiple dimensions of these types of social capital and knowledge sharing (first order variables).

Moreover, the relationship between the first and the second order variables can be reflective and formative. The former is chosen if the first order variables correlate with each other and can be explained by the second order variable, whereas the latter is selected if the first order variables form the second order construct (Hair et al., 2014a).

In this study, the researcher used second order constructs to represent product and process innovation, and first order variables to represent social capital and knowledge sharing (See Table 6.3). All first order variables are considered as reflective indicators. This is because the indicators in these cases reflect the variations of their constructs and are regarded to be highly correlated with each other's (Henseler, 2009). However, at the second order level, all constructs are considered as formative, hence having a higher-order model type B (reflective-formative) (Becker et al., 2012).

Indeed, second order variables could be either represented (reflective) or formed (formative) by first order variables. Becker et al. (2012) explained that the relationship between the higher order construct and its first order indicators is not about causality but instead is about the nature of the second order construct. This implies that if the second order variable is manifested by several specific dimensions (through unobserved latent variables) that can be

distinguished from each other, yet highly correlated, then the relationship among second and first order variables is reflective, while, if these first-order constructs do not share a common cause but instead form a general concept that fully mediates the impact on other endogenous variables (Chin, 1998b), then the second order construct should be formative (Becker et al., 2012).

**Table 6.3: First and Second Order Mediating Variables**

<b>Second Order Variables</b>	<b>First Order Components</b>
SC	SSC,RSC,CSC
KS	KD,KC

In the current research, the second order variables are social capital and knowledge sharing. The lower order of these higher order constructs are believed to compose a general concept while at the individual level these are not related to each other. For example, structural social capital, relational social capital and cognitive social capital are different but they together form a general concept which is “social capital”, similar reasoning could be applied to the remaining higher order constructs, thus justifying the use of reflective-formative higher-order variables.

### **6.2.2. Measurement Model of the Reflective First Order Constructs**

According to Hair et al. (2014a), assessing reflective constructs is based on the assessment of individual indicators’ and latent constructs’ reliabilities in addition to the measures of convergent and discriminant validities.

#### **6.2.2.1 Individual item reliability**

The individual item reliability of reflective indicators is evaluated through the examination of the indicators’ loadings (Hulland, 1999). It is advanced that as a rule of thumb, researchers should only retain indicators with loadings with 0.70 or higher. This would mean that the indicator shares more variance with its construct than error variance. However, it is also

accepted that in the empirical literature, it is very common to come across loadings with less than 0.70. Therefore, the rule of thumb has been decreased to 0.50 (Hulland, 1999). Kock (2011) also stated a threshold of 0.50. Hair et al. (2014a) added that p values for all items' loadings should be significant (less than 0.05). Hulland (1999) explains that a low loading could be the consequence of a poorly worded or an irrelevant indicator and an inappropriate transfer of an indicator from one context to another. The indicators' loadings and their p values for public and private sectors sample shows in Tables (6.4a and 6.4b). After deleting the items with loadings below 0.7, all the combined loadings of the retained indicators became greater than the thresholds 0.7, hence confirming that the indicators used in the two samples present a satisfactory individual reliability. The dropped indicators were:

- In oil public sector' sample: OC 8,9,10,11,12; OS8,9,10; SC8,9,10,11; KS8,9,10,11,12,13,14,15,16, PDIN5 and PSIN5,6,7,8.
- In oil private sector' sample: OC8,9,10,11,12; OS8,9,10; SC10,11; KS9,10,11,12,13,14,15,16; PDIN5 and PSIN6,7,8.

The removed indicators belong to reflective constructs and hence deleting them would not affect the measurement of the variable.

**Table 6.4a: Indicators' loadings for latent variables of public sector sample**

Items	OC	OS	IT	SC	KS	INPD	INPS	P Value
OC1	<b>(0.741)</b>	-0.014	-1.060	0.330	-0.110	-0.592	0.828	<0.001
OC2	<b>(0.863)</b>	-0.116	-0.87	0.057	-0.124	-0.450	0.147	<0.001
OC3	<b>(0.822)</b>	-0.067	0.366	-0.171	0.061	-0.271	-0.082	<0.001
OC4	<b>(0.786)</b>	0.053	0.079	0.125	0.031	-0.243	-0.134	<0.001
OC5	<b>(0.788)</b>	-0.083	0.379	-0.042	-0.085	-0.078	-0.116	<0.001
OC6	<b>(0.716)</b>	0.127	0.007	-0.034	0.080	0.592	-0.217	<0.001
OC7	<b>(0.766)</b>	0.047	-0.097	-0.096	0.040	0.637	-0.012	<0.001
OS1	-0.027	<b>(0.755)</b>	-0.782	0.585	-0.098	0.373	0.593	<0.001
OS2	0.009	<b>(0.865)</b>	0.135	-0.013	0.044	-0.109	-0.287	<0.001
OS3	-0.133	<b>(0.863)</b>	0.108	-0.024	0.020	0.057	-0.271	<0.001
OS4	0.054	<b>(0.778)</b>	-0.009	0.060	0.004	-0.131	0.172	<0.001
OS5	-0.036	<b>(0.797)</b>	0.166	-0.078	-0.081	0.085	-0.096	<0.001
OS6	0.024	<b>(0.773)</b>	-0.068	-0.054	0.092	-0.148	0.173	<0.001
OS7	0.111	<b>(0.818)</b>	0.187	-0.287	-0.013	-0.015	-0.045	<0.001
IT1	0.058	-0.120	<b>(0.703)</b>	-0.145	-0.124	-0.043	0.461	<0.001
IT2	-0.035	0.006	<b>(0.820)</b>	-0.066	0.085	-0.101	-0.048	<0.001
IT3	-0.161	0.107	<b>(0.812)</b>	0.140	0.052	0.001	0.027	<0.001
IT4	0.306	-0.107	<b>(0.739)</b>	-0.090	-0.015	-0.003	0.033	<0.001
IT5	-0.204	-0.008	<b>(0.794)</b>	-0.233	0.005	0.108	-0.274	<0.001
IT6	0.073	0.105	<b>(0.742)</b>	0.396	-0.023	0.038	-0.153	<0.001

SC1	0.122	0.156	0.162	<b>(0.742)</b>	-0.158	0.033	-0.120	<0.001
SC2	0.004	-0.206	0.553	<b>(0.755)</b>	-0.062	-0.020	-0.067	<0.001
SC3	-0.062	0.137	0.435	<b>(0.764)</b>	-0.022	0.118	-0.471	<0.001
SC4	-0.044	-0.110	0.156	<b>(0.734)</b>	0.066	-0.075	-0.007	<0.001
SC5	-0.118	-0.078	-0.447	<b>(0.732)</b>	-0.010	0.101	0.353	<0.001
SC6	0.124	-0.050	-0.283	<b>(0.757)</b>	0.016	-0.003	-0.007	<0.001
SC7	-0.028	0.149	-0.596	<b>(0.743)</b>	0.172	-0.157	0.339	<0.001
KS1	0.023	0.211	-0.462	0.622	<b>(0.769)</b>	-0.199	0.322	<0.001
KS2	0.012	0.061	0.121	-0.266	<b>(0.772)</b>	-0.029	-0.013	<0.001
KS3	0.122	0.063	-0.002	-0.295	<b>(0.799)</b>	0.061	0.130	<0.001
KS4	0.206	0.181	-0.347	-0.125	<b>(0.769)</b>	-0.370	0.312	<0.001
KS5	-0.233	-0.157	0.096	0.071	<b>(0.780)</b>	0.457	-0.182	<0.001
KS6	-0.077	-0.120	0.213	-0.014	<b>(0.722)</b>	0.049	-0.277	<0.001
KS7	-0.046	-0.181	0.244	0.135	<b>(0.791)</b>	0.006	-0.199	<0.001
PDIN1	-0.045	-0.006	0.338	-0.318	0.118	<b>(0.814)</b>	-0.221	<0.001
PDIN2	0.019	0.155	0.171	-0.155	0.137	<b>(0.777)</b>	-0.331	<0.001
PDIN3	0.013	0.125	-0.417	0.293	-0.158	<b>(0.774)</b>	0.278	<0.001
PDIN4	0.014	-0.272	-0.109	0.195	-0.103	<b>(0.781)</b>	0.284	<0.001
PSIN1	0.046	0.134	-0.477	0.160	0.037	0.349	<b>(0.735)</b>	<0.001
PSIN2	0.069	-0.131	0.480	-0.181	-0.029	-0.072	<b>(0.790)</b>	<0.001
PSIN3	-0.316	-0.040	0.246	-0.007	-0.041	0.137	<b>(0.809)</b>	<0.001
PSIN4	0.218	0.049	-0.299	0.040	0.037	-0.407	<b>(0.764)</b>	<0.001

**Table 6.4b: Indicators' loadings for latent variables of private sector sample**

Items	OC	OS	IT	SC	KS	INPD	INPS	P Value
OC1	<b>(0.795)</b>	-0.210	-0.088	0.301	0.017	0.070	-0.073	<0.001
OC2	<b>(0.793)</b>	-0.248	-0.019	-0.017	-0.045	-0.083	0.255	<0.001
OC3	<b>(0.783)</b>	0.056	-0.254	0.030	-0.031	-0.033	0.139	<0.001
OC4	<b>(0.773)</b>	-0.384	-0.044	0.065	-0.010	0.161	0.153	<0.001
OC5	<b>(0.720)</b>	0.142	0.237	-0.354	-0.022	0.228	-0.210	<0.001
OC6	<b>(0.747)</b>	0.325	0.227	-0.150	-0.125	-0.394	0.102	<0.001
OC7	<b>(0.728)</b>	0.374	-0.032	0.093	0.224	0.058	-0.407	<0.001
OS1	0.045	<b>(0.859)</b>	-0.342	0.006	0.193	0.534	0.088	<0.001
OS2	0.110	<b>(0.768)</b>	-0.508	0.014	-0.141	0.687	0.564	<0.001
OS3	0.006	<b>(0.769)</b>	0.287	-0.172	0.036	-0.375	-0.319	<0.001
OS4	-0.031	<b>(0.753)</b>	-0.002	0.237	-0.060	-0.242	-0.078	<0.001
OS5	-0.099	<b>(0.857)</b>	0.283	-0.180	0.154	-0.009	-0.223	<0.001
OS6	0.079	<b>(0.762)</b>	0.014	-0.061	-0.170	-0.380	0.018	<0.001
OS7	-0.104	<b>(0.765)</b>	0.196	0.138	0.017	-0.059	0.003	<0.001
IT1	-0.036	-0.037	<b>(0.799)</b>	0.220	0.095	0.156	-0.174	<0.001
IT2	0.000	0.147	<b>(0.774)</b>	-0.236	-0.069	0.073	-0.069	<0.001
IT3	-0.054	0.204	<b>(0.765)</b>	-0.014	0.016	-0.133	-0.102	<0.001
IT4	0.026	-0.343	<b>(0.786)</b>	0.116	-0.029	0.262	0.108	<0.001
IT5	-0.119	-0.134	<b>(0.887)</b>	-0.160	0.025	-0.277	0.613	<0.001
IT6	0.177	0.164	<b>(0.741)</b>	0.049	-0.039	-0.127	-0.318	<0.001
SC1	0.078	-0.178	0.250	<b>(0.755)</b>	-0.089	-0.104	0.164	<0.001
SC2	0.050	0.083	0.508	<b>(0.789)</b>	0.059	-0.146	0.267	<0.001
SC3	0.145	0.305	-0.124	<b>(0.788)</b>	-0.033	0.024	-0.567	<0.001
SC4	-0.214	-0.173	0.192	<b>(0.776)</b>	-0.015	0.269	-0.058	<0.001
SC5	0.102	0.022	-0.004	<b>(0.727)</b>	0.015	0.012	-0.219	<0.001
SC6	0.023	0.307	-0.013	<b>(0.783)</b>	-0.092	0.077	-0.611	<0.001
SC7	-0.058	-0.186	-0.053	<b>(0.744)</b>	0.072	0.012	0.197	<0.001
SC8	-0.083	-0.207	-0.499	<b>(0.831)</b>	0.095	0.040	0.478	<0.001
SC9	-0.059	-0.012	-0.517	<b>(0.752)</b>	0.031	-0.265	0.661	<0.001
KS1	-0.046	-0.089	-0.075	0.462	<b>(0.869)</b>	-0.396	0.115	<0.001
KS2	-0.099	-0.074	0.153	0.189	<b>(0.764)</b>	-0.228	0.141	<0.001
KS3	-0.117	-0.050	0.220	-0.106	<b>(0.831)</b>	0.093	0.224	<0.001
KS4	-0.184	0.557	-0.461	0.102	<b>(0.863)</b>	0.574	-0.236	<0.001
KS5	0.058	0.378	-0.622	0.078	<b>(0.725)</b>	0.575	0.226	<0.001
KS6	0.153	-0.286	0.312	-0.201	<b>(0.791)</b>	-0.296	-0.071	<0.001
KS7	0.199	-0.289	0.206	-0.061	<b>(0.764)</b>	-0.297	-0.035	<0.001
KS8	-0.120	0.159	-0.062	-0.204	<b>(0.799)</b>	0.292	-0.139	<0.001

<b>PDIN1</b>	0.324	0.178	0.434	-0.128	0.047	<b>(0.708)</b>	-0.450	<0.001
<b>PDIN2</b>	-0.092	-0.053	-0.125	-0.073	0.015	<b>(0.864)</b>	0.192	<0.001
<b>PDIN3</b>	-0.071	-0.091	-0.242	0.141	-0.034	<b>(0.877)</b>	0.057	<0.001
<b>PDIN4</b>	-0.069	0.021	0.070	0.022	-0.015	<b>(0.801)</b>	0.073	<0.001
<b>PSIN1</b>	0.023	-0.070	-0.389	0.014	-0.060	0.527	<b>(0.732)</b>	<0.001
<b>PSIN2</b>	-0.112	-0.160	0.232	0.072	0.030	0.101	<b>(0.789)</b>	<0.001
<b>PSIN3</b>	0.210	0.468	0.395	-0.393	0.163	-0.345	<b>(0.700)</b>	<0.001
<b>PSIN4</b>	-0.105	0.110	0.068	-0.060	-0.126	-0.115	<b>(0.792)</b>	<0.001
<b>PSIN5</b>	0.015	-0.462	-0.446	0.497	0.011	-0.260	<b>(0.813)</b>	<0.001

### 6.2.2.2 Constructs' reliability

According to Hair et al. (2011), construct reliability is considered as an estimate of a construct's internal consistency. The reliability clarifies whether the indicators utilised to assess the latent variables are understood in a similar way by different participants. Many scholars (e.g Ruiz et al., 2008; Ketkar et al., 2012; Kock, 2011; 2013) identified two major measurements to assess reliability, namely; composite reliability and Cronbach's alpha coefficients. A satisfactory construct's composite reliability should be between 0.60 and 0.70 in exploratory research and 0.70 and 0.90 in explanatory research. With respect to the Cronbach's alpha criterion, it is argued that a satisfactory reliability can be achieved when the values higher than 0.70 (Mackenzie et al., 2011). Tables 6.5a and 6.5b shows the composite reliability and Cronbach's alpha measures for all the constructs used in this study.

**Table 6.5a: Composite and Cronbach's Alpha Reliabilities for Public Oil Sector**

<b>Construct</b>	<b>Composite Reliability</b>	<b>Cronbach's Alpha</b>
OC	0.858	0.805
OS	0.917	0.892
IT	0.897	0.861
SSC	0.871	0.834
RSC	0.902	0.878
CSC	0.807	0.791
KSD	0.874	0.813
KSC	0.916	0.898
PDIN	0.867	0.795
PSIN	0.857	0.778

*Note: OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.*

**Table 6.5b: Composite and Cronbach's Alpha Reliabilities for Private Oil Sector**

<b>Construct</b>	<b>Composite Reliability</b>	<b>Cronbach's Alpha</b>
OC	0.907	0.880
OS	0.883	0.845
IT	0.891	0.853
SSC	0.917	0.873
RSC	0.876	0.841
CSC	0.891	0.878
KSD	0.783	0.749
KSC	0.864	0.804
PDIN	0.871	0.799
PSIN	0.835	0.750

*Note: OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.*

As it could be seen from both tables (6.5a and 6.5b), both composite reliability and Cronbach's alpha coefficients are well above the 0.7 suggested threshold for reflective latent variables. Thus, it can be summarised that the reflective measurement instruments used in this research have a satisfactory reliability.

### **6.2.2.3 Constructs' Validity**

According to Hair et al. (2011) checking the construct validity of the reflective indicators is generally based on the examination of two key types of validities; namely: a) convergent and b) discriminant validity. Assessing the construct validity enables the investigator to confirm that the set of indicators indeed assess the latent construct they intend to assess (Henseler et al., 2009). Hair et al. (2010) indicated that validity explains how well the latent variable is represented by its indicators.

Convergent validity assesses the extent to which two indicators under the same construct are correlated (Hair et al., 2010; Hair et al., 2014a). It can be examined by looking at the variance of each indicator in relation to the latent construct. This can be stemmed through the Average Variance Extracted by the latent construct (AVE). The criterion employed to determine a good convergent validity is an AVE of greater than 0.50 as it proposes that the latent

construct can explain more than 50% of the its indicator’s variance (Henseler et al., 2009; Hair et al., 2011; Mackenzie et al., 2011; Peng and Lai, 2012; Schmiedel et al., 2014). Table 6.6a and 6.6b illustrate the AVE for all constructs employed in this research. As it can be seen, AVE for all reflective variables is above the 0.5 threshold, meaning that the measurement constructs have a satisfactory convergent validity.

**Table 6.6a: The Latent Variables’ AVEs for Public Oil Sector Sample**

**Table 6.6b: The Latent variables’ AVEs for Private Oil Sector Sample**

<b>Construct</b>	<b>AVE</b>	<b>Construct</b>	<b>AVE</b>
<b>OC</b>	0.580	<b>OC</b>	0.583
<b>OS</b>	0.615	<b>OS</b>	0.519
<b>IT</b>	0.592	<b>IT</b>	0.577
<b>SSC</b>	0.603	<b>SSC</b>	0.584
<b>RSC</b>	0.531	<b>RSC</b>	0.516
<b>CSC</b>	0.673	<b>CCS</b>	0.538
<b>KSD</b>	0.701	<b>KSD</b>	0.604
<b>KSC</b>	0.579	<b>KSC</b>	0.592
<b>PDIN</b>	0.619	<b>INPD</b>	0.632
<b>PSIN</b>	0.601	<b>INPS</b>	0.570

Note: *OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.*

Complementary to the convergent validity (Hulland, 1999), the discriminant validity, examines the extent to which two conceptually similar constructs have distinct indicators (Hair et al., 2014a). It clarified that it represents the degree to which indicators of a given variable are different from another construct’s indicators (Hulland, 1999). Hair et al. (2014a) stated that creating good discriminant validity implies that the latent variable is unique and assesses a phenomenon not captured by other variables.

Additionally, the convergent validity assessment requires two criteria. Firstly, the Fornell-Larcker criterion stipulating that a latent variable shares more variance with its indicators than with other indicators (Hulland, 1999; Hanseler et al., 2009; Kock, 2011). In this case, the square root of AVE of the latent construct should be higher than other constructs along the diagonal (Hulland, 1999; Ketkar et al., 2012; Peng and Lai, 2012). Secondly, the indicator’s

loading with its latent constructs should be higher than the remaining cross loadings (loading with other latent variables) (Hair et al., 2011; Hair et al., 2014a; Schmiedel et al., 2014). It can be argued that while the Fornell-Larcker criterion assesses the discriminant validity at the latent variable level, the cross loading criterion examines this at the indicator level (Hanseler et al., 2009).

Tables 6.7a and 6.7b show the squares root of AVEs. As it can be seen in Tables 6.7a and 6.7b, for each latent variable, the squares root of AVE is greater than any of the other correlations involving that construct. Furthermore, all the indicators' loadings with their latent variables are higher than the cross loadings (loadings with other constructs). Hence, it can be concluded that the latent variables have satisfactory discriminant validity.

**Table 6.7a: Squares Root of AVEs for Public Oil Sector**

	<b>OC</b>	<b>OS</b>	<b>IT</b>	<b>SSC</b>	<b>RSC</b>	<b>CSC</b>	<b>KSD</b>	<b>KSC</b>	<b>PDIN</b>	<b>PSIN</b>
<b>OC</b>	(0.798)	0.655	0.723	0.727	0.561	0.651	0.652	0.417	0.791	0.662
<b>OS</b>	0.655	(0.784)	0.777	0.651	0.604	0.521	0.592	0.531	0.687	0.694
<b>IT</b>	0.723	0.777	(0.869)	0.824	0.485	0.702	0.641	0.621	0.730	0.850
<b>SSC</b>	0.549	0.431	0.612	(0.886)	0.398	0.498	0.458	0.609	0.458	0.702
<b>RSC</b>	0.392	0.630	0.495	0.691	(0.804)	0.485	0.510	0.518	0.618	0.481
<b>CSC</b>	0.517	0.451	0.651	0.506	0.531	(0.792)	0.385	0.521	0.600	0.672
<b>KSD</b>	0.410	0.619	0.710	0.701	0.602	0.521	(0.836)	0.500	0.642	0.632
<b>KSC</b>	0.621	0.603	0.319	0.618	0.495	0.508	0.616	(0.792)	0.721	0.710
<b>PDIN</b>	0.791	0.687	0.730	0.727	0.543	0.385	0.421	0.623	(0.887)	0.702
<b>PSIN</b>	0.662	0.694	0.518	0.689	0.490	0.601	0.359	0.718	0.702	(0.875)

*Note: OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.*

**Table 6.7b: Squares Root of AVEs for Private Oil Sector**

	<b>OC</b>	<b>OS</b>	<b>IT</b>	<b>SSC</b>	<b>RSC</b>	<b>CSC</b>	<b>KSD</b>	<b>KSC</b>	<b>PDIN</b>	<b>PSIN</b>
<b>OC</b>	(0.763)	0.688	0.730	0.378	0.478	0.467	0.640	0.647	0.677	0.722
<b>OS</b>	0.688	(0.879)	0.732	0.563	0.489	0.478	0.467	0.478	0.743	0.753
<b>IT</b>	0.730	0.732	(0.860)	0.478	0.407	0.428	0.329	0.426	0.730	0.785
<b>SSC</b>	0.573	0.536	0.473	(0.836)	0.627	0.618	0.483	0.723	0.647	0.650
<b>RSC</b>	0.628	0.638	0.738	0.478	(0.749)	0.480	0.618	0.378	0.463	0.518
<b>CSC</b>	0.378	0.483	0.487	0.430	0.647	(0.874)	0.487	0.673	0.457	0.678
<b>KSD</b>	0.473	0.419	0.638	0.719	0.470	0.467	(0.789)	0.593	0.468	0.631
<b>KSC</b>	0.473	0.637	0.473	0.375	0.493	0.627	0.526	(0.852)	0.598	0.509
<b>PDIN</b>	0.677	0.743	0.730	0.309	0.409	0.471	0.492	0.467	(0.795)	0.769
<b>PSIN</b>	0.722	0.853	0.785	0.618	0.471	0.398	0.723	0.618	0.769	(0.812)

*Note: OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.*



#### 6.2.2.4 Collinearity test

In addition to the validity and reliability tests, Schloars proposed that it is important to conduct a full collinearity test (Kock and Lynn, 2012). According to Hair et al. (2014a), collinearity emerges when two or multiple indicators (multicollinearity) are highly correlated (redundancy among constructs). In PLS-SEM, Kock and Lynn (2012) recommends utilizing the full variance inflation factor (VIF) for each predictor construct to measure the full collinearity. Kock and Lynn (2012) also debated that a full collinearity test can also be employed to check the common method bias. Researchers stated that the rule of thumb is a full VIF less than 5 (Hair et al., 2012). Tables 6.8a and 6.8b illustrate the full collinearity (Full VIFs). As it can be seen, all VIFs are below the thresholds five suggesting no collinearity issues between the constructs and confirming the absence of common method bias.

**Table 6.8a: Full VIFs for Public Oil Sector**

**Table 6.8b: Full VIFs for the Private Oil Sector**

Latent Variables	FULL VIF	Latent variables	FULL VIF
OC	3.409	OC	2.716
OS	2.786	OS	4.078
IT	3.718	IT	4.165
SSC	4.310	SSC	1.306
RSC	2.267	RSC	3.258
CSC	1.194	CSC	1.104
KSD	3.312	KSD	3.421
KSC	4.204	KSC	2.260
PDIN	3.508	INPD	3.043
PSIN	3.860	INPS	4.338

Note: Note: OC= Organisational Culture; OS= Organisational Structure; IT=Information Technology; SSC= Structural Social Capital ; RSC= Relational Social Capital ; CSC= Cognitive Social Capital; KSD= Knowledge Donating ; KSC= Knowledge Collecting; PDIN =Product Innovation, PSIN=Process Innovation.

#### 6.2.3. Measurement Model of the Formative Second Order Constructs

In the light of the discussion in section (6.2), second order constructs used in this study are formative variables (Type II). Peng and Lai (2012) acknowledged that the statistical

measurement model assessments for reflective indicators cannot be applied to formative indicators. It is indicated that “the concepts of internal consistency reliability and convergent validity are not meaningful when formative indicators are involved” (Hair et al., 2011: 146). Formative indicators are not necessarily correlated with each other, it is rather their composite that form the latent construct (Kock, 2013). Researchers stressed that reliability assesses such as composite reliability and Cronbach’s alpha are inappropriate for formative indicators (Mackenzie et al., 2011). However, others have debated that with PLS-SEM, the measurement model’s quality including formative indicators can still be measured (Hair et al., 2011).

In checking the quality of the formative measurement model, the researcher should examine whether each indicator truly contributes to forming the latent variable it intend to form (Hair et al., 2011). Petter et al. (2007) claimed that confirming content validity for formative indicators implies that the composite assesses selected by the investigator capture the full domain of the construct. It has suggested checking this contribution through the indicator’s weight (Hair et al., 2011). Cenfetelli and Brasselier (2009) indicated that if both indicator’s weight and loading are non-significant, it would mean that the indicator does not contribute to forming the construct it intends to do and thus could be considered for elimination. Other scholars (e.g., schmiedel et al., 2014) have only looked at the indicator’s weight. Such view supported by Kock (2011), who clarified that investigators may depend on p values associated to the indicators’ weights to assess the validity of the formative constructs.

Nevertheless, researchers (e.g., Hair et al., 2011) have advised that if the conceptual foundations strongly support the inclusion of a non-significant indicator in the formative scale, the researcher should keep this item. Henseler et al. (2009) illustrated that one reason of such a contradictory scenario could be a high level of multicollinearity of the indicator

(redundancy of the indicator's information). In this situation, the Variance Inflation Factor (VIF) should be assessed (Schmiedel et al., 2014).

The extant literature reveals that there are two prospective concerning the suitable level of VIFs (this is not to be mixed with the full VIF). For instance, several researchers views that VIFs should be lower than (5) (Hair et al., 2012). Whereas Kaleka (2012) and Kock (2013), among others, recommended that VIFs should be a more relaxed threshold of (10). The following tables (tables 6.9a, 6.9b, 6.10a and 6.10b) show the indicator's loadings, weights and VIFs for the second order formative variables. As it can be observed, all p values and VIFs are less than the threshold. As it could be noticed from the tables, all second orders' indicators loadings and weights were significant and with a VIF not exceeding the critical value of 3.3. Hence, suggesting a good validity.

**Table 6.9a: 2nd Order Indicators' Loadings in the public sector**

Constructs	SC	KS	P Value
SSC	(0.755)	0.095	<0.001
RSC	(0.776)	0.031	<0.001
CSC	(0.783)	0.397	<0.001
KSD	0.462	(0.791)	<0.001
KSC	- 0.106	(0.764)	<0.001

**Table 6.9b: 2nd Order Indicators' Loadings in the Private Sector**

Constructs	SC	KS	P Value
SSC	(0.755)	0.072	<0.001
RSC	(0.727)	0.095	<0.001
CSC	(0.783)	0.031	<0.001
KSD	0.462	(0.791)	<0.001
KSC	- 0.160	(0.799)	<0.001

**Table 6.10a: 2nd Order Constructs' Indicator Weights and VIF for the Public Sector**

Constructs	SC	KS	P value	VIF	Effect Size
SSC	(0.190)	0.000	0.002	1.751	0.003
RSC	(0.188)	0.000	0.002	1.820	0.476
CSC	(0.194)	0.000	0.007	1.844	0.048

KSD	0.000	(0.162)	<0.001	1.971	0.002
KSC	0.000	(0.220)	<0.001	1.648	0.483

**Table 6.10b: 2nd Order Constructs' Indicator Weights and VIF for the Private Sector**

Constructs	SC	KS	P value	VIF	Effect Size
SSC	(0.172)	0.000	0.002	1.962	0.159
RSC	(0.156)	0.000	0.002	2.320	0.043
CSC	(0.178)	0.000	0.007	1.373	0.081
KSD	0.000	(0.162)	<0.001	1.427	0.085
KSC	0.000	(0.273)	<0.001	1.820	0.058

### 6.2.2.5 Collinearity test

As indicated above for the first order variables, in PLS-SEM, Kock and Lynn (2012) suggested that the full collinearity can be assessed by using the full variance inflation factor (VIF) for each predictor construct. Tables 6.11a and 6.11b show the full collinearity (Full VIFs).

**Table 6.11a: Full VIFs of the 2nd Order Constructs for Public**

Constructs	SC	KS
<b>FULL VIFs</b>	3.767	1.821

**Table 6.11b: Full VIFs of the 2nd Order Constructs for Private**

Constructs	SC	KS
<b>FULL VIFs</b>	4.196	1.541

Owing on the reliability, validity and collinearity tests undertaken for both the first and second order variables, it can be argued that the measurement model presents satisfactory values and hence, the investigator can safely proceed to the analysis of the structural model.

### 6.2.4. The Structural Model Results

After assessed the measurement model and ensured the reliability and validities of all constructs applied in this study (first and second order), the following step is to analyse the structural model in order to check the links among the investigated variables. It is recognised that a reliable and valid measurement model is the basis of an accurate estimate of the

structural model (Hanseler et al., 2009). Hair et al. (2014b) argued that the main steps to measure the structural model are first to evaluate the significance and relevance of the structural relationships, second to assess the values of  $R^2$ , third to measure the effect size  $f^2$  and finally to review the Q2. Therefore, next the aforementioned steps, the current section evaluate the structural model.

#### 6.2.4.1 Model fit indices

there three indices including average path coefficient (APC), average R-squared (ARS) and average variance inflation factor (AVIF) is used to explain assessing the model fit in the PLS-SEM. It is recommended that for a satisfactory model fit indices, both p values of APC and ARS should be significant (less than 0.05) and an AVIF lower than 5 (Kock, 2011).

With respect to the overall goodness-of-fit measures (GoF), researchers (e.g., Chin, 1998; Hulland, 1999; Hair et al., 2013) have argued that this may not be relevant in PLS-SEM. Indeed, it is explained that such a measure only considers reflective constructs and hence when using the PLS-SEM which allows both formative and reflective indicators, the goodness measure become irrelevant (Chin, 1998). Other authors stated “Since the GoF is also not applicable to formatively measurement models...researchers are advised to not use this measure” (Hair et al., 2014a: 185). The next tables (Table 6.12a and 6.12b) present the model fit indices for the present model. It can be clearly seen that the quality indices do all comply with the criteria of a fit model.

**Table 6.12a: Model Fit Indices for Public Oil Sector**

<b>Indices</b>	<b>Results</b>	<b>Criterion</b>
Average path coefficient (APC)	0.226 $P < 0.001$	P value less than 0.05
Average R-squared (ARS)	0.722 $P < 0.001$	P value less than 0.05
Average adjusted R-squared (AARS)	0.716 $P < 0.001$	P value less than 0.05
Average block VIF (AVIF)	3.339	Acceptable if $\leq 5$ , ideally $\leq 3.3$
Average full collinearity VIF (AFVIF)	3.696	Acceptable if $\leq 5$ , ideally $\leq 3.3$

**Table 6.12b: Model Fit Indices for Private Oil Sector**

Indices	Results	Criterion
Average path coefficient (APC)	0.207 P < 0.001	P value less than 0.05
Average R-squared (ARS)	0.643 P < 0.001	P value less than 0.05
Average adjusted R-squared (AARS)	0.635 P < 0.001	P value less than 0.05
Average block VIF (AVIF)	3.311	Acceptable if $\leq 5$ , ideally $\leq 3.3$
Average full collinearity VIF (AFVIF)	3.582	Acceptable if $\leq 5$ , ideally $\leq 3.3$

**6.2.4.2 The path analysis (structural relationships)**

The results of the data analysis of both samples are presented in Figures 8.1 and 8.2. The arrows and adjacent values illustrate the effects between the variables and their  $\beta$  coefficients, including their p values.  $R^2$  values show the explained variance of endogenous latent variables in the structural model (Hair et al., 2014); these are displayed under the endogenous variables.

The structural model relationships shown in figures 6.1 and 6.2 represent the hypothesised relationships proposed in section 3.3. These are represented by the path coefficients ( $\beta$ ). The  $\beta$  coefficients have standardised values ranging from -1 to +1, values close to +1 represents strong positive relationships whereas values close to -1 represents the contrary (Hair et al., 2014). Accordingly, the assessment of the path coefficients ( $\beta$ ) indicated that the six hypothesised paths are all positive and significant. With respect to public oil sector' sample, Figure 6.1 illustrates that organisational context (OC, OS and IT) had a positive and significant effect on firms' social capital in public oil sector ( $\beta=0.41, 0.28, 0.29, P<0.01$  respectively). As for the effect of organisational context (OC, OS and IT) on knowledge sharing behaviour, organisational context was found to have a positive and statistically significant influence on knowledge sharing ( $\beta=0.22, 0.38, 0.27, P<0.01$  respectively). Turning to the impact of social capital on knowledge sharing, social capital was found to have a positive and statistically significant influence on knowledge sharing ( $\beta=0.18, P<0.01$ ).

Moreover, it was found that the social capital had a significant impact on product and process innovation ( $\beta=0.22$  and  $0.31$ ,  $P<0.01$  respectively), and knowledge sharing also had a significant influence innovation, product and process ( $\beta=0.36$  and  $0.29$ ,  $P<0.01$  respectively). Finally, for direct effect, the path coefficient indicated that organisational context was found to have a positive and statistically significant influence on product innovation ( $\beta=0.19$ ,  $0.14$  and  $0.15$ ,  $P<0.01$  respectively), and process innovation ( $0.10$ ,  $0.15$  and  $0.12$ ,  $P<0.01$  respectively).

Turning to private oil sector sample, Figure 6.2 shows that organisational context (OC, OS and IT) had a positive and significant effect on social capital ( $\beta=0.22$ ,  $0.18$  and  $0.34$ ,  $P<0.01$  respectively). As for the effect of organisational context (OC, OS and IT) on knowledge sharing behaviour, organisational context was found to have a positive and statistically significant influence on knowledge sharing ( $\beta= 0.28$ ,  $0.16$  and  $0.46$ ,  $P<0.01$  respectively). With respect to the influence of social capital on knowledge sharing, social capital was found to have a positive and statistically significant influence on knowledge sharing ( $\beta= 0.23$ ,  $P<0.01$ ). Additionally, the path coefficient indicated that the social capital had a significant impact on product and process innovation ( $\beta=0.39$  and  $0.28$   $P<0.01$  respectively), and knowledge sharing also was found to have a positive and statistically significant influence innovation, product and process ( $\beta=0.31$  and  $0.34$   $P<0.01$  respectively). As for the direct effect of organisational context (OC, OS and IT) on innovation, product and process, organisational context was found to have a positive and statistically significant influence on product innovation ( $\beta=0.17$ ,  $0.10$  and  $0.16$   $P<0.01$  respectively), and process innovation ( $\beta= 0.11$ ,  $0.13$  and  $0.14$ ,  $P<0.01$  respectively).

Figure 6.1: Oil Public Sectors' Model

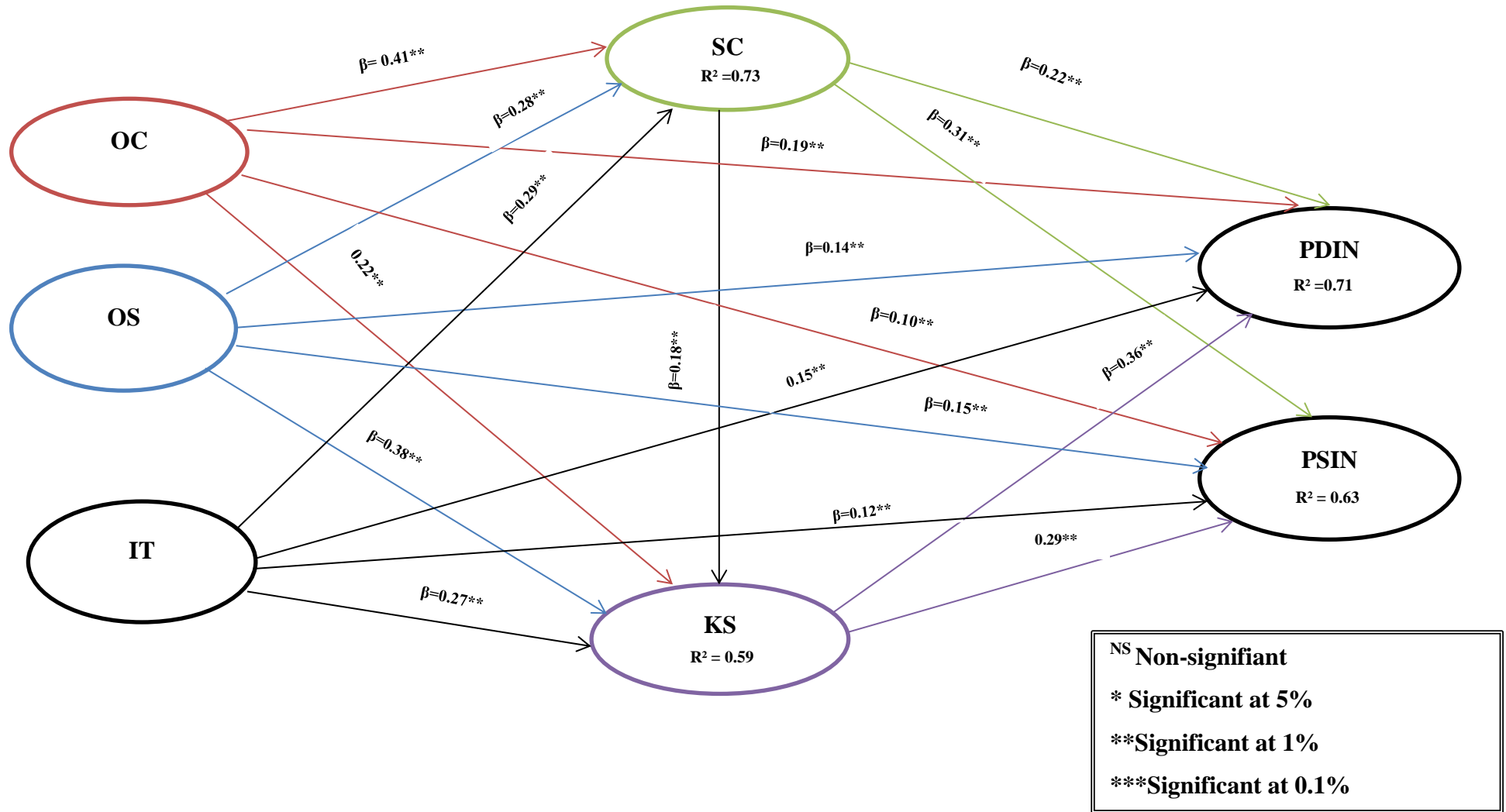
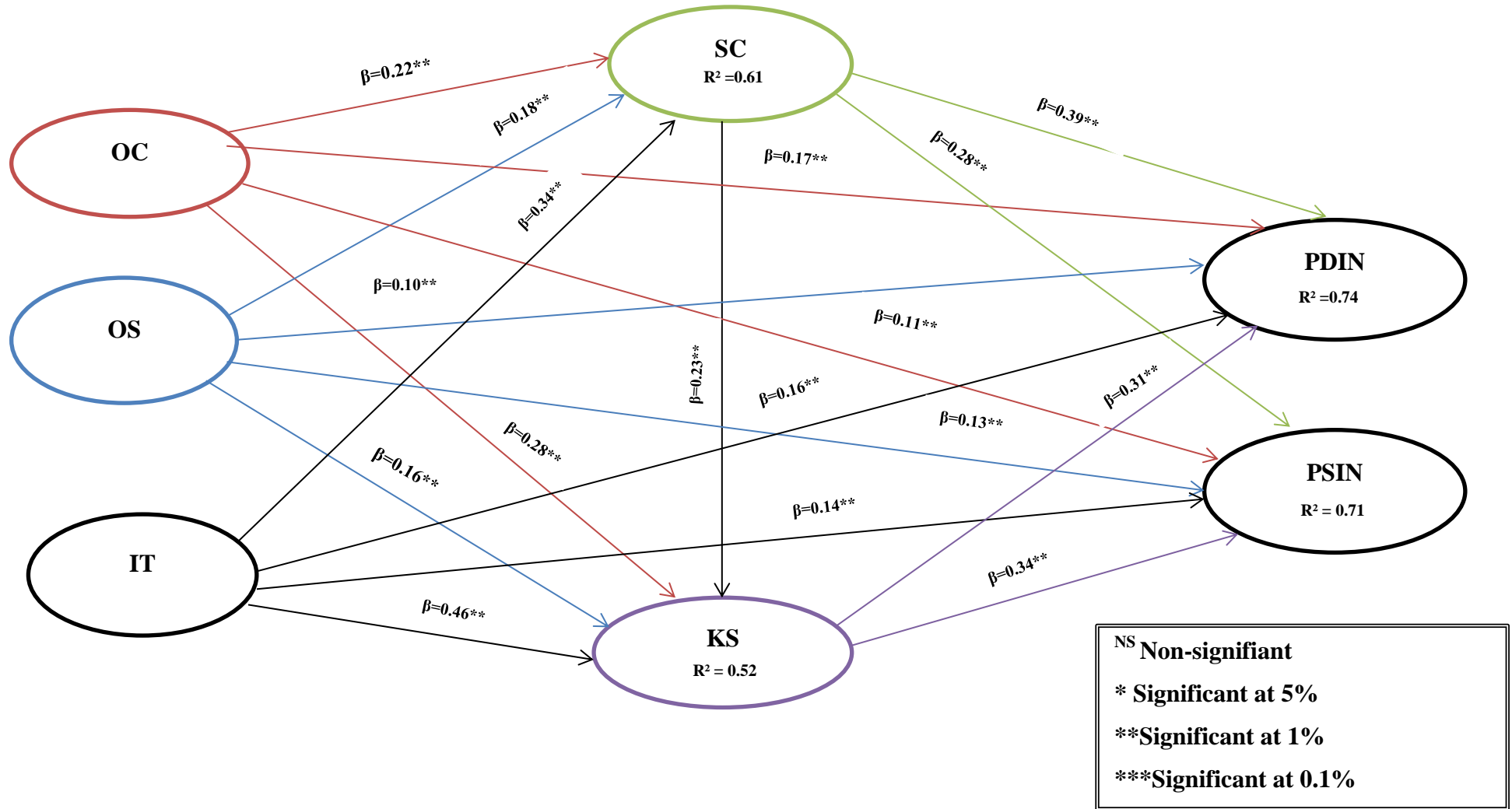




Figure 6.2: Oil Private Sectors' Model



Several researchers (e.g., Henseler et al., 2009; Hair et al., 2012) indicated that the evaluation of the R<sup>2</sup> coefficient (also known as the coefficient of determination) of the endogenous latent variables is an essential step in assessing the structural model. In using PLS-SEM, Hulland (1999) and Peng and Lai (2012) stressed the importance of reporting all R<sup>2</sup> values. However, despite its obvious significance, Martinez-Lopez et al. (2013) found in their analysis of 191 papers published in the four leading marketing journals between 1995 and 2007, that only 35% have reported the R<sup>2</sup> values. Hair et al. (2014a: 93) defined the R<sup>2</sup> as the “amount of explained variance of endogenous latent variables in the structural model”. The authors explained that the greater is the R<sup>2</sup> values, the better the latent variable is explained by the constructs pointing at it through the structural model path model.

The review of the literature reveals that, the acceptable level of R<sup>2</sup> values seems to differ from one discipline to another. For instance, scholars such as Hair et al. (2011) indicted that 0.75 are seen to be high in success driver studies, whereas, 0.20 is considered as high in consumer behaviour. However, the authors have set 0.75, 0.50 and 0.25 can be seen as high, moderate and weak. Furthermore, researchers (e.g., Chin, 1998; Henseler et al., 2009) stated that values of 0.67, 0.33 and 0.19 could be considered as high, moderate and weak. Tables 6.13a and 6.13b summarise all the coefficient values.

**Table 6.13a: Path Coefficients, P Values and R Squares for Public Oil Sector**

Hypothesized Links	Path Coefficient	P Value	R <sup>2</sup>	Description
OC → SC	0.41	<0.01	0.73	Positive, significant and close to high
OS → SC	0.28	<0.01	0.73	Positive, significant and close to high
IT → SC	0.29	<0.01	0.73	Positive, significant and close to high
OC → KS	0.22	<0.01	0.59	Positive, significant and moderate
OS → KS	0.38	<0.01	0.59	Positive, significant and moderate
IT → KS	0.27	<0.01	0.59	Positive, significant and moderate
SC → KS	0.18	<0.01	0.59	Positive, significant and moderate
SC → PDIN	0.22	<0.01	0.71	Positive, significant close to high
SC → PSIN	0.31	<0.01	0.63	Positive, significant and moderate
KS → PDIN	0.36	<0.01	0.71	Positive, significant close high

KS → PSIN	0.29	<0.01	0.63	Positive, significant and moderate
OC → PDIN	0.19	<0.01	0.71	Positive, significant close to high
OC → PSIN	0.10	<0.01	0.63	Positive, significant and moderate
OS → PDIN	0.14	<0.01	0.71	Positive, significant close to high
OS → PSIN	0.15	<0.01	0.63	Positive, significant and moderate
IT → PDIN	0.10	<0.01	0.71	Positive, significant close to high
IT → PSIN	0.12	<0.01	0.63	Positive, significant and moderate

**Table 6.13b: Path Coefficients, P Values and R Squares for Private Oil Sector**

Hypothesised Links	Path Coefficient	P Value	R <sup>2</sup>	Description
OC → SC	0.22	<0.01	0.61	Positive, significant and moderate
OS → SC	0.18	<0.01	0.61	Positive, significant and moderate
IT → SC	0.34	<0.01	0.61	Positive, significant and moderate
OC → KS	0.28	<0.01	0.52	Positive, significant and moderate
OS → KS	0.16	<0.01	0.52	Positive, significant and moderate
IT → KS	0.46	<0.01	0.52	Positive, significant and moderate
SC → KS	0.23	<0.01	0.52	Positive, significant and moderate
SC → PDIN	0.39	<0.01	0.74	Positive, significant and close to high
SC → PSIN	0.28	<0.01	0.71	Positive, significant and close to high
KS → PDIN	0.31	<0.01	0.74	Positive, significant and close to high
KS → PSIN	0.34	<0.01	0.71	Positive, significant and close to high
OC → PDIN	0.17	<0.01	0.74	Positive, significant and close to high
OC → PSIN	0.11	<0.01	0.71	Positive, significant and close to high
OS → PDIN	0.10	<0.01	0.74	Positive, significant and close to high
OS → PSIN	0.13	<0.01	0.71	Positive, significant and close to high
IT → PDIN	0.16	<0.01	0.74	Positive, significant and close to high
IT → PSIN	0.14	<0.01	0.71	Positive, significant and close to high

In the public oil sector sample and from Table 6.13a, the interpretation of the R<sup>2</sup> values of the endogenous variables is as follows, while 73% of social capital is predicted by organisational context including organisational culture, structure and information technology, 59% of knowledge sharing is predicted by organisational context (OC, OS and IT) and social capital. 71% and 63% of both product and process innovation respectively are predicted by social capital, knowledge sharing and organisational context (OC, OS and IT).

With regard to the private oil sample and from Table 6.13b, while 61% of social capital is predicted by organisational context (OC, OS and IT), 52% of knowledge sharing is predicted by organisational context (OC, OS and IT) and social capital. 74% and 71% of both product

and process innovation respectively are predicted by social capital, knowledge sharing and organisational context (OC, OS and IT).

Regarding the effect size of variables, It is suggested that the effect size should also be examined in order to show the extent to which a predictor variable weighs at the structural level (Henseler et al., 2009). The effect size ( $f^2$ ) is defined “as the increase in  $R^2$  relative to the proportion of variance that remains unexplained in the endogenous latent variable” (Peng and Lai, 2012: 473). According to Cohen (1988 cited in Peng and Lai, 2012 and Hair et al., 2014a), values of 0.02, 0.15 and 0.35 are considered to be weak, medium and large respectively. Tables 6.14a and 6.14b report the values for the effect sizes.

**Table 6.14a: The Effect Sizes for Public Oil Sector**

<b>Correlations</b>	<b>Effect Size</b>	<b>Description</b>
OC → SC	0.361	Large
OS → SC	0.135	Medium
IT → SC	0.194	Medium
OC → KS	0.172	Medium
OS → KS	0.143	Medium
IT → KS	0.139	Medium
SC → KS	0.116	Medium
SC → PDIN	0.172	Medium
SC → PSIN	0.201	Medium
KS → PDIN	0.139	Medium
KS → PSIN	0.013	Weak
OC → PDIN	0.039	Weak
OC → PSIN	0.006	Weak
OS → PDIN	0.098	Weak
OS → PSIN	0.067	Weak
IT → PDIN	0.043	Weak
IT → PSIN	0.0765	week

**Table 6.14b: The Effect Sizes for Private Oil Sector**

<b>Correlations</b>	<b>Effect Size</b>	<b>Description</b>
OC → SC	0.169	Medium
OS → SC	0.094	Weak
IT → SC	0.230	Medium
OC → KS	0.143	Medium
OS → KS	0.076	Weak
IT → KS	0.264	large

SC → KS	0.159	Medium
SC → PDIN	0.256	large
SC → PSIN	0.135	Medium
KS → PDIN	0.201	Medium
KS → PSIN	0.230	Medium
OC → PDIN	0.084	Weak
OC → PSIN	0.009	Weak
OS → PDIN	0.006	Weak
OS → PSIN	0.031	Weak
IT → PDIN	0.076	Weak
IT → PSIN	0.040	Weak

Based on Table 6.14a, it can be said that in the case of public oil sector, effect of organisational culture was a large on social capital and, a medium on knowledge sharing. In contrast, organisational structure had a medium on both social capital and knowledge sharing. Information technology whereas had a medium effect on social capital, and a weak effect on knowledge sharing. Furthermore, the effect of social capital on knowledge sharing was a medium. Moreover, while social capital had a medium effect on product and process innovation, knowledge sharing had a medium effect on product innovation, and a weak effect process innovation. Furthermore, organisational culture had a weak effect on both product innovation and process innovation. The effect size of organisational structure was a weak on both product and process innovation, whereas information technology had a weak effect on product innovation and process innovation.

Concerning private oil sector, it can be stated from table 6.14b that while organisational culture had a medium the effect size on both the social capital and knowledge sharing, the organisational structure had weak effect size on both social capital and knowledge sharing. Whereas, the effect size of the information technology on social capital was a medium, and knowledge sharing was a large. Moreover, the effect size of the social capital on knowledge sharing was a medium. In turn, social capital had a large effect on product innovation, and a medium on process innovation. While, knowledge sharing had a medium effect on product

and process innovation, the organisational culture had a weak effect on both product innovation and process innovation. Furthermore, both organisational structure and information technology had a weak effect on both product and process innovation.

Broadly speaking, several researchers emphasised the importance of reporting the Stone-Geisser Q2 measure (e.g Chin, 1998; Henseler et al., 2009; and Hair et al., 2012; Hair et al., 2014a). According to Hair et al. (2014a), it assesses the model's predictive relevance. Tenenhaus et al. (2005) stated that Q2 is a cross-validated R<sup>2</sup> between the indicators of an endogenous construct and all the indicators associated with the constructs predicting the dependent variables. Henseler et al. (2009) and Astrachan et al. (2014) suggested a Q2 greater than 0 meaning that the model has good predictive relevance. Furthermore, Hair et al. (2014) argued that values of 0.02, 0.15 and 0.35 shows a weak, moderate and strong degree of predictive relevance. The following tables (Tables 6.15a and 6.15b) illustrate the Q2 values of the dependant (endogenous) variables for each sample.

As it could be seen, in the public oil sector, all the Q2 values are greater than 0. Moreover, while both product and process innovation had a strong predictive relevance the social capital and knowledge sharing ones had also a strong predictive relevance. Concerning private oil sector, both product and process innovation constructs had a strong predictive relevance, the social capital and knowledge sharing had a high predictive relevance. Therefore, it can be concluded that all endogenous constructs had a strong predictive relevance for both public and private oil sector.

**Table 6.15a: Q Squared of the Endogenous Constructs for (Q2) for Public Oil Sector**

	<b>OC</b>	<b>OS</b>	<b>IT</b>	<b>SC</b>	<b>KS</b>	<b>PDIN</b>	<b>PSIN</b>
<b>Q Squared</b>	n.a	n.a	n.a	0.718	0.468	0.718	0.743

**Table 6.15b: Q Squared of the Endogenous Constructs for (Q2) for Private Oil Sector**

	<b>OC</b>	<b>OS</b>	<b>IT</b>	<b>SC</b>	<b>KS</b>	<b>PDIN</b>	<b>PSIN</b>
<b>Q Squared</b>	n.a	n.a	n.a	0.757	0.620	0.664	0.821

### **6.3. Direct and Indirect Effects (Mediation Test)**

Frazier et al. (2004) define mediating variable as a variable that explains the correlation among an exogenous (independent variable) and an endogenous (dependent variable). Hair et al. (2014a) explains that a mediator provides information about an established and significant direct relationship. Thus, a mediator explains the mechanism via which a direct relationship takes place (Frazier et al., 2004).

According to Kock (2013) mediation can be partial or full (complete). Kock goes further by explaining that when the relationships between the dependent and independent variables is significant (as a direct correlation) and become insignificant upon the inclusion of the mediating variable (the indirect effect should remain significant), the mediation here is considered to be full. However, when the direct relationship remains significant upon the inclusion of the mediating variable, the mediation would be partial.

In accordance with Kock (2013) and Hair et al. (2014a) guidance, assessing a mediating effect should be applied based on the following phases, Firstly, the determination of the direct relationship between the exogenous and endogenous variables without including the mediating factor, if this is significant, the researcher can continue to the second step. Secondly, the inclusion of the mediating variable in the relationship, if the indirect effect is significant and the direct effect remain significant too, one can conclude that a partial mediation has taken place. Nonetheless, if the indirect effect is significant and the direct effect become non-significant, then the researcher can conclude a full mediation. Last, if the indirect effect is non-significant, then one can conclude that there is no mediation effect.

In this study, both social capital and knowledge sharing are hypothesised to be mediating the relationship between organisational culture, structure and information technology (independent variables) and product and process innovation (dependent variables). Tables 6.16a and 6.16b illustrate the different steps applied on this study to detect a mediating effect.

**Table 6.16a: Mediating Effect for Public Oil Sector**

Direct and Indirect Relationship	Relationship	Path Coefficient	P value	Nature
<b>Step One</b> Direct (without the mediating variables )	OC → PDIN	0.14	<0.01	Significant
	OC → PSIN	0.03	0.05	Significant
	OS → PDIN	0.08	<0.01	Non-Significant
	OS → PSIN	0.12	<0.01	Significant
	IT → PDIN	0.19	<0.01	Significant
	IT → PSIN	0.10	<0.01	Significant
<b>Step Two</b> Direct	OC → PDIN	0.19	<0.01	Significant
	OC → PSIN	0.10	0.05	Significant
	OS → PDIN	0.14	<0.01	Significant
	OS → PSIN	0.15	<0.01	Significant
	IT → PDIN	0.15	<0.01	Significant
	IT → PSIN	0.12	<0.01	Significant
Indirect (Through Social capital and knowledge sharing)	OC → SC	0.41	<0.01	Significant
	OC → KS	0.22	<0.01	Significant
	OS → SC	0.28	<0.01	Significant
	OS → KS	0.38	<0.01	Significant
	IT → SC	0.29	<0.01	Significant
	IT → KS	0.27	<0.01	Significant
	SC → KS	0.18	<0.01	Significant
	SC → PDIN	0.22	<0.01	Significant
	SC → PSIN	0.31	<0.01	Significant
KS → PDIN	0.36	<0.01	Significant	
KS → PSIN	0.29	<0.01	Significant	

**Table 6.16b: Mediating Effect for Private Oil Sector**

Direct and Indirect Relationship	Relationship	Path Coefficient	P value	Nature
<b>Step One</b> Direct (without the mediating variables )	OC → PDIN	0.01	0.05	Significant
	OC → PSIN	0.09	0.32	Non-Significant
	OS → PDIN	0.19	<0.01	Significant
	OS → PSIN	0.41	<0.01	Significant
	IT → PDIN	0.31	<0.01	Significant
	IT → PSIN	0.16	<0.01	Significant



<b>Step Two</b>	<b>OC</b> → <b>PDIN</b>	0.17	<0.01	Significant
	<b>OC</b> → <b>PSIN</b>	0.11	<0.01	Significant
	<b>OS</b> → <b>PDIN</b>	0.10	<0.01	Significant
	<b>OS</b> → <b>PSIN</b>	0.13	<0.01	Significant
	<b>IT</b> → <b>PDIN</b>	0.16	<0.01	Significant
	<b>IT</b> → <b>PSIN</b>	0.14	<0.01	Significant
<b>Indirect</b> (Through Social capital and knowledge sharing)	<b>OC</b> → <b>SC</b>	0.22	<0.01	Significant
	<b>OC</b> → <b>KS</b>	0.28	<0.01	Significant
	<b>OS</b> → <b>SC</b>	0.18	<0.01	Significant
	<b>OS</b> → <b>KS</b>	0.16	<0.01	Significant
	<b>IT</b> → <b>SC</b>	0.34	<0.01	Significant
	<b>IT</b> → <b>KS</b>	0.46	<0.01	Significant
	<b>SC</b> → <b>KS</b>	0.23	<0.01	Significant
	<b>SC</b> → <b>PDIN</b>	0.39	<0.01	Significant
	<b>SC</b> → <b>PSIN</b>	0.28	<0.01	Significant
	<b>KS</b> → <b>PDIN</b>	0.31	<0.01	Significant
	<b>KS</b> → <b>PSIN</b>	0.34	<0.01	Significant

Based on Table 6.16a, it can be concluded that in the case of public oil sector, the indirect effect is significant and the direct effect remain significant too. This means a partial mediation effect has taken place between organisational context including organisational culture, structure and information technology and innovation, product and process. Conversely, with respect to private oil sector, and from Table 6.16b, a partial mediation was also found between the organisational context including organisational culture, structure and information technology on both product and process innovation.

In addition, to assess how much of the direct effect does the indirect link absorb (via the mediators), the Variance Accounted For (VAF) can be calculated using the formulas below (Hair et al., 2014a). According to the authors, a VAF higher than 80% indicates a full mediation, while a VAF between 20% and 80% would mean a partial mediation and a VAF less than 20% shows that there is no mediation. Tables 6.17a and 6.17b below subsequently summarise meditation analysis for public and private oil sector through using the VAFs calculations below.

$$VAF = \frac{(Pim * Pmd)}{(Pim * Pmd + Pid)}$$

Where:

*Pim*: the path between the independent and mediator

*Pmd*: the path between the mediator and the dependent variable

*Pid*: the path between the independent and the dependent variables

**Table 6.17a: Summary of Mediation Analysis of Public Oil Sector**

Investigated relationships	B	% of the total effect (% of the total indirect effect mediation Magnitude)
<b><i>Organisational context including (OC, OS and IT) and product innovation</i></b>		
OC → PDIN	-	-
Total effect	0.36	100%
Direct effect before including SC and KS	0.14**	100%
Direct effect after including SC and KS	0.19**	53%
Total indirect via SC and KS	0.1702	47% (Partial)
Specific indirect effect via SC (OC → SC → PDIN)	0.41*0.22=0.0902	25% (Partial)
Specific indirect effect via KS (OC → KS → PDIN)	0.22*0.36=0.08	22% (Partial)
<b><i>OS → PDIN</i></b>		
OS → PDIN		
Total effect	0.3802	100%
Direct effect before including SC and KS	0.08 <sup>NS</sup>	100%
Direct effect after including SC and KS	0.14**	37% (Partial)
Total indirect via SC and KS	0.2402	63% (Partial)
Specific indirect effect via SC (OS → SC → PDIN)	0.31*0.22=0.1034	27% (Partial)
Specific indirect effect via KS (OS → KS → PDIN)	0.38*0.36=0.137	36% (Partial)
<b><i>IT → PDIN</i></b>		
IT → PDIN		
Total effect	0.32	100%
Direct effect before including SC and KS	0.19	100%
Direct effect after including SC	0.15**	48% (Partial)

and KS		
Total indirect via SC and KS	0.17	53% (Partial)
Specific indirect effect via SC (IT → SC → PDIN)	0.29*0.22= 0.07	22% (Partial)
Specific indirect effect via KS (IT → KS → PDIN)	0.27*0.36= 0.0972	31% (Partial)
<b>Organisational context including (OC, OS and IT) and process innovation</b>		
OC → PSIN		
Total effect	0.294	100%
Direct effect before including SC and KS	0.03	100%
Direct effect after including SC and KS	0.10**	34% (Partial)
Total indirect via SC and KS	0.194	66% (Partial)
Specific indirect effect via SC (OC → SC → PSIN)	0.41*0.31= 0.13	44% (Partial)
Specific indirect effect via KS (OC → KS → PSIN)	0.22*0.29= 0.064	22% (Partial)
OS → PSIN		
Total effect	0.347	100%
Direct effect before including SC and KS	0.12	100%
Direct effect after including SC and KS	0.15**	43% (Partial)
Total indirect via SC and KS	0.197	57% (Partial)
Specific indirect effect via SC (OS → SC → PSIN)	0.28*0.31= 0.087	25% (Partial)
Specific indirect effect via KS (OS → KS → PSIN)	0.38*0.29= 0.1102	32% (Partial)
IT → PSIN		
Total effect	0.29	100%
Direct effect before including SC and KS	0.10	100%
Direct effect after including SC and KS	0.12**	41% (Partial)
Total indirect via SC and KS	0.17	59% (Partial)
Specific indirect effect via SC (IT → SC → PSIN)	0.29*0.31= 0.09	31% (Partial)
Specific indirect effect via KS (IT → KS → PSIN)	0.27*0.29= 0.08	28% (Partial)

**Table 6.17b: Summary of Mediation Analysis of Private Oil Sector**

Investigated relationships	B	% of the total effect (% of the total indirect effect mediation magnitude)
<b><i>Organisational context including (OC, OS and IT) and product innovation</i></b>		
OC → PDIN	-	-
Total effect	0.3428	100%
Direct effect before including SC and KS	0.01	100%
Direct effect after including SC and KS	0.17**	50%
Total indirect via SC + KS	0.173	50% (Partial)
Specific indirect effect via SC (OC → SC → PDIN)	0.22*0.39 = 0.086	25% (Partial)
Specific indirect effect via KS (OC → KS → PDIN)	0.28*0.31 = 0.087	25% (Partial)
<b><i>OS → PDIN</i></b>		
OS → PDIN	-	-
Total effect	0.2202	100%
Direct effect before including SC and KS	0.19**	100%
Direct effect after including SC and KS	0.10**	45% (Partial)
Total indirect via SC and KS	0.1202	55% (Partial)
Specific indirect effect via SC (OS → SC → PDIN)	0.18*0.39 = 0.0702	32% (Partial)
Specific indirect effect via KS (OS → KS → PDIN)	0.16*0.31 = 0.0496	23% (Partial)
<b><i>IT → PDIN</i></b>		
IT → PDIN		
Total effect	0.44	100%
Direct effect before including SC and KS	0.31	100%
Direct effect after including SC and KS	0.16**	36% (Partial)
Total indirect via SC and KS	0.28	64% (Partial)
Specific indirect effect via SC (IT → SC → PDIN)	0.34*0.39 = 0.133	30% (Partial)
Specific indirect effect via KS (IT → KS → PDIN)	0.46*0.31 = 0.143	34% (Partial)
<b><i>Organisational context including (OC, OS and IT) and process innovation</i></b>		
OC → PSIN		
Total effect	0.27	100%
Direct effect before including SC and KS	0.09	100%
Direct effect after including SC and KS	0.11**	41% (Partial)
Total indirect via SC and KS	0.16	59% (Partial)
Specific indirect effect via SC	0.22*0.28 =	23% (Partial)

→

( OC → SC PSIN)	0.062	
Specific indirect effect via KS ( OC → KS → PSIN)	0.28*0.34 =0.0952	36% (Partial)
OS → PSIN		
Total effect	0.2348	100%
Direct effect before including SC and KS	0.41	100%
Direct effect after including SC and KS	0.13**	55% (Partial)
Total indirect via SC and KS	0.1048	45% (Partial)
Specific indirect effect via SC ( OS → SC → PSIN)	0.18*0.28= 0.0504	22% (Partial)
Specific indirect effect via KS ( OS → KS → PSIN)	0.16*0.34= 0.0544	23% (Partial)
IT → PSIN		
Total effect	0.3916	100%
Direct effect before including SC and KS	0.16	100%
Direct effect after including SC and KS	0.14**	36% (Partial)
Total indirect via SC and KS	0.2516	64% (Partial)
Specific indirect effect via SC ( IT → SC → PSIN)	0.34*0.28= 0.0952	24 % (Partial)
Specific indirect effect via KS ( IT → KS → PSIN)	0.46*0.34= 0.1564	40% (Partial)

Based on Table 6.17a, it can be concluded that in the case of public oil sector, a partial mediation effect has taken place. Precisely, the VAFs of these effects were found to be between 20% and 100%, an example, from practical perspective, the interpretation is that for every one standard deviation increase in the organisational culture, the level of product innovation will increase by 36% with other variables remaining the same. In fact, 53% of the effect organisational culture on the product innovation is explained through direct effect, while 47% via indirect effect (SC and KS). More specially, 25% is explained through SC and 23% through knowledge sharing within public oil sector. Conversely, for every one standard deviation increase in the organisational culture then the level of process innovation will increase by 0.294% with keeping the other variables constant. Indeed, 34% of the effect

organisational culture on the process innovation is mediated through direct effect, while 66% via indirect effect (SC and KS). In more detail, 44% is explained through SC and 22% through knowledge sharing between employees within public oil sector (See Table 6.17a).

To give another example, as for the private oil sector, it can also be argued that a partial mediation effect has taken place. Precisely, the VAFs of these effects were found to be between 20% and 100%, indicating that for every one standard deviation increase in the organisational culture, the level of the product innovation will increase by 0.3428 % with other variables remaining the same. The interpretation of this finding is that 50% of the effect organisational culture on the product innovation is explained through direct effect, whereas 50% of the effect of organisational culture on the product innovation is mediated through social capital and knowledge sharing. More accurately, 25% is explained through social capital and 25% is mediated through knowledge sharing (See Table 6.17b). On the other hand, for every one standard deviation increase in organisational culture, then the level of process innovation will increase by 0.27% with keeping the other variables constant. Indeed, 41% of the effect organisational culture on the process innovation is explained through direct effect, while 59% is mediated via indirect effect (SC and KS). More precisely, 23% is explained through SC and 36% via knowledge sharing among employees.

#### **6.4. Further Analysis**

The further analysis includes the examination of the second order indicators' weights (their effect size) in order to allow the investigator to determine the effect of each sub-dimension within the higher order construct. According to Kock (2013), the effect sizes of the latent variables' indicators weights represents the individual contributions of these indicators to the  $R^2$  coefficients of the corresponding latent variable. Similarly to the effect sizes for paths, these could be small, medium and large (0.02, 0.15, and 0.35 respectively).

In this research, using these effect sizes would allow the researcher to assess not only the importance of each factor within the three social capital sets, but also each factor within the two knowledge sharing sets. In addition, according to Hair et al. (2014), by looking at the construct's indicator weights, the importance and influence of each sub factor can be assessed and hence this should be used to enhance management implications. Given that in the present sample for both public and private oil sector, all three sets of social capital and to set of knowledge sharing were found to be significant on two investigated dependent variables (product and process innovation). Therefore, relational, cognitive and structural social capital and knowledge donating and collecting are all examined in this case. Table 6.18 illustrates the indicators' weights and effect sizes of these factors under each second order constructs.

**Table 6.18: Sub-Samples Analysis**

<b>Public Sample</b>			
<b>Social Capital-Factor</b>	<b>Indicator's weight</b>	<b>Effect size</b>	<b>Rank</b>
Relational Social Capital (RSC)	0.188	0.476	1
Cognitive Social Capital (CSC)	0.194	0.048	2
Structural Social Capital (SSC)	0.190	0.003	3
<b>Knowledge Sharing-Factor</b>	<b>Indicator's weight</b>	<b>Effect size</b>	<b>Rank</b>
Knowledge sharing Collecting (KSC)	0.220	0.483	1
Knowledge sharing Donating (KSD)	0.162	0.002	2
<b>Private Sample</b>			
<b>Social Capital-Factor</b>	<b>Indicator's weight</b>	<b>Effect size</b>	<b>Rank</b>
Structural Social Capital (SSC)	0.172	0.159	1
Cognitive Social Capital (CSC)	0.178	0.081	2
Relational Social Capital (RSC)	0.156	0.043	3
<b>Knowledge Sharing-Factor</b>	<b>Indicator's weight</b>	<b>Effect size</b>	<b>Rank</b>
Knowledge sharing Donating (KSD)	0.162	0.085	1
Knowledge sharing Collecting (KSC)	0.273	0.058	2

From table 6.18, in the public sample, the social capital factors, relational social capital were the most important factor with a high effect ( $f^2 = 0.476$ ), this were followed by the remaining factors with approximately comparable weak effects with  $f^2$  ranging from 0.003 to 0.048. As for knowledge sharing, knowledge sharing collecting had a high effect ( $f^2 = 0.483$ ), and last came knowledge sharing donating with the smallest effect ( $f^2 = 0.002$ ). Turning to private

sample, in terms of social capital, the structural social capital had a medium effect ( $f^2 = 0.159$ ). This were followed by cognitive social capital with approximately medium effects ( $f^2 = 0.081$ ), while relational social capital had the smallest effect ( $f^2 = 0.043$ ). With respect to knowledge sharing, knowledge sharing donating had a close to medium effect ( $f^2 = 0.085$ ), and last came knowledge sharing collecting with the smallest effect ( $f^2 = 0.058$ ).

## **6.5. Public and Private Sector Comparison**

The comparison of the results stemmed from both public and private oil sectors' samples are undertaken at both measurement and structural models. Kock (2014) argued that differences in the path coefficients between the compared models could be artificially caused by measurement differences. The researcher explained that common bias due to questionnaire translation can cause such differences which often occur when comparing two groups from two distinct organisations (public and private) with environment differences. Indeed, even though common method bias has already been measured in this research, it was only assessed individually for each group and hence can go unnoticed and bias the comparison when multi-groups are involved. In order to avoid such scenario, equivalence of measurement models needs to be checked and developed before comparing the structural models. In this case, p values should be greater than the significance threshold.

Comparing two groups in two different contexts (public and private) is undertaken in a similar way at both measurement and structural models. First, a pooled standard error is calculated for each path coefficient pairs (at the structural models) and weight pairs (at the measurement models) using the following equations:

If the standard errors are similar in both compared models (Pooled method):



$$S_{12} = \left( \sqrt{\frac{(N_1-1)^2}{(N_1+N_2-2)} \cdot S_1^2 + \frac{(N_2-1)^2}{(N_1+N_2-2)} \cdot S_2^2} \right) \cdot \left( \sqrt{\frac{1}{N_1} + \frac{1}{N_2}} \right)$$

Where:

$N_1$  is the sample size for the first model,  $N_2$  is the sample size for the second model,  $S_1$  is the standard error for the path coefficient in the first model, and  $S_2$  is the standard error for the path coefficient in the second model.

If the standard errors are different in both compared models (Satterthwaite method):

$$S_{12} = \sqrt{S_1^2 + S_2^2}$$

Second, the critical ratio  $T$  is calculated using the following formula:

$$T_{12} = (\beta_1 - \beta_2) / S_{12} .$$

The obtained  $T$  ratio then used to identify the  $p$  value associated with it. This  $p$  value reveals whether there is any difference between the path coefficients (Keil et al., 2000; Kock, 2014).

In the present study, the Satterwaite method is used to calculate the pooled standard errors. This is owing to the fact that the standard errors in the public and private samples were found to be different (0.093, 0.057 respectively). However, Kock (2014) recognises that although such a method is not widely used as it yields slightly higher values for the pooled standard errors, the differences are generally minor. Table 6.19 shows the weights' comparison of the constructs included in the final model.

**Table 6.19: Weight Comparison for Public and Private Sector**

<b>Indicators</b>	<b>Public Sector</b>	<b>Indicators</b>	<b>Private Sector</b>	<b>P Value</b>
OC1	(0.149)	OC1	(0.155)	0.42
OC2	(0.097)	OC2	(0.094)	0.479
OC3	(0.236)	OC3	(0.263)	0.3783
OC4	(0.115)	OC4	(0.101)	0.43
OC5	(0.200)	OC5	(0.260)	0.11
OC6	(0.184)	OC6	(0.198)	0.409
OC7	(0.255)	OC7	(0.261)	0.475
OC8	NA	OC8	NA	NA
OC9	NA	OC9	NA	NA
OC10	NA	OC10	NA	NA
OC11	NA	OC11	NA	NA
OC12	NA	OC12	NA	NA
OS1	(0.132)	OS1	(0.189)	0.14
OS2	(0.102)	OS2	(0.091)	0.43
OS3	(0.202)	OS3	(0.262)	0.272
OS4	(0.108)	OS4	(0.128)	0.307
OS5	(0.209)	OS5	(0.198)	0.458
OS6	(0.186)	OS6	(0.179)	0.445
OS7	(0.264)	OS7	(0.145)	0.12
OS8	NA	OC8	NA	NA
OS9	NA	OC9	NA	NA
OS10	NA	OS10	NA	NA
IT1	(0.174)	IT1	(0.257)	0.077
IT2	(0.110)	IT2	(0.198)	0.143
IT3	(0.162)	IT3	(0.135)	0.380
IT4	(0.294)	IT4	(0.370)	0.179
IT5	(0.279)	IT5	(0.249)	0.35
IT6	(0.267)	IT6	(0.264)	0.476
SC1	(0.104)	SC1	(0.159)	0.15
SC2	(0.096)	SC2	(0.126)	0.365
SC3	(0.324)	SC3	(0.345)	0.26
SC4	(0.092)	SC4	(0.095)	0.48
SC5	(0.314)	SC5	(0.353)	0.215
SC6	(0.202)	SC6	(0.192)	0.45
SC7	(0.170)	SC7	(0.212)	0.16
SC8	NA	SC8	(0.092)	NA
SC9	NA	SC9	(0.100)	NA
SC10	NA	SC10	NA	NA
SC11	NA	SC11	NA	NA
KS1	(0.108)	KS1	(0.160)	0.245
KS2	(0.245)	KS2	(0.158)	0.162
KS3	(0.157)	KS3	(0.154)	0.47
KS4	(0.169)	KS4	(0.221)	0.18
KS5	(0.294)	KS5	(0.370)	0.12
KS6	(0.242)	KS6	(0.258)	0.40

KS7	(0.102)	KS7	(0.157)	0.22
KS8	NA	KS8	NA	NA
KS9	NA	KS9	NA	NA
KS10	NA	KS10	NA	NA
KS11	NA	KS11	NA	NA
KS12	NA	KS12	NA	NA
KS13	NA	KS13	NA	NA
KS14	NA	KS14	NA	NA
KS15	NA	KS15	NA	NA
KS16	NA	KS16	NA	NA
PDIN1	(0.168)	PDIN1	(0.207)	0.27
PDIN2	(0.194)	PDIN2	(0.125)	0.19
PDIN3	(0.100)	PDIN3	(0.198)	0.142
PDIN4	(0.194)	PDIN4	(0.210)	0.39
PDIN5	NA	PDIN5	NA	NA
PSIN1	(0.289)	PSIN1	(0.302)	0.43
PSIN2	(0.151)	PSIN2	(0.216)	0.20
PSIN3	(0.298)	PSIN3	(0.282)	0.34
PSIN4	(0.204)	PSIN4	(0.244)	0.27
PSIN5	NA	PSIN5	(0.203)	NA
PSIN6	NA	PSIN6	NA	NA
PSIN7	NA	PSIN7	NA	NA
PSIN8	NA	PSIN8	NA	NA

NA: Not applicable due to dropped item

As can be seen from Table 6.19, all the p values were statistically non-significant meaning that there was invariance between the measurement models applied in the two sectors. This confirms that the measures used in the survey were equal in both sectors. Hence, the researcher can proceed to the comparison of the path coefficients. Table 6.20 illustrates the path comparison and their p values.

**Table 6.20: Path Comparison**

Hypothesized Links	Public Sector	Private Sector	P Value
OC → SC	0.41	0.22	0.0203**
OS → SC	0.28	0.18	0.1286 <sup>NS</sup>
IT → SC	0.29	0.34	0.2538 <sup>NS</sup>
OC → KS	0.22	0.28	0.0062**
OS → KS	0.38	0.16	0.0000***
IT → KS	0.27	0.46	0.0082***
SC → KS	0.18	0.23	0.01**
SC → PDIN	0.22	0.39	0.0000***
SC → PSIN	0.31	0.28	0.3213 <sup>NS</sup>
KS → PDIN	0.36	0.31	0.0895**

<b>KS</b> → <i>PSIN</i>	0.29	0.34	0.0509**
<b>OC</b> → <i>PDIN</i>	0.19	0.17	0.3231 <sup>NS</sup>
<b>OC</b> → <i>PSIN</i>	0.10	0.11	0.4319 <sup>NS</sup>
<b>OS</b> → <i>PDIN</i>	0.14	0.10	0.2302 <sup>NS</sup>
<b>OS</b> → <i>PSIN</i>	0.15	0.13	0.3413 <sup>NS</sup>
<b>IT</b> → <i>PDIN</i>	0.15	0.16	0.4076 <sup>NS</sup>
<b>IT</b> → <i>PSIN</i>	0.12	0.14	0.2561 <sup>NS</sup>

\*\*\*Significant at 1%; \*\*Significant at 5%; \*Significant at 10%; <sup>NS</sup> Non-significant

As it can be seen from table 6.20, the effect of organisational culture on social capital was significantly different in the two investigated sectors ( $p < 0.001$ ), It can therefore be argued that the effect in the public sector was significantly greater than the effect in private sector. Furthermore, the effect of organisational culture, organisational structure and information technology on knowledge sharing was significantly different in the two investigated sectors ( $p < 0.001$ ), It can therefore be debated that the effect of organisational culture in the private sector was significantly greater than the effect in public sector. The organisational structure on the other hand, was found to be positively and significantly improving knowledge sharing in the two investigated sector. The path comparison revealed a significant difference ( $p < 0.001$ ), suggesting that the effect in the public was much greater than the effect in private sector. The path comparison also found that the effect of information technology on knowledge sharing was significantly different in the two investigated countries ( $p < 0.001$ ). It can be seen that the effect of information technology in private sector was much stronger than public sector. In addition, the effect of social capital on knowledge sharing was significantly different in the two investigated sector ( $p < 0.001$ ). It can be seen that the effect of social capital in private sector was much stronger than social capital in public sector.

With respect to the effect of social capital and knowledge sharing on product and process innovation, the following was identified:

- The social capital was found to be positively and significantly improving firms' product innovation in the two investigated sectors. The path comparison revealed a

significant difference ( $p < 0.001$ ), suggesting that the effect in the private sector was much greater than the effect in public sector.

- Knowledge sharing was found to be positively and significantly influencing product and process innovation in both sectors. The path comparison revealed a significant difference ( $p < 0.001$ ), suggesting that the effect of knowledge sharing on product innovation in the public sector was much greater than the effect in private sector, whereas the effect of knowledge sharing on process innovation in the private sector was much greater than it did in public sector.

## 6.6. Summary of the Results and Hypotheses Testing

From the analysis above, the following hypotheses can be supported or rejected, the next table (Table 6.21) recalls and test the hypotheses set in section 3.3.

**Table 6.21: Hypothesis Testing For Both Public and Private Oil Sectors' Samples**

Hypothesis Description	Hypothesis Relationships (+)	Supported	
		Public	Private
<b>H1: There is a positive relationship between Organisational context (OC, OS and IT) and social capital.</b>			
<i>H1a: There is a positive relationship between organisational culture and social capital.</i>	OC → SC	YES**	YES**
<i>H1b: There is a positive relationship between organisational structure and social capital.</i>	OS → SC	YES**	YES**
<i>H1c: There is a positive relationship between information technology and social capital.</i>	IT → SC	YES**	YES**
<b>H2: There is a positive relationship between organisational context (OC, OS and IT) and knowledge sharing.</b>			
<i>H2a: There is a positive relationship between organisational culture and knowledge sharing.</i>	OC → KS	YES**	YES**
<i>H2b: There is a positive relationship between organisational structure and knowledge sharing.</i>	OS → KS	YES**	YES**
<i>H2c: There is a positive relationship between information technology and knowledge sharing.</i>	IT → KS	YES**	YES**
<b>H3: There is a positive relationship between social capital and knowledge sharing.</b>			
<i>H3a: There is a positive relationship between</i>			

<i>social capital and knowledge sharing.</i>	SC → KS	YES**	YES**
<b>H4: There is a positive relationship among social capital and innovation.</b>			
<i>H4a: There is a positive relationship between social capital and product innovation.</i>	SC → PDIN	YES**	YES**
<i>H4b: There is a positive relationship between social capital and process innovation.</i>	SC → PSIN	YES**	YES**
<b>H5: There is a positive relationship between knowledge sharing and innovation.</b>			
<i>H5a: There is a positive relationship between knowledge sharing and product innovation.</i>	KS → PDIN	YES**	YES**
<i>H5b: There is a positive relationship between knowledge sharing and process innovation.</i>	KS → PSIN	YES**	YES**
<b>H6: Organisational context (OC, OS and IT) have a positive direct effect on innovation.</b>			
<i>H6a: There is a positive relationship between organisational culture and product innovation.</i>	OC → PDIN	YES**	YES**
<i>H6b: There is a positive relationship between organisational structure and product innovation.</i>	OS → PDIN	YES**	YES**
<i>H6c: There is a positive relationship between information technology and product innovation.</i>	IT → PDIN	YES**	YES**
<i>H6d: There is a positive relationship between organisational culture and process innovation.</i>	OC → PSIN	YES**	YES**
<i>H6e: There is a positive relationship between organisational structure and process innovation.</i>	SC → PSIN	YES**	YES**
<i>H6f: There is a positive relationship between information technology and process innovation.</i>	IT → PSIN	YES**	YES**
<b>H7: The organisational context (OC, OS and IT ) improves innovation by enhancing its social capital.</b>			
<i>H7a: The organisational culture influences product innovation through enhancing its social capital.</i>	OC → SC → PDIN	YES**	YES**
<i>H7b: The organisational structure influences product innovation through enhancing its social capital</i>	OS → SC → PDIN	YES**	YES**
<i>H7c: The information technology influences product innovation through enhancing its social capital</i>	IT → SC → PDIN	YES**	YES**
<i>H7d: The organisational culture influences process innovation through enhancing its social capital.</i>	OC → SC → PSIN	YES**	YES**
<i>H7e: The organisational structure influences process innovation through enhancing its social</i>	OS → SC → PSIN	YES**	YES**

<i>capital.</i>			
<b>H7f:</b> <i>The information technology influences process innovation through enhancing its social capital.</i>	IT → SC → PSIN	YES**	YES**
<b>H8:</b> <i>The organisational Context (OC, OS and IT) improves innovation by enhancing its knowledge sharing.</i>			
<b>H8a:</b> <i>The organisational culture influences product innovation through enhancing its knowledge sharing.</i>	OC → KS → PDIN	YES**	YES**
<b>H8b:</b> <i>The organisational structure influences product innovation through enhancing its knowledge sharing.</i>	OS → KS → PDIN	YES**	YES**
<b>H8c:</b> <i>The information technology influences product innovation through enhancing its knowledge sharing.</i>	IT → KS → PDIN	YES**	YES**
<b>H8d:</b> <i>The organisational culture influences process innovation through enhancing its knowledge sharing.</i>	OC → KS → PSIN	YES**	YES**
<b>H8e:</b> <i>The organisational structure influences process innovation through enhancing its knowledge sharing.</i>	OS → KS → PSIN	YES**	YES**
<b>H8f:</b> <i>The information technology influences process innovation through enhancing its knowledge sharing.</i>	IT → KS → PSIN	YES**	YES**

As shown in Tables 6.21, the analysis of the impact of organisational context including (OC, OS and IT) on product and process innovation indicated that all hypotheses are positively significant and supported in both public and private oil sectors. These results are presented as following:

**Hypothesis 1:** *There is a positive relationship between organisational context (OC, OS and IT) and social capital in Libyan’s public and private oil sectors.* This hypothesis is divided into sub- hypotheses including (H1a, H1b, and H1c).

**H1a.** Proposed organisational culture was positively associated with social capital in Libyan’s public and private oil sectors. With respect to public oil sector’ result, it was found that organisational culture significantly increases the firms’ social capital ( $\beta=0.41$ ,  $P<0.01$ ). As for private sector, the analysis showed that organisational culture had a significant positive association with social capital ( $\beta = 0.22$ ,  $P<0.01$ ). From practical perspective, the

interpretation of these results is that for every one standard deviation increase in the organisational culture, the social capital in Libyan's public and private oil sectors will increase by (0.41 and 0.22 respectively). Consequently, the proposed association between organisational culture and social capital was supported at public and private oil sectors (H1a).

**H1b.** Proposed organisational structure was positively associated with social capital in Libyan's public and private oil sectors. For public sector, as hypothesized, the analysis suggested that organisational structure showed positive associations with social capital ( $\beta=0.28$ ,  $P<0.01$ ). With respect to private oil sector's result, the empirical result showed a significant positive linkage between organisational structure and social capital ( $\beta=0.18$ ,  $P<0.01$ ). From practical viewpoint, these findings indicate that for every one standard deviation increase in the organisational structure, the level of social capital in Libyan's public and private oil sectors will increase by (0.28 and 0.18 respectively). Therefore, the proposed association between organisational structure and social capital was supported at public and private oil sectors (H1b).

**H1c.** proposed a positive association between information technology and social capital in Libyan's public and private oil sectors. Firstly, for public oil sector's result, it was found that IT significantly increases the firms' social capital ( $\beta=0.29$ ,  $P<0.01$ ). Secondly, for the private sector, the findings showed a significant positive relationship among IT and social capital ( $\beta=0.34$ ,  $P<0.01$ ). The clarification of these findings is that for every one standard deviation increase in the information technology in Libyan's public and private oil sectors then the level of social capital will increase by (0.29 and 0.34 respectively). Thus, the proposed association between IT and social capital at both public and private sectors was supported (H1c). As for differences between the two sectors, while, the organisational culture had a higher effect in improving firms' social capital in the public than in private oil sector, organisational structure and information technology had a similar effect in both sector.



**Hypothesis 2:** *There is a positive relationship between organisational context (OC, OS and IT) and knowledge sharing in Libyan's public and private oil sectors.* This hypothesis is divided into sub- hypotheses including (H2a, H2b, and H2c).

**H2a:** Proposed organisational culture was positively associated with knowledge sharing in Libyan's public and private oil sectors. As for public sector, it was revealed that organisational culture had a positive and significant effect on knowledge sharing ( $\beta=0.22$ ,  $P<0.01$ ). With respect to public oil sector' result, the findings showed that organisational culture had a significant positive association with knowledge sharing ( $\beta=0.28$ ,  $P<0.01$ ). From practical viewpoint, these findings imply that for every one standard deviation in organisational culture provider, the level of knowledge sharing in Libyan's public and private oil sectors will increase by (0.22 and 0.28 respectively). Hence the proposed association between organisational culture and knowledge sharing was supported at public and private oil sectors (H2a).

**H2b:** proposed a positive relationship among organisational structure and knowledge sharing in Libyan's public and private oil sectors. With respect to public oil sector' result, it was found that organisational structure significantly increases the firms' knowledge sharing ( $\beta=0.38$ ,  $P<0.01$ ). Turning to private sector, there was a significant positive relationship between organisational structure and knowledge sharing ( $\beta=0.16$ ,  $P<0.01$ ). These results indicate that for every one standard deviation increase in the organisational structure in Libyan's public and private oil sectors then the knowledge sharing will increase by (0.38 and 0.16 respectively). Thus, the proposed association between organisational structure and knowledge sharing was supported at public and private oil sectors (H2b).

**H2c:** Proposed information technology was positively associated with knowledge sharing in Libyan's public and private oil sectors. As for public oil sector' result, it was found that IT significantly increases knowledge sharing among employees ( $\beta=0.27$ ,  $P<0.01$ ). With respect

to private oil sector, it was noted that IT had a significant positive association with knowledge sharing ( $\beta = 0.46$ ,  $P < 0.01$ ). The interpretation of these results is that for every one standard deviation increase in the information technology, the knowledge sharing in Libyan's public and private oil sectors will increase by (0.27 and 0.46 respectively). Hence, the proposed association between information technology and knowledge sharing was supported at both public and private oil sectors (H2c).

As for differences between the two sectors, the organisational culture had a higher effect in improving knowledge sharing in the private than in public oil sector. Regarding the organisational structure, this was found to be a higher effect in increasing employees' knowledge sharing in the public than it did in the private oil sector. As for information technology, its impact on knowledge sharing was found to be a higher effect in the private than in public oil sector.

***H3: There is a positive relationship between social capital and knowledge sharing in Libyan's public and private oil sectors.*** This hypothesis is represented into (H3a).

**H3a:** Proposed social capital was positively associated with knowledge sharing in Libyan's public and private oil sectors. Firstly, for public oil sector, as expected, social capital had a significant positive association with knowledge sharing ( $\beta = 0.18$ ,  $P < 0.01$ ). Secondly, for the private oil sector, the findings showed that there was a significant positive linkage between social capital and knowledge sharing ( $\beta = 0.23$ ,  $P < 0.01$ ). From practical perspective, the interpretation of these results is that for every one standard deviation increase in the social capital in Libyan's public and private oil sectors, the knowledge sharing will increase by (0.18 and 0.23 respectively). Thus, the proposed association between social capital and knowledge sharing was supported at public and private oil sectors (H3a). However, such positive effect was statistically different across the two sectors. Indeed, it was found that

social capital was more effective at improving employees' knowledge sharing in the private than public oil sector.

**Hypothesis 4:** *There is a positive relationship among social capital and innovation in Libyan's public and private oil sectors.* This hypothesis is divided into sub- hypotheses including (H4a, and H4b).

**H4a:** proposed a positive association between social capital and product innovation in Libyan's public and private oil sectors. As for public oil sector, as expected, social capital had a significant positive association with product innovation ( $\beta=0.22$ ,  $P<0.01$ ). Turning to the private oil sector, the empirical results showed a significant positive linkage among social capital and product innovation ( $\beta=0.39$ ,  $P<0.01$ ). From practical viewpoint, the explanation of these results is that for every one standard deviation increase in the social capital in Libyan's public and private oil sectors, the product innovation will increase by (0.22 and 0.39 respectively). Therefore, the proposed association between social capital and product innovation was supported at public and private oil sectors (H4a).

**H4b:** proposed a positive association between social capital and process innovation in Libyan's public and private oil sectors. Regarding the relationships between social capital and process innovation in public oil sector, the empirical findings showed a significant positive relationship between social capital and process innovation ( $\beta=0.31$ ,  $P<0.01$ ). In terms of the relationships between social capital and process innovation in private oil sector, the analysis suggested that social capital showed positive associations with process innovation ( $\beta=0.28$ ,  $P<0.01$ ). From practical perspective, these results imply that for every one standard deviation increase in the social capital in Libyan's public and private oil sectors, the process innovation will increase by (0.31 and 0.28 respectively). Thus, the proposed association between social capital and process innovation was supported at public and private oil sectors (H4b). However, such positive effect was statistically different across the two

sectors, while social capital had a stronger effect on product innovation in the private than in public oil sector, the social capital had a similar effect on process innovation in both sectors.

**Hypothesis 5:** *There is a positive relationship between knowledge sharing and innovation in Libyan's public and private oil sectors.* This hypothesis is divided into sub- hypotheses including (H5a, and H5b).

**H5a:** proposed a positive association between knowledge sharing and product innovation in Libyan's public and private oil sectors. For public oil sector, it was revealed that knowledge sharing had a positive and significant effect on product innovation ( $\beta=0.36$ ,  $P<0.01$ ). With respect to private oil sector' result, there was a significant positive relationship between knowledge sharing and product innovation ( $\beta = 0.31$ ,  $P<0.01$ ). From practical viewpoint, the interpretation of these results is that for every one standard deviation increase in the knowledge sharing, the product innovation in Libyan's public and private oil sector will increase by (0.36 and 0.31 respectively). Therefore, the proposed association between knowledge sharing and product innovation was supported at both public and private oil sectors (H5a).

**H5b:** proposed a positive association between knowledge sharing and process innovation in Libyan's public and private oil sectors. Regarding the public oil sector, as hypothesized, knowledge sharing had a significant positive association with process innovation ( $\beta=0.29$ ,  $P<0.01$ ). As for the private oil sector, the analysis suggested that knowledge sharing showed a significant positive association with process innovation ( $\beta=0.34$ ,  $P<0.01$ ). These results indicate that for every one standard deviation increase in the knowledge sharing in Libyan's public and private oil sector, the process innovation will increase by (0.29 and 0.34 respectively). Hence, the proposed association between knowledge sharing and process innovation was supported at both public and private oil sectors (H5b).

As for differences between the two sectors, while knowledge sharing had a stronger effect in improving product innovation in public than in private oil sector, knowledge sharing was more effective in increasing process innovation in the private than public oil sector.

**H6: Organisational context (OC, OS and IT) have a positive direct effect on innovation in Libyan's public and private oil sectors.** This hypothesis is divided into sub- hypotheses including (H6a, H6b, H6c, H6d, H6e, and H6f).

**H6a:** proposed a positive association between organisational culture and product innovation in Libyan's public and private oil sectors. As for public oil sector, as expected, the analysis showed that organisational culture had a significant positive association with product innovation ( $\beta=0.19$ ,  $P<0.01$ ). Turning to the private oil sector, there was a significant positive relationship between organisational culture and product innovation ( $\beta=0.17$ ,  $P<0.01$ ). From practical perspective, the interpretation of these results is that for every one standard deviation increase in the organisational culture, the product innovation in Libyan's public and private oil sectors will increase by (0.19 and 0.17 respectively). Therefore, the proposed association between organisational culture and product innovation was supported at both public and private oil sectors (H6a).

**H6b:** proposed a positive association between organisational structure and product innovation in Libyan's public and private oil sectors. For public oil sector, the findings indicate that organisational structure significantly increases product innovation ( $\beta=0.14$ ,  $P<0.01$ ). With respect to private oil sector' result, there was a significant positive relationship between organisational structure and product innovation ( $\beta = 0.10$ ,  $P<0.01$ ), hence accepting H6b across two types of organisations, indicating that for every one standard deviation increase in the organisational structure in Libyan's public and private oil sectors, the product innovation will increase by (0.14 and 0.10 respectively).

**H6c:** proposed a positive association between information technology and product innovation in Libyan's public and private oil sectors. With respect to public oil sector' result, it was found that IT significantly increases product innovation ( $\beta=0.15$ ,  $P<0.01$ ). As for the private oil sector, the empirical results indicated a significant positive relationship between information technology and product innovation ( $\beta=0.16$ ,  $P<0.01$ ). Therefore, H6c was accepted at both public and private sector. From practical perspective, this result means that for every one standard deviation increase in information technology, there is an expected 0.15 increase in process innovation in public oil sector, and 0.16 in private oil sector.

**H6d:** proposed a positive association between organisational culture and process innovation in Libyan's public and private oil sectors. Firstly, as expected, organisational culture had a significant positive association with process innovation in public oil sector ( $\beta=0.10$ ,  $P<0.01$ ). Secondly, for the private oil sector, there was a significant positive relationship between organisational culture and process innovation ( $\beta=0.11$ ,  $P<0.01$ ), hence supporting H6d for both public and private oil sectors. From practical perspective, the interpretation of these results is that for every one standard deviation increase in the organisational culture, process innovation in Libyan's public and private oil sectors will increase by (0.10 and 0.11 respectively)

**H6e:** proposed a positive association between organisational structure and process innovation in Libyan's public and private oil sectors. For public oil sector, it was found that organisational structure significantly increases process innovation, ( $\beta=0.15$ ,  $P<0.01$ ). With respect to private oil sector' result, there was a significant positive relationship between organisational structure and process innovation ( $\beta = 0.13$ ,  $P<0.01$ ), thus accepting H7e, at public and private oil sectors, indicating that for every one standard deviation of organisational structure provider, the greater level of process innovation will increase in public and private oil sectors by (0.15 and 0.13 respectively).

**H6f:** proposed information technology was positively associated with process innovation in Libyan's public and private oil sectors. The empirical results found that the use of IT significantly increases process innovation in public oil sector ( $\beta=0.12$ ,  $P<0.01$ ). On the other hand, It was recorded that IT significantly increases process innovation in private oil sector ( $\beta=0.14$ ,  $P<0.01$ ). Hence, the hypothesised effect was supported (H7f) for both sectors. From practical viewpoint, this result implies that for every one standard deviation increase in the information technology, the process innovation will increase in public and private sectors by (0.12 and 0.14 respectively). However, such positive effect was no statistically different across the two sectors. In fact, it was found that organisational context (OC, OS and IT) had a similar effect on product and process innovation in both sectors.

**H7: *The Organisational context (OC, OS and IT ) improves innovation by enhancing its social capital in Libyan's public and private oil sectors.*** This hypothesis is divided into sub-hypotheses including (H7a, H7b, H7c, H7d, H7e, and H7f).

The indirect effect of organisational context including (OC, OS and IT) on innovation (product and process) was found to be partially mediated by firms' social capital in both the public and private oil sectors. In fact, the VAF has exceeded 20% confirming that the impact of organisational context on product and process innovation was partially explained by social capital. As a result, in both public and private oil sectors, H7a, H7b, H7c H7d, H7e and H7f were supported.

**H8: *The Organisational Context (OC, OS and IT) improves innovation by enhancing its knowledge sharing in Libyan's public and private oil sectors.*** This hypothesis is divided into sub- hypotheses including (H8a, H8b, H8c, H8d, H8e, and H8f).

Similarly, the indirect impact of organisational context (OC, OS and IT) on innovation (product and process) in the public and private oil sectors has taken place, it was found that

knowledge sharing partially mediate such effect (VAF exceeded 20%). As a result, in both public and private oil sectors, H8a, H8b, H8c, H8d and H8e, H8f and H8g were supported.

## **6.7 Chapter Summary**

This chapter presented the statistically results of this study. The researcher used several statistical procedures before conducting PLS-SEM analysis version 5. Descriptive statistics, non-response bias and common method bias were used to check outliers, missing values and measurement errors. The results suggest that non-response may not be a problem and there are no common variables or common method bias. Similarly, the research handled some issues related to missing data, outliers and normality to evaluate the quality of the data. Having presented the samples' characteristics, checked for outliers, missing values and measurement errors, the structural model was then used to assess the hypothesised model proposed in section (3.3), and test the relationships between the constructs. PLS model is analysed and interpreted in a sequence of two phases including the assessment of the measurement model and the assessment of the structural model. In first stage, the assessment of the measurement model was used to measure model of the reflective first order constructs, and measurement model of the formative second order constructs. The measurement model of the reflective first order constructs requested to check individual item reliability, constructs' reliability, constructs' validity and collinearity test.

Assessment of the reflective first order constructs suggested that individual item reliability needed to be rectified as some indicators' loadings were lower than 0.7. Accordingly, some items were dropped and the indicators' loadings and their p values was checked again for the measurement model; all the combined loadings of the retained indicators became greater than the thresholds 0.7, hence confirming that the indicators used in the two samples present a satisfactory individual reliability. As for constructs' reliability, constructs' validity and



collinearity test was conducted and the results showed that constructs' reliability, constructs' validity and collinearity are accepted.

On the other hand, the measurement model of the formative second order constructs requested to conducted collinearity test and the results indicated that the full variance inflation factor (VIF) for each predictor construct to assess the full collinearity. Based on the reliability, validity and collinearity tests undertaken for both the first and second order variables, the measurement model presents satisfactory values and hence, the investigator can safely proceed to the analysis of the structural model to assess the hypothesised model and test the relationships between the constructs. All hypotheses were accepted and the main model estimations indicated that all hypotheses are statistically significant and supported for both oil public and private sectors. The next chapter discusses the results obtained from this analysis.

## **CHAPTER SEVEN: DISCUSSION**

### **7.0 Introduction**

This chapter discusses the key findings reported in previous chapter. Here, the results from Libyan public and private oil sectors are jointly discussed and linked to the proposed research questions of this study. However, prior to doing so, the chapter will briefly recall the research gaps along with the research model and the research questions.

### **7.1. The Research Gaps, Model and Research Questions**

Despite the fact that the organisational context including organisational culture, structure and information technology has been the attention of several studies (Kim and Lee, 2006; van den Hoof and Huysman, 2009; Amayah, 2013), their influences on innovation has mainly been examined by using a direct approach (e.g., Mayondo and Farrell, 2003; Obenchain and Johnson, 2004; Miron et al., 2004; Jaskyte, 2004; Jaskyte and Dressler, 2005; Chang and Lee, 2007; Pizarro et al., 2009; Zheng et al., 2010; Valencia et al., 2010; Hogan and Coote, 2014). Indeed, the review of literature (See section 4.0) revealed that most of these works have underlined the need to research the role of such organisational context in enhancing innovation (product and process) empirically (Jung et al., 2008; Valencia et al., 2010; Abdullaha et al., 2014). However, given the fact that social capital (Molina-Morales and Martínez-Fernández, 2010; Laursen et al., 2012; Mura et al., 2013; Elstouhi et al., 2015) , and knowledge sharing among employees (Nonaka and Toyama, 2005; Michael and Nawaz, 2008; Cheng, 2012; Al-husseini and Elbeltagi, 2014; 2015), are one of the main goals of supporting the promotion and implementation of innovation within organisation (Ichijo and Nonaka, 2007a; von Krogh et al., 2012; Kim and Lee, 2013; Al-husseini, and Elbeltagi, 2014), there is a gap in the literature regarding the use of two group of resources such as social capital and

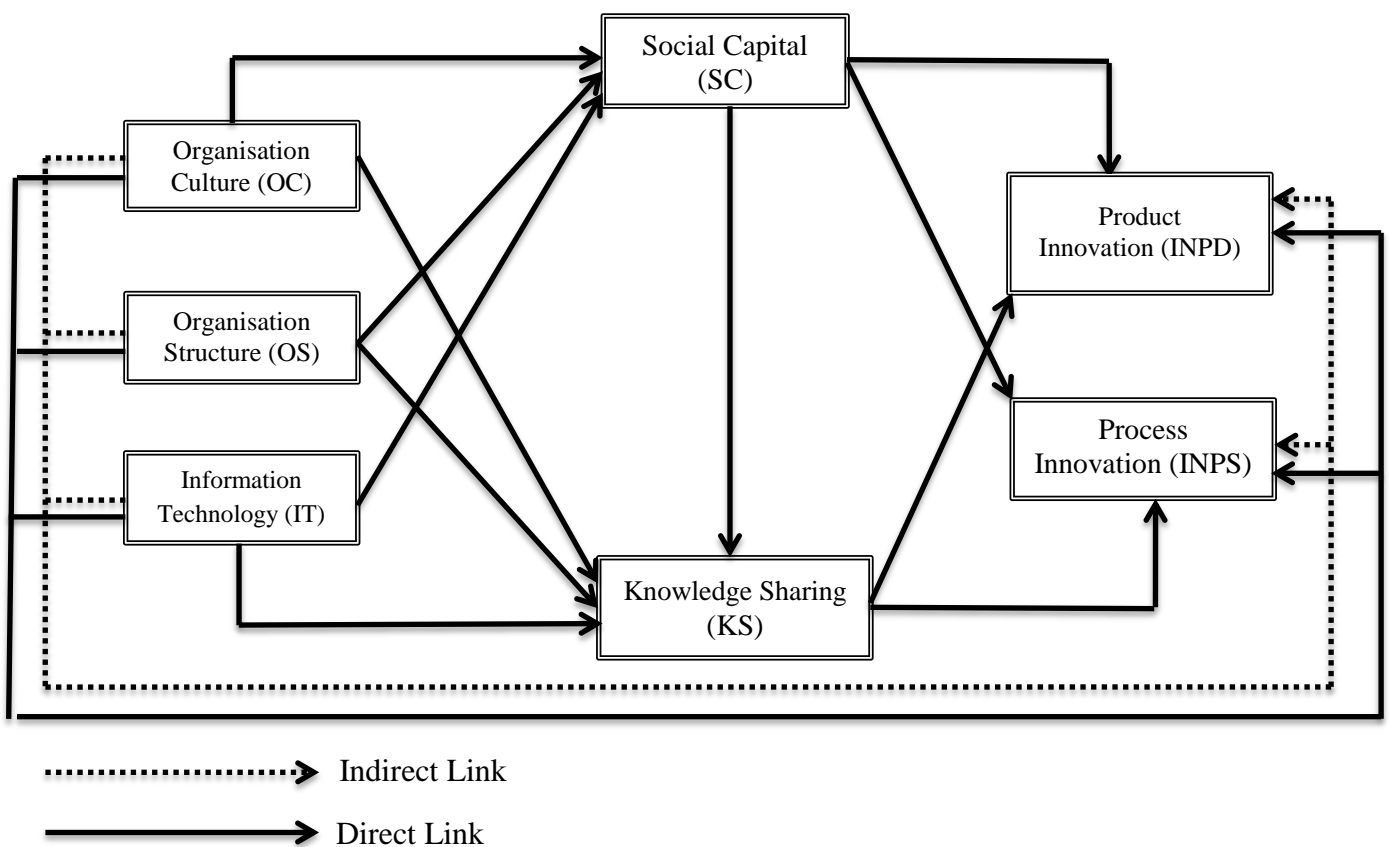
knowledge sharing in supporting the innovation, product and process, especially in oil sector, and the causal links between the three variables have not yet been developed.

Furthermore, the empirical studies have argued that organisational context (OC, OS, IT) is an enabler of social capital (Van Den Hooff and Huysman, 2009), and knowledge sharing (Kim and Lee, 2005- 2006; Liu, 2009; Van den Hooff and Huysman, 2009). Despite the extensive number of empirical studies revealed that organisational context (OC, OS and IT), social capital knowledge sharing and innovation are important to organizations, there is a gap in the literature regarding the impact of organisational context (OC, OS and IT) in supporting product and process innovation through social capital and knowledge sharing, especially in Libyan public and private oil sectors, and no study has been conducted to consider all variables used in this study to date. Besides, it should be noted that both public and private sectors face immense pressures to innovation, however the influence of organisational context (OC, OS, IT) on innovation may be different in public and private sectors due to the organisational and cultural environments. The literature also highlights that public organisations are seen as conservative because of their ownership, limited competition than private sector (Majumdar and Ray, 2011; Amayah, 2013) and so far, the literature remains silent about how organisational context (OC, OS, IT) affects SC, KS and innovation in the public and private sectors. In this regard, Amayah (2013) and Willem and Buelens (2007) have also made a call for more research comparing the impacts of the organisational context between two types of organisations (public and private).

Therefore, in an attempt to address the abovementioned shortcomings in the empirical literature, the present research has explored the indirect effects of the organisational context on innovation (product and process) in two different sectors, namely; public and private oil sectors. On the premise of the knowledge-based view (Alavi and Leidner, 2001, Dougherty et

al., 2002; Nonaka and Toyama, 2005; Michael and Nawaz, 2008; Cheng, 2012), and resource-based view (Kim et al., 2013), the research investigates the organisational context (OC, OS IT) through their impact on social capital and knowledge sharing. Moreover, this research has both theoretical and practical implications by providing empirical evidence on the direct and indirect impact of organisational context and can serve as an indication in practice for both organisation' managers and policy makers who are looking to establish strategies for achieving innovation. These would benefit from expending their efforts on promoting social capital and knowledge-sharing practices among their employees. In this respect, the following structure model have been proposed in section 3.1 (Please note that Figure 7.1 shows the proposed model for public and private' samples.

**Figure 7.1: Structure Model for Public and Private Oil Sectors**



Alongside this model, a set of research questions were developed to address the shortcomings identified in both product and process innovation promotion literature. Since this chapter links the study's findings to the research questions, it would therefore be useful to recall these questions:

**RQ1:** What are the direct effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors?

**RQ2:** What are the indirect effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors via social capital?

**RQ3:** What are the indirect effects of organisational context (OC, OS and IT) on product and process innovation in Libyan's public and private oil sectors via knowledge sharing?

**RQ4:** What is the role of social capital in supporting knowledge sharing practices in Libyan's public and private oil sectors?

**RQ5:** Are there differences between the public and private oil sectors in terms of the relationship between organisational context (OC, OS, IT) and both product and process innovation in Libyan's public and private oil sectors?

The subsequent sections are structured as follows. The first section discusses the direct influence of organisational context including organisational culture, structure and information technology on product and process innovation in both private and public oil sectors. This would address the first research questions (RQ1) and the set of hypotheses identifying the organisational context (OC, OS and IT) influencing the product and process innovation in public and private oil sectors (H6a, H6b, H6c, H6d, H6e and H6f).

Second section discusses the indirect relationship between the organisational context (OC, OS and IT) and innovation (product and process), this, section including sub-sections, starts with the discussion of the direct impact of organisational context on social capital, and the direct influence of social capital on product and process innovation are also discussed in the

following section. In so doing, the second research questions are addressed (RQ2), whereas the hypotheses predicting the effect of organisational context (OC, OS and IT) on social capital are explained in both public and private sector (H1a, H1b and H1c), the hypotheses predicting the direct effect of social capital on innovation are also explained in both public and private sectors (H4a and H4b) and the hypotheses predicting the indirect effect of organisational context (OC, OS and IT) on innovation through social capital are explained in both public and private sector (H7a, H7b, H7c, H7d, H7e and H7f).

Third section discusses the indirect effects of organisational context on product and process innovation through knowledge sharing in both private and public oil sectors. This section also divided into sub-sections: It begins with discussing the direct link between organisational context and knowledge sharing, followed by the discussion of the relationship among knowledge sharing and innovation (product and process). This would address the third research questions (RQ3) and the set of hypotheses identifying the organisational context (OC, OS and IT) influencing the knowledge sharing in public and private oil sectors (H2a, H2b and H2c), whereas the hypotheses predicting the direct effect of knowledge sharing on innovation are explained in both public and private sector (H5a and H5b), and the hypotheses identifying the organisational context (OC, OS and IT) influencing the product and process innovation through knowledge sharing in public and private oil sectors (H8a, H8b, H8c, H8d, H8e and H8f).

Fourth, section discusses the direct effects of social capital on knowledge sharing in both private and public oil sectors. This would address the fourth research question (RQ4) and the set of hypotheses identifying the social capital influencing the knowledge sharing in public and private oil sectors (H3a). Fifth, the differences emerging between the two sectors are individually discussed at each level. As a result, the last research question looking at differences between the two sectors is answered throughout the chapter (RQ5). However,

these differences are summarised in the last section (Section 7.6) to provide an overall insight about these differences. Eventually, a conclusion summarising the main points of the discussion is presented in section (7.7).

## **7.2 The direct Impact of Organisational Context (OC, OS and IT) on Product and Process Innovation (RQ1)**

With respect to the influence of organisational culture on product and process innovation, the findings showed that organisational culture in both public and private oil sectors had a positive and statistically significant effect on innovation. This finding is consistent with other research which provided empirical evidence of OC on innovation (e.g., Liao et al., 2012; Büschgens et al., 2013; Lin et al., 2013; Hogan and Coote, 2014; Naranjo-Valencia et al., 2016). For example, Lau and Ngo (2004) confirmed that organisational culture had a direct effect on the development of new products. Hartmann (2006) argued that OC is considered in the literature as one of the factors that can most stimulate innovative behaviour among members of the organization. Since it influences employee innovative behaviour, it may lead them to accept innovation as a fundamental value of the organisation (Mayondo and Farrell, 2003; Koc and Ceylan, 2007). Valencia et al. (2010) revealed that OC is considered to be one of the key elements in enhancing product innovation. Tip et al. (2012) pointed out that organisational culture plays crucial role in developing innovation within organisations. Jiménez-Jiménez and Sanz-Valle (2011) also observed that OC is fundamental factor to supports the innovativeness of the firm. The extent to which a culture is characterized by establishing and communicating a knowledge-friendly culture, establishing a clear vision and objectives, and clear values related to knowledge, was effective in enhancing the innovation at workplace, because such supportive culture encourages individuals to integrate and sharing their knowledge.

As for the influence of organisational structure on innovation (product and process), the results showed that organisational structure in both public and private oil sectors had a positive and statistically significant effect on innovation (product and process). This finding is consistent with other research which provided empirical evidence of OS on innovation (e.g., Zaltman et al., 1973; Kimberly and Evanisko, 1981; Tesluk et al. 1997; Sciulli, 1998; Liao, 2007). For example, researchers have examined how different types of organisational structure (centralisation and formalisation) influence innovation. In a quantitative approach, Tesluk et al. (1997) found that a less centralisation and formalisation positively affected product and process innovation. Other researchers indicated that organisational structure considerably influences the communication processes and the social interaction between individuals which in turn enhancing innovation (Gold et al., 2001). Bidault and Cummings (1994) and Chen and Huang (2007) confirmed that organisational structure with flexibility is more likely to increase innovation. Van den Hooff and Huysman (2009) indicated that organisational structure facilitates knowledge sharing, which in turn to increase innovation (Liu and Phillips, 2011; Hau et al., 2013). Creating a more transparent structure leading to more insight into the location of knowledge and how to contact relevant people. However, clarity of roles and responsibilities and flexibility in the firm may lead to a more innovation, because this kind of structure enhance informal climate, which is necessary for promoting innovation at workplace.

Turning to the direct relationship between informational technology and innovation (product and process), the results showed that IT in both public and private oil sectors had a positive and statistically significant effect on innovation. This finding is consistent with other research which provided empirical evidence of IT on innovation (e.g., Bharadwaj, 2000; Morikawa, 2004; Kaplan and Norton, 2004; Koellinger, 2008; Hempell and Zwick, 2008; Higón, 2011; Ollo-López and Aramendía-Muneta, 2012).



A number of scholars such as Bharadwaj (2000) among others indicted that the IT infrastructure provides the resources that make feasible innovation and continuous improvement of products (Duncan, 1995; Venkatraman, 1991). Kaplan and Norton (2004) acknowledged that the main role of the IT in enhancing innovation is the provision of IT enabling these organisations to develop effective product and process innovation. Morikawa (2004) found that organisations using IT were more likely to engage in innovative activities than firms without computer applications. Higón, (2011) pointed out that IT plays significant role in reinforcing innovation within organisations. Koellinger (2008), stated that information communication technology is important enablers of innovation at workplace (Hempell and Zwick 2008; Ollo-López and Aramendía-Muneta, 2012). Several empirical studies indicated that information technology is one of the most important determinants, which significantly contribute to innovation capability at different organisational levels (e.g., Liao et al., 2007; Lin, 2007a; Camelo-Ordaz et al., 2011; Yeşil et al., 2013). Overall, the results of these studies suggest that communication infrastructures encourages interaction among employees such as through the use of IT to sharing their knowledge, which is more likely to facilitate innovation at workplace.

Regarding the results of the multi-group analysis, it showed that the effect of organisational context (OC, OS and IT) in the public and private sectors were statistically not different and hence confirms that the important influence of organisational context on innovation (product and process) is relevant in both public and private oil sectors.

It is worth noting that when discussing their findings, the majority of the aforementioned studies examining the direct relationship between organisational context (OC, OS and IT) and innovation argued that such a link takes place through SC and KS (without formal testing reported). Therefore, since the purpose of this research is to uncover and test this indirect

effect, the role of SC and KS as mediators in the indirect relationships between organisational context and innovation is discussed with further details in the following sections (7.3 and 7.4).

### **7.3. Organisational Context Increasing Product and Process Innovation through Social Capital (RQ2)**

This research has revealed that the organisational context (OC, OS and IT) affects the product and process innovation through enhancing social capital. This can be discussed in the following sub-sections: The results first illustrate the influence of organisational context (OC, OS and IT) on social capital. Second, the results discuss the influence of social capital on innovation (product and process), and then illustrate the indirect impact of organisational context (OC, OS and IT) on product and process innovation through social capital. Hence, (H1a, b, c, H4a, b and H7a, b, c, d, e, f) in the two public and private models are confirmed, RQ2 is answered.

#### **7.3.1. Organisational Context (OC, OS and IT) Increasing Social Capital**

##### **7.3.1.1 Organisational Culture and Social Capital**

The positive and significant relationship between the organisational culture and social capital is consistent with previous research (e.g., Gold et al., 2001; Song-zheng and Xiao-di, 2008; Van den Hooff and Huysman, 2009). Gold et al., 2001 confirmed that organisational culture enables maximisation of social capital. Van den Hooff and Huysman (2009) stated that organisational culture was a crucial factor, as it was found to influence all three dimensions of social capital. Establishing and communicating a knowledge-friendly culture, establishing a clear vision and objectives, and clear values related to knowledge, was effective in promoting the social dynamics that were beneficial to knowledge sharing. Such a culture leads to more insight into where relevant knowledge is located, more active interaction

between members of the organisation, a higher mutual understanding, and an atmosphere of social identification, trust, and reciprocity. Other researchers also point out that organisational culture increases social networking and communication between members within organisations (Gu and Wang, 2013; Petrou and Daskalopoulou, 2013), which enhance employee willingness to share knowledge (Nahapiet and Ghoshal, 1998; Cabrera and Cabrera, 2005; Chow and Chan, 2008).

### **7.3.1.2 Organisational Structure and Social Capital**

With respect to the influence of organisational structure on social capital, the results showed that OS in both public and private oil sectors had a positive and statistically significant effect on social capital. This finding is consistent with other research which provided empirical evidence of OS on KS (e.g. Gold et al., 2001; Van den Hooff and Huysman, 2009; Andrews, 2010). For example, Gold et al. (2001) indicated that OS is the key infrastructures, enhances social capital. the extent to which a structure is characterised by clear roles and responsibilities for knowledge sharing and reduced structural barriers to it, leads to more trust, identification, and reciprocity between employees. It might seem that a greater influence of organisational structure on social capital would result in positive influence on structural social capital – a more transparent structure leading to more insight into the location of knowledge and how to contact relevant people. However, clarity of roles and responsibilities and less formal divisions in the organisation may lead to a more “informal” climate, where trust, identification and reciprocity exist.

Andrews (2010) recognised that OS including decentralisation; a less formalisation and specialisation were more likely to enhance firm’ social capital dimensions within organisation. This finding also agrees with research that shows that OS regarding flexibility can affect SC (van den Hooff and Huysman, 2009). In fact, the authors established that firms’

OS with flexibility were a key enhancing close interpersonal relationship among organisational members (Van den Hooff and Huysman, 2009). It is a valuable organisational resource from the resource-based view because it facilitates the individual interactions necessary for collective action (Leana and Van Buren, 1999; Kim et al., 2013). Researchers have shown that SC may be facilitated by having a less centralised organisational structure, creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005; Wang and Noe, 2010), communities of practices (Lam, 1996; Tagliaventi and Mattarelli, 2006; Wang and Noe, 2010), and encouraging communication across departments and informal meetings (Liebowitz, 2003; Liebowitz and Megbolugbe, 2003; Yang and Chen, 2007; Wang and Noe, 2010).

### **7.3.1.3 Information Technology and Social Capital**

As for the influence of information technology on social capital, the results showed that IT in both public and private oil sectors had a positive and statistically significant effect on social capital. This finding is consistent with other research which provided empirical evidence of IT on SC (e.g., Kim and Lee, 2006; Shneiderman, 2007; van den Hooff and Huysman, 2009; Joshi et al., 2010). Providing ICT infrastructure was effective in promoting the social dynamics. Such ICT infrastructure helps individuals by showing where knowledge was located and improving organisational connectivity.

For example, Joshi et al. (2010) argued that IT enabled social integration that builds firms' social capital. These structures of social integration promote connectedness among members of firms by creating seamless networks of people, devices and knowledge (Joshi et al., 2010). Shneiderman (2007) argued that IT including message boards, e-mail software, chat rooms, RSS technology facilitate social interaction inside the firm by creating networking between groups and individuals.

This finding also agrees with research that shows that employee' perceptions regarding ease of use and usefulness of technology can affect SC (Youndt et al., 2004; van den Hooff and Huysman, 2009). Moreover, IT and computer networks abate physical, spatial, and temporal limitations to communication and connect people to create social networks. These 'connections' foster social relations (Wellman, 1997; Youndt et al., 2004), enable communication of ideas to create consensus among a broader network of people (Sproull and Kiesler, 1991; Pickering and King, 1995; Youndt et al., 2004), and enhance cooperation and sharing of knowledge not only among individuals within an organisation, but across organisations (Bensaou, 1997; Youndt et al., 2004). Thus, by expanding the scope of relationships and affiliations among employees, IT should enhance the social capital of organisations. Sherif et al. (2006) pointed out that by providing organisational and technical infrastructures, management can facilitate, stimulate, and influence the emergence of social capital, which in turn influences knowledge sharing. Van den Hooff and Huysman (2009) argued that ICT can play a supporting role. Different kinds of applications can provide insight into the social capital, aid in interaction between people and contribute to a shared identity, norms and values, as well as more understanding of what co-workers are doing.

Regarding the multi-group analysis, the results showed that the effects of organisational culture on firm' social capital were significantly stronger in the public than in private sector. This is seen as a consequence of the greater efficiency for public OC in enhancing firms' social capital than private sector. It also confirms the crucial role of vision and goals and a cooperative in increasing firms' social capital and how this can explain the superiority of public sector' social capital compared with their private sector counterpart. As for the effect of organisational structure and information technology on firms' social capital, the results showed that the effect of OS and IT in the public and private oil sectors were statistically not

different and hence confirms that the important influence of OS and IT on firms' social capital is relevant in both public and private oil sectors.

### **7.3.2. Social capital Increasing Product and Process Innovation**

The positive and significant influence of the social capital on the product and process innovation is in accordance with several previous studies (Wu et al., 2008; Baba and Walsh, 2010; Zheng, 2010; Laursen et al., 2012; Elstouhi et al., 2015). For example, Elstouhi et al. (2015) concluded that SC including structural, relational, and cognitive social capital play both a direct and indirect role in supporting product innovation. Firms, which pay more attention to structural, relational, and cognitive dimensions of SC, produce a higher level of innovation (Laursen et al., 2012).

Based on the resource-based view, social capital is a valuable organisational resource (Kim et al., 2013). It facilitates the individual interactions necessary for innovation (Gold et al., 2001; Kim and Lee, 2010). Several knowledge management scholars have even argued that social capital is a key mechanism for achieving innovation (Nahapiet and Ghoshal, 1998; Perry-Smith and Shalley, 2003). Moreover, the social dynamics derived from interpersonal and group relationships are a primary determinant of knowledge sharing (Van den Hooff and Huysman, 2009), which is likely to increase innovation (Van den Hooff and Huysman, 2009; Akhavan and Hosseini, 2016). It is argued that the more social capital that is transferred to organisational assets, the better the innovation (Abu Bakar and Ahmad, 2010). This implies that social capital is the basis for increased social interaction and communication among employees which in turn improves knowledge sharing and, therefore, increased innovation.

According to the knowledge-based view, the social capital viewed as a potentially critical asset in maximising organisational advantage. Where there are high levels of collaboration and good will among organisation members, which is likely to increase knowledge and

generate new ideas and develop new business opportunities, thus facilitating innovation activities (Andrews, 2010; Akhavan and Hosseini, 2016).

With regard to structural capital dimension, several scholars have observed that the number of ties represents a valuable asset for individuals because they make resources accessible and available to attain goals (Coleman, 1990; Burt, 1992; Kang et al., 2007; Mura et al., 2013). Accordingly, the higher the number of social ties, the higher is individuals' possibility to identify someone willing to support the promotion and implementation of innovation (Mura et al., 2013). As such, individuals might develop greater expectations that their knowledge sharing can be more effective in supporting the promotion and implementation of innovation once they get connected to a larger network of acquaintances (Zheng, 2010; Mura et al., 2013). This expectation is reinforced by the fact that a stronger structural capital allows a stronger social interaction ties among employees of Libyan oil sector.

Moreover, Knowledge networks are a new form of collaboration network. The social network has many challenges related to how firms transform information into knowledge which is converted into new or developed products or processes (Ichijo and Nonaka, 2007a, von Krogh et al., 2012). SC's contribution to innovation is accomplished by reducing information, decision, and implementation costs. This has further been extended to persuading reliable information to be volunteered; making agreements to be honoured; and facilitating employees to share tacit knowledge (Landry et al., 2002; Ichijo and Nonaka, 2007a, von Krogh et al., 2012). The network members, who have close interactions (strong ties) and better accessibility and excitement to cooperate with others, produced valuable knowledge for innovation (Carmona-Lavado et al., 2010). Individuals promote creativity and innovation by informally exchanging varied viewpoints along with their supportive environmental work (De Dreu and West, 2001). Within firms, social networks are shown to play importance role in sustaining potential breakthrough innovation (Baba and Walsh, 2010). Moreover, supporting

the ties amongst employees, trust and group cohesion are key factors to enhance innovation at workplace (Zheng, 2008). SC, which develops a suitable environment, can reinforce innovation (Wu et al., 2008). This environment supports employees as they try to solve problems by creating different ideas. It increases the conformity of members' thoughts and as they experience different forms of conflict and improved group cohesiveness (e.g., West and Farr, 1990; Jehn et al., 1999; Elsetouhi et al., 2015).

Additionally, a social structure of interaction facilitates information exchange and creates outlets for resources which can support the firm's ability to reduce uncertainty and risk, in order to avoid poor decision making. This cooperation is important for building the firm's innovative activity. Social relationships boost productive resource exchange and thus encourage product innovation. A high degree of social interaction between individuals will generate and then implement innovation (Gu and Wang, 2013, Petrou and Daskalopoulou, 2013). This explanation has confirmed that the stronger social ties amongst employees in Libyan oil sectors can affect and enhance the link between SC and innovation. This is mainly due to the fact that the nature of the Libyan culture which is collectivism culture which has a very high score on collectivism 62% (Hofstede, 2009).

With regard to relational social capital dimension, numerous scholars have noted that trust-based-relationships hasten knowledge sharing between partners whereby they are more likely to pool their resources and share their knowledge with partners. Trust generates security in terms of confidence that partners would not exploit the opportunity to steal their colleagues' knowledge. Spreading trust amongst employees represents an informal safeguard in reinforcing the innovation process (Pérez-Luño et al., 2011). A high level of trust encourages a depth of challenge experienced in the development of new products (Tidd, 1995; Rodriguez et al., 2005). This increases their willingness to cooperate within the firm to convince other



partners of innovation (Adler and Kwon, 2002). Researcher such as Moran (2005) and Hsieh and Tsai (2007) considered that the trust in the relationships reflected positively on the performance of innovation and the launch stage for product innovation. Zheng (2010) noted that the relational capital “trust” is a prerequisite for knowledge sharing, and cooperation, which are usually preconditions for innovation by group. Building trust is the number one task for leaders of innovative teams. As for the SC’s cogitative dimension, several researchers also argued that shared goals encourage individuals to have common responsibilities and goals which sustain progress in their innovative activities (Gu and Wang, 2013).

As for the multi-group analysis, the results showed that the effects of social capital on product innovation were significantly stronger in the private sector than in public sector. This is seen as a consequence of the greater efficiency for private sector organisational context in enhancing firms’ social capital than public sector social capital (Chiem, 2001; Eskildsen et al., 2004; Willem and Buelens, 2007; Seba et al., 2012; Amayah, 2013). It also confirms the crucial role of structural, relational, and cognitive social capital in increasing firms’ innovation and how this can explain the superiority of private sector compared with their public sector counterpart.

### **7.3.3. The Indirect Impact of Organisational Context (OC, OS and IT) on Product and Process Innovation through Social Capital**

Given the fact that organisational culture, organisational structure and information technology are a part of organisational context, organisational context (OC, OS and IT) was confirmed to be an important determent of social capital. In the meanwhile, social capital was in turn found to be a positive precursor for innovation (Product and process), due to structural, relational, and cognitive social capital. Therefore, based on these reasons, it could be argued

that the organisational context (OC, OS and IT) has an indirect influence on innovation (product and process) through social capital.

This explanation was indeed confirmed by the empirical analysis. It was found that the organisational context (OC, OS and IT) affect the innovation (product and process) through enhancing their social capital. Using social capital in the public and private sector, the organisational context was found to affect the innovation (product and process) through social capital (supporting H3 in public and private sectors). It was found that while in the public oil sector the social capital mediate 25% of the organisational culture' effect on product innovation, the social capital mediate 27% of the organisational structure' effect on product innovation, and 22% of information technology' effect on product innovation, However, in private oil sector; social capital explained 25% of the organisational culture' effect on innovation, 32% and 30% of the organisational structure and information technology' effect on innovation respectively. It is believed that this study is the first looking at the indirect effect of organisational context' on innovation (product and process). The following sub-sections discuss the indirect relationships among organisational context and innovation through social capital in detail:

#### **7.3.3.1 The indirect effect of Organisational Culture on Innovation through Social Capital**

Several researchers found that organisational culture has significantly increased communication among employees, which facilitates explicit knowledge sharing (Gold et al., 2001; Kim and Lee, 2006), which more likely to improve innovation at workplace (von Krogh et al., 2012; Choi and Park, 2014). Other scholars noted that organisational culture helps members communicate and cooperate more effectively as well as to better express and understand shared knowledge, especially the tacit knowledge embedded in a particular context (e.g., Kim and Lee, 2006; Seba et al., 2012), which develop products or processes innovation (Cheng, 2012; Al-husseini and Elbeltagi, 2015).

Furthermore, the organisational culture increases the efficiency of innovation (product and process) by providing social networking among individuals within organisations (Gu and Wang, 2013; Petrou and Daskalopoulou, 2013), which create a work environment that allow employees to share their knowledge more effectively (Amayah, 2013). Van den Hooff and Huysma (2009) confirmed that organisational culture has a positive orientation towards social capital. Van den Hooff and Huysma (2009) argued that organisations should create organisational culture that foster social capital by establishing a knowledge-friendly culture with openness, innovativeness, a willingness to share, etc. to facilitate informal and formal communication channels, through which employees can have better social relationships which enhance knowledge sharing and therefore create opportunities that encourage innovation among staff (Gold et al., 2001).

### **7.3.3.2 The indirect effect of Organisational Structure on Innovation through Social Capital**

As for the indirect effect of organisational structure on innovation, numerous empirical studies (e.g., Gold et al., 2001; Chen and Huang, 2007; Song-zheng and Xiao-di, 2008; Van den Hooff and Huysman, 2009) found that organisational structure including flexibility positively affected strength of ties or frequency of interactions among individuals, which has a positive impact on knowledge sharing (Amayah, 2013; De Clercq et al., 2013), which turn to enhancing innovation at workplace (Leung, 2010; Cheng, 2012). Similarly, a lower level of centralisation and formalisation which are types of OS positively affected the interactions and communication among individuals within organisations (Robbins and Decenzo, 2001; Tsai, 2002). Other researchers argued that organisational structure with low centralisation and less formalisation facilitates cooperation among members, and informal face-to-face interactions that minimize the potential for misunderstanding and allow tacit knowledge to be effectively observed and understood (Liebowitz, 2003; Liebowitz and Megbolugbe, 2003;

Yang and Chen, 2007; Wang and Noe, 2010 ) and also opportunities for sharing explicit knowledge (Kim and Lee, 2006), which turn in enhancing innovation within organisation (von Krogh et al., 2012; Choi and Park, 2014). It is argued that the appropriate organisational structure allows individuals to facilitates cooperation and communication among members (Burns and Stalker, 1961; Zheng et al., 2010; Wang and Noe, 2010), leading to feel comfortable sharing experiences and know-how (Kim and Lee, 2006; Van den Hooff and Huysman, 2009), which turn in to increase innovation (Tsai, 2001, Dougherty et al., 2002, Michael and Nawaz, 2008, Mehrabani and Shajari, 2012; Elbeltagi, 2014; Al-husseini and Elbeltagi, 2015).

#### **7.3.3.3 The indirect effect of Information Technology on Innovation through Social Capital**

Turning to the indirect relationship between information technology and innovation, several researchers argued that IT enhanced social integration that builds organisations' social capital. These structures of social integration support connectedness between employees of organisations by generating seamless networks of individuals, devises and knowledge (Joshi et al., 2010), which enhance innovation at workplace (Mura et al., 2013; Elstouhi et al., 2015). Shneiderman (2007) among others argued that IT facilitates social interaction inside the firm by creating networking between groups and individuals (Youndt et al., 2004; van den Hooff and Huysman, 2009), which more likely to improve innovation at workplace (Mura et al., 2013).

#### **7.4. Organisational Context Increasing Product and Process Innovation through Knowledge Sharing (RQ3)**

The second aim of this study is to determine the indirect effect of organisational context (OC, OS and IT) on innovation. The research has revealed that the organisational context (OC, OS and IT) affects the product and process innovation through enhancing knowledge sharing.

The following first discusses the results illustrating the influence of organisational context (OC, OS and IT) on knowledge sharing. Second, the results discuss the influence of knowledge sharing on innovation (product and process), and then illustrate the indirect impact of organisational context (OC, OS and IT) on product and process innovation through knowledge sharing. Hence, (H2a, b, c, H5a, b and H8a, b, c, d, e, f) in the two public and private models are confirmed, RQ3 is answered.

### **7.4.1. Organisational Context Increasing Knowledge Sharing**

#### **7.4.1.1 Organisational Culture and Knowledge Sharing**

The positive and significant influence of the organisational culture on the knowledge sharing is in accordance with several previous studies (Gold et al., 2001; Kim and Lee, 2006; Van den Hooff and Huysman, 2009; Chen and Cheng, 2012).

For example, Shin (2004) showed that organisational culture can facilitate knowledge creation and sharing by developing a positive work environment and effective reward systems. Michailova and Minbaeva (2012) pointed out that knowledge is embedded and carried through organisational culture, policies, practices, systems and employees. However, knowledge sharing does not occur automatically, but requires substantial organisational efforts aimed at encouraging close relationships between organisations' members. Courtney (2001) argued that knowledge management in organisations increases communication and knowledge sharing between organisational members, and enriches interpretation and coordinating actions between them. Accordingly, a cooperative organisational culture must be created in such organisations to allow effective knowledge sharing and communication between employees. However, organisational culture that emphasises competition between employees may pose a barrier to knowledge sharing, while cooperation between teams helps

in creating trust, an essential condition for knowledge sharing (Willem and Scarbrough, 2006; Schepers and VandenBerg, 2007; Wang and Noe, 2010).

Previous studies uncover that organisational culture had a strong influence over knowledge sharing (Andrews and Delahay, 2000; Al-Alawi et al., 2007). Von Krogh (1998) and Kim and Lee (2004) argued that organisational culture promotes active knowledge sharing among employees and enhances communication speed by empowering co-workers to freely share personal knowledge and concerns. According to Cohen and Prusak (2001), organisational culture can lead to better KS, shared goals, and lower transaction costs. Kim and Lee (2005) noted that supportive organisational culture is necessary to encourage individuals to share their knowledge with others in the same work environment, because organisational culture plays a vital and dynamic role in enabling employees to support interactions toward knowledge sharing. Roberts (2000), among others such as Panteli and Sockalingam (2005) and Renzl (2008) also stressed that employee organisational culture is one of main determinants that influence knowledge sharing among employees at workplace. It argued that tacit knowledge to be shared successfully there must be supportive organisational culture (e.g., Ardichvili et al., 2003; Ardichvili, 2008).

Moreover, van den Hooff and Huysman (2009) pointed out that knowledge sharing can be promoted through the creation of an environment such as organisational culture that motivate the staff to look for new training programmes, attend courses, encouraged staff to help each other, facilitate interaction between different departments. Other researcher (e.g., Gold et al., 2001) argued that organisational culture can enhance knowledge sharing when the organisations' goals and vision are clearly stated for all staff and make employees recognising the importance of knowledge sharing. Similarly, Kim and Lee (2006) highlighted that organisational culture including vision and goals can facilitate knowledge sharing through encouraging organisational members to share their knowledge. It has also suggested that clear

organisational vision and goals engender a sense of involvement and contribution among employees (Davenport et al., 1996; O' Dell and Grayson, 1998; Popovich, 1998), which enhancing knowledge sharing among individuals within organisation (Willem and Scarbrough, 2006; Schepers and VandenBerg, 2007; Wang and Noe, 2010).

#### **7.4.1.2 Organisational Structure and Knowledge Sharing**

The positive and significant influence of the organisational structure on the knowledge sharing is consistent with several previous studies (Gold et al., 2001; Kim and Lee, 2006; Chen and Huang, 2007; Van den Hooff and Huysman, 2009; Seba, 2012). According to Wang and Noe (2010) knowledge sharing may be facilitated by having a less centralised organisational structure, creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005), use of fluid job descriptions and job rotation (Kubo et al., 2001), and encouraging communication across departments and informal meetings (Liebowitz, 2003; Liebowitz and Megbolugbe, 2003; Yang and Chen, 2007). Sharratt and Usoro (2003), found that “organisations with a centralised, bureaucratic management style can stifle the creation of new knowledge, whereas a flexible decentralised OS encourages knowledge-sharing, particularly of knowledge that is more tacit in nature” (p. 189). Similarly, Tsai (2002) and Kim and Lee (2006) found that centralisation could reduce individuals' interest in sharing knowledge with other units within an organisation. Conversely, knowledge sharing will increase among employees when formalisation is low in the organisational structure (Kim and Lee, 2005; Lin, 2008).

Moreover, Chen and Huang (2007) stated that the less formalised work process is likely to stimulate the social interactions among organisational members which make employees are able to share knowledge and apply it. Other researchers pointed out that centralisation creates a non-participatory environment that reduces communication, commitment, and involvement with tasks and projects among participants which affect employees' willingness to share their

knowledge (Damanpour, 1991; Sivadas and Dwyer, 2000; Robbins and Decenzo, 2001; Tsai, 2002; Chen and Huang, 2007). Other scholars found that a decentralised structure encourages communication (Burns and Stalker, 1961; Zheng et al., 2010) and increases employees' knowledge sharing because in less centralised environments, free flow of lateral and vertical communication is encouraged within organisation. In a similar vein, despite inconclusive findings regarding the relationship between organisational structure and knowledge management (Tsai, 2002), a decentralised structure has often been seen as facilitative to knowledge management and knowledge sharing success (Deal and Kennedy, 1982; Damanpour, 1991; Gold et al., 2001; Zheng et al., 2010). High centralisation inhibits interactions among organisational members (Gold et al., 2001; Zheng et al., 2010), reduces the opportunity for individuals to share their knowledge, and prevents imaginative solutions to problems (Deal and Kennedy, 1982; Zheng et al., 2010). On the contrary, decentralisation facilitates internal communication (Bennett and Gabriel, 1999), increase employee's knowledge sharing, and adoption of innovation and higher levels of creativity (Miller, 1971; Khandwalla, 1977; Zheng et al., 2010). Other researchers argued that lower formalisation and centralisation, could enhance individuals' interest in sharing knowledge with each other within organisation (Amayah, 2013; De Clercq et al., 2013). Other researchers confirmed that organisational structure with flexibility facilitates interaction between organisational members to enhance knowledge sharing among employees (Gold et al., 2001; van den Hooff and Huysman, 2009). This means that knowledge sharing can be promoted through the creation organisational infrastructure related to creating a appropriate organisational context such as an organisational structure that shows who is responsible for which knowledge activities and that has little formal barriers to interaction between individuals and different parts of the organisation.



#### **7.4.1.3 Information Technology and Knowledge Sharing**

The positive and significant correlation between information technology on knowledge sharing in the two sectors is once more in accordance with most past empirical studies (e.g. Ives et al. 2003; Kim and Lee, 2006; Van den Hooff and Huysman, 2009; Abodulah et al. 2009; Teimouri et al. 2011; Hitam and Mahamad, 2012). For example, Ives et al. (2003) and Spender (1996) examined the influence of IT on knowledge sharing. The results indicate that IT influences employees' willingness to share their knowledge at workplace.

Van den Hooff and Huysman (2009) confirmed that ICT infrastructure was a crucial factor to facilitate knowledge sharing among individuals, because establishing and maintaining an IT infrastructure that efficiently and effectively helps organisational members to learn what is relevant knowledge, where it is located, and how to contact those possessing or needing it. Kim and Lee (2006) emphasise, the effective sharing of organisational knowledge among employees is based strong information technology including IT application usage and End-user. For example, computer networks, electronic bulletin boards, and discussion groups facilitate contact between those seeking knowledge and those who control access to knowledge. Cong et al. (2007) concluded that advanced IT systems impact on an individual's willingness to share knowledge with other employees. However, Sandhu et al. (2011) identified organisational barriers to knowledge sharing including: insufficient rewards, lack of interaction, lack of time and weak IT systems. Similarly, Seba et al. (2012) conclude that appropriate, reliable, and easy to use IT resources will facilitate knowledge sharing, whilst a less effective IT infrastructure dominated by functional inadequacies or political agendas may act as a barrier to knowledge sharing.

Hitam and Mahamad (2012), found that the implementation of IT and reward systems can enhance KS among employees within organisation. Lin et al. (2009) studied IT consisted of technological infrastructure, databases, and a knowledge network. The study revealed that all

dimensions of IT are critical for KS practice. Khalid et al. (2012) showed that IT had stronger impacts on knowledge donating and collecting than enjoyment of helping others, knowledge self-efficacy, and reward systems, in public organisations in the UAE.

This finding also agrees with research that shows that employee' perceptions regarding ease of use and usefulness of technology can affect knowledge sharing (Hendriks and Vriens, 1999; Roberts, 2000; Spiegler, 2003; Bock et al., 2005; DeVries et al., 2006; Lin, 2007; Wang and Noe, 2010). Moreover, Fernandez-Mesa et al., (2014) highlighted that employees' willingness to share knowledge are heavily grounded in the information technology, which helps individuals to share their knowledge within organisations.

Information technology plays a vital role in business, as it helps employees in accessing the knowledge they need when they need it and provides the tools with which decision makers and users can leverage their knowledge in the context of their work (Bals et al., 2007; Chong and Chong, 2009; Abdelrahman, 2013). Over the past three decades, many organisations have developed information technology-based systems (IT-based systems) designed specifically to facilitate the sharing, integration and utilisation of knowledge, referred to as knowledge management systems (KMSs). These systems are part of the agenda in many of today's leading organisations (Nielsen and Michailova, 2007; Abdelrahman, 2013). Bose (2004) highlighted that KMSs can facilitate KS by ensuring knowledge flow from the person(s) who know to the person(s) who need to know throughout the organisation. Therefore, organisations are always looking for support from their IT departments to utilise, facilitate and use their existing knowledge effectively and efficiently (Montazemi et al., 2012). However, many organisations have found difficulty in implementing KMSs successfully. It is demonstrated that in many organisations technology has failed to have much impact on the way knowledge is transferred and shared.

Recent studies in a related vein of research provided evidence that individuals tend to rely on a combination of ICTs to support communication and collaboration in the workplace (Stephens, 2007; Watson-Manheim and Belanger, 2007; Lee and Kelkar, 2013). This indicates that it is likely that individuals also need to rely on a set of ICT(s) to support KM and KS practices in organisations. It is widely accepted that ICT plays a critical role to support communication and collaboration in organisations (e.g. Culnan and Bair, 1983; Boczkowski and Orlikowski, 2004; Watson-Manheim and Belanger, 2007; Lee, 2010; Lee and Kelkar, 2013). Furthermore, past KM studies have also shown that appropriate ICTs can aid in the creation, sharing and transfer of knowledge (Alavi and Leidner, 1999; Goh et al., 2008; Chudoba et al., 2011; Lee and Kelkar, 2013). The goal of many organisations is thus to use appropriate ICTs so that KM initiatives can be conducted effectively (Broos and Cronje, 2009).

Davenport and Prusak (1998) believed that weaving ICT into KM initiatives in the organisation would create a common controllable environment such that knowledge can be shared within the organisation, thus helping to ensure the success of such initiatives. Further, researchers (e.g., Hendriks and Vriens, 1999; Hendriks 2001; Hedelin and Allwood, 2002; Lee and Kelkar, 2013) found that ICTs have both a direct and indirect influence on the motivation for sharing knowledge because they can eliminate hindrances, provide channels to obtain information, correct flow processes, and identify the location of the knowledge carrier and knowledge seeker. Other researchers such as Kim and Lee (1996), Huysman and Wulf, (2006) and Eid and Nuhu (2011) also found that both employees' usage of IT applications and the user-friendliness of the IT systems significantly impact employee knowledge-sharing capabilities. This means that knowledge sharing using information technology systems of Libyan oil sectors facilitates a community of practice and makes ideas, experiences, best practice and knowledge accessible and available to all employees in Libyan oil sectors. Other

studies (Roberts, 2000; Park et al., 2004; Riege, 2005; Kim and Lee, 2006; Schwartz, 2007; Eid and Nuhu, 2011) examined the use and/or impact of common IT tools such as intranets, content management and collaboration tools for knowledge sharing.

As for the difference between organisational context and knowledge sharing behaviour, significant differences were noticed between the two types of organisations. Firstly, it was found that organisational culture had strong effect on private sector than public sector. This result is in accordance with the recent studies of knowledge sharing in the public sector compared the public sector with the private sector and, in particular focussed on aspects of culture. For example, Liebowitz and Chen (2003) and Seba et al. (2012) argued that knowledge sharing in the public sector is difficult because most people view knowledge as closely coupled with power, and related to their promotion prospects.

Moreover, researchers (e.g., Milner, 2000; Willem and Buelens, 2007; Amayah, 2013) indicated that OC including organisational goals in public organisations are typically more difficult to measure and more conflicting than in private organisations, and they are affected differently by political influences (Pandey and Wright, 2006; Amayah, 2013). Secondly, the results also showed that the effect of organisational structure on knowledge sharing was significantly stronger in the private sector than in public sector. This is seen as a consequence of the greater efficiency for private' OS in enhancing employees' knowledge sharing than public organisational structure (Willem and Buelens, 2007; Seba et al 2012; Amayah, 2013). In this regard, scholars point to the different approach to rewards for knowledge sharing between the private and public sectors and the negative effect that bureaucracy and fragmented authority have on knowledge sharing in the public sector (Heffron, 1989; Chiem, 2001; Willem and Buelens, 2007; Seba et al., 2012; Amayah, 2013). Lastly, it was found that the influence of information technology on knowledge sharing was also significantly stronger

in the private than in public sector. This result is line with accordance with a number of researchers (e.g., Chiem, 2001; Eskildsen et al., 2004; Seba et al., 2012) who argued that the private organisations have good systems of knowledge management than the public organisations.

#### **7.4.2. Knowledge Sharing Increasing Product and Process Innovation**

The positive and significant correlation between knowledge sharing on both the product and process innovation in the two sectors is once more in accordance with most past empirical studies (Alavi and Leidner, 2001; Hong et al., 2004; Choi and Park, 2014; Al-husseini and Elbeltagi, 2014; Al-husseini and Elbeltagi, 2015).

In the resource-based view of a firm (Wernerfelt, 1984; Barney, 1991), Knowledge is critical resources of the firms (Grant, 1996). Effectively encouraging employees to share useful knowledge across the organisation can increase innovation (e.g. Cummings, 2004; Lin, 2007a; Mesmer-Magnus and DeChurch, 2009). In addition, according to Darroch (2005), the capability of a firm to generate innovation depends on its ability to manage its knowledge resources. In addition, a firm that promotes employees to share knowledge within teams and organisations is likely to generate new ideas and develop new business opportunities, thus facilitating innovation activities (Darroch and McNaughton, 2002; Akhavan and Hosseini, 2016). Knowledge in the organisation needs to be managed and well promoted in order to guarantee the efficiency of innovation (Du Plessis, 2007). Besides, Darroch (2005) found that a firm which is able to manage its knowledge resources more successfully will ultimately be able to transform into a more innovative firm. Therefore, knowledge in the organisation needs to be managed and well promoted in order to guarantee the efficiency of innovation (Du Plessis, 2007). Knowledge sharing creates opportunities to maximise an organisation's ability to generate solutions and initiatives that provide a business with the innovation that

leads to competitive advantage (Reid, 2003). For example, Hong et al. (2004) discovered in their empirical study that KS and new product development have a significant positive relationship. Furthermore, Lin (2007a) asserted that an atmosphere which encourages knowledge donating among employees – transformation of individual knowledge into team or organisational knowledge which improves the stock of knowledge available to the organisation – is likely to generate new ideas and develop new business opportunities, thus facilitating innovation activities.

According to the knowledge-based view, knowledge is a valuable resource of organisations (Nonaka and Takeuchi, 1995, Nonaka and Toyama, 2005). The role of knowledge sharing has emerged as an important area in the investigation of innovation in organisations (Spender, 1996, von Krogh et al., 2012; Choi and Park, 2014). Knowledge sharing refers to a two-dimensional process whereby organisational members share and exchange their tacit and explicit knowledge. Daily interaction creates new knowledge through the process of knowledge exchange, donation, and collection (Hooff and Weenen 2004). The purpose of donating knowledge is to see tacit knowledge become explicit and owned by the entire group. Meanwhile, collecting knowledge refers to consulting people and seeking knowledge out, which in turn improves the entire stock of knowledge available to the organisation (Nonaka et al., 2006; von Krogh et al., 2012).

Access to knowledge may help organisational members to come up with new ways to solve problems and engage in further innovative activities (Rodan and Galunic, 2004). Product and process innovation are shown to solve problems and improve performance (Cooper, 1998, Tsai, 2001). Innovation depends on employees' knowledge, skills, and experience of value creation (Skerlavaja et al., 2010; Wang and Wang, 2012). New knowledge is critical to developing innovative ideas for new products (Tsai, 2001). The knowledge-based view suggests that organisations need to exhibit knowledge creation but more importantly KS

(Alavi and Leidner, 2001). Since knowledge is embedded in individuals, it is necessary for it to be shared among organisational members so that they can establish new routines and mental processes that may help them to solve their problems (Nonaka and Takeuchi, 1995; Nonaka et al., 2006; Cheng, 2012). When organisational members share their tacit knowledge and convert it into explicit knowledge through collecting and donating, collective learning is generated, which in turn improves the stock of knowledge available to the organisation (Alavi and Leidner, 2001; Nonaka and Toyama, 2005; Lin, 2007). It is argued that organisations that promote a KS culture among organisational members are likely to generate new ideas that lead to product and process innovation (Tsai, 2001, Dougherty et al., 2002, Michael and Nawaz, 2008, Mehrabani and Shajari, 2012). Through knowledge activities, employees can reconfigure and utilise existing knowledge in new ways so as to change and develop their tasks, which in turn generates new knowledge that can be used for product and process innovation.

Supar (2006) noted that the encouragement and practising of KS activities among employees can enhance performance and create opportunities for innovation. The results of this study demonstrate that the members of staff surveyed in public and private oil sectors are willing to donate and collect their skills, insights, experiences, expertise, information and notes both inside and outside of their own departments, which enables their organisations to improve their product (e.g. research and projects with other sectors) and their process innovation (taking and developing training programmes and adopting new technology). Employees in oil sectors exchanging their knowledge through forums, conferences, formal and informal meetings, seminars, and training programmes helps to diffuse innovation of product and process.

These findings contradict Jantunen's (2005) study, which concluded that knowledge acquisition and innovative performance do not have a significant relationship, and Ling and

Nasurdin's (2010) findings indicating that KS is unrelated to product and process innovation, while knowledge acquisition has a positive relation to both within the Malaysian manufacturing sector. According to the authors, such unexpected results were thought to be due to the cultural differences in Malaysian context where networks and cooperation among individuals is not prevalent. This confirms that Libyan context such as culture have effect in the relationship between knowledge sharing and innovation for example high collectivism culture were revealed to be important for the relationship among knowledge sharing and innovation. However, the findings of the current study do support the assertions of previous studies such as those of Leung (2010) and Cheng (2012), who both indicated that promoting KS practice within an organisation helps employees to discuss different ideas about experiences and skills that could increase the effectiveness learning performance, thus supporting product and process innovation. The findings are also congruent with Ferraresi et al. (2012), who argued that KM processes, namely capturing, sharing, and application, can enhance innovation through the strategic orientation of the organisation. This view also supported by other researchers who indicated that innovation requires that individuals acquire existing knowledge and that they share this knowledge within the organisation (Stata, 1989; Cohen and Levinthal, 1990; Nonaka, 1991; Yli-Renko et al. 2001; Hall and Andriani, 2003; Jiménez-Jiménez and Sanz-Valle, 2011).

As for the multi-group analysis, first, the results showed that the effects of knowledge sharing on product innovation were significantly stronger in the public oil sector than in private oil sector. This is seen as a consequence of the greater efficiency for public organisational context including (OC, OS and IT) in enhancing knowledge sharing than private organisational context. It also confirms the crucial role of collecting and donating knowledge in increasing innovation and how this can explain the superiority of public oil sector' innovation compared with their private sector counterpart. Second, the effects of knowledge



sharing on process innovation were significantly stronger in the private oil sector than in public oil sector. This is also seen as a consequence of the greater efficiency for private organisational context including (OC, OS and IT) in enhancing knowledge sharing than public organisational context. It also confirms the crucial role of collecting and donating knowledge in increasing innovation and how this can explain the superiority of private oil sector' innovation compared with their public sector counterpart. This is in line with previous findings from developing countries (Al-husseini and Elbeltagi, 2014; Choi and Park, 2014; Al-husseini and Elbeltagi, 2015).

#### **7.4.3. The Indirect Impact of Organisational Context (OC, OS and IT) on Product and Process Innovation through Knowledge Sharing**

Based on the above discussion, the results show that organisational context (OC, OS and IT) is positively related to knowledge sharing, due to interaction between individuals and different departments and vision and goals, reward system and flexibility, and IT application usage. In the meanwhile, the results also showed that knowledge sharing was found to be a positive and significant impact on innovation (product and process), as a result of donating and collecting knowledge. Hence, based on these reasons, it could be argued that the organisational context (OC, OS and IT) has an indirect influence on innovation (product and process) through knowledge sharing. This explanation was indeed supported by the empirical investigation. It was revealed that the organisational context affect the product innovation indirectly and regardless of the context (public or private) where the firm operate (supporting H4a). It was found that the entire effect of organisational context' on product innovation is partially mediated by knowledge sharing. Thus, organisational context can enhance product innovation indirectly.

With respect to the impact of organisational context' on process innovation, the latter was found to be solely indirect through knowledge sharing in both public and private oil sectors

(supporting H4b). These results suggest that organisational context including organisational culture, structure and information technology can increase process innovation through knowledge sharing and regardless of the type of firm (public or private) where the firm evolve. It appears that such findings on the impact of organisational context on product and process innovation have not been tested by previous studies. Hence, it could be suggested that the positive influence of the organisational context on knowledge sharing would lead the firm to innovation (product and process). The following sub-sections below are discussed the indirect relationships among organisational context and innovation through knowledge sharing in detail:

#### **7.4.3.1 The indirect effect of Organisational Culture on Innovation through Knowledge Sharing**

Several researchers (e.g., Chang and Lee, 2007 and Pérez-Luño et al., 2011) found that organisational culture have significantly increased employees knowledge sharing which develop products or processes innovation. Abdelrahman (2013) indicated that organisational culture increases communication and knowledge sharing among organisational members, and enhances interpretation and coordinating actions among them Accordingly, a supportive organisational culture must be created in such organisations to allow effective knowledge sharing and communication among individuals, which more likely improves innovation within organisations (Choi and Park, 2014; Al-husseini and Elbeltagi, 2014). Others researchers have suggested that clear organisational vision and goals engender a sense of involvement and contribution among employees (Kim and Lee 2005; 2006), which may in turn increase knowledge sharing among individuals within organisation (Schepers and VandenBerg, 2007; Willem and Scarbrough, 2006; Wang and Noe, 2010) and enhancing innovation (Al-husseini and Elbeltagi, 2015). Gold et al. (2010) stated that organisational culture facilitate knowledge sharing more effectively, which in turn to increase innovation. van den Hooff and Huysman (2009) confirmed that organisational culture has a positive

orientation towards knowledge sharing and innovation, because supportive organisational culture can motivate employees to look for new training programmes, attend courses, encourage staff to help each other, facilitate interaction between different departments, goals and vision of this organisation are clear for all staff and make employees recognising the importance of KS. Hence, these would bring the most effective benefits in terms of product and process innovation.

In addition, Scholars (e.g., Gu and Wang, 2013; Petrou and Daskalopoulou, 2013) believe that OC supports the efficiency of innovation (product and process) through providing interaction between individuals at workplace which create a work environment that encourage employees to share their knowledge more effectively (Amayah, 2013). Similarly, through encouraging employees to ask others for help whenever necessary, employees can improves their knowledge sharing by gathering employees' interaction (De Dreu and West, 2001; Carmona-Lavado et al., 2010), which may in turn increase innovation within organisations (Mura et al., 2013). Finally, it is believed that organisations should creating supportive organisational culture that uses a standardised reward system for knowledge sharing, promotes collective behaviour, encouraging interaction between employees and different departments, goals and vision are clearly communicated to the employees, encouraging cooperation among employees and stresses the importance of knowledge to the success of the organisation, which may in turn enhance knowledge sharing and increase skills of employees, hence develop product and process innovation within organisations.

#### **7.4.3.2 The indirect influence of Organisational Structure on Innovation through Knowledge Sharing**

As for the indirect effect of organisational structure on innovation, numerous empirical studies (e.g., Seba and Delbridge, 2012 ; Amayah, 2013) found that a low centralisation and formalisation positively affected knowledge sharing between individuals whereas a high

centralisation and formalisation had the opposite effect (Kim and Lee, 2006; Wang and Noe, 2010; Amayah, 2013), which has a negative impact on innovativeness (Aiken and Hage, 1971; Pierce and Delbecq, 1977; Aiken et al., 1980; Choi and Park, 2014). Similarly, studies that have examined the influence of a low centralisation and formalisation and innovation found positive results compared to those that examined a high centralisation and formalisation (Sciulli, 1998). Liao (2007) examined the effects of organisational structure which included centralisation and formalisation and different types of innovation. The results indicated that when centralisation and formalisation were decreased, the product and process innovation will increase within organizations. Researchers (e.g., Chen and Huang, 2007; Yang and Maxwell, 2012) emphasised the need to align organisational structure and knowledge sharing. Authors explained that a less centralisation and formalisation is a supportive for knowledge sharing among individuals, which develops a suitable environment, can reinforce innovation at workplace (Wang and Wang, 2012; Choi and Park, 2014; Al-husseini and Elbeltagi, 2014; Al-husseini and Elbeltagi, 2015).

Moreover, scholars have shown that knowledge sharing may be facilitated by having a less centralised organisational structure (Kim and Lee, 2006; Wang and Noe, 2010), creating a work environment that encourages interaction among employees such as through the use of open workspace (Jones, 2005; Wang and Noe, 2010), and encouraging communication across individuals and departments and informal meetings, which facilitate knowledge sharing (Damanpour, 1991; Sivadas and Dwyer, 2000; Robbins and Decenzo, 2001; Tsai, 2002; Chen and Huang, 2007; Wang and Noe, 2010; Zheng et al., 2010) when knowledge is used, learning takes place, which in turn leads to changes of behaviour and innovation (Ichijo and Nonaka, 2007a, von Krogh et al., 2012; Kim and Lee, 2013). On the contrary, high centralisation inhibits interactions among organisational members (Gold et al., 2001; Zheng et al., 2010), reduces the opportunity for individuals to share their knowledge, which has a

negative impact on a level of innovation (Khandwalla, 1977; Zheng et al., 2010). Other researchers suggested that organisations should create opportunities for employee interactions to occur, and organisational structure should have a less centralised and formalised to facilitate knowledge sharing among employees (Wang and Noe, 2010), which individuals and users can leverage their knowledge in the context of their work, which in turn improves innovation within organisations (Nonaka and Takeuchi, 1995; Hu et al., 2009; Wang and Noe, 2010; Yang, 2010; Kim and Lee, 2010; 2012; Kim and Lee, 2013). Gold et al. (2001) and van den Hooff and Huysman (2009) confirmed that the flexibility of organisational structure is essential for encouraging communication between individuals and departments and informal meetings, which facilitate effective knowledge sharing and innovation.

#### **7.4.3.3 The Indirect Impact of Information Technology on Innovation through Knowledge Sharing**

Scholars in knowledge management state that information technology is ineffective if they are not used (Kulkarni et al., 2006). Shin (2004) pointed out that information technology enhance the quality of knowledge management by supplying tools for effective storage and sharing of knowledge, and through facilitating knowledge creation and knowledge sharing. Furthermore, Bolloju et al. (2002) stressed that in order to assist the creation of new knowledge effectively; information technology must support not only the creation, but also the gathering, organisation and sharing of existing knowledge, When knowledge is used, learning takes place, which in turn leads to enhance innovation (Von Krogh et al., 2012). Cabrera and Cabrera (2005) and Wang and Noe (2010) maintained that KS using information technology facilitates a community of practice and makes ideas, experiences, best practice and knowledge accessible and available to all employees in an organisation, which develops a suitable environment, can reinforce innovation (von Krogh et al., 2012; Choi and Park, 2014 ).

Several researchers suggested that KS between organisations units requires particular coordination mechanisms and tools in this complex environment to facilitate KS (Ghoshal and Bartlett, 1995; Gupta and Govindarajan, 2000; Sia et al., 2010). Therefore, they are always looking for support from their IT departments to utilise, facilitate and use the existing knowledge effectively and efficiently (Montazemi et al., 2012), which in turn improves product and process innovation (Wang and Wang, 2012). Dennis and Vessey (2005) state that information technology succeed in playing a vital and dynamic role in enabling employees in organisations easily to find expertise residing in the organisation and to support interactions toward KS, which can be more likely to support the firm's ability to develop product and process innovation (Wang and Wang, 2012; Choi and Park, 2014; Al-husseini and Elbeltagi, 2014). Joshi et al. (2010) pointed out that IT affects social integration that builds organizations' social capital. These structures of social integration support connectedness between employees of organisations by creating seamless networks of individuals, which leads to increase knowledge sharing among individuals, which enhancing innovation at workplace (Mura et al., 2013; Elstouhi et al., 2015). Researchers (e.g., Youndt et al., 2004; Shneiderman 2007; van den Hooff and Huysman, 2009) also emphasised the importance and influence of IT on facilitates social interaction within organisation by creating networking between groups and individuals, which more likely to improve knowledge sharing practice and then enhancing innovation at workplace (Mura et al., 2013).

### **7.5. Social Capital Increasing Knowledge Sharing (RQ4)**

The positive and significant effect of social capital on employees' knowledge sharing is in accordance with a number of past empirical works. In fact, structural, relational and cognitive social capital was found to be affecting the employees' knowledge sharing (e.g., Hua et al., 2013; Kim et al., 2013; Hu and Randel, 2014; Akhavan and Hosseini, 2016). Given the fact

that structural, relational and cognitive social capital is part of the social capital, and based on the social capital theory, they enhance knowledge sharing (Zhang et al., 2008). According to social capital theory, employee willingness to share knowledge is influenced by social capital (Nahapiet and Ghoshal, 1998; Cabrera and Cabrera, 2005). Several empirical studies have shown that SC as the key facilitator of organisational knowledge sharing (Inkpen and Tsang, 2005; Wasko and Faraj, 2005; Yang and Farn, 2009; Van den Hooff and Huysman, 2009; Chang and Chuang, 2011; Kim et al., 2013).

Chang and Chuang, (2011), state that SC is a key organisational resource and is associated with KS. Moreover, SC play importance role of employees' knowledge donating and collecting within workplace, and several empirical researchers have shown that it is a significant factor in KS (e.g., He et al., 2009; Wei et al., 2011; Kim et al., 2013). Wei et al. (2011), suggested that in order to assist social capital to make knowledge sharing and effectively, organisations should incorporate a social capital paradigm into the enterprise's business processes so that knowledge workers can share knowledge and use it effectively and efficiently in their daily work. Researchers such as Marouf (2007) and Chang et al. (2011) say that SC in organisations enhances communication and KS between organisational members. Aslam et al. (2013) highlighted that social capital including structural, relational and cognitive dimensions plays a vital role in organisations, as it helps employees in accessing the knowledge they need when they need it and provides the close interpersonal relationships among organisational members with which employees can leverage their knowledge in the context of their work. Chiu et al. (2006) and Chang and Chuang (2011) argued that SC including social interaction ties among members provided a cost-effective way to share knowledge. The more these social interactions build, the greater of the knowledge exchanged among individuals (Yli-Renko et al., 2001; Chang and Chuang, 2011).

According to Kim et al. (2013), based on the resource-based view, the results of this study support the importance of soft issues – namely, the three dimensions of SC such as structural, relational, and cognitive SC – in explaining oil sector employees' KS behaviours such as KC and KD. It offers insights into the value of SC and explains the driving forces to make employees in oil sector willing to engage in KS within organisations. The findings indicate that all SC dimensions are strongly associated with oil sector employees' KC and KD. Whereas cognitive SC has the strongest effect on employees' KC, relational SC has the strongest effect on employees' KD.

It is noteworthy that SC may be an organisational resource that can facilitate employees' KS as an organisational capability within oil sector from the resource-based view (Wernerfelt, 1984; Barney, 1991; Kim et al., 2013). Therefore, social dynamics among individuals are the most important factors in employees' contributions to organisational knowledge repositories (Nahapiet and Ghoshal, 1998; Van den Hooff and Huysman, 2009). Since KS is a sensitive behaviour, close interpersonal relationships are needed to encourage employees to collect and donate their knowledge. From the resource-based view, stronger social interaction ties (structural SC), social trust (relational SC), and shared goals and visions (cognitive SC) are critical organisational resources that may increase both KC and KD of oil sector employees as a critical organisational capability. Thus, in oil sector with stronger social interaction ties, greater social trust, and more shared goals and visions, employees are more likely to share their knowledge.

Turning to the differences in strengths of the social capital' influence between public and private sector, the multi-groups analysis showed that the effects of social capital on knowledge sharing were significantly stronger in the private than in public sector. This is seen as a consequence of the greater efficiency for private organisational context in enhancing firms' social capital than organisational context in public sector. It also confirms



the crucial role of structural, relational and cognitive social capital in increasing firms' innovation and how this can explain the superiority of private sector compared with their public sector counterpart. These findings contradict Seba et al.'s (2012) study, which concluded that knowledge sharing in the public sector can be viewed as a social good can act as an incentive and this does not easily exist in the private sector.

As mentioned above in section (7.2), it should be argued that the variables including social capital and knowledge sharing were mediated the relationship among organisational context (OC, OS and IT) and innovation (product and process), therefore the indirect relationship among such variables is due to the scope of the study.

### **7.6. Organisational Context (OC, OS and IT) and Product and Process Innovation: differences between the Public and Private Oil Sectors (RQ5)**

In terms of differences identified between the two selected sectors, these could be summarised in the following. With respect to direct influence of organisational context on innovation (product and process), it was found that the effect of private organisational context (OC, OS and IT) on innovation were significantly greater than the influence of the public organisational setting. Such results were thought to be due to the cultural differences among two setting, public and private (Willem and Buelens, 2007; Amayah, 2013; Al-husseini and Elbeltagi, 2014; Choi and Park, 2014; Al-husseini and Elbeltagi, 2015). For example, Damanpour (1991) revealed that public sector organisations tend to have higher bureaucratic control such as high formalisation and centralisation than private sector organizations, which has impact on innovativeness (Aiken and Hage, 1971; Pierce and Delbecq, 1977; Aiken et al., 1980; Choi and Park, 2014). Further arguments comes from researchers (e.g., Chiem, 2001; Cong and Pandya, 2003; Eskildsen et al., 2004; Cong et al., 2007; Seba et al., 2012), who demonstrated that there is a lack of implementation of KM strategies in the public sector, which has a negative impact on innovativeness.

Regarding factors affecting innovation (product and process) recorded few differences between the two sectors. First, knowledge sharing was found to be important determinants of product innovation in public sector, followed by social capital. However, social capital was found to be important determinants of product innovation in private sector, followed by knowledge sharing. Such results were thought to be due to the cultural differences in public sector where a lack of implementation of KM strategies, bureaucratic control such as high formalisation and centralisation within organisation is prevalent (Cong and Pandya, 2003; Cong et al., 2007; Willem and Buelens, 2007; Amayah, 2013; Choi and Park, 2014). Second, social capital was found to be important for process innovation in the public sector, followed by knowledge sharing.

On the other hand, knowledge sharing was found to be important for process innovation in private sector, followed by social capital. Such results also are thought to be due to the nature of the different among public and private sectors (Willem and Buelens, 2007; Amayah, 2013). Liebowitz (2003) confirmed that knowledge sharing in the public sector is difficult because most people view knowledge as closely coupled with power, and related to their promotion prospects. Cong et al. (2007) and Cong and Pandya (2003) demonstrated that there is a lack of implementation of KM strategies in the public sector. It is argued that the private organisations have good systems of knowledge management (knowledge sharing no expiation) than the public organisations (Seba et al., 2012).

As for the effect of organisational context (OC, OS and IT) on innovation (product and process), significant differences were noticed between the two sectors. The indirect effect of such organisational context was found to be strictly indirect through the firms' social capital and knowledge sharing in the public sector, in the private sector; the mediation test also reveal indirect links between the organisational context and innovation (product and process). One explanation could be that the effect of organisational context on public and private firms'

social capital and knowledge sharing were strong enough to lead to a significant increase in innovation (product and process). This explanation was indeed supported by the multi-group analysis. The latter revealed that the effect of private organisational context on the firms' social capital and knowledge sharing were significantly greater than the influence of the public organisational context, hence logically suggesting that the private innovation were more effective than their public sector counterparts in all stages of innovation.

## **7.7. Summary of the Chapter**

This chapter aimed to discuss the key findings of this study regarding the effect of organisational context (OC, OS and IT) on innovation (product and process) through social capital and knowledge sharing in Libyan public and private oil sectors, and to address the research questions that assesses the relationships between the constructs in the structural model. The findings emerging from the public and private samples have illustrated the crucial role of organisational context in enhancing innovation in Libyan public and private oil sectors. Firstly, it was found that organisational context including organisational culture, structure and information technology are the important factors in enhancing innovation in both public and private oil sectors. Secondly, it was found that the social capital and knowledge sharing are the most crucial factors in making the organisations more innovation regardless of the organisational setting where it operates. Social capital and knowledge sharing become respectively important for achieving high product innovation. As for the predictors of process innovation, social capital and knowledge sharing were among the factors found to be important irrespective of the context where firms evolve. This could suggest the importance of structural, relational, and cognitive social capital and donating and collecting knowledge sharing in enhancing regularity of the innovation within organisation.

The next chapter concludes this study by briefly recalling the findings obtained in this research, addressing the research aim, objectives and questions and highlighting the implications drawn from these results. It will also acknowledge the study's limitations and identify potential areas of further research.

## **CHAPTER EIGHT: CONCLUSION**

### **8.0 Introduction**

The main aim of this study was to examine the impact of organisational context (OC, OS and IT) on social capital and knowledge sharing to support product and process innovation in public and private oil sectors. This aim was achieved through conducting and analysing a literature review to identify the factors affecting social capital, knowledge sharing and innovation. A set of strong overarching themes concerning these factors were identified in a conceptual framework. A structural model was proposed, based on the review of the literature review, to examine the relationships among these factors through using a multivariate analysis using a variance-based statistical technique known as Partial Least Squares Structural Equation Modelling.

The main aim of this chapter is to conclude the thesis. The chapter therefore is structured as follow. Section (8.1) briefly recalls the major findings obtained in this research. These findings are linked to the research objectives set in chapter one. Thereafter, the contributions and research implications are discussed and divided into theoretical and practical implications in section (8.2). Finally, the research limitations and future works are linked together and acknowledged in the last section of this chapter.

### **8.1 Main Conclusions**

Despite the fact that the organisational context including organisational culture, structure and information technology has been the attention of several studies (Kim and Lee, 2006; van den Hoof and Huysman, 2009; Amayah, 2013), their influences on innovation has mainly been examined by using a direct approach (e.g., Mayondo and Farrell, 2003; Miron et al., 2004; Obenchain and Johnson, 2004; Jaskyte, 2004; Jaskyte and Dressler, 2005; Chang and Lee,

2007; Pizarro et al., 2009; Zheng et al., 2010; Valencia et al., 2010; Hogan and Coote, 2014). Indeed, the review of literature (See section 2.3.10) revealed that the impact of organisational context on innovation remains unclear and empirical evidence is still inconclusive (Valencia, 2010; Büschgens et al., 2013; Abdullah et al., 2014). However, given the fact that social capital (Wu et al., 2008; Baba and Walsh, 2010; Zheng, 2010; Molina-Morales and Martínez-Fernández, 2010; Laursen et al., 2012; Mura et al., 2013; Elstouhi et al., 2015) , and knowledge sharing among employees (Alavi and Leidner, 2001; Dougherty et al., 2002; Nonaka and Toyama, 2005; Michael and Nawaz, 2008; Cheng, 2012; Al-husseini, and Elbeltagi, 2014; 2015), are two group of resources can support the promotion and implementation of innovation within organisation (Ichijo and Nonaka, 2007a; von Krogh et al., 2012; Kim and Lee, 2013; Al-husseini and Elbeltagi, 2014). Indeed, it appeared that the few studies looking at such role have stressed the motivational function of the organisational context and overlooked their social capital and knowledge sharing' enhancement effect. Consequently, it is believed that despite the aforementioned studies, the indirect and mediating effects of organisational context on innovation are still not fully answered. In this respect, the study has adopted a comprehensive approach simultaneously exploring the direct and indirect relationships between organisational context (OC, OS and IT) on innovation, product and process in Libyan public and private oil sectors.

This study has set six research objectives to be addressed. The first objective was to examine the direct relationship between organisational context (OC, OS and IT) and product and process innovation in Libyan public and private oil sectors. In both sectors, the obtained results revealed that organisational context have a positive and significant effect on innovation but organisational culture has a greater positive impact on innovation, followed by information technology and organisational structure respectively.

The second objective of the study was to explore the indirect impacts of organisational context (OC, OS and IT) on innovation, product and process through social capital in public and private sectors. In this regard, the study has confirmed that in both sectors, the impact of such variables is more likely to be indirect more than direct. The mediation tests have suggested that a major part of the organisational context' effect on innovation' product and process is explained through the firms' social capital. For public and private oil sectors' samples, social capital was intervening in the relationship between organisational context and innovation. It could therefore be concluded that in the case of public and private oil sectors, the organisational context enhances the relational, structural and cognitive social capital, which would then increase the firms' probability to start innovation. Such outcome is irrespective of the context where the firm operate.

The third objective of the study was to explore indirect impacts of organisational context (OC, OS and IT) on innovation, product and process through knowledge sharing. Similar to the results obtained from the second objective of the study, the role of organisational context in enhancing innovation' product and process was indirect rather than direct. Confirming the inappropriate approach adopted by most previous studies (direct), the present findings illustrate that the organisational context do not increase the product and process innovation per se, but rather improve the employees' knowledge sharing which would in turn increase and sustain this innovation. Having said this, the mediation test confirmed the indirect effect in the public and private oil sectors; in both public and private sectors indirect effects were found to be statistically significant. It would however be reasonable to advance and generalise that organisational context enhances product and process innovation through enhancing the donating and collecting knowledge sharing. Instead, such results could be owed to the effectiveness of the public and private organisational context which was strong to

have a significant indirect impact, which would then increase innovation. Such outcome is irrespective of the context where the firm operate.

The fourth objective of the research was to examine the effect of social capital on employees' knowledge sharing. The findings have tested and confirmed the significant and positive effect of social capital on two process of knowledge sharing (donating and collecting) and in public and private oil sectors, thus confirming that the social capital could enhance the employees' both donating and collecting knowledge sharing.

The last objective was to identify differences between the public and private oil sectors in the link between organisational context and innovation' product and process. Broadly speaking, due to the cultural differences between the two sectors, knowledge sharing was revealed to be important for the product innovation of public oil sector followed by social capital. On the other hand, social capital was revealed to be important for the process innovation of public oil sector followed by knowledge sharing. Similarly, due to nature of organisational context from private sector, social capital was found to be important for process innovation in a private context, followed by social capital. However, knowledge sharing was found to be important for process innovation in a private sector, followed by social capital. More importantly, while the indirect effect of organisational context on innovation' product and process was established in both sectors, the indirect impact on innovation' product and process was established in private sector than public sector. Such a difference was supported by the MGA results where the organisational context effects on firms' social capital and knowledge sharing were significantly stronger in the private than in public sector. This suggests the strong on indirect influence in private context was due to the strong effect of the private organisational context.



## **8.2 Implications**

The findings of this thesis have significance for a number of organisations including public and private oil sectors as well as the academic society. Therefore, the implications of the results of this research are explained separately as theoretical and managerial implications.

### **8.2.1 Theoretical Implications**

This research is a two-fold study. It first examines the determinants of product and process innovation and second explores the impact of organisational context (OC, OS and IT) on product and process innovation. As a result, the findings have implications for the product and process innovation and organisational context, social capital and knowledge sharing literatures.

The study contributes to the innovation literature in several ways. First, the comprehensive approach adopted in this research where the two types of resources (social capital and knowledge sharing) are analysed simultaneously provides an enhanced picture on the determinants of product and process innovation. In fact, the study illustrated those different types of resources affect both product and process innovation. Hence, answering researchers (e.g., Subramaniam and Youndt, 2005; Xu et al., 2010; Zwain et al., 2011; Al-husseini and Elbeltagi, 2015), who calls for more research to address the gap in the impact of knowledge sharing on product and process innovation literature especially in developing countries.

Secondly, by looking at the direct impact of organisational context (OC, OS and IT) on innovation, product and process, the study contributes to the literature by bringing evidence on the role of organisational context (OC, OS and IT) in increasing product and process innovation, a role thus far acknowledged in the theoretical literature remains unclear and empirical evidence is still inconclusive (Valencia, 2010; Büschgens et al., 2013).

Thirdly, by bringing evidence from a developing country (Libya) and comparing the results with data collected from both public and private sectors; the study shows that in general, the indirect effect is not similar across the two setting and the direct effect does not differ from one setting to another.

As for the implications to the organisational context (OC, OS and IT), social capital and knowledge sharing literature, this study is believed to have contributed to this literature in a number of ways. In fact, although extensive, the empirical literature looking at the effect of organisational context (OC, OS and IT) remains limited and inconclusive (Wang and Noe, 2010; Chennamaneni et al., 2012; Amayah, 2013; Akhavan and Hosseini, 2016), lacking a strong theoretical background, and restricted to developed countries (Wang and Noe, 2010), two types of organisations public and private sector (Amayah, 2013).

By exploring the indirect effects of the organisational context on innovation product and process, the present study has contributed to shed more light on the doubts raised regarding the influence of organisational context in increasing innovation, product and process (McLaughlin et al., 2008; Tellis et al., 2009; Valencia, 2010; Nakata and Di Benedetto, 2012; Büschgens et al., 2013; Naranjo-Valencia et al., 2016). It was found that organisational context increase innovation both direct and indirectly through enhancing the firms' resources. Such findings are two-fold. Not only it does confirm the direct approach followed by previous studies when evaluating the influence of organisational context, it also reveals the mechanism whereby the organisational context use. In this respect, although several studies has acknowledged the potential indirect effect of organisational context through enhancing knowledge sharing and social capital, there has been no research to date to consider all the variables used in this study, especially in Libyan public and private oil sectors.

Secondly, by looking at the impact of organisational context (OC, OS and IT) on knowledge sharing and social capital, the study contributes to the literature by bringing a new conceptual

framework that investigates the factors that affect KS and SC to support product and process innovation in public and private oil sectors. The conceptual framework will make important contribution to the literature in SC and KS, which will help public and private oil sector to identify new ways of building SC and leveraging and sharing knowledge to support the product and process innovation. Hence, answering Wang and Noe (2010) calls for more research to address the gap in the impact of organisational context on knowledge sharing literature, especially in developing countries. Equally, it answers Amayah, (2013) call for conducting more integrative research that would have implications for businesses and practitioners regarding to the impact of organisational context and knowledge sharing, particularly in public and private sectors. Similarly, answering Chen and Huang, (2007) calls for more comprehensive approaches to address the gap in the knowledge sharing literature. Also, answering Andrews, (2010) calls for more research enhance the understanding of the impact of organisational structure as a part of organisational context on social capital. Moreover, answering call for undertake research to understand of the precise role of information technology to facilitate knowledge sharing behaviour, which in turn influences organisational performance (Choi et al., 2010).

Thirdly, this research applied RBV and KBV approaches in a new context of using both social capital and knowledge sharing to support innovation, product and process in Libyan public and private oil sectors. The success of the amalgamation of a wider range of factors that affect social capital and knowledge sharing to support the innovation, product and process in one framework (i.e. organisational context (OC, OS and IT), knowledge sharing, social capital and innovation, product and process) is evident from the results. Moreover, the results suggest that the proposed model can explain the impact of different factors on social capital, knowledge sharing and product and process innovation in Libyan public and private oil sectors. Thereby, the findings of this study extend the RBV by showing how both social

capital and knowledge sharing can support innovation, product and process, and by taking organisational context (OC, OS and IT) as a vital factor which affects social capital, knowledge sharing and innovation, product and process to build social network and trust and shared goals (social capital) and make the best use of knowledge available in an organisation and create the best value. This study also extends the KBV in the context of knowledge sharing through showing the impact of organisational context (OC, OS and IT) in deploying social capital and sharing knowledge assets in Libyan public and private oil sector, resulting in a better understanding of knowledge and social capital as a competitive resource and linking it with innovation, product and process.

Lastly, from a methodological perspective, not all the aforementioned studies have formerly tested the mediation effect of the two group of resource-factors such as social capital and knowledge sharing in the link between organisational context and innovation, product and process. Thus, applying robust statistical analysis (Utilising sophisticated statistical technique (WarpPLS, a variance-based structural equation modelling package, and the use of two advanced statistical techniques- reflective and formative approach) to test the expected indirect effect of organisational context would confirm and endorse it. In addition, specifically with respect to the organisational context mechanism in enhancing innovation, past studies lacked a thorough analysis and strong theoretical basis. Therefore, an enhanced theoretical base should be used to justify such effects.

### **8.2.2 Managerial Implications**

From a practical perspective, the findings of this study can improve the understanding and practice of public and private oil sectors in terms of their employees' social capital and knowledge sharing. This study incorporated three organisational context factors that are essential to oil sectors' successful social capital and knowledge sharing and discuss the

implications of these factors for developing organisational strategies that encourage oil employees' social capital and knowledge sharing (collecting and donating). Based on the results, the following suggestions are offered to help management enhance product and process innovation by establishing appropriate organisational context, a successful social capital and knowledge sharing strategy.

The results of the current study illustrate the importance of organisational culture in public and private oil sectors in Libya for encouraging product and process innovation. Therefore, oil sectors should create organisational culture that inspire their staff to engage in product and process innovation, by motivating them to look for new training programmes, attend courses, encouraged staff to help each other, facilitate interaction between different departments, goals and vision of this organisation are clear for all staff and make employees recognising the importance of knowledge sharing to the success of the organisation. This study has further revealed that organisational structure is the predictor for the practising of product and process innovation in both sectors. Thus, managers in Libyan oil sector should create opportunities that encourage innovation among staff by using a standardised reward system to promote collective behaviour and communication in order to exchange of their expertise, skills, experience, and knowledge. Moreover, in order to increase innovation, Libyan public and private oil sectors should establishing and maintaining an information technology infrastructure that efficiently and effectively help organisational members to learn what is relevant knowledge, where it is located, and how to contact those possessing or needing it in order to enhance innovation.

The unprecedented increase in the use of social capital and knowledge sharing to facilitate the product and process innovation is compelling public and private oil sectors to build social capital and knowledge sharing that facilitate social network, trust and provide users with access to knowledge at anytime and anywhere. Establishing knowledge sharing that facilitate,

share and improve access to knowledge is particularly critical for public and private oil sectors. For example, managers in public and private oil sectors need to expend effort on promoting knowledge sharing practice. The findings of this study show that innovation requires members of staff to generate and share new knowledge. Therefore, managers should design strategies aimed at encouraging their employees to engage in knowledge sharing activities whether through formal meeting including sessions and workshops, etc. or informal meeting through taking time for informal activities such as personal relationships and social communities can facilitate knowledge learning and develop respect, trust, and friendship among staff, which are the core elements of knowledge sharing. Hence, oil organisations in both sectors need to make time for knowledge sharing and adopt strategies that encourage social interaction and reflection on the effectiveness of meetings.

In addition, establishing social capital is particularly critical for public and private oil sector. For example, managers in public and private oil sectors should invest in establishing strong and clear goals and priorities which employees should follow; clearly understanding what employees should do will lead to more specific and higher knowledge sharing and increase innovation. Moreover, managers should allocate more organisational resources in developing several tools. For example, management can help employees establish close informal and formal communication channels or form their own communities and social activities, through which employees can have better social relationships such as increased trust and trustworthiness among members. Hence, investing in trust would bring the most effective benefits in terms of product and process innovation

Given the large effort in building social capital and knowledge sharing, an understanding of the factors affecting social capital and knowledge sharing are useful so that public and private oil sectors can prioritise their resources in an effective way. For example, organisational context including organisational culture, structure and informational technology were found

to be significant factors that exert a strong impact on social capital and knowledge sharing, and social capital was found to have a significant impact on knowledge sharing. Social capital and knowledge sharing were also found to have a significant impact on product and process innovation. Public and private oil organisations are recommended to consider organisational context (OC, OS and IT) as a significant factor that affects social capital and knowledge sharing and product and process innovation. For example, managers should promote knowledge sharing and social capital through the creation of an environment that fosters knowledge sharing and social capital. This environment can be developed by creating an organisational structure that shows who was responsible for which knowledge activities and that had little formal barriers to interaction between different parts of the organisation; using a standardised reward system for knowledge sharing. Incentives can help to determine knowledge flow, access, and sharing of existing knowledge, and the generation of new knowledge. They increase the communication among all departments on oil organisations and facilitate the collection and delivery of knowledge within departments. Thus, managers, as the decision makers in oil organisations, should establish appropriate systems of rewards such as bonuses and promotions.

Moreover, it can be created by establishing a knowledge-friendly culture with openness, innovativeness, a willingness to share, etc. As well as establishing and maintaining an information technology infrastructure that provide insight into the structural social capital, aid in interaction between people and contribute to a shared identity, norms and values, as well as more understanding of what colleagues are doing. However, managers must not limit their attention to the factors mentioned above; it is strongly recommended that they consider the existence of other factors outside the scope of this study such as leadership, national culture, and research and development (R&D), which may have an influence on social capital and knowledge sharing. Also, since this research was conducted in two settings (public and

private), managers must consider their specific organisation which might significantly influence the results.

The results show that social capital factors (i.e. structural, relational, and cognitive SC) are important prerequisites for active interpersonal knowledge collecting and knowledge donating. In order to facilitate knowledge sharing in public and private sectors, managers may assign more resources to enhance structural and relational capital which contributes to knowledge sharing intention and behaviour (knowledge collecting and knowledge donating). As the results indicated, managers interested in developing and sustaining knowledge exchange in organisations should develop strategies or initiatives that promote the interaction and heighten the relationships among individuals. For instance, managers can arrange face-to-face meetings or seminars and invite top-level knowledge contributors and professional instructors to share their knowledge and experience with colleagues as a way to increase the social interaction ties among the individuals. In addition, management can help members establish intimate informal and formal communication channels or form their own communities and social activities, through which members can have better social relationships such as increased trust and trustworthiness among members. Based on a well-developed relationship social capital, managers can cultivate an active knowledge sharing-oriented culture. In addition, in order to achieve higher cognitive social capital – the most effective factor to increase knowledge sharing – management should invest in establishing strong and clear goals and priorities which employees should follow; clearly understanding what employees should do will lead to more specific and higher knowledge sharing and eventually higher outcomes (Chow and Chan, 2008). Management may also systematically set up opportunities or channels to share key information and knowledge in order to generate more innovative product and process.



### **8.3. Limitations and Future Research**

While this study has made significant contributions, there are limitations that need to be considered in the future. Firstly, although the sample size (218 from public and 200 from private organisations) proved to be sufficient to conduct a robust statistical analysis, a larger sample would probably enhance the results. Collecting data from firms' managers and employees is often very challenging and generally the response rate did not exceed the 35%. In addition, gathering data from two different sectors across two different groups has made the process lengthier in time. For these reasons, the data collection process took three months and due to time constraints the researcher could not spend more time on this. Future studies could have more allocated time and resources and therefore include larger samples.

Second, the study was conducted in public and private oil sectors, and practically in Libya. Obviously, there is no reason to assume that the results obtained in this research can be generalised to other countries, or other industries. Third, the model developed in this study represents a reasonable starting point as it was tested on a sample size (218 and 200 responses respectively), which certainly will have some implications for the generalisability of the findings. To generalise the results and make significant analysis, further research needs to be conducted through using the same questionnaire with a much larger sample size. Furthermore, testing and exploring the model developed in this study in other cultural settings, including African, Asian or other western countries, will be valuable in providing evidence concerning the robustness of the research model across different cultural settings. It would also be interesting for future researchers to test and explore the model developed for this study as a case study in a single private or public oil company with branches all over the world. In other words, conducting comparative studies among two countries is also suggested, to expand the research model by testing it in different regions or industries. In addition, the data was

collected in this study through a cross-sectional survey; future research is recommended with more in-depth investigations using longitudinal data.

Third, based on a thorough literature review, the comprehensive approach adopted in this study attempted to include the most important factors influencing innovation. However, some factors such as (leadership, national culture and research and development (R&D)), which could be important predictors of innovation, yet may have been neglected by the literature, could have been excluded in this study because of the time constraint. In this sense, future research could comprise additional factors that could potentially mediate the effect of organisational context on innovation. Fourth, given the long-term impact often associated with the organisational context (OC, OS and IT), a longitudinal study would bring an enhanced insight about the indirect effects of organisational context (OC, OS and IT) and hence could be a more accurate way to evaluate the effectiveness of such organisational context. Fifth, the present study adopted a post-positivistic approach using quantitative questionnaires as a method of data collection to compare between two different types of organisations (public and private). The results first allowed the study to explore the indirect effects of organisational context by identifying the social capital and knowledge sharing mediating such effects, and second revealed a number of differences in the organisational context indirect impacts between the two selected sectors. However, the post-positivistic approach could neither empirically provide an in-depth explanation on how social capital and knowledge sharing are enhanced by supportive organisational context (OC, OS and IT), nor uncover the factors leading to differences between the two sectors. Such in-depth explanations can only be achieved by an interpretive approach. Hence, future studies could adopt a qualitative methodology using in-depth interviews with managers to increase awareness on the way the identified firms' social capital and knowledge sharing can be enhanced by organisational context between public and private setting.

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## APPENDIX:

### Appendix A: The Covering Letter and Questionnaire



School of Management  
Plymouth Business School  
University of Plymouth  
Plymouth  
United Kingdom

**Research Title: THE IMPACT OF ORGANISATIONAL CONTEXT (OC, OS and IT) ON INNOVATION IN LIBYAN OIL COMPANIES: THE ROLE OF SOCIAL CAPITAL AND KNOWLEDGE SHARING.**

Dear Sir/Madam

I am a PhD researcher at the University of Plymouth Business School, investigating the impact of organisational context including organisational culture, structure and information technology on innovation in Libyan oil companies through the mediating role of social capital and knowledge sharing.

Your organisation is a part of a representative sample of Libyan firms selected to participate to this research. Your opinions and answers to the questions below will be highly valued. It is expected that your cooperation will, in addition to enabling the realisation of the study's objectives, allow your firm to be more innovative. In this respect, I would be most grateful if you could aid my research by completing a questionnaire by clicking on the link bellow. This will take you from 10 to 15 minutes to be completed. I intend to start my analysis on the 30<sup>th</sup> of December 2015. Hence, I would be very appreciative if you can complete the questionnaire by this date.

Please be assured that the information provide within the questionnaire will be treated as **STRICTLY CONFIDENTIAL** and is bound to respect the University's code of ethics. No individual data will be disclosed to any external party. In addition, this research will only be used for academic purposes. I will be very willing to send you a free copy of the summary of this report if you so indicate, by providing your company name and address in the space provided at the end of the questionnaire. Please note that your participation in this research is entirely voluntary. It is your choice whether to participate or not

Thank you for your time and cooperation.

Yours sincerely

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## PART 1: FOR ORGANISATION CONTEXT

### SECTION A. Organisational Culture

Please assess your firm's organisational culture (Please circle the appropriate number using the following scale).

5=Strongly agree      4=Agree      3=Neutral      2=Disagree      1=Strongly disagree

	Strongly Agree				Strongly Disagree
The management of our organisation expects everyone to actively contribute to the registration and transmission of knowledge.	5	4	3	2	1
Employees are encouraged to innovate, to investigate and to experiment.	5	4	3	2	1
On-the-job training and learning are highly appreciated in this organisation.	5	4	3	2	1
In this Organisation employees are encouraged to ask others for help whenever necessary.	5	4	3	2	1
Interaction between different departments is encouraged in this organization.	5	4	3	2	1
Employees are encouraged to discuss their work with people in other workgroups.	5	4	3	2	1
The vision of this organisation is clearly communicated to the employees.	5	4	3	2	1
Overall, organisational goals are clearly stated in this organization.	5	4	3	2	1
I can explain my organization's vision and goals to others.	5	4	3	2	1
The management of this organisation stresses the importance of knowledge to the success of the organization.	5	4	3	2	1
Employees understand the importance of knowledge to organization's success.	5	4	3	2	1
Employees are valued for their individual expertise.	5	4	3	2	1

### SECTION B: Organisational Structure

Please indicate the extent to which each of the following statements that can describe organisational structure in your organisation (Please use the same scale above).

	Strongly Agree				Strongly Disagree
The structure of our organisation impedes interaction and knowledge sharing.	5	4	3	2	1
The structure of our organisation promotes collective behaviour over individual behaviour.	5	4	3	2	1
The structure of our organisation facilitates the development of new ideas/processes/products.	5	4	3	2	1
This organisation uses a standardised reward system for knowledge sharing.	5	4	3	2	1
The employees in this organisation are approachable.	5	4	3	2	1
Designs processes to facilitate knowledge exchange across functional boundaries.	5	4	3	2	1
The structure of our organisation facilitates the flow of new knowledge across structural boundaries.	5	4	3	2	1
The structure of our organisation facilitates the discovery of new knowledge.	5	4	3	2	1
Bases our performance on knowledge creation.	5	4	3	2	1
Encourages employees to go where they need for knowledge regardless of structure.	5	4	3	2	1

## SECTION C. Information Technology

Please indicate the extent to which each of the following perception statements describe the information technology in your organisation (Please circle the appropriate number using the following scale).

5 = *Strongly agree*    4 = *Agree*    3 = *Neutral*    2 = *Disagree*    1 = *Strongly disagree*

	<i>Strongly Agree</i>				<i>Strongly Disagree</i>
The information technology facilities within this organisation provide a positive contribution to my productivity and effectiveness.	5	4	3	2	1
Our information technology facilities make it easier to cooperate with others within our organization.	5	4	3	2	1
The information technology facilities within this organisation provide a positive contribution to the development of my knowledge.	5	4	3	2	1
The information technology facilities within this organisation provide important support for knowledge sharing.	5	4	3	2	1
Information technology makes it is easier for me to get in contact with employees who have knowledge that is important to me.	5	4	3	2	1
Information technology makes it is easier for me to have knowledge that is relevant to me at my disposal.	5	4	3	2	1

**PLEASE NOW GO TO PART 2**

## PART 2: FOR SOCIAL CAPITAL

Please indicate the extent to which each of the following statements that can describe social capital in your organisation (Please circle the appropriate number using the following scale).

5=*Strongly agree*    4=*Agree*    3=*Neutral*    2=*Disagree*    1=*Strongly disagree*

	<i>Strongly Agree</i>				<i>Strongly Disagree</i>
In general, I have a very good relationship with my colleagues	5	4	3	2	1
My colleagues know what knowledge I have at my disposal	5	4	3	2	1
I know what knowledge could be relevant to which colleague	5	4	3	2	1
Within my department, I know who has knowledge that is relevant to me at their disposal	5	4	3	2	1
I feel connected to my colleagues	5	4	3	2	1
I know my colleagues will always try and help me out if I get into difficulties	5	4	3	2	1
I can trust my colleagues to lend me a hand if I need it	5	4	3	2	1
I can rely on my colleagues when I need support in my work	5	4	3	2	1
My colleagues and I always agree on what is important at work	5	4	3	2	1
My colleagues and I always share the same ambitions and vision at work.	5	4	3	2	1
My colleagues and I are always enthusiastic about pursuing the collective goals and missions of the whole organisation.	5	4	3	2	1

**PLEASE NOW GO TO PART 3**

## **PART 3: FOR KNOWLEDGE SHARING**

**Please indicate the extent to which each of the following statements reflects your practicing KS in your department or company** (Please use the same scale as above).

	Strongly Agree	4	3	2	Strongly Disagree
Knowledge sharing with colleagues is considered normal outside of my department	5	4	3	2	1
Knowledge sharing between colleagues is considered normal in my department	5	4	3	2	1
When I have learned something new, I tell colleagues outside of my department about it	5	4	3	2	1
When my colleagues within my department have learned something new, they tell me about it	5	4	3	2	1
I share knowledge about managerial and technical profession with my colleagues in the company.	5	4	3	2	1
I share knowledge about managerial and technical issues with my colleagues in the company.	5	4	3	2	1
When I have learned something new regarding managerial and technical profession, I tell my colleagues in my department about it.	5	4	3	2	1
When colleagues outside of my department have learned something new, they tell me about it.	5	4	3	2	1
I share knowledge I have with colleagues within my department when they ask for it.	5	4	3	2	1
Colleagues in my organisation share knowledge about managerial and technical skills with me.	5	4	3	2	1
Colleagues within my department share knowledge with me , when I ask them about it.	5	4	3	2	1
Colleagues within my department tell me what their skills are, when I ask them about it.	5	4	3	2	1
I share my skills and know-how with colleagues outside of my department, when they ask me to.	5	4	3	2	1
I share my skills and know-how with colleagues within my department, when they ask for it.	5	4	3	2	1
I share knowledge I have with colleagues outside of my department, when they ask me to.	5	4	3	2	1
Colleagues in my organisation share knowledge about managerial and technical issues with me.	5	4	3	2	1

**PLEASE NOW GO TO PART 5**

## **PART 4: FOR INNOVATION**

**Please indicate the extent to which each of the following statements assess developing and implementing process innovation in your firm** (Please use the same scale as above).

	Strongly Agree	4	3	2	Strongly Disagree
Our organisation is always delivering new courses for employees	5	4	3	2	1
Our organisation constantly emphasises development and doing research projects	5	4	3	2	1
Our organisation often develops production manuals and methodologies	5	4	3	2	1
Our organisation often develops new programmes/services for employees	5	4	3	2	1

Our organisation is extending its programmes/services to new groups of employees not previously served by the organization	5	4	3	2	1
Our organisation is developing new training programmes for employees	5	4	3	2	1
Our organisation encourages teamwork and relationships between employees	5	4	3	2	1
Our organisation implements an incentive system (i.e. higher salaries, bonuses,--) to encourage employees to come up with innovative ideas.	5	4	3	2	1
Our organisation often develops new technologies (internet, databases,--) to improve the production process.	5	4	3	2	1
Our organisation often uses new technologies to improve the production process.	5	4	3	2	1
New multimedia software is implemented by this Organisation for production purposes and administrative operations.	5	4	3	2	1
This organisation implements a reward system (i.e. promotions, thank yous,--) for employees to encourage them to come up with innovative ideas.	5	4	3	2	1
Our organisation is trying to bring in new equipment (i.e. computers) to facilitate work procedures.	5	4	3	2	1

**PLEASE NOW GO TO PART6**

## PART 5: FOR PERSONAL INFORMATION

Could you please provide the following information about you? (Please tick the appropriate).

### Your Gender

Male	<input type="checkbox"/>
Female	<input type="checkbox"/>

### Marital Status

Single	<input type="checkbox"/>
Married	<input type="checkbox"/>
Divorced	<input type="checkbox"/>
Widowed	<input type="checkbox"/>

### Your age

Under 25	<input type="checkbox"/>
25 - 30	<input type="checkbox"/>
31 - 40	<input type="checkbox"/>
41 - 50	<input type="checkbox"/>
Over 50	<input type="checkbox"/>

### The time you have been with your present firm

Less than 1 year	<input type="checkbox"/>
1 – 5 years	<input type="checkbox"/>
6 – 10 years	<input type="checkbox"/>
11 – 25 years	<input type="checkbox"/>
Over 25 years	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

### Educational qualifications you hold

University degree (or equivalent)	<input type="checkbox"/>
High diploma	<input type="checkbox"/>
Master's	<input type="checkbox"/>
PhD	<input type="checkbox"/>
Others.....	<input type="checkbox"/>

### The position you hold in your company

Head of Dept.	<input type="checkbox"/>
Administrator	<input type="checkbox"/>
Technician	<input type="checkbox"/>
Supervisor	<input type="checkbox"/>
Operator	<input type="checkbox"/>
Other.....	<input type="checkbox"/>

### Type of organisation

Public	<input type="checkbox"/>
Private	<input type="checkbox"/>

Organisation name (Optional).....  
 Email address.....

**THANK YOU FOR YOUR TIME AND CONSIDERATION!**

## Appendix B: The Ethics Form



Ibrahim Alhaj  
PGR Student  
Faculty of Business

Ref: FoB/UPC/FREC/FREC1415.65/clc  
Date: 13 November, 2015

Dear Ibrahim

**Ethical Approval Application No: FREC1415.65**  
**Title: The impact of organisation context (OC, OS and IT) on both product and process innovation in Libyan Oil Sector: The role of social capital and knowledge sharing**

The members of the Faculty Research Ethics Committee would like to thank you for the time and effort you have put into addressing our queries on your application. We are now happy to approve the revised application and are now fully satisfied that the project complies with Plymouth University's ethical standards for research involving human participants.

With reference to section 10 (c) and 10 (f) of the revised application, we would recommend that data collected are safely stored up to a period of 10 years as stipulated by article 88 of the Plymouth University Research Ethics Policy (available at: <http://www1.plymouth.ac.uk/research/ourresearch/Documents/Plymouth%20University%20Research%20Ethics%20Policy.pdf>)

Approval is for the duration of the project. However, please resubmit your application to the committee if the information provided in the form alters or is likely to alter significantly.

We would like to wish you good luck with your research project.

Yours sincerely

*(Sent as email attachment)*

Dr James Benhin  
Chair  
Faculty Research Ethics Committee  
Faculty of Business

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**Appendix C: Tables for Non-response Bias Test**  
**C1: Non-response Test for Public Oil Sector**

Independent Samples Test				
PUBLIC SECTOR				
	Levene's Test for Equality of Variances		t-test for Equality of Means	
	F	Sig.	Sig. (2-tailed)	Mean Difference
OC1	0.412	0.384	0.610 0.610	0.327 0.327
OC5	0.178	0.963	0.742 0.742	-0.472 -0.472
OS4	2.371	0.205	0.236 0.235	-0.618 -0.618
OS7	0.804	0.416	0.810 0.810	-0.362 -0.362
IT2	0.107	0.850	0.351 0.351	0.625 0.625
IT5	0.708	0.316	0.582 0.581	-0.725 -0.725
SC3	3.409	0.109	0.905 0.905	-0.637 -0.637
SC6	2.053	0.317	0.365 0.365	-0.183 -0.183
KS1	0.162	0.963	0.627 0.626	0.372 0.372
KS3	3.086	0.114	0.725 0.725	-0.791 -0.791
KS6	0.741	0.403	0.619 0.618	-0.367 -0.367
INPD1	2.065	0.197	0.271 0.271	-0.822 -0.822
INPD3	0.816	0.305	0.704 0.704	-0.719 -0.719
INPS4	0.917	0.180	0.164 0.163	-0.613 -0.613
INPS6	2.481	0.104	0.382 0.381	-0.519 -0.519

**C2: Non-response Test for Private Oil Sector**

Independent Samples Test				
PRIVATE SECTOR				
	Levene's Test for Equality of Variances		t-test for Equality of Means	
	F	Sig.	Sig. (2-tailed)	Mean Difference

OC1	0.701	0.293	0.374 0.374	0.162 0.162
OC5	0.195	0.837	0.173 0.173	-0.431 -0.431
OS4	2.734	0.127	0.641 0.641	-0.238 -0.238
OS7	0.715	0.202	0.427 0.426	-0.187 -0.187
IT2	0.329	0.625	0.352 0.352	-0.402 -0.402
IT5	0.618	0.273	0.703 0.703	-0.261 -0.261
SC3	3.267	0.178	0.837 0.837	-0.039 -0.039
SC6	2.179	0.215	0.825 0.824	0.104 0.104
KS1	0.254	0.662	0.372 0.371	-0.473 -0.473
KS3	0.827	0.263	0.736 0.736	-0.217 -0.217
KS6	0.534	0.667	0.437 0.437	-0.481 -0.481
INPD1	3.289	0.273	0.619 0.619	-0.279 -0.279
INPD3	0.172	0.738	0.218 0.218	-0.341 -0.341
INPS4	0.637	0.460	0.602 0.602	-0.173 -0.173
INPS6	2.178	0.152	0.726 0.726	-0.382 -0.382

## Appendix D: Tables for Common methods Bias Test

### D1. Harman's one-factor test for public sector sample

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	19.442	25.225	25.225	19.442	25.225	25.225
2	7.201	8.407	33.632			
3	6.132	6.564	40.196			
4	5.13	6.089	46.285			
5	4.229	5.312	51.597			
6	5.169	5.019	56.616			
7	4.579	4.442	61.058			
8	4.153	4.018	65.076			
9	2.521	3.111	68.187			
10	2.599	3.230	71.417			
11	1.218	2.973	74.39			

12	2.610	2.532	76.922			
13	1.940	1.881	78.803			
14	1.698	1.647	80.45			
15	1.401	1.356	81.806			
16	1.356	1.309	83.115			
17	1.168	1.128	84.243			
18	1.089	1.046	85.289			
19	.986	.953	86.242			
20	.946	.912	87.154			
21	.906	.876	88.03			
22	.854	.826	88.856			
23	.820	.790	89.646			
24	.768	.741	90.387			
25	.705	.689	91.076			
26	.662	.646	91.722			
27	.640	.623	92.345			
28	.593	.576	92.921			
29	.555	.539	93.46			
30	.524	.512	93.972			
31	.511	.497	94.469			
32	.491	.472	94.941			
33	.413	.415	95.356			
34	.423	.405	95.761			
35	.394	.382	96.143			
36	.373	.363	96.506			
37	.358	.342	96.848			
38	.320	.309	97.157			
39	.304	.291	97.448			
40	.293	.285	97.733			
41	.241	.234	97.967			
42	.229	.219	98.186			
43	.218	.210	98.396			
44	.198	.193	98.589			
45	.173	.164	98.753			
46	.141	.135	98.888			
47	.127	.120	99.008			
48	.113	.107	99.115			
49	.098	.096	99.211			
50	.095	.092	99.303			
51	.092	.089	99.392			
52	0.82	.078	99.47			
53	.078	.075	99.545			
54	.075	.073	99.618			
55	.068	.065	99.683			
56	.059	.056	99.739			
57	.051	.049	99.788			
58	.047	.045	99.833			
59	.043	.040	99.873			
60	.040	.035	99.908			
61	.037	.026	99.934			
62	.034	.017	99.951			
63	.029	.013	99.964			
64	.025	.011	99.975			
65	.015	.010	99.985			
66	.010	.009	99.994			
67	.005	.005	99.999			
68	.001	.001	100.00			

Extraction Method: Principal Component Analysis.



***D2. Harman's one-factor test for private sector sample***

**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	32.253	36.373	36.373	32.253	36.373	36.373
2	7.640	9.623	45.996			
3	4.795	5.826	51.822			
4	4.494	5.523	57.345			
5	4.206	4.085	61.43			
6	3.746	3.634	65.064			
7	2.520	3.111	68.175			
8	2.499	3.069	71.244			
9	1.832	2.261	73.505			
10	1.835	2.498	76.003			
11	1.305	1.856	77.859			
12	1.412	1.825	79.684			
13	1.359	1.636	81.32			
14	1.247	1.499	82.819			
15	1.095	1.336	84.155			
16	.0945	1.152	85.307			
17	.850	1.037	86.344			
18	.803	.978	87.322			
19	.680	.828	88.15			
20	.670	.810	88.96			
21	.612	.745	89.705			
22	.578	.703	90.408			
23	.565	.688	91.096			
24	.507	.616	91.712			
25	.446	.543	92.255			
26	.442	.537	92.792			
27	.408	.496	93.288			
28	.392	.477	93.765			
29	.358	.436	94.201			
30	.356	.433	94.634			
31	.326	.396	95.03			
32	.305	.370	95.4			
33	.284	.345	95.745			
34	.271	.329	96.074			
35	.268	.325	96.399			
36	.258	.315	96.714			
37	.224	.273	96.987			
38	.206	.258	97.245			
39	.203	.247	97.492			
40	.189	.231	97.723			
41	.179	.219	97.942			
42	.172	.208	98.15			
43	.157	.192	98.342			
44	.134	.164	98.506			
45	.129	.159	98.665			
46	.117	.145	98.81			
47	.111	.136	98.946			
48	.097	.119	99.065			
49	.093	.115	99.18			

50	.092	.112	99.292			
51	.087	.106	99.398			
52	.080	.098	99.496			
53	.064	.079	99.575			
54	.058	.072	99.647			
55	.051	.064	99.711			
56	.043	.053	99.764			
57	.037	.045	99.809			
58	0.33	.040	99.849			
59	.029	.035	99.884			
60	.022	.027	99.911			
61	0.18	.023	99.934			
62	.016	.019	99.953			
63	.013	.015	99.968			
64	.010	.012	99.98			
65	.006	.008	99.988			
66	.005	.006	99.994			
67	.004	.005	99.999			
68	.001	.001	100.00			

Extraction Method: Principal Component Analysis