

**PEOPLE-CENTRED KNOWLEDGE MANAGEMENT SYSTEMS AND SUPPLY  
CHAIN PERFORMANCE: THE CASE OF SMALL AND MEDIUM ENTERPRISES  
IN ZIMBABWE**

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**This is submitted in fulfilment of the requirements for the degree**

**Doctor of Philosophy**

**in the discipline of**

**BUSINESS**

**in the**

**FACULTY OF MANAGEMENT SCIENCES**

**at the**

**VAAL UNIVERSITY OF TECHNOLOGY**

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**March 2021**

## **DECLARATION**

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree

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## **STATEMENT 1**

This thesis is being submitted in partial fulfilment of the requirements for the Doctor of Philosophy (D.Phil): in Business, measuring the impact of people-centred knowledge management on supply chain performance

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## **STATEMENT 2**

This thesis is the result of my own independent investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A list of references is appended.

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## **DEDICATION**

This thesis is dedicated to my wife, Shamiso Ngoni Tarambiwa for being always there for me.

## ACKNOWLEDGEMENTS

I would like to thank the following for their contributions in coming up with this thesis:

- Firstly, the Lord Almighty, the creator of the heavens and earth, for His providence and protection from the day I was born and throughout my studies. May honour, praise, glory and worship be given to Him forever and ever Amen.
- Secondly, I want to thank my wife, Shamiso Ngoni Tarambiwa, my children, Dorothy, Andrew, Ropafadzo and Tinotenda for their encouragement and unwavering support during the challenging times of data collection and compilation of the thesis. When economic situations were pulling in another direction and I was wasted and almost giving up, they encouraged me and helped me to regain my confidence until by God's grace the work was completed.
- Thirdly, I want to give special thanks to my promoter, Prof. Chenedzai Mafini for being both a promoter, spiritual guide and counsellor during the entire study period. He provided me with the necessary research skills (i.e. both qualitative and quantitative), which I lacked and provided the technical guidance as and when it was needed. I want to thank him for the academic and social support guiding me through to all seminars, venues, conferences and whichever knowledge I was lacking. Indeed, my appreciation can never be fully expressed in written form. May the Lord continue to bless you and grant you all your prayer requests.
- Fourthly, my co-promoter, Prof. Andrea Garnett for the technical guidance especially adding to Prof. Mafini on academic writing and consistency and coherence in thesis compilation. She was always ready to attend to the chapters as I was sending them to her and responding on time. May the Lord continue to bless you.
- Lastly, I would like to give special mention of all VUT staff, namely, the security, academic staff, library staff and higher degrees staff for always being there when I needed their support in applications, registration, directions and access to resources. Great appreciation also goes to the Zimbabwean Ministry of Small and Medium Enterprises, the Small and Medium Enterprises Association of Zimbabwe (SMEAZ) for their support in providing authority for conducting data collection. I also want to express my appreciation for the Government of the Republic of South Africa and VUT management for the financial support provided for conducting the research.

Thank you all and may God bless each one of you as we await the soon appearing of our Lord and Saviour Jesus Christ (John 3:3-5,16; Exodus 20:8; Acts 2:38-39).

## ABSTRACT

The Small and Medium Enterprise (SME) sector has been receiving increased global attention from governments, researchers and management practitioners in both developed and developing nations as a vehicle for economic growth. The Zimbabwean SME sector has been on record as minimising the impact of the economic challenges on the economy thus proving the strategic role played by the SME sector in improving economic growth. Therefore, the Zimbabwean government has high hopes of resuscitating the economy through empowering the SME sector. However, the sector is inundated by challenges that have retarded its effectiveness in achieving the government's expectations. Some key limitations and challenges include short life span of the SMEs, entrenchment of archaic business practices, lack of financial capitalisation and the failure to adopt a supply chain perspective of business. Although several solutions to the problem have been proposed and implemented, one solution that has not been fully tested relates to how people-centred knowledge management systems (KMSs) can be harnessed to improve the performance of SME supply chains in Zimbabwe. Therefore, the purpose of this study was to investigate the relationships between people-centred KMSs, knowledge sharing and supply chain performance (SCP) in the Zimbabwean SME sector.

The study adopted a quantitative research method in which a survey design was implemented in collecting the data that were used to test the relationships on people-centred KMSs (i.e. communities of practice (CoPs), innovation management, organisational culture and social capital); knowledge sharing and SCP (i.e. time-related performance (TRP), cost-related performance (CRP), responsiveness-related performance (RRP) and operation quality-related performance (OQRP)). A structured survey questionnaire was designed using measurement scales adapted from extant literature and it was administered to a sample of 580 SME owners, managers and employees who had some prior understanding of knowledge management, information technology and supply chain management. The collected data were analysed using the Statistical Packages for Social Sciences (SPSS) Version 25.0 and the Analysis of Moment Structures (AMOS) Version 25.0 statistical software. The data were analysed using both descriptive and inferential statistics. The statistical techniques used included measures of central tendency, cross-tabulations, factor analysis, multiple linear regression analysis, path analysis and structural equation modelling. The results of the study showed that SME employer qualifications (Kendall-tau = 0.88;  $p=0.000$ ), work experience (Kendall-tau = 0.86;

$p=.001$ ) and nationality (Kendall-tau = 0.79;  $p=.010$ ) as well as SME business sector (Kendall-tau = 0.89;  $p=.000$ ) can be used to predict SME life span in the Zimbabwe SME sector. The results also showed significant relationships between three people-centred KMSs, namely, CoP ( $\beta=0.639$ ,  $t=9.656$ ,  $p=0.000$ ), innovation management ( $\beta=-0.337$ ,  $t=-8.578$ ,  $p=0.000$ ) and organisational culture ( $\beta=-0.261$ ,  $t=-4.083$ ,  $p=0.000$ ) and knowledge sharing. The relationship between social capital and knowledge sharing was insignificant ( $\beta=-0.076$ ,  $t=0.177$ ,  $p=0.859$ ). Significant relationships were also realised on knowledge sharing and three process-based SCP sub- factors, namely, TRP ( $\beta=0.231$ ,  $t=4.717$ ,  $p=0.000$ ), CRP ( $\beta=-0.082$ ,  $t=-2.015$ ,  $p=0.044$ ) and RRP ( $\beta=-0.177$ ,  $t=-3.621$ ,  $p=0.000$ ). No relationship was found between knowledge sharing and OQRP ( $\beta=-0.076$ ,  $t=0.049$ ,  $p=0.254$ ). Moreover, knowledge sharing was found to have a full mediation effect on people-centred KMSs and process-based SCP while no mediation effect was found with network-based SCP.

The study makes substantial contributions to the existing body of knowledge. Theoretically, it provides in-depth insights of people-centred KMSs in SME SCP for developing countries such as Zimbabwe, which is an under researched area, thus expanding extant literature on the subject. From a knowledge management perspective, the study proposes the utilisation of SMEs' socio-demographic factors to predict SMEs' continued existence, thereby enabling financial institutions to offer financial assistance to such businesses with confidence. For governments in developing countries, the study suggests that specific attention should be directed to knowledge-based supply chains that adopt people-centred KMSs and process-based SCP to consider them as a possible alternative in addressing performance challenges in SME sectors.

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## LIST OF ABBREVIATIONS

Knowledge management system	KMS
Communities of practice	CoP
Supply chain performance	SCP
Supply chain management	SCM
Cost-related performance	CRP
Time-related performance	TRP
Responsiveness-related performance	RRP
Operation quality-related performance	OQRP
Supply chain knowledge	SCK
Small and medium enterprise	SME
Knowledge discovery in databases	KDD
Exploratory factor analysis	EFA
Confirmatory factor analysis	CFA
Structural equation modelling	SEM
Average variance extracted	AVE
Statistical package for social sciences	SPSS
Analysis of moment structures	AMOS
Resource Based View	RBV
Knowledge Based View	KBV
Small and Medium Enterprises Association of Zimbabwe	SMEAZ
Knowledge sharing behaviour	KSB
Small Enterprise Development Corporation	SEDCO
Infrastructure Development Bank of Zimbabwe	IDB

# **CHAPTER ONE**

## **OVERVIEW OF THE STUDY**

### **1.1 INTRODUCTION AND BACKGROUND TO THE STUDY**

The Small and Medium Enterprise (SME) sector has recently received increased global attention from governments, researchers and management practitioners in both developed and developing nations (Mayer-Haug, Read, Brinckmann, Dew & Grichnick, 2013:1252; Rahman, Yaacob & Radzi, 2015:509; Ya'kob & Jusoh, 2016:99; Miranda & Miranda, 2018:107; Trunina & Chen, 2019:44; Ogwu-oju, Onodugo & Mbah, 2020). This trend is more visible in developing countries since these countries view the SME sector as a key driver to economic growth (Chaudhary & Ahalawat, 2014:470). The same view is supported by Maunganidze (2013:3), who argues that there has been increased research in developing countries on SMEs, particularly as a tool for the attainment of economic growth and poverty eradication. Examples of research studies that direct emphasis to the importance of SMEs in developing countries in Southern Africa include those from countries such as Botswana (Mutula & Brakel, 2006:403), Democratic Republic of the Congo (Kabongo & Okpara, 2014:316), and more significantly, South Africa (Urban & Naidoo, 2012:145; Hamann, Smith, Tashman & Marshall, 2015:1; Masutha, 2015:1; Tlale, 2015:16; Mafini, Pooe & Loury-Okumba, 2016:261; Bruwer, Coetzee & Meiring, 2018:711; Venkatachalam, Marshall, Ojiako & Chanshi, 2019:595). The outcomes of these studies serve as a confirmation of the importance of SMEs in the economic growth of developing nations.

In Zimbabwe, there is evidence of continuous research on SMEs as exhibited by an increased rate in the number of studies focusing on the improvement of the sector. These studies cover areas such as technological learning (Chipika & Wilson, 2006:970); organisational support and job performance (Chinomona, 2012:10005); organisational performance (Zindiya, Chiliya & Masocha, 2012:656); funding (Nyangara, 2013:220; Manyani, 2014:11); tax compliance (Maseko, 2014:2); strategy implementation (Nyamwanza, 2014:54); policy evaluation (Nyamwanza, Paketh, Mhaka, Makaza & Moyo, 2015:36); and branding (Chigora, 2016:2). The prevalence of these studies validates that SMEs are considered an important sector of the Zimbabwean economy, and hence, are worthy of continued empirical attention. However,

regardless of the world's drive towards knowledge-based economies none of the studies have attempted to look into the emerging area of knowledge management systems (KMSs) in the sector.

It may be argued that the increase in studies within the SME sector in Zimbabwe could be attributed to government's emphasis on the utilisation of SMEs as a vehicle for economic growth. This is outlined in the 2013-2020 National strategic blueprint known as the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimASSET) (Government of Zimbabwe, 2013:114). The ZIMASSET program emphasises that SMEs remain an important economic sector in Zimbabwe after the liquidation of the majority of the international exporting companies that were operating in the country. These companies closed because of hyperinflation, a volatile political environment as well as restrictive policies and legislations enacted by government (Kawaza, 2016:1). However, regardless of increased government emphasis on the importance of the SME sector, the benefits have been quite depressed since the sector is still inundated with numerous challenges that impede its performance (Majoni, Matunhu & Chaderopa, 2016:377).

The Zimbabwean SME sector has faced numerous performance-related drawbacks. According to Zindiya *et al.* (2012:663), there are several challenges affecting SME performance in Zimbabwe. Key amongst these challenges is poor feature selection to uniquely identify and classify an SME which has led to definitional and classification inconsistencies coupled with a short life span. Other common challenges include poor access to transport, high cost of capital, the lack of entrepreneurial and managerial skills, high costs of raw materials, globalised competition, failure to produce world class quality products and the lack of marketing knowledge and skills. Apart from noting similar challenges, Nyamwanza *et al.* (2015:35) further identified challenges such as the lack of proper and adequate infrastructure, use of out-dated technology, information asymmetry and the lack of market knowledge. In support, a study by Nyangara (2013:220) points to poor funding as one of the major challenges retarding SME performance in Zimbabwe. The same study further concludes that institutions such as the Small Enterprise Development Corporation (SEDCO), Infrastructure Development Bank of Zimbabwe (IDBZ) and Commercial Bank of Zimbabwe (CBZ) that were established by government to support SMEs still consider the latter as high-risk clients, thereby preferring to deal with more structured larger companies (Manyani 2014:11). Recent studies such as the one by Majukwa, Fan and Dwyer (2020:152) have also highlighted that Zimbabwean SMEs were



faced with serious sustainability challenges that limited their borrowing capacity from financial institutions. These developments serve as a clear indication of the continued scepticism directed to SME ventures by other important stakeholders.

To mitigate the perils facing SMEs, a number of scholars (Kumar, Singh & Shankar, 2015:93; Adama, 2016:2) suggest that a possible remedy could be the implementation of recent business practices that have proven to be effective in promoting organisational success elsewhere. Examples of such practices include *inter alia*, KMSs, (for example, enabling organisational cultures, innovation, CoPs and social capital), the sharing of knowledge with strategic partners, as well as supply chain management (Whitten, Green & Zelbst, 2012:29; Rathi, Given & Forcier, 2014:868; Haque & Islam, 2018:309; Mehdikhani & Valmohammadi, 2019:778). As acknowledged by several researchers (Sajeva, 2010:765; Borges, 2012:89; Charles, 2016:1; Kim & Shin, 2017:2417; Zulfadil, Hendriani, Machasin, 2020:269), the acceptance and application of these recent business practices has the effect of uplifting both productivity and the overall performance of organisations, making them important tools for business success. SMEs in developing countries such as Zimbabwe are not immune to these developments and could therefore benefit immensely by embracing these business practices.

Literature on KMSs (Said, 2015:76; Lee, Foo, Leong & Ooi, 2016:137; Li, Liu & Liu, 2016:189) has shown that the effective application of KMSs in managing knowledge can improve both business performance and competitive advantage through promoting knowledge sharing. A number of previous studies (Maguire, Koh & Magry, 2007:40; Sindakis, Depeige & Anoyrkati, 2015:563; Wang *et al.*, 2015:13) classify KMSs into two major groups, namely, information technology-centred KMSs (IT-centred KMSs) and people-centred KMSs. On the one hand, IT-centred KMSs emphasise the sharing of explicit (clear) knowledge with technology, only without people. On the other hand, people-centred KMSs involve the sharing of both explicit and tacit (indirect) knowledge with people as the main players. Therefore, knowledge sharing plays an important role in enhancing the transfer of both tacit and explicit knowledge within an organisation (Tuan, 2013:144).

There is limited literature evidence on people-centred KMSs. Davenport and Prusak (1998:26) first noted knowledge markets as people-centred KMSs, which are important in achieving knowledge sharing and knowledge transfer in organisations. Bibikas, Kourtesis, Paraskakis, Apostolou and Vasconcelos (2008:49) identify innovation management, CoP and strategy

formulation as necessary people-centred KMSs in the success of knowledge sharing in an organisation. Sajeva (2010:769) proposes that people-centred KMSs comprise organisational structure and organisation culture as some of the systems that impact on knowledge sharing and performance within an organisation. Pawloski and Bick (2012:95) also note that the success of knowledge management in organisations is based on the people in the organisation as influenced by organisational culture, organisational strategy and organisational structure. Wu and Lee (2016:525) identify social capital as a people-centred KMS that promotes the success of knowledge management and organisational performance through enhancing knowledge sharing. In addition, several studies (Sveiby, 2001:345; Connell & Voola, 2007:54; McGee & Thomas, 2007:542; Andreeva & Kianto, 2011:1017; Borges, 2012:92; Lee, Park & Lee, 2015:884; Grant, 2016:900) recognise that CoPs, organisational culture, strategy formulation, organisation structure, innovation management, social capital and knowledge markets are some of the important people-centred KMSs that affect knowledge sharing and business performance. This confirms that there are several types of people-centred KMSs that can be adopted by organisations to improve knowledge sharing and performance.

It can be argued that knowledge sharing is an important factor that influences the performance of an organisation particularly when a people-centred approach is adopted. Aljuwaiber (2016:733) suggests that knowledge sharing that is people-centred exerts an influence on the level at which people-centred KMSs such as CoPs can improve organisational performance. This view is supported by Grant (2016:898) who highlights that knowledge sharing is a key factor to the success of knowledge management in an organisation. Knowledge sharing has been considered by both small and large organisations as being pivotal to achieving sustainable competitive advantages (Wang, Noe & Wang, 2011:979). Rodríguez-Enríquez, Alor-Hernández, Mejia-Miranda, Sánchez-Cervantes, Rodríguez-Mazahua and Sánchez-Ramírez (2016:2) further opine that using a KMS to achieve knowledge sharing is vital in enhancing the performance of the supply chain of an organisation. Thus, knowledge sharing can be considered as a key factor in improving the supply chain and performance of any given organisation whether large or small.

There is a difference between an information sharing supply chain and a knowledge sharing supply chain. Rashed, Azeem and Halim (2010:62) differentiate an information sharing supply chain from a knowledge sharing supply chain and argue that the latter is an evolution of an information sharing supply chain. In their research on the influence of knowledge sharing and

performance in supply chains they concluded that knowledge sharing positively influences the performance of a supply chain (Rashed, Azeem & Halim, 2010:73). This gives a hint that if SMEs are to improve their individual performances, their respective supply chains must also perform well. This means that SME performance is linked to the performance of the supply chain in which the SME operates. Nevertheless, further understanding is still required on how people-centred KMSs and knowledge sharing will impact supply chain performance (SCP) particularly in uncertain supply chains (Wang, 2017:690) such as those in Zimbabwe.

Supply chain management (SCM) literature supports the implementation of a KMS as a strategy to improve competitiveness. Capo-Vicedo, Mula and Capo (2011:380) state that the adoption of KMSs to support SCM has long been identified as a source of competitive advantage. This is because it provides the best customer value at the lowest cost for both large companies and SMEs (Awgheda, Rahman, Ramli & Arshad, 2015:313). Seo, Dinwoodie and Kwak (2014:733) add that SCM is a key component for attaining a competitive advantage, which when disregarded can lead to operational losses. SCM is important in improving knowledge sharing among supply chain partners to enhance the performance of the entire supply chain (Cheng, Yeh & Tu, 2008:283). Therefore, the major objective of knowledge sharing in SCM is to optimise SCP within an organisation.

## **1.2 STATEMENT OF THE PROBLEM**

The role of SMEs as key drivers to economic growth in developing countries such as Zimbabwe has been a key theme in literature for some time and a number of interventions to their survival have been suggested (Roxas, 2008:59; Maseko & Manyani, 2011:171; Chinomona, 2012:10004; Maunganidze, 2013:2). However, besides survival challenges, the sector has also continued to suffer from definitional inconsistencies and classification challenges, which may be as a result of the poor selection of key features to uniquely identify an SME from a global perspective. As stated by Chigora (2016:2), the Zimbabwean government has put in place various intervention measures suggested in existing literature to perpetuate the life-span of SMEs but the results have been almost negligible. For instance, the Zimbabwean government established a Ministry of Small and Medium Enterprises in 2002 with the aim of promoting the growth of such enterprises (Majoni *et al.*, 2016:381). In addition, financial support structures in nearly all commercial banks were set up (Nyangara, 2013:219; Mangudya, 2016:58). In addition, the ZimASSET Agenda was developed, which has SMEs as its primary driver for

economic growth (GoZ, 2013:114). To sum up, an indigenisation policy and other statutory instruments were created that were meant to support and create fair competition for the SMEs and protect them from large corporations (Chinamasa, 2016:15).

The drive to support SMEs was after Zimbabwe saw more than 70 percent of large foreign owned companies closing down due to an unfavourable operating environment (Zindiya *et al.*, 2012:655) characterised by uncertain supply chains (Wang, 2017:690). Their demise left indigenously owned SMEs with the responsibility of generating sufficient local and foreign capital to sustain the economy. However, not much has been realised since more than 60 percent of SMEs are underperforming and are unlikely to engage in exports that generate the foreign currency needed to boost economic growth (Chingwaru & Jakata, 2015:643). Further observations by Nyamwanza *et al.* (2015:36) report that 60 percent of the SMEs were failing within the first year, 25 percent failed within the first three years and only 15 percent had the potential of surviving beyond the first three years. This outcome translates to a massive 85 percent failure rate of SMEs within the first three years of operation. This scenario suggests that the interventions in place so far have not done much to improve the performance of SMEs in Zimbabwe. This creates the incentive for further research efforts to generate information that may lead to lasting solutions to SME challenges facing the country.

Although KMSs are an important concept in enhancing organisational performance (Rezaei, Ortt & Trot, 2014:1531), there is a dearth in literature directed to how they can be implemented to enhance SCP in the SME sector. Moreover, literature (Greco, Grimaldi & Hanandi, 2013:2) treats a KMS as a domain for large corporations because of the generalised approach to viewing a KMS from a technology-centred perspective while ignoring the much affordable and more effective people-centred approach (Babikas *et al.*, 2008:47; Sajevo, 2010:766). The limited literature on people-centred KMSs, particularly for developing countries (Dougherty, 1999:263; Pawlowski & Bick, 2012:96), does not provide information on the relationship that this branch of KMSs has with knowledge sharing and SCP in SMEs. What currently exists are different studies, testing organisational culture and knowledge sharing (Akhavan & Sanjaghi, 2014:229; Ferreira, Maria & Saldanha, 2014:538), social capital and knowledge sharing (Wu & Lee, 2014:523; Bharati, Zhang & Chaudhury, 2015:460), innovation management and knowledge sharing (Andreeva & Kianto, 2011:1018; Connel, Thorpe & Kriz, 2014:137), CoPs and knowledge sharing (Jeon, Kim & Koo, 2011:252; Bozillo, Schmitt & Antino, 2012:23) as well as knowledge sharing and SCP (Wong & Wong, 2011:942). Extant literature has continued

to emphasise the importance of knowledge sharing and model development in improving SCP (Panahifar, Byrne, Salam and Heavey, 2018:358; Wang & Shi, 2018:989; Attia & Eldin, 2018:1217). There is also evidence of the need to identify the valid factors (Zvarevashe & Olugbara, 2018:3) for the successful implementation of knowledge sharing in all KMSs as outlined in literature (Mohammed, Khan & Bashier, 2017:24; Wang *et al.*, 2019:5334). However, there is no known effort that has been directed towards providing such a model and factors that can be considered when implementing people-centred KMSs in improving the performance of the supply chain within the SME sector. In fact, from the reviews conducted in numerous digital databases, scant evidence was found suggesting such a study, more so a relationship on people-centred KMSs, knowledge sharing and SCP of SMEs within uncertain supply chains. Therefore, the present study is ground-breaking since it tests these under-researched issues in a fairly new context.

### **1.3 RESEARCH OBJECTIVES**

The objectives of this study were classified into primary and secondary objectives.

#### **1.3.1 Primary objective**

The primary objective of the study was to investigate the connection between people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector.

#### **1.3.2 Secondary objective**

The secondary objectives of this study were classified into theoretical and empirical objectives.

##### **1.3.2.1 Theoretical objectives**

The study tested the following theoretical objectives:

- i. To review literature on SME developments.
- ii. To conceptualise people-centred KMSs, namely, CoPs, innovation management, organisational culture and social capital from literature.
- iii. To conceptualise knowledge sharing from literature.

- iv. To conceptualise SCP and its sub-factors, namely, time-related performance (TRP), response-related performance (RRP), cost-related performance (CRP) and operation quality-related performance (OQRP) from literature.
- v. To examine literature on the knowledge-based view (KBV) theory.

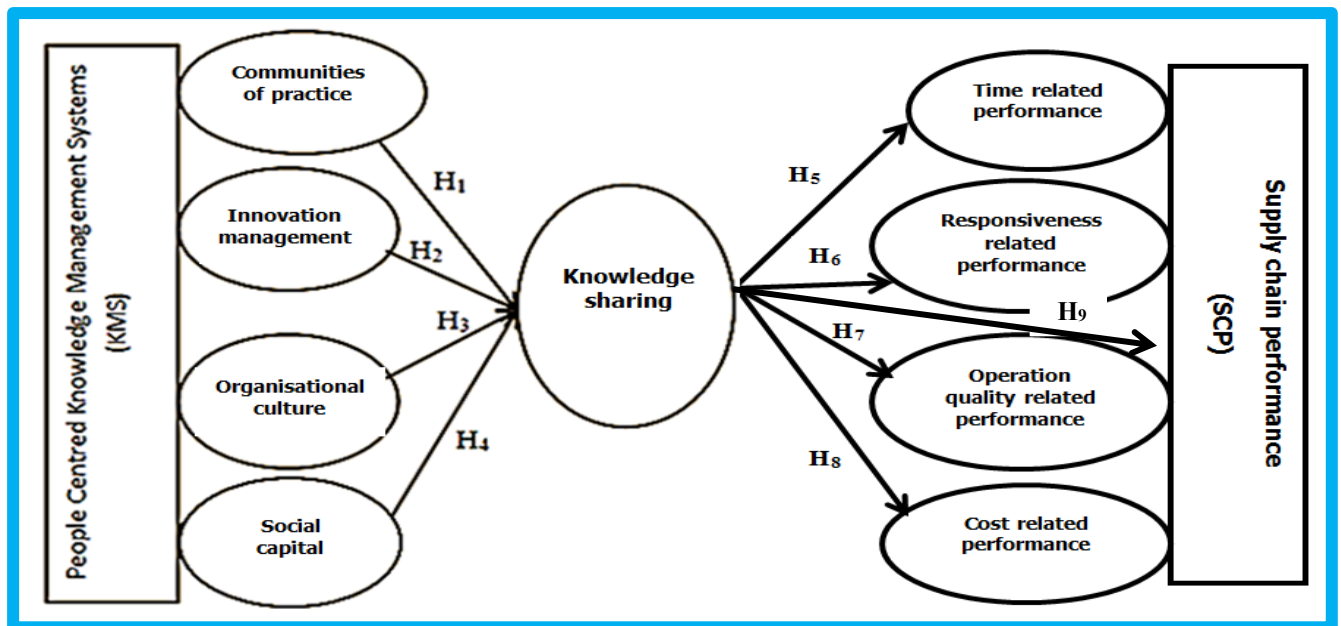
### **1.3.2.2 Empirical objectives**

The following empirical objectives were formulated:

- i. To establish the socio-demographic factors that can predict SME life span.
- ii. To assess the perceptions of SME employees regarding the implementation of knowledge management practice in their sector.
- iii. To examine the perceptions of SME employees regarding the level of knowledge sharing in their sector.
- iv. To establish the perceptions of SME employees regarding the level of SCP in their sector.
- v. To determine the influence of people-centred KMSs on knowledge sharing in the Zimbabwean SME sector.
- vi. To determine how knowledge sharing influences SCP in the Zimbabwean SME sector.
- vii. To determine the mediating effect of knowledge sharing on people-centred KMSs and SCP in the Zimbabwean SME sector.
- viii. To develop a model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector.

## **1.4 CONCEPTUAL FRAMEWORK FOR THE STUDY**

Conceptually, the study examined four predictor variables, namely, CoPs, innovation management, organisational culture and social capital which emanate from people-centred KMSs followed by a mediating variable in the form of knowledge sharing with the outcome variable being SCP as depicted in Figure 1.



**Figure 1.1 Conceptual framework for the relationship between people-centred knowledge management systems, knowledge sharing and supply chain performance**

Source: Compiled by author

## 1.5. RESEARCH HYPOTHESES

In light of existing literature and the conceptual framework outlined in Figure 1.1, this study generated ten hypotheses. Hence, the research developed and tested the following hypotheses:

- H<sub>1</sub>: CoPs have a positive influence on knowledge sharing in Zimbabwean SMEs.
- H<sub>2</sub>: Innovation management has a positive influence on knowledge sharing in Zimbabwean SMEs.
- H<sub>3</sub>: Organisational culture has a positive influence on knowledge sharing in Zimbabwean SMEs.
- H<sub>4</sub>: Social capital has a positive influence on knowledge sharing in Zimbabwean SMEs.
- H<sub>5</sub>: Knowledge sharing exerts a negative influence on TRP in Zimbabwean SMEs.
- H<sub>6</sub>: Knowledge sharing exerts a positive influence on RRP in Zimbabwean SMEs.
- H<sub>7</sub>: Knowledge sharing exerts a positive influence on OQRP in Zimbabwean SMEs.
- H<sub>8</sub>: Knowledge sharing exerts a positive influence on CRP in Zimbabwean SMEs.
- H<sub>9</sub>: Knowledge sharing exerts a positive influence on SCP in Zimbabwean SMEs.
- H<sub>10</sub>: Knowledge sharing mediates the effect of people-centred KMSs on SCP in Zimbabwean SMEs.

## **1.6 ABBREVIATED LITERATURE REVIEW**

The literature review section discusses brief theoretical ideas on the research theory for the study as well as the constructs that were considered in the study as detailed in Chapters Two to Four of this thesis.

### **1.6.1 Theoretical framework**

The knowledge-based view (KBV) is widely acknowledged to be an emerging theory, which is likely to override the relevance of the resource-based view (RBV) in the modern organisation. Alavi, Kayworth and Leidner (2005:192) argue that the knowledge-based view (an offshoot of the resource-based view (RBV)) presents knowledge resources as key organisational assets. In furtherance of that assertion, the authors argue that if firms effectively manage knowledge resources, they can attain sustainable competitive advantages. The attained competitive advantages will be anchored on factors such as improved customer service and reduced costs. Other factors from which competitive advantages can be derived include improved decision-making processes, quicker problem solving, product innovation, improved corporate agility and the transfer of best practices. This shows that the knowledge-based view (KBV) can facilitate the improvement of SCP since all of these factors qualify as supply chain factors. According to Liao, Liao and Hutchnison (2009:125), the most important class of knowledge put forward by the KBV theory is tacit knowledge. This type of knowledge has been considered to be mainly people-centred, not easy to be copied or mimicked by competitors and to improve greatly the performance of the organisation. The theory further contends that all organisations are loaded with dormant knowledge-based assets in the form of tacit knowledge.

Organisational tacit knowledge has been argued to be mostly dormant in SME organisations. However, Ritala (2013:1185) postulates that it is this dormant knowledge that enables organisations to greatly improve their performance. The KBV will be chosen for the theoretical framework of this study as it seeks to develop an understanding of the effect of people-centred KMSs on SCP. In the same vein, the study presupposes that the adoption of people-centred KMSs in SMEs could correlate with knowledge sharing, resulting in improved SCP. Therefore, the KBV presents the best platform of argument for the present research study as expounded in Chapter Four.



### **1.6.2 The Small and Medium Enterprises sector in Zimbabwe**

SME definitional inconsistencies have remained an unresolved issue in SME literature. As stated by Ngwenya, Chitate and Sibanda (2014:1), there has been no single unanimous definition and classification of SMEs. The authors note that definitions tend to vary from country to country or within the same country depending on the source. In Zimbabwe, the SME Association of Zimbabwe (SMEAZ) defines a small organisation as a company with a turnover of less than USD 240 000 or assets less than USD 100 000 and a medium enterprise as having a turnover and assets above the thresholds for small enterprises but less than USD 1 million each (SMEAZ, 2017:1).

The SME sector is of great interest to the government, business and researchers in Zimbabwe since it is viewed as an important tool for resuscitating the ailing economy (Chinamasa, 2016:15; Mangudya, 2015:49). SMEs in Zimbabwe mainly comprise locally owned organisations since most foreign-owned companies withdrew from the country citing unfavourable operating conditions. The Zimbabwean SME sector in the country currently drives most major areas of industry, making up 80 percent of companies in all sectors of business including manufacturing, services and mining (Maunganidze, 2013:3; Masocha, 2014:11). In support of this sector, government has offered support in the form of funding, formulation of favourable policies to counter competition from large corporates and free access to important services. Accordingly, the SME sector remains a strong pillar of the Zimbabwean economy and manifests great potential if the current levels of support remain in place. The detailed review is provided in Chapter Two.

### **1.6.3 People-centred knowledge management systems**

Knowledge management systems are presented from two major perspectives by most authors in the field of knowledge management. Literature (Maguire, Koh & Magry, 2007:40; Sindakis, Depeige & Anoyrkati, 2015:563; Wang *et al.*, 2015:13) identifies two major types of KMSs, namely, technology-centred KMSs and people-centred KMSs. Technology-centred KMSs were only discussed in general but were not addressed in this study because they are not particularly associated with SMEs (Fink & Ploder, 2009:37). Instead, emphasis was directed to people-centred KMSs, which have more bearing on SMEs (Albizu, Otero-Gutierrez & Olazaran, 2015:2). Literature indicates that CoPs, organisational culture, strategy formulation,

organisational structure, innovation management, social capital and knowledge markets are some of the important people-centred KMSs that affect knowledge sharing in an organisation (Sveiby, 2001:345; Connel & Voola, 2007:54; McGee & Thomas, 2007:542; Andreeva & Kianto, 2011:1017; Borges, 2012:92; Lee, Park & Lee, 2015:884; Adama, 2016:2; Grant, 2016:900).

Due to the nature of the study, which focused on SMEs, only SCP, organisational culture, innovation management, CoPs and social capital were considered as they relate directly to the study subject. Strategy formulation, organisational structure and knowledge markets were not covered in the study because although they may be practiced in some SMEs, the practice is not uniform across the sector. The non-uniformity stems from the view that their implementation requires extra costs or education on the part of the SMEs, which is a major hindrance since most SMEs are lacking as far as financial resources and skills are concerned (Kraus, Harms & Schwartz, 2006:335; Wagner & Paton, 2014:473; Zaridis & Mousiolis, 2014:465). Furthermore, the views by all the authors from the reviewed literature suggest that people-centred KMSs such as innovation management (Saenz, Aramburu & Blanco, 2012:920; Connel, Kriz & Thorpe, 2014:140), organisational culture (Borges, 2012:92), CoPs (Pavlin, 2006:137) and social capital (Wu Lee, 2016:524; Adama, 2016:2) can be adopted in SMEs to enhance knowledge sharing and SCP, as discussed in detail in Chapter Three.

#### **1.6.4 Organisational culture**

Organisational culture may be defined as the organisation's shared social knowledge in the form of rules, norms, artefacts, basic assumptions and values (Shihab, Wismiarsi & Sine, 2011:11; Halim, Ahemad, Ramayah & Hanifah, 2014:111). Cheng (1990:33) identifies several factors influencing organisational culture, which include social responsibility, neighbourhood harmony, customer orientation, performance orientation and innovation. The same author adds to these factors; uprightness and honesty, leader-subordinate relationship orientation as well as teamwork. Other factors that influence organisational culture include hierarchy, dimension, clan, adhocracy and market (Rai, 2011:786), innovation and risk-taking, attention to detail, results orientation, the orientation of the individual, team orientation, aggressiveness and stability (Rumanti, Hidayat & Yordy, 2015:204).

Although culture can exert either a positive or negative influence, the most beneficial culture is one that promotes sharing of knowledge amongst employees (Peralta & Saldanha, 2014:538; Saifi, 2015:170). This type of culture can help improve organisational knowledge management practices resulting in improved organisational performance and sustainable competitive advantages (Nguyen & Mohamed, 2011:209; Laforet, 2016:382). Most SMEs stand to benefit more from using organisational culture as a performance enhancement tool as they have few employees who can easily share a common culture without extra costs (Tidor, Gelmereanu, Baru & Morar, 2012:711).

### **1.6.5 Innovation management**

Innovation is the continued pursuit of harnessing new and unique knowledge with the aim of improving business processes and operations (Saenz, Aramburu & Blanco, 2012:919). Innovation management is the field that emphasises how the innovation process could be managed effectively (Goh, 2005:6). Literature on innovation management outlines numerous factors, for instance, technical innovation audit, new product development process, research and development management and implementation of production innovations (Lerro, 2012:6). Ghosh (2015:1135) postulates that innovation management includes elements such as the organisation's proactivity to changes in both the market and environment; idea generation, support and implementation of new business products and processes; and level of innovativeness compared to peer organisations. Peralta and Saldanha (2014:538) have shown that both organisational performance and knowledge sharing are greatly improved if an organisation adopts effective innovation management (Rahman, Yaacob & Radzi, 2015:510). Mandal and Korasiga (2015:32) assert that innovation management can help organisations effectively manage their supply chains and gain a competitive edge in the market. The other benefits include lead-time reduction, generation of new operational strategies, flexibility, development and proactive response to environmental uncertainties (Mandal & Korasiga, 2015:33). Laforet (2009:188) suggests that since innovation management is linked to many benefits, SMEs that follow it are more likely to grow and survive longer than those that disregard it.

### **1.6.6 Communities of Practice**

CoPs are informal groups within and between organisations that generate, share and maintain knowledge and are bound by a common interest and problem (Albizu *et al.*, 2015:2). They can be established in the form of learning communities (for example at Hewlett-Packard), family groups (for example at Xerox) and thematic groups (for example at the World Bank) (Gongla & Rizzuto, 2001:842). Some of the factors influencing the effectiveness of CoPs include member interaction, member commitment and member communication. However, the lack of relevance; visibility; practicality and applicability of the topics discussed, knowledge and experiences shared between group members; the reluctance to apply knowledge provided by others and the level of face-to-face interactions can hamper the effectiveness of these groups. CoPs can be of benefit to organisations as they facilitate knowledge sharing (Bashouri & Duncan, 2014:35, Lee, Suh & Lee, 2014:384), which in turn improves the performance of the organisation (Akhavan & Mirjafari, 2015:200). They can also facilitate the reduction of existing barriers to knowledge exchange amongst organisations and have been viewed as an effective and affordable tool for knowledge management implementation in SMEs (Du Plessis, 2008:66).

### **1.6.7 Social capital**

Social capital refers to features such as networks, shared norms, and trust that facilitate coordination and the attainment of organisational goals (Putnam, 2000:36). It can also be viewed as the entire compliment of organisational resources (actual and potential), accessible through and derived from the network of relationships within an organisation (Kontinen & Ojala, 2012:40). Lee, Park and Lee (2015:883) define social capital as a theory that delineates the benefits an individual gains from a social network where knowledge is shared. Wu and Lee (2016:525) add that social capital consists of group social capital conduits (work design, task independence and social interaction); group social capital resources (group trust, supportive climate for knowledge sharing) and group effectiveness (knowledge sharing). Chandra and Machado (2016:5) identified six social capital factors, namely, social cohesion; trust and information; political empowerment; collective action; social ties or networks and communication. Placing emphases on social capital in an organisation helps social partners (organisations) in acquiring complementary capabilities from other members of the social unit using minimal resources. Further benefits include the availability of mechanisms for acquiring skills and internalising expertise that will in turn improve organisational performance (Gordon & Jack, 2010:521).

### **1.6.8 Knowledge sharing**

Knowledge sharing as a concept has been defined in numerous ways. Knowledge sharing is defined by Adama (2016:3) as the exchange of knowledge between and among individuals as well as within and among teams in an organisation. The same author argues that knowledge sharing can be influenced by the level of source–recipient relationships and literacy, nature and location of knowledge, knowledge sharing capability and sharing environment. Literature (Zhang & Fai Ng, 2012:1326; Zhang & Jiang 2015:277) makes it clear that through knowledge sharing, organisations can benefit directly from knowledge repositories stored within them. Such benefits include employee knowledge application, transformation of individual knowledge to organisational knowledge and the improvement of innovation capacity which ultimately improves the organisation’s competitive advantage (Zhang & Jiang, 2014:277; Wang, Sharma & Cao, 2016:4650). Knowledge sharing is a critical element particularly for SMEs as it has the potential to facilitate their quick response change, to innovate, and to succeed (Wu & Lin, 2013:673). The detailed review on knowledge sharing literature is presented in Chapter Four.

### **1.6.9 Supply chain performance**

SCP has been defined from a network- and process-based perspective. Sundran, Chandram and Bhatti (2016:1448) define SCP as a systematic process of measuring the effectiveness and efficiency of supply chain operations. In this case, it is the operational measure for the positive paybacks enjoyed by an organisation(s) for participating in supply chain relationships (Odongo, Dora, Molnar, Ongeng & Gellynck, 2016:1785). Whitten, Green and Zelbst (2012:32) submit that the success of organisations today, lie in how they manage their supply chains. Their study suggests that SCP can be measured using the organisation’s ability to satisfy the ultimate customer in both quality and cost. It can also be measured using other factors such as efficiency, responsiveness, quality and supply chain balance (Odongo *et al.*, 2016:1785). Miri-Lavassani and Movahedi, (2018:692) suggest that SCP is a multifaceted concept, hence, it requires multi-dimensional measurement. They then suggest cost-related performance, responsiveness-related performance, operation quality related-performance, time-related performance and innovation-related performance as factors for measuring the performance of a supply chain. If organisations effectively and efficiently manage their supply chains their overall performance

will be above their competitors (Anand & Grover, 2015:136; Collins, Worthington, Reyes & Romero, 2010:948). This provides a valuable link between organisational performance and SCP. A comprehensive review of literature on SCP is presented in Chapter Four of the study.

## **1.7. SUMMARISED RESEARCH METHODOLOGY**

All scientific studies must be conducted using some relevant methodology (Neuman, 2014:8). This section gives an overview of how the study was conducted with an intention of proving the feasibility of conducting the research before any resources were committed. It covers the research design, sampling design, procedures for data collection, data analysis and ethical considerations as discussed in detail in Chapter Five of this thesis.

### **1.7.1 Research design**

The research design is a key aspect of the research methodology. According to Stephen (2016:203), a research design is a blueprint of a study that outlines how the study will be conducted. The research design can be in the form of quantitative, qualitative and mixed method approaches. In this study, the quantitative approach, which is based on testing relationships in a theory using statistical procedures, was followed. This is because the objectives of this study are more related to measuring prediction or causal associations than understanding the nature of the variables. Furthermore, the quantitative approach uses mathematical models, which make it more reliable and valid when measuring behaviour related constructs (Dudwick, Kuehnast, Jones & Woolcock, 2006:3; Li, Liu & Liu, 2016:194). The approach also removes researcher bias and eliminates unwanted measurements, which was quite important for this study because of the broadness of the constructs under study (Williams, 2007:66).

In this study, the survey design, which involves the collection of data using a survey questionnaire (Cresswell, 2013:155), was adopted. The survey method can be used to collect data at the same time (cross-sectional survey) or over a long period of time (longitudinal survey) as highlighted by Hair (2015:205). This study involved collection of data from SMEs in Zimbabwe using the cross-sectional survey approach. This approach was chosen as it provides cheaper methods of collecting data over a large sample and pairs well with quantitative designs

(Alan, 2015:148). The research design was combined with a review of literature for the collection of secondary data and an empirical study for the collection of primary data.

### **1.7.2 Literature review**

In this study, a literature review of the relevant concepts was conducted with the prime intention to address the theoretical objectives of the study. The literature review focused on the theoretical issues underpinning key concepts such as the SME sector (both internationally and in Zimbabwe), people-centred KMSs such as organisational culture, innovation management, CoPs, social capital, as well as knowledge sharing and SCP. The data were sourced from Internet sources such as academic search engines (for example, Google Scholar and Researchgate), digital databases such as but not limited to Emerald Insight, Science Direct, and JStor. In addition, hard copy materials such as books, magazines, newspapers and organisational records, amongst others, were also used as sources of literature. The literature review process is also discussed in detail in Section 5.3.3.1.

### **1.7.3 Empirical study**

The empirical study involved the sampling design, procedures for data collection, data analysis, and validity and reliability.

#### **1.7.3.1 Sampling design**

Sampling design is the researcher's provisional plan for a quantitative description of trends, attitude or opinion of a population by studying a sample of that population (Creswell, 2013:235; Alison & Gass, 2015:11). The primary aim of sampling is to make some inferences about a given population using the chosen sample (Uprichard, 2013:4). Based on this view, the sampling design for this study as outlined in Section 5.3.3.3, comprised the target population, sampling frame, sample size, sampling approach and sampling technique.

### 1.7.3.2 Target population

A population refers to the entire group or set of individuals from which research data are to be collected (Surujlal, 2004:141). The target population for the study was comprised of all SMEs that were currently operating in Zimbabwe and were registered by the Small and Medium Enterprises Association of Zimbabwe (SMEAZ). According to the SMEAZ (2016:1), the association had approximately 1684 registered SMEs operating in nearly 38 disciplines within the sector.

### 1.7.3.3 Sampling frame

A sampling frame refers to a list containing the elements (for example, names of people or organisations) under consideration in a research study (Turner, 2003:3). The sample that was used in this study was taken from the list of registered SMEs maintained by the SMEAZ. The list contained the names of SMEs, their contact details, area of specialisation and any other details that market the SME online.

### 1.7.3.4 Sample size

Singh and Masuku (2014:6) define sample size as the determination by the researcher of the number of respondents that can be feasibly included in a statistical sample. The sample size for the study was determined after considering a combination of sampling approaches as recommended in literature. One such an approach was the historical approach, which was used to determine the sample size for this study based on historical evidence of the sample sizes used in other related studies and is presented in Table 1.1.

**Table 1.1: Basis for sample size for the study**

<b>Construct</b>	<b>Previous study</b>	<b>Sample size used</b>
Community of practice	Cervellon & Wenerfelt (2012:181)	196
	Akhavan, Marzieh & Mirjafari (2015:205)	450
Supply chain performance	Bonomyyong & Supatn (2011:24)	500
	Ramish & Aslam (2016:716)	800
Social capital	Hoof & Huysen (2009:7)	650



	Wu & Lee (2015:528)	640
Organisational culture	Lin (2007:321)	500
	Peralta & Saldanha (2014:541)	128
Innovation management	Saenz, Aramburu & Blanco (2012:926)	446
	Andreeva & Kianto (2012:1022)	261
Knowledge sharing	Zhang & Jiang (2015:285)	258
	Wang, Sharma & Cao (2016:4653)	356

**Source: Adapted from literature study**

As indicated in Table 1.1, when all the research constructs are considered, the lowest sample size used is 128, the highest is 800, and the average sample size is 430. Based on this guideline and the need to have equal representation of all disciplines within the SME sector, the sample size was set at N=500. The other approaches considered were the sample size determination tables, the upper limit ratio leading to the selection of a sample size of n=1100. This approach was meant to prevent a negative effect on the statistical significance of the results as would be the case if a small sample size is used (Wang, Noe & Wang, 2015:1003).

### **1.7.3.5 Sampling procedure**

The study used probability sampling to select the respondents since the list of respondents forming the sampling frame is already known (Uprichard, 2013:3). As put across by Schiffman and Kanuk (2009:123), probability sampling is the best sampling approach for quantitative research studies because it provides each possible respondent with an equal chance of being selected, thereby eliminating sample bias and making it possible to generalise results to the entire population. Amongst the probability sampling techniques available for use in research, a stratified technique was utilised to select respondents. The stratified technique is one which ensures that certain cases varying on preselected parameters are included and equally represented in the sample in order to decrease the error in the estimation (Sandelwoski, 2000:250). The relevant industries in which the SMEs are operating were considered as strata where the sample respondents were drawn from. Stratified sampling was probable since the strata adopted the categories of the SMEs as clearly provided by the SMEAZ. Proportional stratified sampling using the identified small to medium enterprise ratios coupled with simple

random sampling were implemented on the sampling frame to ensure that small enterprises do not dominate the sample. The technique facilitated more accurate representation of the entire population by a smaller sample through guaranteeing that one group does not dominate (Zikmund, Barbin, Carr & Griffin, 2013:400).

#### **1.7.4 Data collection method and procedure**

Data collection is a research process that informs how relevant information to address the research problem will be gathered (Sani, 2013:40). In this study, data were collected through a self-administered survey questionnaire distributed via email and also in person by the researcher to employees, owners and managers of SMEs in Zimbabwe over a period of three and half months. Consequently, the questionnaire was administered using a cross-sectional design.

The questionnaire was partitioned into seven sections. Section A elicited information about the demographic details of respondents and their SMEs. Sections B to G consists of seven questions each that measure the six constructs under consideration in the current study. Section B sought responses on Organisational Culture using questions adapted from Cockrell and Stone (2010:855). Section C sought responses on Innovation Management using questions adapted from Wang *et al.* (2016:4656). Section D sought responses on CoPs using questions adapted from Zboralski (2009:97). Section E sought responses on Social Capital using questions adapted from Hoof and Huysman (2009:8). Section F sought responses on Knowledge Sharing using questions adapted from Cockrell and Stone (2010:855), and Wang, Sharma and Cao (2016:4656). Section G sought to gather responses on SCP using questions adapted from Miri-Lavassani and Movahedi (2018:692). Measurement scales in Sections B, E and F were measured using seven-point Likert-type scales anchored by 1=strongly disagree and 7=strongly agree. Measurement scales in Section G were measured using five-point Likert-type scales anchored by 1=significantly worse and 5=significantly better. While Sections C and D used a scale that was anchored on 1=Never and 7=Always. The adapted questions were not a mirror of the original questions but were adjusted and developed to contextualise them to the current study, using feedback from a pilot study. These questions were closed-ended for simplicity of answering. A list of measurement scales used in this study after factoring in pilot study adjustments is provided in Appendix 1.

### **1.7.5. Data analysis and statistical approaches**

Data were analysed using both descriptive and inferential statistics. Data from Section A of the questionnaire, which sought to establish the demographic details of respondents were analysed using descriptive statistics. Cross tabulations were also performed on the data from Section A to extract SME factors that could be used to predict SME life span. Data from the other sections that sought to test the hypotheses were analysed using inferential statistics. The Statistical Package for the Social Sciences (SPSS Version 25.0), and the Analysis of Moment Structures (AMOS Version 25.0) software was utilised in the statistical analyses. Since the measurements were adapted from previous literature and further developed for the study, an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were conducted in order to test the psychometric properties and the goodness-of-fit of the measurement scales. Relationships between the research constructs were tested using cross tabulations, multiple regression analysis, path analysis and structural equation modelling (SEM). There are several SEM indices such as the comparative fit index (CFI), goodness-of-fit index (GFI), incremental fit index (IFI), normed fit index (NFI), random measure of standard error approximation (RMSEA) and Tucker-Lewis index (TLI). However, only the CFI, TLI and RMSEA were used to establish whether the collected data supported the conceptualised model due to their validity in supporting large samples and complex models that have mediating variables.

### **1.7.6 Reliability and validity**

The inclusion of validity and reliability in this study is necessary. This is because as suggested by Golafshani (2003:598), reliability and validity are concepts that are typically associated with quantitative research. Boyce (2002:43) also notes that the two concepts are important tools in assessing the appropriateness of a research instrument and increasing reader confidence. Therefore, various procedures were followed to ascertain the validity and reliability of the study.

#### **1.7.6.1 Reliability**

Reliability of research results is an important element in conducting research. Travakol and Dennick (2011:447) define reliability of research as how closely the same constructs in a research instrument replicate similar results. Literature identifies several methods of ensuring

reliability, which include the test and retest method, Alternative-Form method, Split-Halves method, internal consistency method and correction for attenuation (Carmines & Zeller, 1999:37). In this study, reliability was ascertained through the use of the internal consistency method, since a single measurement instrument was administered to a group of respondents in a distinct period of time. A pilot study was also conducted in which a conveniently selected sample of 53 respondents was used to test the reliability of measurement scales and adjustments were made accordingly. The Cronbach's Alpha coefficient, Composite Reliability and the Average Variance Extracted (AVE) were used for testing internal consistency. The recommended values of 0.7 for the Cronbach's Alpha and Composite Reliability, and 0.4 for the AVE (Fraering & Minor, 2006:284) were used as thresholds.

#### **1.7.6.2 Validity**

Validity can be ascertained through testing the instrument for face validity, content validity, and construct validity (Carmines & Zeller, 1999:17). Face validity was established through a review of the questionnaire by a panel of experts from a South African university of technology whose lines of expertise are in the management sciences. Content validity was determined by pilot testing the questionnaire with a conveniently selected sample of 50 respondents. Construct validity included both convergent validity and discriminant validity. Factor loadings of above 0.5 were accepted for the testing of convergent validity on each of the test items.

### **1.8. ETHICAL CONSIDERATIONS**

Research ethics refer to the reasonable approaches adopted by the researcher before collecting data, during data collection and during reporting of research results to avoid violating the rights of respondents (Creswell, 2013:92). Several ethical considerations were observed in this study. Firstly, permission to conduct the research was granted by the Small and Medium Enterprise Association of Zimbabwe, registered under the Ministry of Small and Medium Enterprises in Zimbabwe, which is the responsible authority (refer to letter in Appendix 2). Secondly, all the respondents were given full details about the research and made aware that their involvement in the study was voluntary. Formal consent was sought from respondents before the data were collected from them. Thirdly, the identities of the respondents were not required in the questionnaire. In addition, respondents were protected from victimisation by maintaining their anonymity and it was ensured that all collected data would be securely kept.

## 1.9. DEFINITION OF TERMS

**Communities of practice** - a domain of interests or community of participating individuals who formally or informally practice knowledge sharing within a specific supply chain (Pavlin, 2006:138).

**Cost-related performance** – the supply chain knowledge sharing costs experienced by the concerned organisation from participating within the supply chain (Ramish & Aslam, 2016:716).

**Innovation management** – a people-centred, concurrent management of knowledge-related innovation activities within the entire SME supply chain (Mandal & Korasiga, 2016:32).

**Knowledge sharing** - a process of transferring knowledge that employees or members within a given supply chain engage in to gain experience and expertise from each other (Norfadzilah, Faizuniah, Zinb, Azlina, Yunusc & Asnawic, 2016:547).

**Operation quality-related performance** – the level of quality in the supply chain knowledge possessed by an organisation and the influence the knowledge imparts on product quality (Yoo, 2014:525).

**Organisational culture** - the organisational characteristics such as individual or collective beliefs, values and artefacts that influence participation in a supply chain (Schein, 1985:30).

**People-centred knowledge management systems (people-centred KMSs)** - people centred systems that emphasise the role of people in transferring knowledge as compared to technology (Dougherty, 1999:264).

**Responsiveness-related performance** – the level in which an organisation utilises supply chain knowledge in order to effectively respond to disruptions in both the internal and external supply chain environment (Wu, Lee & Tsai, 2012:67).

**Small and medium enterprises** - a small enterprise is one that is legally registered and with a turnover of less than US\$240 000 or assets less than US\$100 000, and a medium enterprise is one that is legally registered, with a turnover or assets above the thresholds for small enterprises, but less than US\$1 million each (SMEAZ, 2015:1).

**SME employees and managers** – individuals who are employed in a non-supervisory or supervisory capacity within a formally registered SME organisation (Author).

**SME owners** – entrepreneurs who run an SME that is officially registered with the registrar of companies and are observing all national regulations including returning taxes (Research study).

**Social capital** - the ability of a community or network to secure benefits from the knowledge shared within a business social network such as a supply chain (Mu, Peng & Love, 2008:88).

**Supply chain experts** – SME employees, owners or managers who possess a qualification in supply chain management. (Author).

**Supply chain performance** - the effective and efficient process of governing supply chain relationships to attain quality, fairness, trust and economic benefits through participation in the supply chain (Miri-Lavassani & Movahedi, 2018:673).

**Time-related performance** – The effective reduction of supply chain lead time resulting from the sharing of supply chain knowledge (Marouf, 2016:155).

## **1.10. OUTLINE OF THE STUDY**

The final thesis emanating from the research is composed of seven chapters, which were divided as follows:

### **Chapter One: Introduction and background to the study**

This chapter discussed the introduction and background to study. It provided the statement of the problem and outline the research objectives guiding this study. Other issues discussed in this chapter included the formulation of hypotheses, a brief review of literature as well as methodological aspects of the study such as the research design, sampling design, data collection, statistical analyses and ethical considerations.

### **Chapter Two: Developments in small and medium enterprises**

This chapter provided the literature on SMEs and how these organisations can adopt modern business practices such as KMSs and SCP. The chapter focused on issues that include definitions of SMEs, the contribution of SMEs, challenges faced by SMEs and best practices for SME success. The discourse focused on both the international and Zimbabwean contexts in order to give appropriate comparisons.

### **Chapter Three: A theoretical overview of knowledge management systems**

This chapter reviewed literature on knowledge management and more specifically KMSs. Issues that were discussed include KMSs in general and people-centred KMSs that include organisational culture, innovation management, social capital and CoPs.

#### **Chapter Four: A literature review of knowledge sharing and supply chain performance**

The chapter reviewed literature on knowledge sharing and SCP. Some of the issues that were discussed include the definitions of knowledge sharing and supply chain performance, factors influencing knowledge sharing and supply chain performance, the outcomes of knowledge sharing and supply chain performance and the relationship between knowledge sharing and supply chain performance as well as the mediating effect of knowledge sharing on people centred KMSs and SCP.

#### **Chapter Five: Research methodology and design**

The chapter discussed the research methodology and design that will be adopted during the research. It further directed the discourse to the sampling design that will be used in selecting the research sample. It also deliberated on the research instrument that was employed in collecting the data before outlining the methods to be used in the analysis and presentation of the data.

#### **Chapter Six: Data presentation, Data analysis results and interpretation**

This chapter presented the results of the study based on the statistical analyses employed. It also discussed the interpretation of the results and outline the implications of these results. The discussions were supported by previous literature which either confirms or contradicts the results of this study.

#### **Chapter Seven: Conclusions and recommendations, limitations, and implications for future research**

The chapter stated the conclusions drawn from the results based on the objectives of the study. The chapter further put forward recommendations on best practices for increasing SCP in SMEs through KMSs and knowledge sharing. The chapter also highlighted suggestions for future research, limitations of the study and present a model for maximising the impact of KMSs on knowledge sharing and SCP.

### **1.11 CHAPTER SUMMARY**

The chapter provided an overview of the problem that motivated the current study. The chapter introduction section introduced the entire thesis and set the tone that then gave direction to the study. This was followed by the explication of the problem statement in a summarised form

leading to the formulation of the research objectives, which were divided into theoretical and empirical objectives. The chapter also presented a justification for conducting the study, a brief review of related literature and the methodology which was used to conduct the research. The chapter concludes with an outline of the chapters of the entire thesis.

## **CHAPTER TWO**

### **DEVELOPMENTS IN SMALL AND MEDIUM ENTERPRISES**

#### **2.1 INTRODUCTION**

The purpose of this chapter is to analyse literature on developments in SMEs across the globe with an emphasis on activities in southern Africa. This discussion is motivated by the view that although SMEs are important, particularly for developing countries, they typically experience a high failure rate. This matter is an issue which deserves attention if SMEs are to effectively



contribute to the attainment of knowledge economies in developing countries. The current chapter begins by analysing the developments in SME definitions and the constructs used in understanding SMEs at an international level before directing attention to Zimbabwe. The aim is that of getting an appreciation of definitional variations and limitations to derive a common definition, which will help achieve a comparable global analysis of SME performance. The chapter will also delve into the contributions made by SMEs to corroborate the benefits they are adding to the attainment of both economic development and knowledge economies, particularly in developing countries. Nevertheless, the impact of SME contributions will be analysed in both developed and developing nations to understand the matter from a global perspective. The chapter goes further to identify the challenges that SMEs were previously facing, with the aim of informing on the recurrent nature of these challenges. This will therefore reveal the dearth of current literature in providing lasting solutions that will guarantee effective SME performance. The final section discusses the best practices that have been suggested as possible solutions to resolving the challenges affecting SMEs with the intention of identifying the best alternatives.

## **2.2 HISTORICAL DEVELOPMENTS IN SMALL AND MEDIUM ENTERPRISES**

This section focuses on ensuing developments in the attempt to define SMEs as outlined in the extant literature. The definitions are drawn from different perspectives, which include both developing and developed countries. The major subject in this evolution has been the adoption of different constructs to try and uniquely define an SME (Salikin, Wahab & Muhammad, 2013:335; Abiodun, Harry & Busra, 2015:3). Due to this development, the section will interrogate the various constructs that have been used to define SMEs. Finally, the section will conclude by proposing a common definition of SMEs that will also be adopted for the current research.

### **2.2.1 An overview of small and medium enterprises' historical developments**

There is a lack of unanimity in the actual definition of an SME. There is a consensus in current SME studies (Kachlami & Yazdanfar, 2016:967; Kunday & Sengular, 2015:973) that SME definitions have evolved over the years but without standardisation. Nonetheless, although differences in definitions may exist, the standard factor amongst all SMEs globally is that they should be uniquely differentiated from large companies in their current context. This contextual

dependence gives rise to definitional differences associated with the SME classification and construct definition criteria, which generally differs from country to country or sector to sector within the same country. A recent study by Massaro, Handley, Bagnoli and Dumay (2016:274) that reviewed the global literature on SMEs, concluded that the attainment of a common SME definition has remained a challenge. Durst and Edvardsson (2012:894) note that the only acceptable stride towards standardisation was the consensus on micro, small and medium as the three main classifications influencing SME definitions. This acceptance can be attributed to international bodies such as the European Union, the Australian, and American SME organisations who had factored in these terms in their definitions of SMEs. Accordingly, as the SME definition was changing, the classification and the naming criteria have been the key guidelines in the final definition to be adopted. It can, therefore, be argued that attainment of standard criteria for the classifying and naming of SMEs is important in coining a globally applicable definition of an SME. The next subsection reviews the SME classifications, naming, and definitions used in developed countries since these were seen to exert a great impact on the advancements in developing countries.

### **2.2.2 Developments in the classification and naming criteria within small and medium enterprises**

Small organisation classification and naming standards have played a significant role in determining the definition of an SME in developed countries as argued by Berisha and Pula (2015:17). Their study supports this view by concluding that these constructs were used in all the efforts made towards developing a standardised definition for SMEs. Conversely, some classification efforts such as the “economic” and “statistical” criteria have caused more confusion as argued by the South African NCR Report (2011:22). The report notes that these criteria resulted in serious ambiguities thus they had a low adoption by both nations and organisations. As a result, nothing further will be discussed regarding their influence, but emphasis will be directed towards the more common quantitative and qualitative criteria.

The quantitative approach has helped minimise the confusion in standardising the SME definition. Hitherto, the greatest influence on standardisation efforts as postulated by Berisha and Pula (2015:17), was exerted through the quantitative criterion (i.e. the use of quantitative constructs to define SMEs). This progress can be viewed as a panacea towards standardisation of the SME definition in the developed world. Interestingly, the same study highlighted that

localised areas such as the European Union were using different quantitative SME classification figures, thus making it difficult to adopt one universal definition. The variations arose from the fact that all figures used were dependent on sector or country economic performance and development. Such a conflicting outcome then crippled the entire previous successes leaving a void for further research. In addressing this contradiction, their study concluded that standardisation of the SME definition by solely using the quantitative approach was impractical. The solution to the problem was the combination of quantitative and qualitative criteria to compliment the limitation of each approach as earlier propounded by Meredith (1994:41).

It is important to note that literature is to a large extent silent on advocating for the full adoption of the suggestion to combine the two commonly used criteria ever since it was promulgated. There will thus be no harm in trying it now considering that existing solutions have not been effective in standardising the SME definition. It is equally justifiable to take this direction since efforts to coin a standard definition for SMEs are continuing and the need to universally compare SME performance is also becoming unavoidable. This need has been the main driving force in the evolution of the SME definition globally.

#### **2.2.2.1 The influence of small and medium enterprises classification on definition standardisation**

SMEs were mainly classified as informal organisations and their formalisation was not considered important since they had an insignificant economic contribution. However, with the advent of global economic challenges and the role these organisations played in sustaining economies during difficult times (Cucculelli, Bettinelli & Renoldi, 2014:1493; Gherhes, Williams, Vorley & Vasconcelos, 2016:939), focus was directed towards their formalisation. Efforts were then undertaken to clearly understand the nature of an SME. It was then that they were classified as formal small organisations but what remained was to understand the term “small organisation” and distinguish it from the term “large organisation”. The outcome was the concerted effort to further classify small organisations since they varied widely in size and nature.

A plethora of SME classifications have come about, that include survivalist, micro, very small, small, medium, among others, thereby hindering definition standardisation. All these classes

were a result of unavoidable SME definitional standardisation demands. These demands were dictated by the simultaneously increasing importance of small organisations in global economics as well as the growing need to statistically analyse SME performance. The attainment of a comprehensive statistical analysis was aimed at fostering an effective comparative examination of these small organisations so as to determine their overall contribution and performance. Nevertheless, the struggle was not easy due to the existing classification variations within the small organisations as already alluded to earlier. Consequently, instead of classifying the organisations using industry or context specific terms, there was now a further requirement for collective classification that would lead to the much-needed SME standardisation.

One such effort was by the European Commission where they first adopted a common way of classifying SMEs as micro, small and medium and naming them enterprises (European Commission, 2003; Ward & Rhodes, 2014). The classification had, to a limited extent, helped in minimising inconsistencies in SME statistical analysis in the region and had been widely used in SME literature (Wibhowo & Grandhi, 2017:1217; Stouraitis, Harun & Kyritsis, 2017:41). However, the challenge of defining SMEs remained as some countries in the region were slow in adopting the proposed standardised classifications for country-specific reasons. For instance, some countries had adopted WTO or UN classification criteria (which are different from the EU commission) to meet funding requirements from these institutions. While others depended more on classifications as defined in national laws. This development had up until then prolonged the definition standardisation challenge in the EU region.

#### **2.2.2.2 Developments in the classification of small and medium enterprises**

Further evidence from the literature suggests that the lack of consistency in the naming of SMEs can also be a driving factor to the global definition standardisation challenge. For instance, in the United States, the term “small businesses” is common for referring to small organisations (SBA, 2014:1). While international institutions such as the World Bank, United Nations and World Trade Organisation as well as the EU have adopted the concept of SME (World Bank, 2014:1), the confusion is further amplified in the literature (Berisha & Pula, 2015:24) since these terms although potentially different in meaning are used interchangeably based on the preference by the author. An example is the Business Dictionary (2017:1), which defines a small business as an organisation where goods and services are exchanged amongst customers

for profit. Whereas the same source defines a small enterprise as a project or risky initiative undertaken by an entrepreneur. Thereby raising definitional ambiguity on whether small organisations should be treated as projects or businesses. Key organisations such as the Organisation for Economic Co-operation and Development (OECD 2005:1) accepted the heterogeneity of SME definitions and instead of championing standardisation they resorted to adopting country-specific definitions even though this approach resulted in inter-country comparison challenges. Again, such moves impacted negatively on the efforts towards the attainment of a universal SME definition. Therefore, the current trends envisage a nearly impossible situation to find a common definition of a small organisation, due to differences in naming criteria because extant literature has not provided solutions to guide business.

**2.2.2.3 Small and medium enterprise classification factors in developed countries**

Although the definitions in the developed world are different, they hover around SME classification and naming. The differences emanate from the meanings and figures applied to these two aspects as already shown. The European region mainly uses the name “SMEs”, and the classifications are summarised in Table 2.1.

**Table 2.1: Summary of small organisation factors from the European Union**

<b>Enterprise category</b>	<b>Headcount: annual work unit</b>	<b>Annual turnover</b>	<b>Annual balance sheet total</b>
Medium sized	> 250	Greater than or equal to 50 million Euros	Greater than or equal to 43 million Euros
Small	> 50	Greater than or equal to 10 million Euros	Greater than or equal to 10 million Euros

Micro	> 10	Greater than or equal to 2 million Euros	Greater than or equal to 2 million Euros
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**Source: Kunday and Sengular (2015:974)**

As shown in Table 2.1, within the European Union (Commission, 2003:1), the classification influences the definition. SMEs are classified as micro, small and medium enterprises, which is the most common approach within this region. Guided by this classification, the commission then defines an SME as any entity involved in any economic activity, despite its legal nature and it must among other characteristics have less than 250 employees; an annual sales revenue of 50 million Euros and an annual balance sheet total of Euro 43 million or less. The classification coupled with the figures then determines the definition of micro, small and medium enterprises.

Although the World Bank also adopts the same naming and classification as the European Commission, the definition remains different mainly because some figures vary. For example, from a World Bank perspective, SMEs are those formal sector entities with up to fifty (50) employees and total assets and total annual sales of up to US\$3 million (World Bank, 2017:1). Similarly, the Australian Bureau of Statistics (ABS) uses the same naming and classification as the EU and the World Bank but again with totally different figures. The Australian Bureau defines SMEs as having between 1-49 employees and medium businesses as having between 50-99 employees (ABS, 2017:1).

A much different context exists in the USA, where the name small business is used, and classification is industry specific and not uniformly applied to all areas. This non-uniformity of classification as noted by the NAICs website (2017) has influenced the definitions, as they tend to vary by industry resulting in industry-specific definitions. This classification is being used in the United States, Canada, and Mexico to facilitate standardised collection and analysis of business statistics as postulated by the US Census Bureau (2018). This common approach can be the main driver of standardisation progress within the region. However, the need for consistency in figures remains a challenge since the figures are not the same in the countries where this coding system has been adopted.

The NAICS system as defined by the United States Small Business Administration (SBA) provides a list of small business size standard codes for each industry. An example is the manufacturing industry where a small business is defined as a business with 500 employees or less, while other sectors such as in wholesale trades, the number reduces to 100 employees or less. This thus advocates that the figures used in the classifications of small organisations vary with performance and context, making it complicated to exclusively standardise using a quantitative criterion.

Some countries, for example, Kosovo (KOSME, 2014:4) and Albania (Berisha & Pula, 2015:25), instead of their definition being influenced by classifications and naming actually relied more on developments in Europe and the USA. This was affirmed by the uniformity of naming and classifications between these countries. However, economic performance and context variations still resulted in the definitions being different in terms of the figures. In Kosovo, for example, there was a visible EU influence, but figures included at least nine employees and a total turnover of not more than EUR 500,000 during a 12-month accounting period for a small enterprise. While figures for a medium enterprise were between 10 and 49 employees and a total turnover of 2.4 million Euros over the same period (Business and Finance Consulting, 2016:11). Also, in Albania, there was both a USA and EU influence where the term ‘small businesses’ was used, but classification was more EU-oriented and not industry based as in the USA. Accordingly, the country had a classification including micro businesses, which had figures including 5 employees, small businesses with between 6 and 20 employees and medium businesses which had between 21 and 80 workers (Berisha & Pula, 2015:25).

### **2.2.3 Small and medium enterprises’ classification factors in developing countries**

The SME definition in developing countries has over and above lacking clarity, been equally fraught with the problem of definitional standardisation (Eniola, Entebang & Sakariyau, 2015:3). The results from the previous section show that SME classification is to a certain extent influenced by the nature of economic performance (KOSME, 2014:4; ABS, 2017:1; Kunday & Sengular, 2015:974). Based on this view, the complexity of the classification in developing countries increases, since most of these countries have varying economies, which are also characterised by high volatility.

Economic stability has played a pivotal role in improving SME classification standardisation in the developed world although to a limited extent. Therefore, the same factor is contributing significantly to definition standardisation challenges in developing countries since their economies are unstable. This condition was visible from the multiplicity of economic performance factors influencing SME classifications adopted by the developing world as identified by Musa and Chinniah (2016:255). They highlighted classes such as micro and small enterprises (MSEs), micro, small and medium enterprises (MSMEs) and small, micro, and medium enterprises (SMMEs) as also supported by Eniola, Entebang and Sakariyau (2015:3).

Additionally, economic volatility led to multiple classifications within the same country, based on sector performance and/or sources of capital funding. The trend here indicates that where the economy was less stable, mixed classifications were used and clarity of classes improved positively with economic stability. However, suggesting postponing until all economies in the world have improved then coining a standard SME definition is equivalent to rejecting reality. Hence, even though lack of financial independence and poor economic development in developing countries are contributing factors to the non-standardisation of definitions, the fact that they are merely inheriting everything from the developed world is a move in the right direction. As such, their dependency presents a good ground for standardisation as it shows that if all developed and emerging economies were to have a standardised definition, the developing nations would automatically fall in-line.

### **2.2.3.1 The influence of small and medium enterprise classification factors in the developed world on developing countries**

There is clear evidence in developing countries of SME definition influences from the developed world. The influence is more pronounced in countries that have made strides towards industrialisation of their economies such as Vietnam. In Vietnam, a small organisation is also named a small business and defined as a registered business entity with an employee establishment of between 5 and 299 (Chowdhury, Azam & Islam, 2013:52), indicative of a USA influence. Similarly, in the United Arab Emirates, small organisations are named SMEs and defined as enterprises with less than 250 employees and an annual turnover of 250 million UAE dirhams signifying an EU influence. In South Africa, as alluded to by Kallier (2017:141), the definition of a small organisation given by the National Small Business Act of 1996 uses



the term business, showing US influence. But the small business classification as highlighted by Fatoki and Odeyemi (2010:136) into small and medium businesses, uses EU constructs to distinguish between the two classes.

Even though other developing countries might be using different classifications, the key terms small businesses and SMEs remain visible in the naming criteria (Anggadwita & Mustafid, 2014:417). Therefore, these definitions are very much influenced by the development in the EU, Australia and USA since no new naming term is imminent from the developing countries, only new classifications. These new classes such as MSME, MSE and SMME, among others, are the result of an attempt to minimise the effects of economic volatility.

### **2.2.3.2 Limitations of using quantitative factors to standardise small and medium enterprise definitions in developing countries**

The limitations of attempting to exclusively use quantitative features to standardise the definition of small organisations in developing countries can never be overemphasised. Substantiation of this limitation emanating from economic volatility was seen in Zimbabwe from the period 2008 to around 2017 when companies adopted all sorts of schemes to survive. Under this environment companies would randomly reduce the number of employees, production levels, target markets and profit thresholds to match economic challenges. In this case, which is not necessarily documented in official sources of literature, a new term, “the new normal” was derived, which treated even vendors as small organisations under the indigenisation law (Nyoni, 2017:2). Hence, the coining of additional terms of classification as alluded to above arose in an effort to balance between legally recognising the formalised informal sector and qualification for international funding. This scenario created more confusion in the classification of SMEs since it was using a completely figure-based classification approach. On a positive note, it proved the existence of a correlation between SMEs’ classification complexity and economic volatility. In this context, it is more reasonable to conclude that as the volatility of the economy increases, the complexity of SME classification also increases. Hence, the need to adopt the knowledge-based approach, which has adaptability to changing environments.

### **2.2.4 Variables used in defining small and medium enterprises**

Literature presents numerous variables that have been used in defining micro, small and medium enterprises. SMEs, as alluded to by Eniola and Entebang (2015:335), have been mostly defined using several quantitative variables such as number of employees (Salikin, Wahab & Muhammad, 2013:335), the value of fixed assets (Chowdhury, Azam & Islam, 2013:52), production capacity (Kemayel, 2015:1125), capital employed and economic development (Asian-Pacific Economic Cooperation, 2017:3). Other variables have been identified as financial performance (Asare, 2014:25), the industry in which the SME is operating, and the market share it is enjoying (Rao, Metts, Monge, 2003:12). Although dotted within SME literature, qualitative variables have not been widely used in most SME definitions across the globe.

#### 2.2.4.1 Quantitative variables used in defining small and medium enterprises

Most developed, developing, and underdeveloped countries are using quantitative variables in defining small organisations. Table 2.2 shows the various variables and where they have been adopted.

**Table 2.2: Variables used in defining small organisations**

Country/ region	Quantitative variables				Qualitative variables			
	Total assets	No. of employees	Annual turnover	Market share	Management style	Legal nature	Owner role	Sector
EU	Yes	<b>Yes</b>	Yes	No	No	No	No	No
USA	Yes	<b>Yes</b>	Yes	No	No	No	No	Yes
Australia	Yes	<b>Yes</b>	Yes	No	No	No	No	No
India	Yes	<b>Yes</b>	Yes	No	No	No	No	Yes
China	Yes	<b>Yes</b>	Yes	No	No	No	No	Yes

Brazil	Yes	<b>Yes</b>	Yes	No	No	No	No	Yes
Nigeria	No	<b>Yes</b>	Yes	No	Yes	No	Yes	No
South Africa	Yes	<b>Yes</b>	Yes	No	No	No	No	Yes
Malawi	No	<b>Yes</b>	Yes	No	No	No	No	No
Namibia	No	<b>Yes</b>	Yes	No	No	No	No	Yes
Zambia	No	<b>Yes</b>	Yes	No	No	Yes	No	Yes
Botswana	No	<b>Yes</b>	Yes	No	No	No	No	No
Zimbabwe	Yes	<b>Yes</b>	Yes	No	No	Yes	No	Yes

**NB: Bold means mandatory variable**

**Source: Author from SME institutions, OCED, World Bank records, (2017)**

The results in Table 2.2 support the view in SME literature that the number of employees variable is argued to be the most stable and commonly used as seen by its appearance in all sample countries (Masato & Kumar, 2014:5; Muda & Rahman, 2016:685). Essentially in nearly all countries and institutions it is mandatory for an SME to meet the prescribed number of employees for them to qualify as an SME while other variables are considered optional.

There are also other variables that are utilised by the World Bank. Another scenario, as highlighted by Anggadwita and Mustafid (2014:416), is that of the World Bank, which uses the number of employees as a prerequisite combined with two optional financial variables. This approach underscores the significance of the number of employees in classifying SMEs although it has already been shown that it is difficult to set figures for global adoption due to differences in economic performance. Conversely, the universal application of the approach can still pose a challenge since no standard exists for inclusion or exclusion of employees. For example, some companies may adopt the employment of very few permanent employees and more casual and contract workers as a cost-cutting strategy during difficult times. Such a strategy was more visible in highly volatile economies such as the Zimbabwean experience where large companies laid off their employees based on the three months-notice ruling perpetuated by the government (Herald, 2017:1). However, after they laid off non-key employees these large companies could thus by SME definition standards (i.e. minimum employee number) be considered as SMEs. Yet the companies were still classified as large, thus

uncovering the limitations of using the number of employees as a key SME defining variable in highly volatile economies.

The second most common variable is the financials of the organisation such as asset value and annual turnover. Table 2.2 indicates that of these two variables, the annual turnover is used in most countries while the total assets variable is not universally applied. Nevertheless, these variables pose several challenges since they are both affected by economic performance. Furthermore, the accuracy is doubtful due to poor financial reporting standards and misrepresentation of figures common amongst SMEs in developing countries (Xiang & Worthington, 2015:515). All these dynamics make it difficult for consistent SME comparison to be a reality especially when conducted over a longer period of time. More so because inflation, and in particular, hyperinflation, stands out as the major challenge deterring the use of company financials as a global variable in defining SMEs.

In view of the above factors, it will be difficult to ascertain the actual current asset value especially where figures rapidly vary from trillions to hundreds as currency is re-valued or changed as was the situation in Zimbabwe from the year 2000 to around 2009. In effect, such situations invalidate the use of financials in defining SMEs since no accurate data on financials can be produced and if produced their applicability would be void and confusing. Official statistics from ZimStat (2017:1) placed industry operational levels by year-end 2017 at below 15 percent, reducing annual turnover by half. Therefore, asset value and annual turnover validity were eroded by circumstances. In view of the aforementioned, the adoption of financials to universally define SMEs is an insurmountable task in developing countries.

#### **2.2.4.2 Qualitative variables used in defining small and medium enterprises**

Qualitative variables are non-numeric variables that have also been used in defining SMEs. Qualitative variables as propounded by Eniola, Entebang and Sakariyau (2015:3), can also be used in defining SMEs, more so when combined with quantitative variables. In pursuance of this view, they noted that the qualitative definition of SMEs utilises three variables. These include management of firm by the owner/manager in a personalised manner; small market share in economic terms and then independence in decision making. Other scholars have used

different qualitative variables that include the entity's legal form and autonomy, the role of the firm owner (Werner & Lim, 2017:853), the firm's position in the market, organisational structure and economic autonomy (Molodchik & Jardon, 2017:425).

The qualitative dimension poses a more practical and realistic approach for developing countries as they depend less on economic performance. In some of these countries, particularly Zimbabwe, quantitative variables, though still used, were usually meaningless since they could be overshadowed by poor economic performance. This consequently reveals that as the level of economic performance decreases, the use of quantitative variables in defining SMEs loses validity while that of qualitative variables becomes pronounced. It can thus be sound to propose that a globally applicable SME definition needs to have mandatory qualitative variables and not only quantitative variables as is the case with all definitions globally.

Although it is reasonable to use qualitative variables in volatile economies it is also critical to consider that qualitative variables are difficult to operationalise; an issue which needs attention before implementation. In that sense a combined approach, which will balance the weakness of quantitative variables with the strength of the qualitative variable (Meredith, 1994:44), will be an acceptable direction to take if ever a global definition is to be documented. This dimension is the way forward as it manages to address challenges in other previously confusing areas (i.e. research methods) and thus the same will apply to the SME definition.

### **2.2.5 Definitions for small and medium enterprises in southern Africa**

Unlike regional blocs in the developed countries that have at least managed to standardise the SME definition within their area, those in developing countries are still marred by a plethora of definitions. For instance, evidence from SME literature in Southern Africa proves that there are no countries in the Southern African Development Committee (SADC) bloc that are sharing the same definition (Ayandibu & Houghton, 2017:134; Kwambale, Chisoro & Karodia, 2015:82; Mutoko & Kapunda, 2017:2). There are also several countries that have numerous national definitions for an SME. Most of the organisations and even government-owned institutions have their own definition, raising serious challenges in standardising the definition

to the extent that the regional leadership on SMEs were not considering this as an important matter.

#### **2.2.5.1 Development of small and medium enterprises in South Africa**

South Africa, as postulated by Mohlameane and Ruxwana (2013:396) defines SMEs by first classifying and naming them small and medium businesses, and then using three constructs, i.e. number of employees, annual turnover and gross assets to define each type of SME. An SME as given by the National Small Business Act of 1996 is any separate and distinct business entity, including cooperative enterprises and non-governmental organisations, managed by one or more owners including its branches, which is engaging in any economic activity (Kallier, 2017:141). The 2004 amendment of the Act adds two classifications, namely, micro, consisting of survivalist enterprises and very small enterprises, over and above the small and medium classifications outlined in the 1996 Act (Smit & Watkins, 2012:6324). Though this is the most commonly used definition in the country, Ayandibu and Houghton (2017:134) argue that there is no single definition for an SME in South Africa. Rather there are several definitions for each area, such as one for amnesty purposes, income tax purposes, and capital gains tax requirements.

#### **2.2.5.2 Development of small and medium enterprises in Namibia**

In Namibia, small organisations are classified as small and micro enterprises. These are further classified according to the sector (i.e. manufacturing or all other businesses) and then number of employees, turnover and capital are used to distinguish organisations in each category. An SME, as alluded to by Amadhila (2016:38), is a small or micro organisation, which if it is engaging in manufacturing has less than 10 employees, a maximum of N\$1 million and maximum capital investment of N\$500 000. If it is engaging in services or non-manufacturing activities it must have less than 5 employees, maximum turnover of N\$250 000 and maximum capital investment of N\$100 000 (Kambwale, Chisoro and Karodia, 2015:82). This classification and definition was reviewed by the Namibian Ministry of Industrialisation, Trade and SME Development (2015:7) to include the commonly used classification of micro, small and medium.

Like all other definitions, the classification was used to define an SME in the Namibian context using two constructs, namely, number of employees and annual turnover. Thus, defining a micro enterprise as having up to 10 employees and an annual turnover of up to N\$300 000; small with 11-30 employees and annual turnover N\$3 million, and medium with between 31 and 100 employees and an annual turnover of N\$10 million. Namibia was one of the few countries that was using a universal definition for all sectors and institutions in the economy.

### **2.2.5.3 Definition of small and medium enterprises in Botswana**

The achievement by Botswana of maintaining one common definition across all sectors even though the sectors are separately funded presents good ground for attaining a universal definition. Botswana had maintained the same definition of a small organisation from 1998 with no amendment (Nkwe, 2012:30; Mutoko, 2015:2), an unusual condition in most SADC countries. As such, the bloc can learn lessons from this country in its efforts to unify SME activities.

The definition in this country was also influenced by the classifications of micro, small and medium enterprises and two constructs (i.e. number of employees and annual turnover). An SME in Botswana is defined as a micro business with less than 6 employees and an annual turnover of up to P60 000; small with less than 25 employees and an annual turnover which is above that of a micro business and less than P1.5 million (Mwobobia, 2012:89), and a medium business which has all the features of the micro and small but less than that of a large organisation (i.e. 25-100 employees and P1.5 million – P5million) (Shemi & Procter, 2013:63; Mmerekhi, Setibi & Bafaneli, 2015:199; Mutoko & Kapunda, 2017:2). The definition has both a USA and EU influence as it incorporates the term business while borrowing constructs from the EU definition.

### **2.2.5.4 Development of small and medium enterprise in Zimbabwe**

The classification of the SME sector in Zimbabwe was comprised of various definitions that differ from institution to institution as is the case with most developing countries. Most of the definitions had adopted the quantitative criteria of defining SMEs. Some of the definitions included the ministry of small and medium enterprises and cooperative development (MoSME & CD, 2017:1) that defined an SME as a legal business entity which is not a subsidiary or

branch or associate of a large business organisation, which must have a total annual turnover not exceeding USD800 000 and a maximum of one hundred employees on a full-time permanent or contract basis (Karedza, Sikwila, Mpofo & Makurumidze, 2014:38). The emphasis on the nature of engagement of the employees was added in this definition as a way of trying to mitigate the fluid nature of the number of employees' variable in a situation where the economy is unstable.

Two more SME definitions were highlighted by Manyani (2014:11), namely the Small Enterprises Development Corporation (SEDCO) that defined an SME as an enterprise employing not more than seventy five people with a fixed asset base not exceeding \$500 000 (SEDCO, 2010:1). Another one was by the Government of Zimbabwe (GoZ) that defined a small enterprise as one that employs not more than fifty people and acts as a registered entity and medium enterprises being firms employing up to seventy and one hundred people (GoZ, 2000:2). The Zimbabwe Revenue Authority (ZIMRA, 2011:1) gives another dimension and defines SMEs by categorising them as small and medium and postulates that a small company is one with six to forty employees, annual turnover of US\$50 000 to US\$500 000 and assets valued at between US\$50 000 to US\$1 million. While a medium-sized company is one with forty one to seventy five employees, annual turnover of between \$1 million and US\$2 million, and assets valued between US\$1 million and US\$2 million.

The last definition is from the Finscope SME survey (Finscope, 2012:3), which recognises micro, small and medium SMEs but it adds a new categorisation of SMEs known as individual SMEs that are run solely by the owner/manager. They define individual SMEs as entrepreneurs who have no employees, micro organisations as having between one and five employees as well as small and medium size businesses that have between six and seventy-five employees. There was a visible trend in the thresholds for the number of employees used in each definition in that it continued to decline with each newer definition. This decline can be attributed to the declining economic performance since some of the definitions were adopted during the period when Zimbabwe was experiencing a serious hyperinflationary environment. It was also during the same period that the Finscope survey definition ignored all financial variables and went on to accept an individual (vendor) as an SME. This consideration confirms that quantitative variables are less valid in volatile economies when defining SMEs; as such, their dominant use contributes to the non-existence of a universal SME definition. Nevertheless, the remaining part of this section attempts to derive the most suitable SME definition that was used for the



study. The definition was intended to as far as possible address the limitations identified above and allow for global comparability of SME results.

The most appropriate definition in view of the argument posed above was by the SMEs Association of Zimbabwe (SMEAZ). They define a small enterprise as one that is legally registered and with a turnover of less than US\$240 000 or assets less than US\$100 000. While a medium enterprise is one that is legally registered, with turnover or assets above the thresholds for small enterprises, but less than US\$1 million each (SMEAZ, 2015:1). The definition includes the legal variable, which is qualitative as primary and two optional quantitative variables, which are all financials, and ignores the number of employees because of its varying nature. It further sets the medium enterprise thresholds in relation to those of the small enterprises allowing for matching when economic performance varies. This makes this definition unique and appropriate for a developing country and with limited adjustment it can be adopted universally without raising statistical comparability challenges in global SME data.

The SME definitions that were being used in Zimbabwe varied from institution to institution; as such there was no single definition of an SME as highlighted by Ngwenya, Chitate and Sibanda (2014:1). Hitherto, most institutions, excluding the SMEAZ had a bias towards quantitative variables (number of employees, asset value and annual turnover) but none had similar figures on thresholds. Although this was in-line with findings from literature (Majoni *et al.*, 2016:378), most of these variables had little significance in Zimbabwe if used independently. The definition by the SMEAZ was the only one that combined both quantitative and qualitative variables in that it was considering the legal form (qualitative) together with one optional quantitative financial variable.

### **2.2.6 Section summary**

The developments in all the definitions show a general trend of being biased towards the quantitative criteria and thus increasing the level of heterogeneity in the definitions. Very few of the definitions combine both qualitative and quantitative criteria, suggesting that it is complicated to adopt the same measures since no two economies are exactly the same. The findings also indicate that the terms SMEs and small businesses are used in the developed world and classification has been standardised to micro, small and medium within regional blocs. This

condition was different for developing countries where there were several classifications being used and no indications of standardisation.

The figures used to quantify the variables varied with the context and were from as high as 500 employees for medium organisations to as low as five employees for micro-organisations. These views are indicative of the existence of a challenge in coming up with a universal definition for small organisations while using solely the quantitative criteria. Be that as it may, the importance of a standardised definition is inalienable if SMEs are to be successfully compared at a global level. Hence, these definitions show that only the figures vary but the constructs remain the same and wholly quantitative as was the case in developed countries.

There was also to a larger extent a trend suggesting that definitions used by developing countries are very much influenced by those in developed and emerging economies as driven by financial dependence. This dependency therefore leaves the possibility of deriving a global standardised definition for SMEs. However, for that to be possible there is need to relook the different constructs that are used in defining SMEs as they pose the greatest challenge in standardising the SME definition.

In light of the above outcomes it emerges that there are two major categorisations of SME variables, namely, qualitative and quantitative. Furthermore, it also surfaced that countries had adopted quantitative variables which may have had a negative correlation with economic performance raising statistical comparability challenges at a global level. It was also evident that countries had not fully adopted qualitative variables though they proved more suitable for volatile economies, which were common in developing countries. There is therefore a continued challenge in academia of identifying the best variables that will allow for global comparison of SME performance. Due to this challenge, many research studies on SMEs have remained country, region or sector-specific depending on the availability of a common definition within the research context. Based on this restrictive nature of SME studies, the current study focused on one country, which might have been a limitation to the generalisation of the results to other countries.

### **2.3 THE CONTRIBUTION OF SMALL AND MEDIUM ENTERPRISES TO ECONOMIC GROWTH AND KNOWLEDGE ECONOMIES**

This section centres on establishing the importance of an SME by reviewing its contribution to economic growth and the attainment of a knowledge economy. The contribution of an SME will be discussed in relation to economic growth, poverty eradication or societal factors and more importantly in-line with the development of a knowledge-based economy.

**2.3.1 Small and medium enterprises’ contribution to economic growth**

The survival of economies from economic downturn through SMEs in both developing and developed countries is clear and literature sets this argument in no uncertain terms. This clarity has been attributed to a number of characteristics that SMEs possess such as high innovation levels (Chatzoglou & Chatzoudes, 2016:328), easy adaptability to changing environments and low initial capital (Arbussa, Bikfalvi & Marques, 2017:274; Bos-Brouwers, 2010:420), high dynamism and creativity (Harrington, Walsh, Owens, Joyner, McDonald, Griffiths, Doyle & Lynch, 2016:96) and simple decision making processes (Lin, 2014:1416). Due to these factors, SMEs were being utilised as a springboard for attaining industrialisation and in particular, knowledge-based economies in developing economies such as Brazil, India, China and South Africa (Chen, 2006:141; OECD, 2014:82). Therefore, SMEs were viewed as the game changers of successful economies in the future.

**Table 2.3: SME contribution to improving employment level - selected countries**

Country name	Structure of the MSME sector (% of all MSMEs)			SME participation in the economy		
	Micro	Small	Medium	SMEs	SMEs per 1,000 people	SME employment (% total)
Brazil	93.9	5.6	0.5	4 903 268	27.4	67.0
China	n/a	n/a	n/a	8 000 000	6.3	78.0
Egypt	92.7	6.1	0.9	1 649 794	26.8	73.5
United Kingdom	95.4	3.9	0.7	4 415 260	73.8	39.6
Ghana	55.3	42.0	2.7	25 679	1.2	66.0
India	94.0	3.3		295 098	0.3	66.9
Mexico				2 891 300	27.9	71.9
Malawi	91.3	8.5	0.2	747 396	72.5	38.0
Russian Federation				6 891 300	48.8	50.5
United States	78.8	19.7	1.5	5 868 737	20.0	50.9
South Africa	92.0	7.0	1.0	900 683	22.0	39.0

**Source: NCR (2011:14)**

Table 2.3 shows that globally in both developed and developing countries such as the United States, Russia, South Africa, India and China, SMEs were contributing significantly to economic growth and development. It further substantiated the view by Mayer-Hauga, Read, Brinckmann, Dewd and Grichnik (2013:1251) that globally SMEs represent 95 percent of companies and account for between 60 and 70 percent of all new jobs created in OECD member countries. Over and above the examples cited in Table 2.3, in other countries such as United Arab Emirates, SMEs constituted 95 percent of the businesses with a contribution of 40 percent to the national economy.

SMEs in Asian countries such as Thailand, the Philippines, and Bangladeshi contribute an average of 38 percent to the gross domestic product (GDP) of their national economies (Basera, 2013:73). In Europe, Ensari and Karabay (2014:194) note that Turkish SMEs were contributing to around 60 percent of the total exports and 38 percent of total imports in 2012, over and above producing nearly 90 percent of the locally manufactured products. Gray and Jones (2016:475) also highlight that the UK economy was cushioned from economic challenges by over 5.2 million SMEs that were raking in an annual turnover of £1.6 trillion.

Similar findings to those stated above were also revealed in other studies. Hyder and Lussier's (2016:83) study on SMEs in the Eurozone concluded that when nations encounter an economic recession coupled with a debt crisis, SMEs play a pivotal role in reviving the economy through exports and innovations. They further highlight that SMEs were contributing to nearly 58 percent of the gross value added (GVA) in the European economy during the 2008-2009 global crisis. Similarly, in the USA during the same period, 33 percent of exporting value was from the SME sector. Massaro, Handley, Bagnoli and Dumay (2016:258) came to the same conclusion in their Australian study and noted that in Australia over a third of the value addition from the industry during the economic crisis came from SMEs.

Several academics and commentators have argued that the Zimbabwean economy was being sustained from the SME sector. The reports from both the Zimbabwean ministry of SMEs and the ministry of finance as highlighted by Chikwinya (2017:1) in her presentation at the annual SME expo, showed that the Zimbabwean economy was being sustained by SMEs. This is proof that countries that intend to revive their economies after a recession need to focus on the SME sector as a conduit for success. It is therefore prudent for this study to focus on the SME sector considering that when Zimbabwe was going through an economic transitional period, supporting positive SME performance strategies was a prerequisite.

### **2.3.2 Small and medium enterprises' contribution to poverty reduction**

Poverty is a reality in both developed and developing countries. In the recent years, poverty has, however, remained more prominent amongst developing and underdeveloped countries (UNDP, 2015:2; World Bank, 2016:15). Generally stated, eradication of poverty is an unattainable goal for all nations, as such only poverty reduction can be achieved, and all governments are making efforts towards improvement of living standards within their citizenry. One strategy for achieving this outcome, that emerged dominantly from the literature, was the promotion of SMEs as they improve economic performance (Afrifa & Tauringana, 2015:720), which will in turn reduce poverty (Khalique, Bontis, Shaari & Isa, 2015:227). The United Nations (2014:1) and World Bank (2014:1) reports indicate that poverty reduction was being achieved effectively in Brazil, Russia, India, China and South Africa and these nations had also realised improved economic growth through SMEs. There is confirmation that besides these countries there were a number of other countries that had attained economic growth (Rajablu, 2016:324; Massaro, Handley, Bagnoli & Dumay, 2016:258) through focusing on the SME

sector. The proof in these countries of increased economic growth through SME advancement followed by a reduction in poverty levels reveals that SMEs are an effective tool for poverty reduction.

Literature states several strategies for poverty reduction. Some of the strategies include employment creation, reduction of hunger, provision of access to basic amenities, gender mainstreaming and developing opportunities for self-sufficiency (UNDP, 2017:1). These areas were rapidly being addressed to a larger extent through SMEs as highlighted in the previous discussion above. In terms of world poverty statistics, the UN (2016:1) report concludes that in most countries the greater percentage of the population facing extreme poverty is women and children. The study by Teoh and Cheong (2014:433) indicates that SMEs were addressing poverty to this marginalised group through an entrepreneurship drive and approximately 25 percent of the world's businesses are owned by women. They note that nearly 80 percent of these businesses are SMEs, which then explains the reduction of world poverty levels by means of growing the SME sector to arrest all the causes of poverty.

The noble assertion about SMEs is that they promote self-sustenance, which is a permanent solution to poverty as compared to issuing aid in the form of clothing or food hand-outs. The latter type of support though providing basic needs, promotes idleness; it is temporary in nature; its perpetuity depends on economic performance and in some cases external relations with other nations. Therefore, provision of aid in the form of support to SME business enhances the involvement of poverty-stricken citizens making them self-sustaining and resultantly reducing poverty levels. This is despite the fact that the ease of doing business varies from nation to nation. The Zimbabwean situation presents a possible undocumented reality of the effectiveness of SMEs in supporting self-sustenance and poverty eradication in a nation.

The introduction of SMEs has been pointed out as a solution to poverty reduction in situations where nations are experiencing low economic performance. Between the years 2000-2017 as postulated by Nyamwanza (2014:18), the government was faced with a huge debt, failing to provide enough aid to affected people, large and productive companies closing, high unemployment levels and a shortage of basic commodities. Amidst these challenges, most families resorted to starting small businesses in the services, mining, agriculture and manufacturing sectors as an alternative means for survival. Considering the conclusion made by Laforet (2016:379) that most family businesses fall within the SME category, it is prudent

to conclude that the businesses started by local Zimbabweans were also SMEs. Consequently, the improvement of lifestyles among families in both rural and urban areas during this era was considered to be an SME contribution to poverty reduction.

Zimbabwe is one country that has managed to adopt several positive poverty eradication strategies particularly in the early 1980s. When Zimbabwe adopted the growth pole policy in the late 1980s there was a rise in family businesses around the newly designated rural growth points as stipulated by Manyanhaire, Rwafa and Mutangadura (2011:3). As a result, SMEs were the source of improved lifestyles, road networks and electrification as business was booming across the country. Regardless of all these positive developments, SMEs have continued to struggle to make a steady contribution to economic growth, which suggests an underlying knowledge-related limitation. If this limitation is properly identified and resolved, SMEs could be a strong source of poverty eradication in underdeveloped, developing and emerging economies. Therefore, the major concern is whether it is possible to fully tap into the knowledge repositories found within this sector under the current prevailing conditions.

### **2.3.3 Small and medium enterprises' contribution to the development of a knowledge-based economy**

Modern economies value knowledge as a tool for economic growth. Maldonado-Guzman *et al.* (2016:831) postulate that SMEs are rich fountains of knowledge that can benefit economic growth in various fields as nations strive to pursue the goal of attaining knowledge-based economies. Yet, their knowledge is mostly tacit (stored within the individuals) and they are not ready to share for fear of losing business or inviting competitors into their identified niche market (Afrifa & Padachi, 2016:46). As such, these companies particularly those in developing countries do not engage in knowledge management probably because most of the existing KMSs are technology based and comprise irrelevant features to these organisations. This situation warrants the need for proper feature selection to enable the SMEs to confidently adopt the use of KMSs. Since the lack of KMSs in the sector can be attributed to their continued failure or lack of both growth and survival regardless of continued government support. On the one hand, Maldonado-Guzman *et al.* (2016:835) note that non-availability or lack of knowledge on intellectual property rights was the leading factor for the resistance to engage in knowledge management within the SME sector. While Lee and Wong (2015:719) add and contend that factors such as lack of resources, poor strategy and short-term focus (Harrington

*et al.*, 2016:97) were hindering knowledge management practices in SMEs. On the other hand, SMEs lose employees at a much faster rate than large companies and they can be shortchanged when the employees migrate and leave with the knowledge they would have acquired. This may definitely cause a negative impact on the SME, but it will indirectly increase knowledge transfer since the current situation does not encourage knowledge sharing among organisations. Hence it can be propounded that SME employee migration (and not ICT adoption) positively influences SME contribution in the attainment of knowledge-based economies in developing countries.

Nevertheless, it remains necessary to reduce the fear amongst SMEs to make them comfortable to share their knowledge so that they meticulously contribute towards the building of a knowledge-based economy. In this regard, Buganza, Colombo and Landoni (2014:73) suggest the people-centred adoption of University-Industry Collaboration (UIC) between SMEs and universities. They argue that this strategy allows for knowledge from both sides to be used in developing new products and improving resource utilisation. Their study concludes that when SMEs engage in collaborative engagements their fear is reduced thereby improving knowledge sharing. Although not instant, the sharing starts with exchanging knowledge on the testing of products and then moves to more complex activities as trust grows. In support of the need for trust, Pattinson and Preece (2014:112) note that trust in the SME sector is a key element in achieving successful knowledge transfer. As such, since according to Buganza *et al.* (2014:73), UICs improve trust it implies that they certainly could increase the participation of SMEs in the development of a knowledge-based economy. The limited participation of developing countries' SMEs in knowledge management practices is attributed to lack of trust because of poor platforms for transferring knowledge (Sharif, Kalafatis & Samouel, 2005:410). Therefore, there is a need to promote UICs as tools that promote the building of trust within SMEs and resultantly the development of a knowledge-based economy. This need is more pronounced in developing countries like Zimbabwe where politics has destroyed mutual trust amongst business practitioners.

#### **2.3.4 Section summary**

The review of the extant literature revealed that the contribution of SMEs to economic growth and development was taking an upward trajectory. Firstly, in the midst of the economic challenges facing the globe, SMEs were shown to be the source of improving the livelihoods



of the general populace both in the urban and rural setting. Secondly, SMEs were key to economic growth due to their high levels of innovation and again they are an alternative source of employment when large companies liquidate. Thirdly, SMEs were the major contributors to national revenue collection, and they had proven to contribute significantly to total exports. Lastly, SMEs were viewed as imbued with tacit knowledge which has not yet been fully utilised for the benefit of the economy.

Considering the importance of a knowledge-based approach for developing economies that are pursuing industrialisation, it is reasonable for these countries to focus on the SME sector and ensure that the knowledge repositories in SMEs are fully utilised. A number of challenges ranging from financial, human skills, and lack of market knowledge were also identified as retrogressive factors within the SME sector. It was unearthed that the value of the knowledge resources within SMEs far out-weighs the impact of the aforementioned challenges on performance. Currently little was provided in literature on how to tap these important resources. This failure to tap the abundant knowledge is likely the reason for an unsteady economic contribution from this important sector. For this reason, these challenges need to be closely analysed and resolved. Some of the challenges are discussed in the next section.

## **2.4 CHALLENGES FACED BY SMALL AND MEDIUM ENTERPRISES**

This section will make an analysis of the challenges that plague the SME sector in both developing and developed countries. It will look at challenges from a general perspective and then those related to specific areas such as marketing, production, human resources and training. The aim is to expose the underlying reasons for the unstable contribution that characterises the SME sector globally so as to suggest possible solutions to minimise the challenges.

### **2.4.1 Small and medium enterprises' challenges in developed and developing countries**

The SME sector across the globe has been reported in the extant literature to be facing challenges which have been in existence as far back as the early 1980s and beyond. Asare (2014:24) notes that a distinct effort to show such a trend was made via the joint literature survey by the University of Karlstad and the University of Wollongong in Australian and

Swedish SMEs. The findings of the review are outlined in Table 2.4, which show the trend in which the challenges have been resurfacing as identified by different authors in different periods and contexts of research.

**Table 2.4: SME challenges identified in literature**

SME challenge	Author(s)
Failure to compete with larger firms	Lawrence (1997:588)
High failure rate	Brigham & Smith (1967:10); DeLone (1988:51) Cochran (1981:50)
Poor strategic management skills	Tetteh & Burn (2001:172); Miller & Besser (2000:69); Markland (1974:21); Rotch (1981); Bunker & MacGregor (2000:75); Dennis (2000:288);
Poor access to funding and government support	Cragg & King (1993:47); Gaskill & Gibbs (1994:37)
Lack of skilled human resources	Martin & Matlay (2001:400)

**Source: MacGregor and Vrazalic (2004:7)**

The most noteworthy issue is that the same challenges are consistently recurring. For instance, poor access to finance, (Popeika-Apoga & Donavani, 2015:201); poor government support, (Eniola & Entebang, 2015:341) and low skills, (Muda & Rahman, 2016:688) resurfaced in recent literature. This is regardless of continued efforts by governments (Nyamwanza *et al.*, 2015:35; Inn, Dummay & Kokubu, 2015:220; Mutula & Brakel, 2006:403) and SME practitioners to implement the suggested best practices as provided in SME literature. It is thus noticeable that no new challenges have emerged, but the same challenges recur after a very short-lived success following adoption of existing best practices. The trend thus suggests that the available solutions have continuously failed to permanently address the problems in the lucrative SME sector.

The recurrence of similar SME challenges is a trend in most countries. In support of this view, is the study by Asare (2014:26) on challenges facing SMEs in Ghana, where he reviewed related literature over a thirty-year period. He noted challenges such as lack of infrastructure, poor regulatory framework and globalisation, which can still be linked to poor government support

though stated explicitly. He then singled out lack of access to easy and affordable funding, poor government support and lack of managerial and limited technological know-how as the major challenges. Additionally, he contended that the Ghanaian government had embarked on a number of initiatives to support the SME sector such as the formation of relevant structures and policies, but this move did not eliminate the challenges within the sector.

This effort by government is an indication that SMEs were being supported but still not performing to expected levels. The major limitation to the study was that it used less than 20 articles to reach this number; some articles from outside Ghana were included in the sample. The limited number of articles unveils another challenge of low levels of country specific research in SMEs within developing African countries. Nevertheless, the findings still support the reality that the identified problems had been in existence for an extended period. Conversely, the continuous identification of the same challenges over a long period might not necessarily mean the SME sector was practically still facing the same challenges since this recent study did not collect data from a primary source but rather it used secondary sources.

Regardless of the nature of the study used by the researchers, the identified challenges have been consistent globally. Another study, which adopted a literature-based methodology was by Musa and Chnniah (2016:259), which focused on the challenges that Malaysian SMEs were facing in trying to expand and “go green”. Their findings were based on a survey that had been conducted two years earlier and supported by other publications dating as far back as the early 1990s. This methodology further indicated the lack of data collection through primary sources thereby suggesting the possibility of a trend of duplicating invalidated outcomes. There was therefore a need to ascertain whether the challenges being faced in the SMEs were reality or a fallacy perpetuated by academics while the industry in actuality was not facing any challenges. This was because the trend in literature had been that of reporting both challenges being faced (Asare, 2014:26) and the large benefits that the sector has contributed to economic growth (Asare, 2014:27). This then created confusion on whether SMEs were benefiting economies or being a burden to economies.

Most countries have realised the benefits from the SME sector in spite of the existing challenges. In outlining the benefits of SMEs in Malaysia, Musa and Chnniah (2016:255) started by indicating that the benefits of the SME sector to the Malaysian economy were on an increasing trend. They also followed the same trend, and their study reinforced the view that

the same challenges were resurfacing by tracing the same challenges for over a decade. Their study noted continued exposure to challenges such as high cost of material and initial investment, lack of skilled labour and failure to train employees. They further argued that sticking to the same ways of doing business, poor technology adoption and know-how, limited market knowledge, low research and development and heavy regulatory frameworks were among the many challenges hindering SME growth in Malaysia. Paradoxically with all these challenges, Malaysia remained an example of how SMEs can grow an economy. This allows an argument then regarding the extent to which organisational challenges influence performance. However, the argument needs to be verified and if it is true then the focus in academia should be directed to other areas instead of concentrating on non-productive matters. Alamgir (2015:105) in his study on SME financing, noted a number of financing and development challenges in the Bangladeshi SME sector. He acknowledged that the challenges facing the SME sector vary with the different types of organisations but have some common characteristics. He argued that SMEs were faced with investment financing and working capital financing challenges. He contended that these challenges were exacerbated by the lack of willingness by the financial institutions to fund this purported risk sector. This view by the financing institutions was as a result of the high failure rate of these SMEs and their low motivation to pay back debts. He also highlighted that SMEs were faced with the lack of an enabling environment for trade and business for them to fund themselves internally. He then concluded that SMEs were usually not privileged with the relevant infrastructure to use as collateral when borrowing.

SMEs in developing countries experience numerous challenges that are related to exporting. SMEs in Harare were ready to engage in exports as a way of survival from international competition, but they were facing challenges as discovered by Chingwaru and Jakata (2015:645). Their findings were hinged on poor knowledge as the main challenge affecting export performance in SMEs. The survey in their study revealed that all the non-exporting SMEs lacked entry strategy know-how and knowledge of the available potential export markets. They highlighted that the exporting SMEs did not have clear knowledge of host country requirements, international payment systems as well as freight and customs procedures. Contrary to this outcome was the fact that the government had several structures to support exports in areas of knowledge provision. This contradiction indicates that there were poor knowledge management practices, which can be credited as the major cause of the knowledge gap between the intended beneficiaries and the knowledge providers.

A number of challenges facing SMEs in their efforts to meet international marketing standards have also been identified from literature. For instance, the challenges Kazimuto (2014:312) identified include lack of access to international marketing, non-existence of international marketing regulations and standards, failure by government to provide relevant and sufficient support, inability to conduct consumer needs and services assessments, poor owner/manager managerial skills and more importantly weak network structures by the SMEs. This particular research differed from the other studies that were only concluding their findings based on literature without collecting primary data as it further tested the validity of the existence of such challenges by collecting data from Tanzanian SMEs.

The study conclusions confirmed that the challenges were indeed a reality with poor networking structures ranked highest in terms of responses from SMEs and other stakeholders. It further recommended that information should be availed to SMEs through government though experience has shown that this requirement is not easily accomplished. Therefore, the SMEs must have independent means of getting information rather than relying on government. This failure by governments in developing nations to provide information indicates that the successes of SMEs are only possible through effort by the SMEs themselves. As such, a people-centred approach that, in turn, promotes knowledge-sharing within the sector is the most probable solution.

There are visible similarities between the challenges being faced by SMEs in developed countries and those faced by SMEs in developing countries. Rupeika-Apoga and Danovi (2015:202) argue that the same challenges that SMEs in developing countries are facing are replicated in developed countries although at a lesser magnitude. Their study went on to confirm that similar challenges were also ranked high amongst SMEs in countries such as Cyprus, Greece, Croatia, Ireland, the Netherlands, and Slovenia, among others. Interesting to note is the finding that the magnitude of the challenges further reduced in well-developed countries such as Germany and Austria. This trend could suggest that developed countries are improving SME performance as they slowly adopt best practices such as KMSs and SCP.

Literature has noted some best practices that have been adopted in SMEs with some significant levels of improvement in performance. Authors such as Rymaszewska (2014:93) analysed the application of some of these best practices that have yielded positive results in large

organisations such as lean manufacturing. Though he noted that this practice is necessary for SME growth and performance, he highlighted that this sector was not implementing this practice due to challenges they were facing. They noted a number of challenges that were being experienced by SMEs in developing countries. These include limited financial resources, shortage of skilled manpower, reliability on one-person management, lack of training and education of how to run organisations, intuitive rather than analytical decision making, reliance on out-dated labour-intensive technologies, and traditional management practices. These conclusions were further supported by Alamgir (2015:106), who also noted lack of skilled manpower as a challenge in SMEs in Bangladeshi and he argued that even in areas where SMEs were performing well there is a dearth of skilled manpower which is curtailing growth progress. Finally, he noted poor managerial skills in the owner/manager and argued that most of the SMEs lack strategic planning skills, which further impacts on their continued survival. This continuance of failure indicates that best practices such as strategic planning that were borrowed from large companies should be as simple as possible if they are to improve SMEs' performance.

Participation in public tendering was cited as one of the best practices that assures access to contracts for SME businesses. Sarter, Fuchs and Sacks (2014:9) contend that although SME best practices compel them to participate in public tendering to succeed, this was not being experienced in the sector. They highlighted that public tenders were full of several challenges which hinder the participation of SMEs. In their survey on German SMEs, they cited tender size as one of the restraining factors for SMEs to participate since they usually lack resources to undertake large and complex tasks. In furtherance of that they highlighted specialisation, which is common in SMEs, as another factor that causes them to fail to compete against large companies because they neglect to cover the full range of requirements on the contracts. They concluded that SMEs could survive this challenge through joint bidding on large contracts where several SMEs could join hands and collaborate to take different roles in the larger contracts as earlier suggested by Birru (2011:807). This approach to contract bidding necessitates SMEs to have full knowledge about each other's capabilities. Since there is limited documentation in this regard, it implies that SMEs must adopt a people-centred approach to network and gather sector knowledge, which becomes a tool for success in public tendering.

Nevertheless, there are some best practices which though yielding better performance have been considered complex for implementation by SMEs. Maldonado-Guzmán, Garza-Reyes,

Pinzón-Castro and Kumar (2017:1674) conclude that complex best practices such as innovation were a challenge for use within the SME sector. They identified challenges which they classified as financial resources challenges, external environment challenges and human resources challenges. They found all these challenges to be significant in Mexican SMEs and all of the three challenges exerted some influence on the level of innovation in SMEs. The findings also go further to confirm the failure that follows the adoption of a best practice if it is not simplified to fit the SME context. One such approach is the people-centred approach as it emphasises the importance of the role played by human resources in the success of SMEs as emphasised by Birru (2011:808). Contrary to this view, they conclude that human resources are less important in the adoption of innovation in SMEs and argue that financial resources and external environments have a higher priority. Nonetheless their findings are not consistent since SME literature (Ey, 2014:18; Hyder & Lussier, 2016:84) provides evidence of supported funding and favourable policy implementation by governments but nothing much has changed. In essence, there is a lack of comprehension by the SMEs and other stakeholders to support a people-centred approach. Hence, it is argued that if this approach is adopted it is likely to improve the situation.

#### **2.4.2 Small and medium enterprises' organisational survival challenges**

The major survival challenges that have heavily affected SMEs have mainly been related to the operating environment. Over and above peer-reviewed journals, various SME reports in local newspapers such as The Herald, Newsday, Financial Gazette, Sunday Mail and The Chronicle were also analysed to identify the challenges affecting SME survival. The choice of using such unpublished sources was due to the limited availability of published articles on the subject matter. The identified challenges from all the sources can be summarised as comprising: poor infrastructure to support business operations; highly volatile economic and political environment; lack of modern payment systems; complex processes in some industries; lack of capacity to handle disasters and high levels of corruption and bureaucratic procedures. The nature of the challenges is explained below.

- **Poor infrastructure to support business operations.** SMEs in a developing country rely heavily on imported infrastructure in areas such as communication and machinery (Alamgir, 2015:106). These imports are usually very expensive for both the government and the business practitioners and their non-availability led to some companies closing down. Most

of the SME activities required a constant supply of electricity which was usually not available. Some SMEs resorted to alternative sources of power which still increased the cost of production, making products expensive and less competitive. SMEs that were located in remote and inaccessible areas where there were no roads also had limited access to markets. Due to lack of networking amongst the SMEs some of them were producing products that others were importing because of lack of knowledge of the existence of local products.

- **Highly volatile economic and political environment.** The political and economic situation in most developing countries such as Zimbabwe had affected a number of SMEs with most of them failing to withstand the intensity. Some of the occurrences included the interference by politicians into business activities where some companies were forced to make unplanned donations to sponsor political parties. In addition, the uncertainty in the monetary system where currencies were in short supply, were continuously changed or re-valued made it difficult for SMEs to invest their proceeds. Quite a number of listed companies were affected by these activities as the stock exchange crumbled, some survived, but a greater number ended up closing. Those that managed to survive did so mainly from advice received from friends thus endorsing the importance of networking.

- **Lack of modern payment systems.** Most developing countries are slowly introducing modern methods of payment using plastic money. Equally, after experiencing serious cash shortages, Zimbabwe was forced by circumstances to adopt modern payment systems (plastic money) that utilises technology to make payments. When this development arose, the country had not prepared to embrace new ways of doing business. As such, a number of SMEs could not afford to purchase the required technology since it was very expensive and as a result, they lost business to large companies. The situation was even worse in remote areas such as rural areas where the SMEs lacked the relevant knowledge of how to go about adopting these modern payment systems. This reduced business transactions in this sector and some companies were forced to close down, as they could not meet the costs of migrating to the new way of doing business.

- **Lack of capacity to handle disasters.** Most SMEs do not engage in risk management due to limited resources and lack of knowledge (Beranek, 2011:43). As such when disaster strikes, they are not prepared to mitigate the risks. A number of SMEs are incapacitated to handle risk such as natural and occupational health disasters due to lack of resources and knowledge as alluded to by William and Snow (2012:731). Closing down soon after experiencing disasters such as fire or floods is a common phenomenon in the SME sector. One



major reason is that SMEs do not consider insuring their properties due to ignorance and lack of knowledge of the existence or importance of such services.

- **Complex processes associated with some industries.** Although SMEs may engage in some industries, their survival is limited by the complexity associated with some of these areas (EL-Khasawneh, 2012:329). This limitation is more so in the manufacturing sector, which is characterised by complex processes that also require huge initial capital outlays. This area also involves constant upgrading of machinery and if this is not done it may lead to high cost of production and non-availability of support spares, which in turn forces the company to close down. Normally the experienced SMEs will survive because of the knowledge they possess in the area but due to fear of losing business they do not share their experiences. This lack of knowledge by new entrants and the unwillingness to share by the existing businesses will shorten the survival period of new companies.
- **High levels of corruption coupled with bureaucratic procedures.** The SMEs were also affected by high levels of corruption, which were buttressed by the existing bureaucratic procedures in government. The SMEs would be required to pay a bribe at each level when importing or exporting goods and even to acquire or renew licenses thereby increasing their cost of business. Some SMEs that could not engage in these corrupt tendencies had to close down and this was mainly because of lack of knowledge of existing laws and policies to support them.

### **2.4.3 Small and medium enterprises' marketing challenges**

SMEs are usually poorly funded and thus they face marketing-related challenges. Alamgir (2015:106) postulates that SMEs are facing marketing challenges as a result of the advent of globalisation (Anur & Yusuff, 2011:325) which brings with it issues of non-tariff barriers and new trade regimes that SMEs cannot handle. The need to engage in marketing activities becomes mandatory for SMEs if their products are to compete with the well marketed international products which are better positioned in terms of funding marketing activities. SMEs are then found wanting since they are usually impoverished in terms of both resources and knowledge of effective marketing strategies as alluded to by Shemil and Procter (2013:19).

The SMEs can also avert the challenges of globalisation by considering not only local markets but also international markets and that has its own share of challenges as well.

The most significant marketing challenges for SMEs are related to venturing into international markets. Yener, Dogruoglu and Ergun (2014:8), in their study on Turkish SMEs, noted a number of challenges that hinder SMEs from considering international markets. They contend that SMEs in Turkey were producing similar products, and this raised a conflict of interest when choosing accredited exporters into international markets. They postulate that SMEs are secondary producers of the goods they market to international markets and this raised conflicts with primary producers who tend to take over when the product performs well. Another challenge they noted affecting internationalisation was the economic challenges the SMEs face in the domestic market. They argued that poor economic performance in the domestic market may lead to poor company performance, which in turn reduces the appetite for risk and the willingness to look into international markets. They also noted that most SMEs lack international market knowledge (Simpson, Padmore, Taylor & Frecknall-Hughes, 2006:364), which made them fail to sustain their marketing activities.

Modern ways of marketing that adopt computer-based systems such as e-commerce have arisen and are promoting cheaper methods of marketing products. Considering the resource limitations in SMEs, such methods can be helpful in alleviating marketing challenges in SMEs. The major drawback though is that SMEs, particularly in developing countries, have not embraced these technologies owing to a number of challenges outlined by Shemi and Procter (2013:20) using the Technology-Organisation-Environment (TEO) framework initially propounded by Tornatzky and Fleischer (1990:40). Confirmatory of the importance of people in SMEs they also included the owner/manager challenges since they exert a strong influence on the successful implementation of ideas. Their main findings are discussed next:

- **Technological challenges.** SMEs in developing countries are limited in terms of adopting technology-based marketing strategies due to the high cost of services. The cost of hosting a website and paying for internet connectivity is so exorbitant that SMEs cannot afford to provide them efficiently without facing a financial challenge. In the event that they sacrifice, the connectivity is usually very slow because of their location or low bandwidth. Moreover, the support infrastructure such as electricity supply and technical support will be poor and intermittent (Shemi & Procter, 2013: 98), which further reduces the adoption rate in the sector.

Owing to this challenge most SMEs in developing countries have resorted to network-based marketing techniques (Simpson, Padmore, Taylor & Frecknall-Hughes, 2006:364), which are more people-centred and shy away from technology. This trend makes it necessary to understand SMEs from a people-centred approach rather than from the common technology centred approach, which has shown to be marred by challenges.

- **Organisational challenges.** Chatzoglou and Chatzoudoes (2016:349) conclude that SMEs that intend to implement modern methods of marketing must ensure that they adopt and implement the relevant security technologies to protect data. Although the view is true, its applicability in SMEs is next to impossible since most of these technologies, over and above requiring huge sums of money to implement, also demand well-skilled persons to manage them. The lack of a regulatory framework (Shemi & Procter, 2013:20) is another challenge that poses a threat to SMEs using modern marketing systems although these systems are known to increase organisational competitiveness. The non-existence of statutes coupled with the lack of skill to secure these platforms is a strong drawback for SMEs in developing countries to start enjoying the benefits of technology-based marketing. In view of this scenario, SMEs in developing countries such as South Africa (Humphrey, Mansell, Pare & Schmitz, 2003:1) and Botswana (Duncombe & Heeks, 2002:64) have resorted to face-to-face, informal social methods of marketing. This shows that activities in SMEs, particularly in developing countries are very much people-centred and technology should come in to support these structures. Downscaling of technologies that have been effectively used in large companies so that they fit SMEs is an approach that will most likely fail to solve SME challenges in this area.

- **Environmental challenges.** Chang (2010:104) argues that the environmental challenges affecting SME marketing arise as result of the willingness and capability of supply chain partners, competitive pressure, government support and customer readiness. SMEs normally acquire their raw materials and sell their products through networks (Simpson, Padmore, Taylor & Frecknall-Hughes, 2006:364), which form their supply chain. Most of the partners in the supply chain are still using traditional methods of becoming aware of products and there is an exceptionally low penetration of e-commerce among customers. This behaviour from the customers poses a challenge for the SMEs who intend to implement e-commerce since the customers are reluctant and not ready to embrace modern marketing technologies. Although these technologies are effective in reaching international markets, challenges such as poor infrastructure, lack of security controls and lack of legal frameworks remain a hindrance.

- **Owner/manager challenges.** SME owner/managers are the decision makers who determine the direction that the organisation takes. Most of these managers, even though they may possess a specialised skill, usually have limited computer expertise, which hinders them from adopting computer-based marketing methods. This therefore shows that there is a scarcity of knowledge which then acts as a deterrent to the adoption of best practices in SMEs.

#### **2.4.4 Small and medium enterprises' production challenges**

Production is another concern for SMEs as it poses another array of challenges. EL-Khasawneh (2012:331) notes that SMEs are faced with production challenges that include supply chain and long lead times, prices of energy and power sources, high workforce turnover, quality control, total quality management and brand development. Anur and Yusuff (2011:328) further highlight that in the modern world competition has increased and focus is no longer on just producing but also on the quality of the product and the extent to which it will meet customer expectations. This emphasis on product characteristics therefore requires SMEs to commit their resources to standard production procedures where top management should be devoted, and manpower should be equipped with the right skills.

Challenges such as long lead times within the supply chain and high workforce turnover compromise the quality of products from SMEs. As such, these products are less competitive compared to international products, which are of better quality more so in developing countries as argued by Alamgir (2015:106). Various other challenges such as failure to pay employees and failure to finance operations will sprout from this situation.

Globally, manufacturing processes have been improving albeit with high capital outlay making it difficult for SMEs to cope with the trends and remain competitive and profitable. Talib, Ali and Idris (2013:148) argue that most SMEs in developing countries are faced with challenges in improving their manufacturing process as they lack sufficient knowledge in this regard. They contend that the nature of ownership in the company retards progress in embracing modern ideas as owners remain using old and out-dated methods of production. This stereotype approach increases operating and variable costs while compromising on quality and standardisation thereby reducing product competitiveness, which is a common challenge in SMEs. Hasnan, Aziz, Zulkifil and Taip (2014:331) add and conclude that most SMEs do not train their manpower on production, but skills are usually passed on from the experts to the new

unskilled employees, which limits the incorporation of new ideas. They further contend that SMEs due to their lack of resources and skilled manpower hardly conduct internal research and development activities. As such they rely more on knowledge from public sources such as universities and research institutions since large companies are not at liberty to share their knowledge due to fear of competition.

#### **2.4.5 Small and medium enterprises' knowledge management and supply chain challenges**

Though with limited publication, SMEs in developing countries are faced with serious supply chain challenges. The supply chain challenges include lack of supply chain knowledge (SCK), inability to implement modern supply chain management technologies such as e-procurement and e-supply chains due to prohibitive costs and failure to identify both suppliers and buyers resulting in poor quality products and low sales. The KMS challenges include lack of expertise to utilise a complex technology-based KMS, high costs related with purchasing and maintaining the available technology-based KMS. Since most of the KMSs use algorithm-based models, which need to be trained and tested before performing the knowledge management process, they require prior knowledge of the right features to be used in the model training and testing procedures. However, there are no publicly known features for use in knowledge-based supply chains; a challenge that is faced by the SMEs, which may hinder them from embracing KMSs in their organisations.

Another challenge is that a KMS and SCP require research effort and SMEs cannot afford the cost of research and are very dependent on external knowledge to improve their business as argued by Braun and Hadwiger (2011:92). This, therefore mandates the need to have established methods of promoting knowledge transfer through the people-centred approach to ensure that there is smooth knowledge flow amongst SMEs and their supply chains. Amidst all the above-mentioned challenges, there are some best practices that have been recommended for adoption amongst SMEs as explained in the next section.

#### **2.4.6 Section summary**

The reviewed literature shows a continuing trend of the resurfacing of the same challenges within the SME sector. Challenges such as poor access to funding, low or no government

support and limitations in human resources capability have remained in existence for decades. The existence of these challenges is related to the borrowing of complex knowledge-based supply chain features from large companies and trying to utilise the features to share knowledge without simplifying them to meet the SME context due to lack of relevant features for the sector. The SME contribution to the economy has been to some extent affected by the existence of these challenges thus demanding a lasting solution. The next sections intend to understand the best practices that have been adopted and those that can be adopted to eradicate these challenges and enjoy full benefits from the hidden potential within the SME sector.

## **2.5 BEST PRACTICES FOR SMALL AND MEDIUM ENTERPRISE SUCCESS**

This section highlights the best practices that SMEs can and have adopted in their quest to overcome the challenges outlined in the previous section. It focuses on the various solutions that have been proposed in the literature to alleviate the already known challenges by focusing on the different models that literature suggests being suitable for SMEs. It further sets the groundwork for the discussion of other proposed practices as outlined in this study's conceptual framework.

### **2.5.1 An overview of small and medium enterprise best practices**

The need to embrace best practice in the modern business environment cannot be over emphasised. Merriam-Webster (2017:1) defines best practices as procedures that have been proven through both research and experience to produce optimal results and confirmed or proposed as a standard suitable for widespread adoption. They are solutions or strategies proffered by academia to help SMEs in their growth phase to overcome barriers and perpetuate their existence. Global statistics prove that 90 percent of SMEs fail within the first three years with only less than 5 percent surviving beyond five years (Small Business UK, 2014:1; Yeboah, 2015:4; Rahman *et al.*, 2015:511). However, those that survive the ruthless challenges of financing, market availability and lack of human resources that affect SMEs in the first five years find themselves faced with the new challenge of consolidating growth. Generally, literature presents a plethora of best practices in each field of study including those relevant for SMEs. SME best practices hinge around finance, policies, information communication technologies, innovation, supply chain management (SCM), SCP and knowledge management, among others.

### **2.5.2 Small and medium enterprise best practices in finance**

Literature abounds with models, theories and frameworks on how financing can improve SMEs' performance. Governments across the globe have accepted finance to be a challenge affecting SMEs and have gone all out to put measures and structures in place to fund their SME sectors. However, regardless of all these efforts, there is little or no improvement in the sector in terms of survival and contribution. A possible finding to explain this outcome is the working capital management study by Afrifa and Padachi (2016:46), which argues that the relationship between funding and profitability is not linear but concave. They argue that research on working capital management suggests that the concept of capitalising SMEs improves performance but other findings argue that it does not improve performance. This, thus implies that capitalisation reaches a maximum point after which it begins to fall regardless of the increase in working capital. It will be reasonable to conclude that the belief that SMEs when properly funded (i.e. increase working capital) will grow, is a fallacy. Instead, there is a need to understand SME SCP further and establishment of the funding curve behaviour and thresholds.

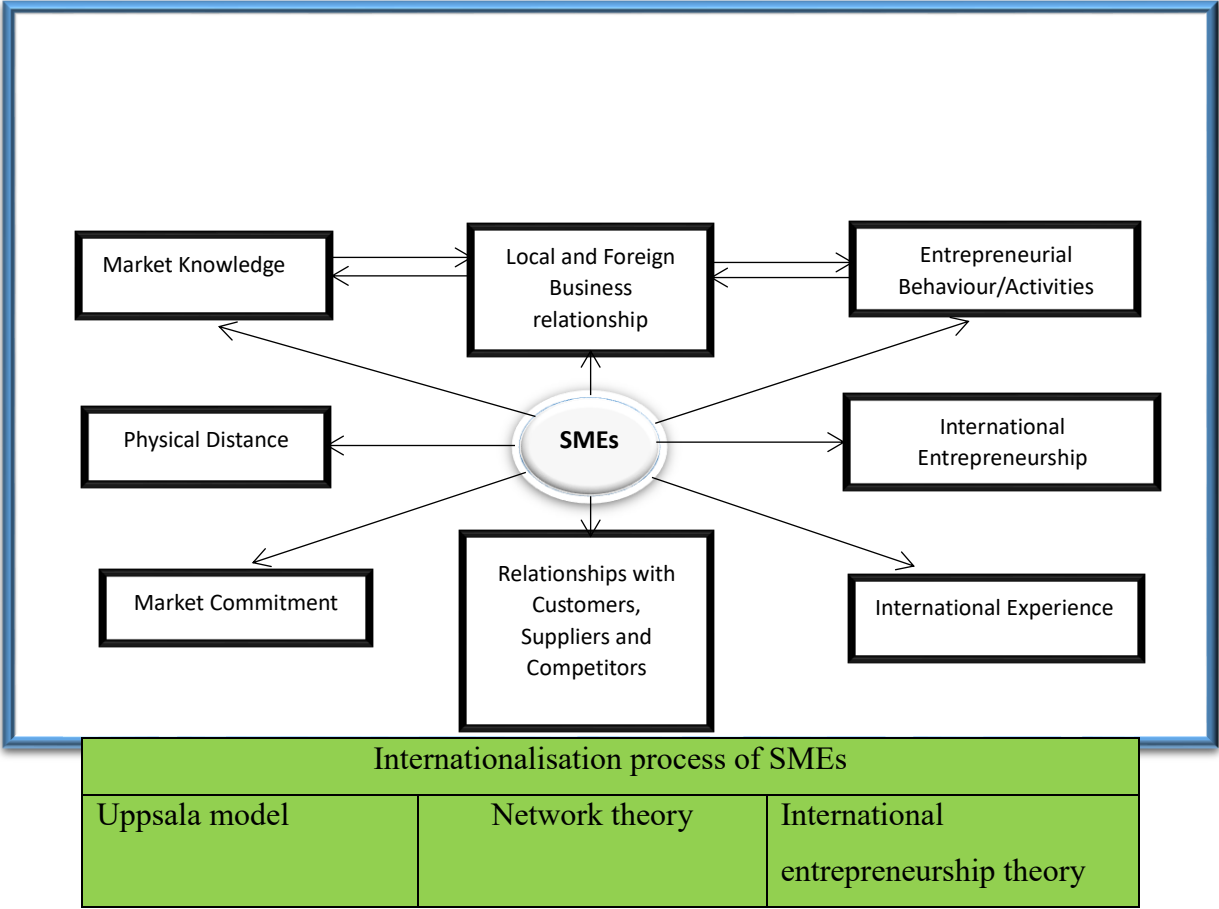
### **2.5.3 Small and medium enterprise best practices in marketing**

Marketing is one key business function that ensures business survivability and thus should be carefully conducted with confirmity to customer expectations. Kunday and Senguler (2015:967) cite a model on how SMEs might engage in international markets as a marketing strategy for them to be competitive and survive. Internationalisation has proven to be successful for large companies and based on this outcome they conclude that the same concept could be adopted in SMEs to achieve similar results. The model has variables such as market knowledge, local and foreign relationships, international experience, entrepreneurial behaviours and relationship with suppliers, physical distance, customers and competitors. It suggests that acquiring knowledge is particularly important for SMEs that need to move into international markets as indicated by the knowledge market variable.

Figure 2.1 covers a number of people-centred approaches needed for organisations to understand international markets. The remaining variables are more relational based, an outcome that does not emerge if people are ignored in the process. This model is an indication that SMEs need to focus more on people-centred approaches to acquiring knowledge as

opposed to using information technology-based approaches. The summary of the interconnection between the variables and underlying theories is pictorially shown below.

One outstanding factor from Figure 2.1 is that it advocates that over and above borrowing internationalisation strategies from large companies, SMEs must also consider networking as can be seen by the integration of the network theory in the SME model. Therefore, a people-centred approach presents a better chance of improving SME performance thereby perpetuating their survival. Although the figure emphasises the importance of a people-centred approach it lacks the emphasis on knowledge management and SCP. This exclusion of such important practices then explains the reason why it could not fully address the current SME challenges.





### **Figure 2.1: Internationalisation model for SMEs**

Source: Kunday and Senguler (2015:967)

#### **2.5.4 Small and medium enterprise best practices in innovation and supply chain**

Innovation has also been noted as a key best practice and strength for SME organisations. Madrid-Guijarro, García-Pérez-de-Lema and Van Auken (2016:100) in their study on how SMEs can survive during economic crisis found that innovation was a *de facto* for SME survival. The study argued that those SMEs that engage in innovation and also seek more external funding to support innovation activities (product innovation and process innovation) gained an improved competitive advantage. Their conclusion raises more confusion in trying to then understand why SMEs fail and yet literature affirms beyond doubt that SMEs are known for high innovation capability. This paradox further complicates the efforts by academia to establish and address the reasons why SMEs continue to fail within the first five years. Conclusively, the fact that when SMEs survive the trying five-year period, then face new challenges that are management related means there is a need to investigate innovation from a management perspective rather than the common innovation adoption view.

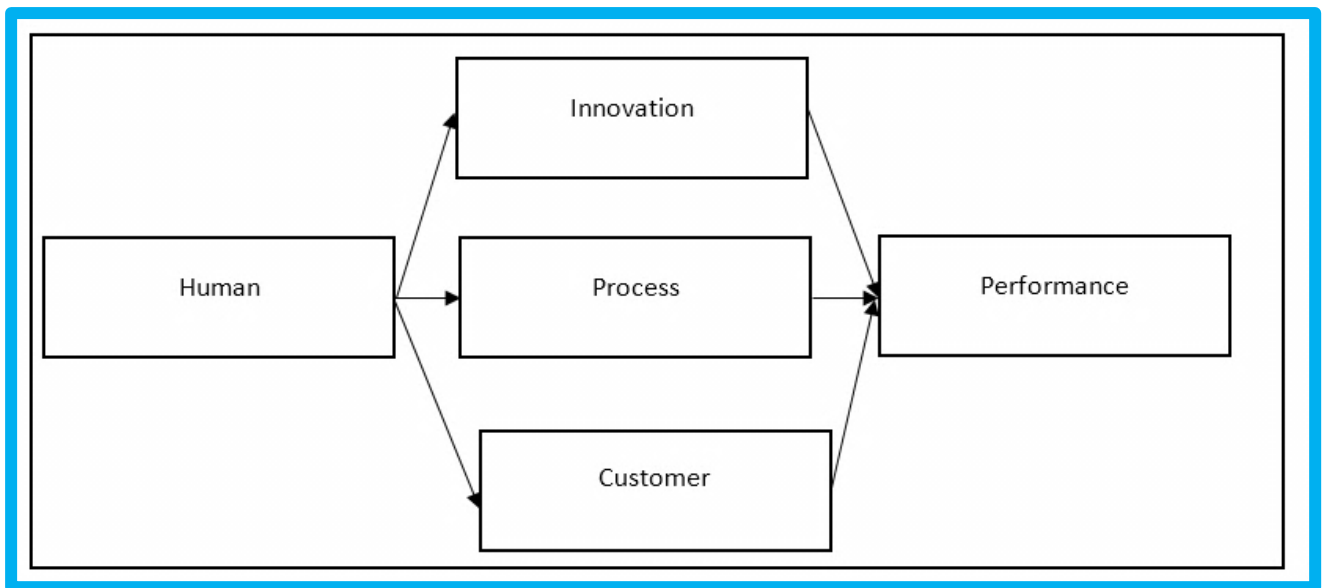
The emergence of technologies such as the Internet of Things (IoT) also known as the semantic web has connected the world leaving customers with a plethora of choices on production selection. According to Thakkar, Kanda and Deshmukh (2007:99), competition has been globalised and if SMEs are to survive the adoption of supply chain management (SCM), strategies are needed for them to compete with large multinational corporates. This is because SCM can improve customer satisfaction, inventory cycle time and provide the right products at the right time and at affordable competitive prices (Chin, Hamid, Rasli & Baharun,

2012:615). Therefore SCM has the ability to change the Zimbabwean SME sector since the implementation of SCM in organisations both large and small can improve their innovation management, thereby improving the performance of the supply chain as alluded to by Razaeei, Ortt and Trott (2014:1531).

### **2.5.5 Small and medium enterprise best practices in people management**

The marketing concept of the internal customer directs emphasis to the employees of the business thus making people management an important best practice in business. Muda and Rahman (2016:688) in their study on the importance of human capital (people), conclude that for SMEs to survive they must consider the importance of human capital requirements at each level of their life cycle. They postulate that the life cycle of an SME comprises the start-up, growth and maturity phases (Muda & Rahman, 2016:686). They highlight that at the start-up level the key individual is the owner since the organisation is still faced with low financing and focusing on developing new products, building relations, finding customers and markets. As the company grows, importance shifts to the owner together with the managers and the company begins to focus on achieving high volumes of production, increasing market share and skills required in managers, including financial management, marketing, strategic planning, production and operations management. Furthermore, in the maturity stage importance moves away from the owner to the managers and employees, and the organisation holds an advantage in luring skilled manpower. The focus then shifts to technology rather than people, which could then explain why large companies believe in IT-centred KMSs as compared to people-centred KMSs.

Linked to people management is also intellectual capital and the practices must be combined for better performance. Eniola, Entebang and Sakariyau (2014:1) argue that SMEs should consider Intellectual Capital (IC) as an important resource for positive performance. They highlight that IC helps organisations to harness all the capabilities of their human resources and this will in turn give them a sustainable competitive advantage. They suggest a model that depicts a relationship between the people and innovation activities, processes and customers as shown in Figure 2.2 as suitable for achieving performance in SMEs through harnessing intellectual capital.



**Figure 2.2: Intellectual capital and performance in SMEs**

Source: Eniola, Entebang and Sakariyau (2014:5)

The model in Figure 2.2 states that SME success can never be talked about without the people. It suggests that it is the people that will be key in innovation activities, in running organisational processes and in relating to customers, contrary to the long-standing notion that Information Communication Technologies (ICT) are key in attaining success in SMEs (E-Business Watch, 2008:5; Kossai & Piget, 2013:9; Kabongo & Okpara, 2014:313). Notwithstanding the importance that ICT can play in successful SME performance, the nature and continued challenges in this sector suggests the need to prioritise the people above ICT. This is an area, though clear in extant literature, which has been ignored with more emphasis being given to the adoption of ICT which generally perpetuates the existence of the same challenges in the sector.

### **2.5.6 Section summary**

Literature has suggested numerous best practices for improving SME performance, survival and contribution in the areas of human resources, financing, innovation and supply chain management. These practices are falling short since there have been no permanent solutions to the challenges in the sector. The section notes the importance of adopting a people-centred

approach to resolving these challenges in the sector since people have proven to be the major players in the success or failure of SMEs in developing countries.

The best practice suggested in literature also revealed that although effective funding of SMEs is considered by most researchers as the most appropriate way of supporting SMEs it is true that too much funding may lead to poor performance as well. This was uncovered by the disagreement in literature where some authors argued that funding does not improve SMEs' status quo with others emphasising funding as a panacea to SME success. It was also highlighted that although marketing played a significant role in improving SMEs success, most of the SMEs lacked the relevant knowledge particularly when attempting to venture into international markets.

## **2.6 SOCIO-DEMOGRAPHIC FACTORS IN SME STUDIES**

This section focuses on the socio-demographic factors that have been applied in SME studies. The section aims to identify the factors that have been used and also establish whether results from such factors have been effectively utilised to resolve challenges being faced by the SMEs. The section begins by discussing the relevance of the factors in improving the performance of SMEs through providing valid and usable knowledge that aids in making informed decisions. The section will then focus on some of the SME socio-demographic factors used in literature before giving a summary of the section.

### **2.6.1 Relevance of socio-demographic factors in SME performance**

Studies in the SME sector have continued to outline the ever existing challenge of short life span since the inception of these business organisations (Agner & Paton, 2014:470; Kunday & Senguler, 2015:967; Hyder & Lussier, 2016:84; Bruwer, Coetzee & Meiring, 2018:711; Venkatachalam, Marshall, Ojiako & Chanshi, 2019:595; Majukwa, Fan & Dwyer, 2020:152). However, most of the existing solutions that have been proffered as discussed earlier have mainly managed to improve performance but failed to perpetuate the existence of the SMEs. The emergence of modern technological methods of predicting future performance or understanding performance trends such as data mining and machine learning (Zvarevashe & Olugbara, 2018:3) have been applied by large corporates to foresee challenges before they occur. Although such methods are very expensive there are simple predictive methods that are

now available as freeware (software that can be used at no cost) that may be utilised by SMEs. Such efforts may help the businesses themselves as well as the responsible authorities to strategically support the SME businesses. However, one hindrance could be to have knowledge of the factors that may be used to conduct such predictions.

One dimension that has received less attention though especially important, is the use of socio-demographic factors which are linked to knowledge-based SCP in which the socio-demographic factors of the entity are used to mine knowledge from existing datasets. Guided by such knowledge-based concepts coupled with the use of valid socio-demographic factors, financial institution, governments, SME employees and other stakeholders may be able to avert failure well before it occurs. The existence of such possibilities makes these factors particularly important in research and thus they should not only be reported as descriptive statistics but rather should be analysed and utilised in improving SME performance. However, such analysis has been lacking in SME literature regardless of the emphasis to migrate to knowledge-based systems. The next section looks at the socio-demographic factors outlined in SME literature and how they have been utilised.

### **2.6.2 Socio-demographic factors in SME studies**

Socio demographic factors have been reported in nearly all studies, but emphasis has inclined towards descriptive statistics which gives less inferential value on the results from such factors. The SME factors have mainly been categorised into two, namely, SME employee/owner/manager characteristics and SME business profile characteristics. Some of the identified characteristics in SME literature are outlined in Table 2.5.

The review as outlined in the table shows that factors used to describe an SME business profile include number of employees, sector, annual turnover, strategic plan, and market share. The factors used to describe an SME employee/owner include age, gender, nationality, qualifications and experience. The review of the studies revealed that the foregoing factors particularly the SME employee/owner have been used just to describe the characteristics with no further beneficial application. Some of the factors for the SME business profile such as market share and annual turnover have been utilised to analyse performance and define or classify the SME. However, from the reviewed studies there were none that tried to identify which of these factors could help in predicting the existence of an SME. Hence the area needs

further research to identify such factors and at least provide a possible solution to SME existence.

**Table 2.5: Socio-demographic factors used in SME studies**

<b>Nature of factor</b>	<b>Factor description</b>	<b>Author(s)</b>
<b>SME employee/owner characteristics</b>	Gender	Eniola, Entebang and Sakariyau (2015:3);
	Nationality	Musa and Chinniah (2016:255);
	Qualification	Chowdhury, Azam and Islam (2013:52);
	Experience	Kallier (2017:141);
	Age	Fatoki and Odeyemi (2010:136);
<b>SME business profile characteristics</b>	Number of employees	SBA (2014:1); World Bank (2017:1);
	Annual turnover	OECD (2005:1); Commission (2003:1);
	Location	ABS (2017:1); KOSME (2014:4); Berisha &
	Sector	Pula 2015:25); Business and Finance
	Market share	Consulting (2016:11); Eniola, Entebang and
	Strategic plan	Sakariyau (2015:3)

**Source: Adapted from literature review**

### **2.6.3 Section summary**

It emerged from the reviewed literature that socio demographics are important data elements in SMEs particularly in the emergence of knowledge-based supply chains. Such factors may help in predicting the life of an SME and thus avert the failure before it occurs. Research in this area was seen to place less emphasis on socio-demographic factors as important data elements in resolving the challenges bedevilling the SME sector in Zimbabwe.

## **2.7 CONTEXT OF THE STUDY**

This section gives insight into the context of the study environment by briefly looking at the SME business environment at the time of the study. The section also looks at the SME setup structures within the country, which include the sectors available, nature of ownership and organisational structure of SMEs at ministerial level.

### **2.7.2 The Zimbabwean SME business environment**

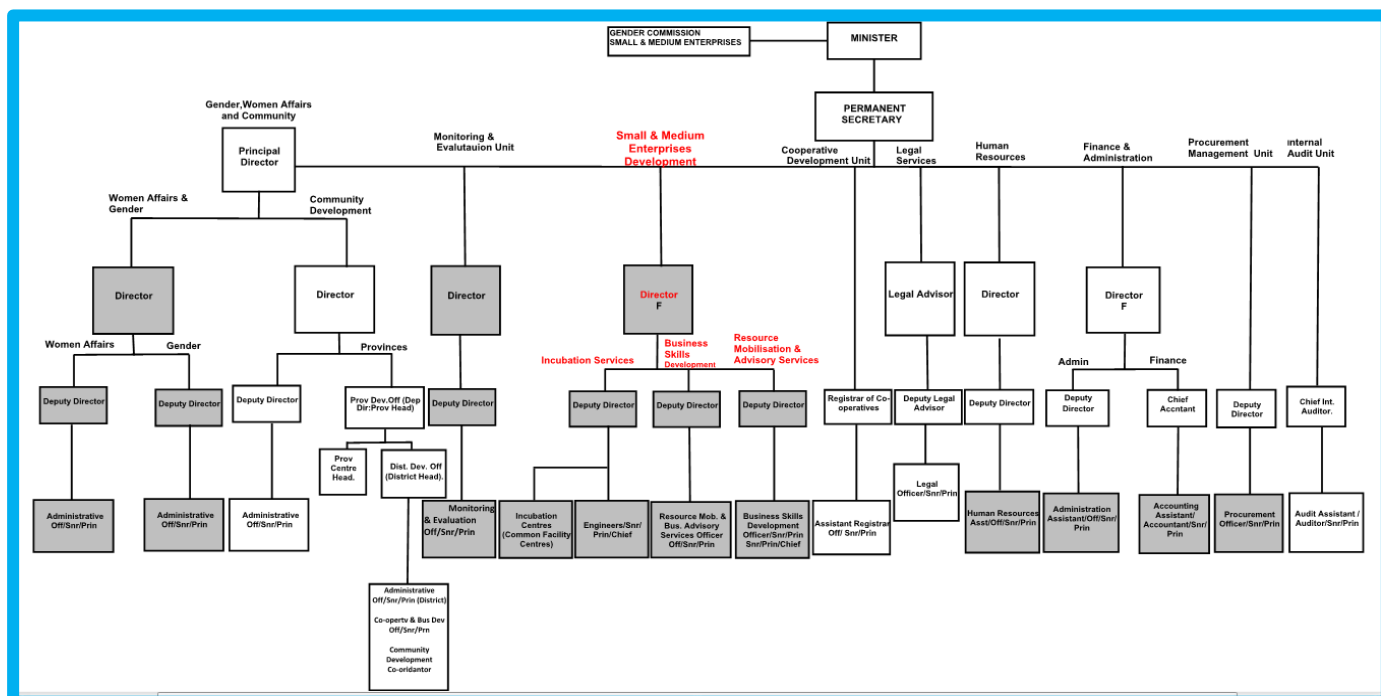
The Zimbabwean SME sector was introduced through an Act of Parliament in 2002 to encourage Zimbabwean citizens to go into business and allow for economic growth through home grown solutions. The country established an independent ministry responsible for SMEs, which has a mandate to promote, manage and fund all activities within the sector. Although there have been efforts to formalise the sector, it has remained highly informal due to prohibitive conditions of doing business. Most of the SMEs in Zimbabwe are family businesses aimed at just providing the family's basic needs and they have limited intentions to become formalised exporting businesses. These SMEs, though contributing to economic growth are also very much known for evading established laws such as tax laws and registration laws. Such challenges may be improved by the introduction of a people-centred knowledge management system approach to supply chain management.

Currently SMEs are now operating in all the country's major sectors, namely, mining, retail, hospitality and tourism, agriculture and manufacturing (ZimSTATS, 2020:1). All the SME sectors have been dominated by male entrepreneurs with females beginning to take up the role of being businesspeople. The entrepreneurs are comprised of highly skilled individuals, some of them having acquired their skills through natural talent and others through formal education in technical colleges and universities. SMEs are found in all of the ten provinces in the country, including Harare, Bulawayo, Midlands, Matabeleland north, Matabeleland south, Manicaland, Mashonaland central, Mashonaland west, Mashonaland east and Masvingo.

The SME are faced with the monumental task of being the vehicle to economic recovery amidst a hyperinflationary environment coupled with an unstable currency and a nearly collapsed banking system. The SMEs' business environment in Zimbabwe is characterised by winding procedures of doing business, inconsistent company business regulations and statutes, high tax rates, shortages of inputs such as fuel, electricity and raw materials. Other challenges faced also include high employee attrition to neighbouring countries, and head hunting of critical skills by local large companies who offer better terms of services and working conditions. Recently, politically motivated demonstrations targeted at small and medium entrepreneurs have also been a threat that was marred with injury of personnel, loss of property and equipment and high uncertainty for the future.

## 2.7.2 A brief overview of the SME structure in Zimbabwe

The SME sector falls under the ministry of women affairs, community, and SME development, which is composed of the governing commission, the minister, permanent secretary and several other subdivisions with directors responsible for each subdivision. There are other bodies where all formal SMEs are affiliated such as the Small and Medium Enterprises Development Cooperation (SMEDCO) and the Small and Medium Enterprises Association of Zimbabwe (SMEAZ). The organisational structure of the ministry and the SME sector is shown in Figure 2.3.



**Figure 2.3: Organisational structure of the ministry responsible for SMEs in Zimbabwe**

Source: Ministry of Women affairs, community, small and medium enterprise development (2019:1)

The structure in Figure 2.3 shows that the Zimbabwean SME sector is a sub-branch of the ministry of women affairs, community, small and medium enterprise development. The ministry is headed by a Director and deputy directors who are responsible for incubation services, business skills development and resource mobilisation and advisory services. The



current study will be helpful in the business skills development department by providing valid factors for consideration when developing SME employee business skills.

## **2.7 CHAPTER SUMMARY**

The global comparison of SME performance remains a challenge due to definitional challenges. Regardless of the differences that exist in the definition, it emerged that the classification micro, small and medium is used in most countries with the terms small and medium appearing in all countries. Hence, the terms small and medium enterprises were adopted for this study. The most common criteria for defining SMEs globally were the quantitative criteria, which although associated with variation challenges had remained in use. The chapter suggests that the combination of quantitative and qualitative criteria is the best approach to resolve SME definitional challenges.

SMEs remain key structures in supporting developed economies during difficult times and were sources of economic growth in developing countries. SMEs, although with a high failure rate have stood the test of time making significant contributions to the GDP in nearly all countries. The chapter unveiled the major issue in this sector as being that of recurrence of the same challenges ever since the idea of SMEs was brought to light. It further noted the need to closely consider the people in this sector above all facets as they influence greatly the success or failure of the organisations. The next chapter examines the concept of people-centred KMSs to understand how they can be adopted to improve SMEs' performance.

## **CHAPTER THREE**

### **A THEORETICAL OVERVIEW OF KNOWLEDGE MANAGEMENT SYSTEMS**

#### **3.1 INTRODUCTION**

The aim of this chapter is to analyse literature on knowledge management and KMSs in order to understand and address this missing link in the current literature. The discussion leans towards an SME context and presupposes that people-centred KMSs are best suited for SMEs and help improve knowledge sharing. The conceptualisation of knowledge management and a KMS are introductory areas because of the need to clarify their meaning and context. This will be buttressed by explaining the underlying theory motivating the current study that is the knowledge-based view (KBV) of the firm. This explanation will outline the transition from the resource-based view (RBV) of the firm to the knowledge-based view (KBV) of the firm. The subsequent section tries to establish the benefits and challenges of a KMS so that it can be ascertained whether their adoption and utilisation within SMEs will indeed improve knowledge sharing. The next section gives a brief analysis of the limitations within the current KMS strategies, particularly in line with their operationalisation in a developing country context. The last segment concentrates on the four predictor variables, namely: organisational culture, CoPs, innovation management and social capital. The discourse will lead to the development of the hypotheses by looking at the relationship between these variables and the mediating variable, which is knowledge sharing. Although only four people-centred KMSs have been selected, it is acknowledged that the list of these systems is not exhaustive. As such, this chapter will focus only on the four people-centred KMSs that are indicated in the conceptual framework of this study.

## **3.2 CONCEPTUALISATION OF KNOWLEDGE MANAGEMENT AND KNOWLEDGE MANAGEMENT SYSTEMS**

This section provides clarity on knowledge management and KMSs by defining these broadly defined concepts in literature. Therefore, the point of departure will be defining and explaining key terms, namely, organisational knowledge and knowledge management, which are primary in the development of a KMS. It also introduces the knowledge-based view (KBV) of the firm as a guiding theory influencing the study. The section then zeros into the focus area, which is KMSs by looking at the two primary KMSs, namely, people-centred and IT-centred KMSs.

### **3.2.1 An overview of knowledge management and knowledge management systems**

The field of knowledge management has gained significant ground in recent studies as a necessary tool for improving organisational performance (Chong, Ooi, Bao & Lin, 2014:122; Wibowo & Grandhi, 2017:1216). Literature affirms that knowledge management will be the primary success factor in modern economies (Chon, Chon & Gan, 2011:36; Litvaj & Stancekova, 2015:468; Dickel & Moura, 2016:211; Hernandez & Jimenez-Jimenez, 2017:109). This knowledge management perspective has been reinforced by the transitioning from the physical economy, anchored on production factors (land, labour, capital, entrepreneurship), to the intangible economy based on information and knowledge (Sajeve, 2010:765; Cavusoglu, 2016:721). Edvardsson (2009:92) argues that knowledge management, though common in large companies is slowly permeating the SME sector, a view also shared by Kunday and Sengular (2015:974). The recent study by Scoutto, Giudice, Bresciani and Messiner (2017:643) further proves that the adoption of knowledge management within SMEs improves the sector's contribution to economic growth. Another earlier study by Maier (2007:103) highlights that knowledge management is a source of sustainable competitive advantage in SMEs. These views suggest that the propagation of a knowledge management drive will significantly improve organisational performance and perpetuate the lives of both large and small companies.

Knowledge management implementation in organisations has been enhanced by KMSs. Wang and Wang (2016:829) postulate that knowledge management implementation in organisations is achieved through a KMS. There are two main classifications of KMSs, namely, people-centred KMSs (Dougherty, 1999:264) and IT-centred KMSs (Wee & Chua, 2013:960; O'Connor & Kelly, 2017:158). Hitherto, IT-centred KMSs have dominated KMS literature (Vaast, 2007:283; Al-Aama, 2014:3; Lin, Liu & Liu, 2016:189; Ou, Davison & Wong, 2016:145). On the one hand, little has been mentioned in extant literature about people-centred KMSs as a solution to knowledge management adoption challenges. On the other hand, the few available studies advance that people-centred KMSs are not expensive to setup (Desouza & Awazu, 2006:34; Bibikas *et al.*, 2008:45), they eliminate barriers to KMS adoption (Hasan & Crawford, 2007:238) and can be best suited for both large companies and SMEs (Nunes, Annansingh & Eaglestone, 2006:103). To this end, the people-centred approach to a KMS has not been fully pursued to improve KMS adoption, particularly for developing countries such as Zimbabwe as evidenced by the limited literature.

### **3.2.2 Conceptualisation of organisational knowledge**

The concept of knowledge has been in existence since the sixties when it was introduced by some early academics such as Polanyi (1967:15). Nevertheless, knowledge was not viewed as an organisational resource up until the 1990s, when business slowly began accepting knowledge management as a concept (Nonaka & Tekeuchi, 1995:3; Alavi & Leidener, 2001:107, Woodman & Zade, 2012:184). In the development of knowledge and knowledge management literature, various definitions have been given, and some of them are discussed.

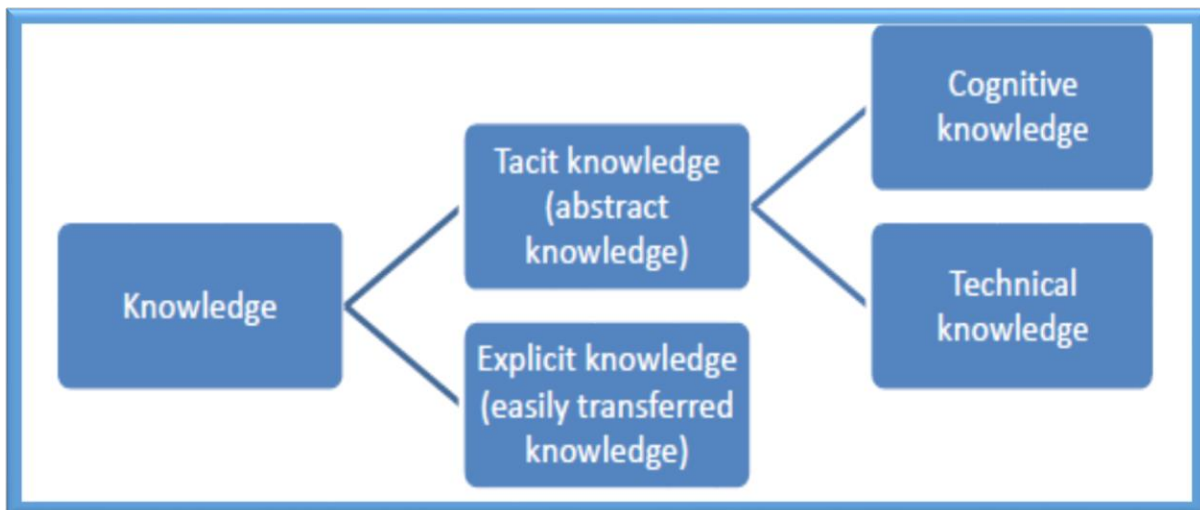
### **3.2.2.1 Definition of knowledge in the organisational context**

Knowledge has been defined as consisting of different factors such as culture, behaviour, experience and beliefs within a society (Polanyi, 1962:60; Huber, 1991:90). However, it was Drucker (1993:20) who was one of the pioneers of the concept of knowledge as an organisational resource. He argued that in the modern economy knowledge becomes the key resource that improves company performance. The introduction of this business dimension to knowledge can be seen as the genesis of organisational knowledge thereby differentiating it from general knowledge such as indigenous knowledge.

Organisational knowledge has been defined either from a technology-centred perspective or a people-centred perspective. Alavi and Leidner (2001:108) contend that most technology-centred definitions attempt to define organisational knowledge by distinguishing it from information and data. Conversely, they argue that although the difference is clearly outlined by assuming a hierarchical approach, which starts with data at the lowest level followed by information and then knowledge, the dimension is difficult to understand. Torabi, Kyani and Falakinia (2016:473) try to address this limitation by treating data and information as subsets of knowledge. These views suggest the difficulties that arise when knowledge is treated from a technical perspective. Consequently, they (Alavi & Leidner, 2001:109) then define organisational knowledge from two standpoints, which take cognisance of both the technical and people dimensions. In this maiden study, organisational knowledge is defined as information (unique, new or existing) that is in the minds of the employees, including that within the organisational books, databases and documents. In consistency with a dual dimension of knowledge, organisational knowledge can thus be defined as the people-centred and IT-centred knowledge resources within a given organisation.

### 3.2.2.2 Categories of organisational knowledge

Knowledge can be grouped as indigenous knowledge, emotional knowledge, cognitive knowledge, declarative and procedural knowledge, tacit knowledge and explicit knowledge, and the list can continue based on purpose (Wiig, 1993:39; Norton, 1998:2; Bratianu, 2014:43; Sanchez, Marin & Morales, 2015:139). The seminal studies by Nonaka (1994:16) and Alavi and Leidner (2001:110) contend that organisational knowledge can be divided into two main taxonomies, namely, tacit and explicit knowledge. Likewise, the later study is one of the most cited studies (Oborn, Barret & Racko, 2013:419; Al-Aama, 2014:3; Wang, Ding, Liu & Li, 2015:12; Mao, Liu, Zhang & Deng, 2016:1066; Mbassegue & Gardoni, 2017:1; Chais, Ganzer & Olea, 2018:18) in knowledge management literature. This trend shows that academia accepts that organisations are endowed with both tacit and explicit knowledge. To simplify these two categories and make them comprehensible, Man Li (2012:99) modelled them as depicted in Figure 3.1.



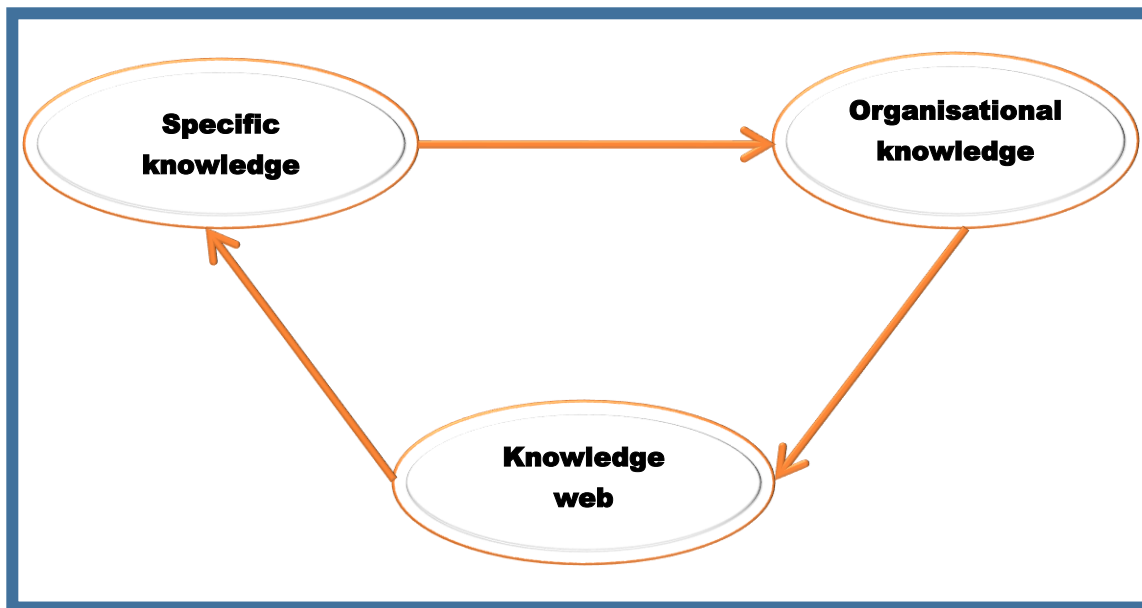
**Figure 3.1: Types of organisational knowledge**

Source: Adapted from Man Li (2012:99)

Using the model in Figure 3.1, Man Li (2012:99) argues that tacit knowledge is abstract and can be cognitive or technical. He also defines explicit knowledge as formal and systematic knowledge that can be easily transferred from one employee to another. Zemaitis (2014:166) further explains the model by defining technical tacit knowledge as the individual “know-how” and cognitive tacit knowledge as ideals, beliefs, values, morals and mental models which are deeply integrated. Similarly, Alavi and Leidner (2001:110) had earlier defined tacit knowledge

as that which resides in the head of the employee, and they argue that it is difficult to manage and transfer (Sanchez, Marin & Morales, 2015:139). They also note that explicit knowledge is knowledge captured in books or computers and is easily transferred from employee to employee (Oberg & Alexander, 2018:7).

Another categorisation of knowledge is by McGee and Thomas (2007:556) who suggest three types of knowledge, namely: specific knowledge, organisational knowledge and the last element being the knowledge web.



**Figure 3.2: Categories of knowledge**

Source: McGee and Thomas (2007:556)

As depicted in Figure 3.2, one of the categories of knowledge is specific knowledge, which relates to production functions, relationships, connections, access, diffusion and renewal of existing knowledge. Within this category also falls indigenous knowledge, emotional knowledge and cognitive knowledge. There is also organisational knowledge, which relates to the process in which the specific knowledge is integrated into organisational activities. Lastly, there is the knowledge web which defines the way in which specific and organisational knowledge is captured into value-creating activities that benefit the firm. This study agrees with Alavi and Leidener (2001:110) and postulates that specific knowledge is mainly tacit; organisational knowledge is both tacit and explicit while the knowledge web is largely explicit. Noteworthy, is also the earlier study by Bibikas *et al.* (2008:47) that concludes that both

taxonomies (tacit and explicit) form the fundamental organisational knowledge resources as concurred by Abubakar, Elrehail and Alatailat (2017:3).

The utilisation of tacit knowledge in organisations has been associated with some limitations. Huntrakul, Thaloey and Songsangyos (2012:2201) highlight that of the two taxonomies, there have been limitations in utilising tacit knowledge as supported by Sanchez *et al.* (2015:139). These studies also note that the higher percentage of organisational knowledge has remained tacit and that technology does not necessarily improve knowledge conversion. As such, a fully technology-oriented approach that ignores the people will leave the greater part of organisational knowledge resources unused. Moreover, a study by Jasinskias, Svagzdiene and Simanavicius (2015:2474) found that it is mainly tacit knowledge that is crucial for the attainment of sustainable competitive advantage. There is, however, substantiation of a consensus that tacit and explicit are the main categories of knowledge and these form the basis for the knowledge-based view (KBV) of the firm as proposed by McGee and Thomas (2007:557).

### **3.2.3 The knowledge-based view of the firm**

It has often been acknowledged in the literature that the knowledge-based view (KBV) is an off-shoot of the RBV (Nonaka, 1994:101; Grant, 1996:15; Cepeda-Carrion, Martelo-Landeroguez & Leal-Rodriguez, 2017:2). The resource-based view (RBV) (Penrose, 1959:90) that views knowledge as one of the resources to company growth (Barney, 1991:100) is the foundation of the KBV. The primary limitation of the RBV was that it focused on the collection of internal resources of the firm while ignoring the external resources (Barney, 1991:102; Curado, 2006:1). As a way to complement this limitation, other external-oriented theories were derived, such as the market based view (MBV) (McGee & Thomas, 2007:542) and the co-competition view (Carayannis, Depiege & Sindakis, 2014:1020). All these classical theories have similar limitations in common, which include that of downplaying knowledge as one of the factors in improving organisational performance. They also consider both tangible and intangible assets as organisational resources that are necessary for attaining a sustainable competitive advantage in a knowledge economy. As such, they took a generalised approach to knowledge by treating it as just one of the intangible resources that organisations must factor into their strategy.

Conversely, the “new economy” also known as the “knowledge economy” ushers in a new standpoint where knowledge is the most strategic resource central to all business operations (Torabi, Kyani & Falakinia, 2016:472). In this environment, organisations exist to create, transfer and transform knowledge to survive in a highly competitive and turbulent environment (Kogut & Zander, 1992:384; Merlo, 2016:16). This dimension is the root of the KBV theory which argues that sustainability is no longer in the abundance of physical resources (land, labour, capital) but in knowledge superiority (Grant, 1996:19; Castro, Lopez-Saez & Delgado-Verde, 2011:871). The KBV integrates the views of the RBV, MBV and co-opetition view (McGee & Thomas, 2007:544) to emphasise the creation and utilisation of knowledge from both internal and external sources. The theory postulates that the application of both external and internal knowledge will, in turn, increase the knowledge base thereby growing performance outside of physical resources (Nicolas & Cerdan, 2012:502; Denford, 2013:176). In addition, the KBV viewpoint also concedes that both tacit and explicit knowledge is essential for improved performance (Berg, 2013:163; Sanchez *et al.*, 2015:139). However, it is noteworthy to realise that the KBV prioritises tacit knowledge because this knowledge is assumed to be highly inimitable (Liao, Liao & Hutchinson, 2009:125).

Paradoxically, the progenitors of the KBV on the one hand stress knowledge as a sustainable competitive advantage (SCA) within the organisation (Kogut & Zander, 1992:384; Grant, 1996:19; Alavi & Leidner, 2001:108; Dickel & Moura, 2016:211). On the other hand, authors such as Desai and Rai (2016:1022) argue that when knowledge is considered as an SCA, the owner is more likely not prepared to share that knowledge. The KBV advocates that when knowledge is shared and made public, organisations derive more benefits from their knowledge resources (Leal, Cunha & Couto, 2017:1000). The current study seeks to address this anomaly guided by the KBV while arguing that knowledge must be managed and shared for improved organisational performance. Given the need to manage knowledge, the next section discusses the concept of knowledge management.

### **3.2.4 Basic concepts of knowledge management in organisations**

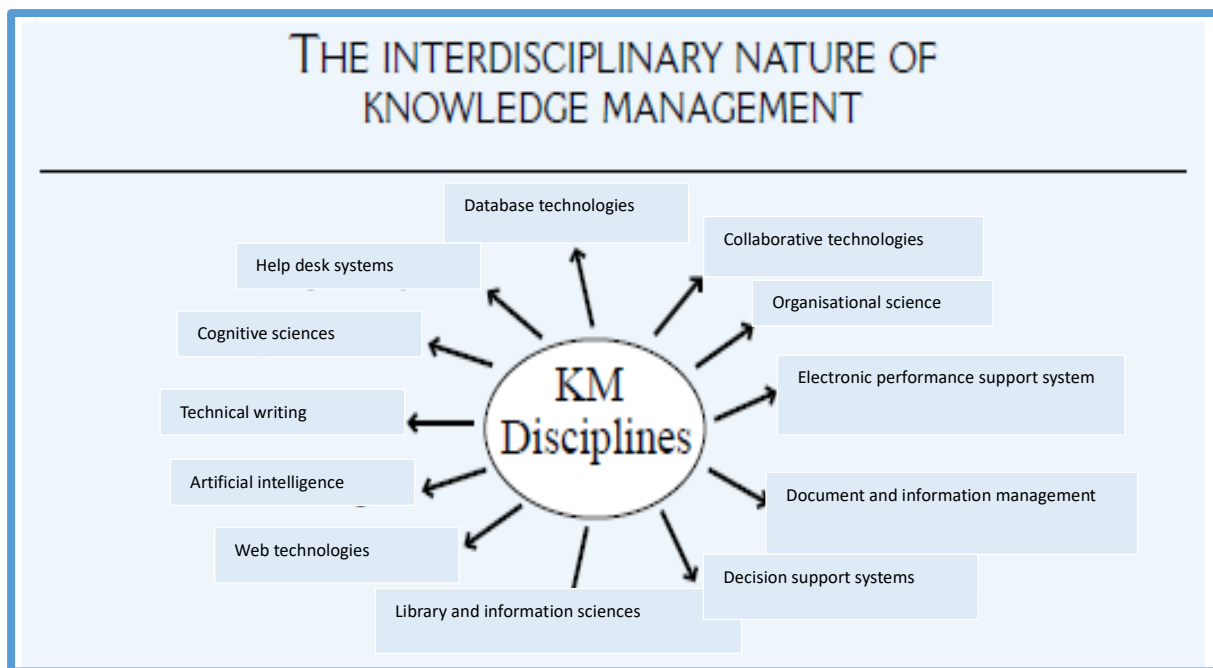
A knowledge-based perspective which evolved following the dawning of the knowledge era has grown rapidly in the developed world and is now spilling over into the developing world (Walczak, 2008:486). In this modern environment, information is generated and disseminated very quickly, and the dominant challenge is how to manage this resource for economic benefits.



Moreover, the management of knowledge so that it can be used to improve organisational performance is increasingly becoming important globally (Hussain, Ajmal, Khan & Saber, 2015:791) with some international certifications now emphasising mandatory adoption of knowledge management practices.

The modern economy values knowledge, and as such, organisations are faced with completely new and ever-changing ways of doing business (Halawi, McCarthy & Aronson, 2006:384). The developments in the way both business and academia treated knowledge led to the rise in the need for an organisation to manage the knowledge that they discover and generate. Newman and Conrad (1999) note that knowledge management is not just a single-sided area but was multifaceted, covering diverse aspects of the organisation. Building from the proposition by Newman and Conrad (1999), several disciplines relating to knowledge management are identified by Dalkir (2005:7). He agrees that knowledge management is multidisciplinary in nature and constitutes various disciplines. Figure 3.3 summarises the knowledge management discipline.

Figure 3.3 shows that knowledge management comprises help desk systems, database technologies, collaborative technologies, electronic performance support systems, document and information management systems, decision support systems, library and information sciences, web technologies, artificial intelligence, technical writing, organisational science and cognitive science. Some of the KMSs are discussed below.



**Figure 3.3: The knowledge management disciplines**

Source: Adapted from Dalkir (2005:7)

Cognitive systems and organisational science derive their basis in tacit knowledge (Cheng, Ou, Chen & Chen, 2014:420), which makes them highly people-centred KMSs. Qiu, Ping, Chui and Helander (2008:158) postulate that there is a fundamental mismatch in the way humans process knowledge compared to the way it is processed by technology. They assert that it is necessary to develop tools, methods and technology, which integrate seamlessly with the way people process knowledge. They further conclude that cognitive knowledge modelling will usually result in a natural integration of knowledge-based systems into the existing people-centred processes. Help desk systems help organisations to understand the company’s overall structure and capture system processes using frequently asked questions. These systems are helpful in converting organisational tacit knowledge to explicit knowledge (Serbest, Goksen, Dogan & Tokdemir, 2015:461). Database technologies can capture unstructured knowledge, which becomes indispensable for the support of knowledge work (Yousuf, 2014:365). Although unstructured knowledge is inconvenient and difficult for sharing, organising and acquisition, the categorisation accuracy of unstructured knowledge is significantly improved in database technologies using object-oriented methodologies, data mining and knowledge discovery in databases (KDD) techniques (Malakhov, 2019:145). Database technologies allow an organisation to capture the valuable tacit knowledge embedded in the unstructured knowledge assets such as help desk systems. This helps an organisation to explore business opportunities

for continuous business improvement. Other related technologies are the collaborative technologies, which support the interaction between and amongst employees as well as electronic performance support systems both of which utilise various human computer interaction (HCI) techniques.

Decision support systems (DSSs) aid decision makers to be able to combine different types of knowledge available in various forms in the organisation (Grimaldi & Hanandi, 2014:165). The DSSs have also been strongly supported by artificial intelligence systems implementing machine learning techniques (Metaxiotis, Ergazakis, Samouilidis & Psarras, 2003:218). Web technologies such as Web 2.0, Web 3.0 and Web 4.0 have also been effective KMSs in improving particularly the knowledge sharing and knowledge storage phases of knowledge management (Rudman & Bruwer, 2016:133; Bower, 2017:160). These technologies have been supported by simple, secure and cheap technologies for knowledge storage such as cloud computing and Internet of Things (IoT). Organisations today benefit from the use of web technologies to easily gather knowledge, store and process the knowledge for decision making. Other KMSs that are gaining ground are artificial intelligence systems based on machine learning techniques (mainly supervised and unsupervised), fuzzy logic and expert systems (Mackerle & Orsborn, 1988:93; Liebowitz, 1998:170). These KMSs utilise various algorithms to achieve feature extraction, feature selection, feature classification and feature prediction (Dey, 2016:1174). One AI-based system includes case based reasoning (CBR), which is one of the well-known knowledge repositories and learning techniques that is widely adopted in decision-making based on previous experience (Paschen, Kietzmann & Kietzmann, 2019:1413; Pei, Xu, Zhang, Guo & Yang, 2019:2).

Generally, the disciplines discussed above support the two fields of knowledge as discussed earlier where science disciplines such as cognitive sciences provide tacit knowledge and the technical disciplines such as decision support systems will provide explicit knowledge. All these disciplines have come to be known as knowledge management and in particular KMSs, thus introducing new ideologies to strategic management theories. There are two main aspects of knowledge management as argued by Rincon and Orero (2004:502), namely, information management and people management. They argue that information management is a part of knowledge management for managing explicit knowledge while people management manages tacit knowledge.

Knowledge management also plays a critical role in improving organisational performance. Davenport and Prusak (1998:10) conclude that knowledge management in organisations plays three critical roles, namely, to make knowledge visible through various knowledge tools; to develop a knowledge sharing culture and to build a knowledge infrastructure. These roles give an understanding of the knowledge management process, which has continued to guide knowledge management literature. Although the other side of knowledge management deals with knowledge workers mandated with superintending the management of knowledge (Gao, Li & Nakamori, 2002:8), the thrust of this subsection is to discuss the management of knowledge activities and processes.

#### **3.2.4.1 Definition of knowledge management**

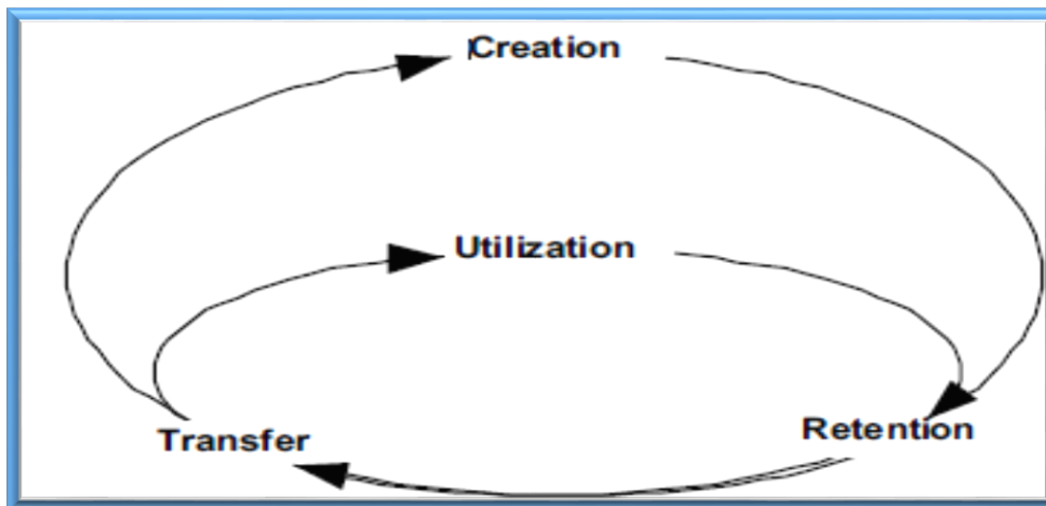
Knowledge management is one concept that has seen several definitions being outlined in literature. Lee, Foo, Leong and Ooi (2016:137) identified various definitions of knowledge management that literature has provided over the years and conclude that most authors define knowledge management as a process. Authors such as Davenport, De Long and Beers (1998:45) subscribe to this view and define knowledge management as a process of collecting, distributing and efficiently utilising internal and external knowledge resources. Also, Meso and Smith (2000:225), although defining knowledge management from an innovation management dimension, approve the idea of knowledge management as a process. Drawing their argument from a detailed literature survey, they postulate that knowledge management is a process of capturing all the knowledge assets in an organisation through continued organisational learning.

The foregoing view of the process perspective also finds support from several studies. Several authors (Alavi, Kayworth & Leidner, 2005:192; Greco, Grimaldi & Hanandi, 2013:2; Wang, Ding, Liu & Li, 2016:11) agree with the process perspective and contend that knowledge management is a process, which involves the generation, representation, storage, transfer, transformation as well as application, embedding and protection of organisational knowledge. Differing from the process view and instead adopting a strategic view, O'Dell and Grayson (1998:40) argue that knowledge management is an organisational strategy that ensures that knowledge is accessible to the people and useful to organisations' success. Although this dimension brings a different angle, it still integrates processes since accessibility and utilisation of knowledge are stages in the aforementioned process-oriented approach. Therefore, knowledge management entails the process of managing both tacit and explicit knowledge for

the purpose of achieving organisational goals. Important to note is the fact that the management of knowledge is achieved through various processes, which organisations can adopt on a situational basis.

### 3.2.4.2 Knowledge management process

Knowledge management has been understood through different models that outline how organisational knowledge is generated and utilised. One such model is by Newman and Conrad (1999:3), who view the knowledge management process as composed of four steps that explain the movement of knowledge within an organisation. They then developed the general knowledge management model as shown in Figure 3.4.



**Figure 3.4: General knowledge management model**

Source: Newman and Conrad (1999:3)

Figure 3.4 illustrates a cyclical approach to knowledge management with looping phases that move back and forth from creation, to retention, transfer and utilisation. Expounding on the model, Newman and Conrad (1999:3) contend that the creation phase deals with the discovery and generation of new knowledge as well as its capture and development. Once this knowledge is captured it becomes part of the organisational knowledge, and in the retention phase measures are taken to preserve and keep the created knowledge within the system. The retained knowledge is then shared in the transfer phase. Lastly, movement of knowledge between the transfer and retention phases explains the utilisation phase, which involves those activities associated with the application of the acquired knowledge. The model suggests a cyclical

behaviour of the knowledge management process and affirms that people are key players in each activity. The study recommends the model for supporting the application of knowledge management in a small organisation because of its people-centred focus.

The cyclical nature of the knowledge management process was further confirmed by Alavi and Leidner (2001), who classified the processes using the knowledge life cycle perspective. Their model has four knowledge management process stages, namely: knowledge creation, knowledge storage and retrieval, knowledge transfer, and knowledge use and application. The study also noted that the greater percentage of the knowledge being generated and used is tacit, thus people become the most important participants. Among other models (Bukowitz & Williams, 2003:65; McElroy, 1999:52; Meyer & Zack, 1996:69; Wiig, 1993:69), a cross-section is summarised in Figure 3.5 as noted by Dalkir (2005:44).

Meyer & Zack (1996)	Bukowitz & Williams (2003)	McElroy (1999)	Wiig (1993)	Integrated KM Cycle
Acquisition	Get	Individual & group learning	Creation	Create/capture
Refinement	Use	Knowledge claim validation	Sourcing	Create/capture
Store/retrieve	Learn	Information acquisition	Compilation	Create/capture
Distribution	Contribute	Knowledge validation	Transformation	Create/capture and contextualize
Presentation	Assess	Knowledge integration	Dissemination	Share, disseminate, and assess
	Build/sustain		Application	Acquisition and application
	Divest		Value realization	Update

**Figure 3.5: Summary of knowledge management process model**

Source: Dalkir (2005:44)

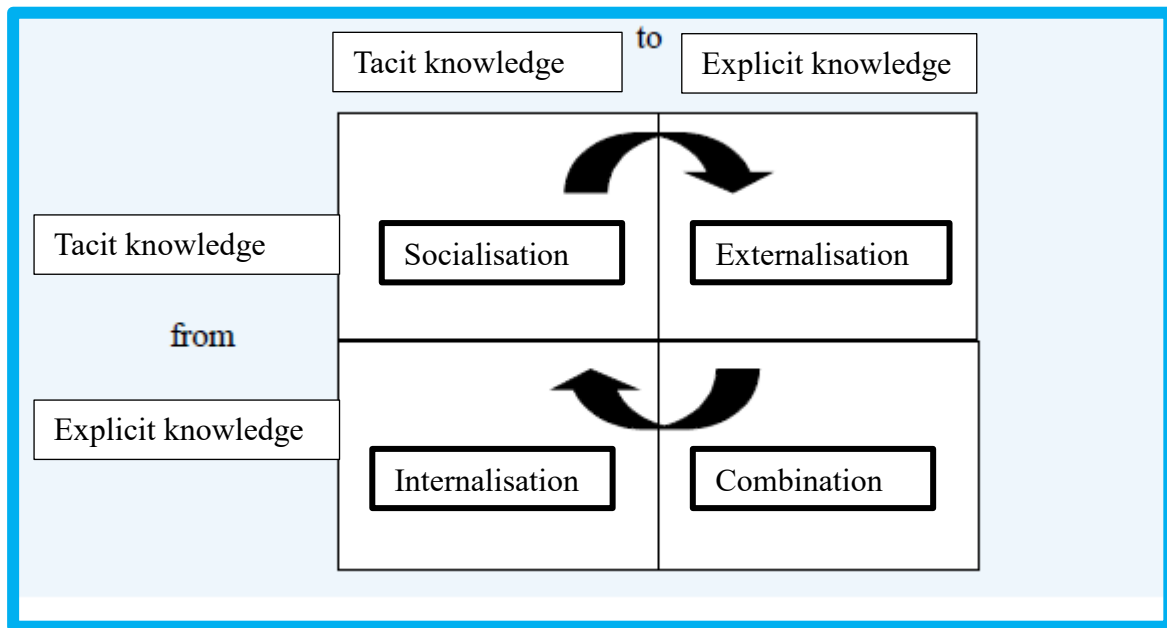
The summary in Figure 3.5 shows that Meyer and Zack (1996:69) identify the knowledge management process as composed of acquisition, refinement, storing or retrieving, distributing and presenting. Taking a similar perspective, Bukowitz and Williams (2000:65) add a strategic perspective and used the processes get, use, learn, contribute, assess, build/sustain and divest.

McElroy (2003:52) agrees that people are critical in the knowledge management process and identified the processes as individual and group learning, knowledge claim validation, information acquisition and knowledge integration. Wiig (1993:39) draws his model from how people build and use knowledge and postulates that the process involves creation, sourcing, compilation, transformation, dissemination, application and value realisation. Dalkir (2005:44) summarises all the models and concludes by proposing an integrated model with processes starting with create and capture, contextualise, share, disseminate and assess, acquire and apply and lastly update. He also argued that knowledge management processes are cyclical in nature and people play a dominant role in the success of any organisation, however, technology can only aid the people's activities and not vice versa. This, therefore, implies that although recent knowledge management literature presents people as being of less importance, the leading knowledge management models prove that people still matter in the success of knowledge management.

Another widespread model in knowledge management literature is by Nonaka and Takeuchi (1995:62), which also agrees with the view that people cannot be ignored if knowledge management is to be successful. Their model comprises cyclical stages, including socialisation, externalisation, combination, and internalisation and has come to be known as the SECI model.

The model in Figure 3.6 presents a matrix of knowledge categories and cyclical organisational knowledge phases. The initial phase is the socialisation phase which involves tacit-tacit activities where knowledge manipulation is assumed to be conducted amongst and by people only. The next phase is the externalisation phase that focuses on tacit-explicit activities emphasising knowledge conversion through both people and technology. The following phase is the combination phase in which the knowledge is expected to be fully explicit, and knowledge management is done primarily through technology. The last phase is the internalisation phase that involves explicit-tacit activities where people retrieve the explicit knowledge and then utilise it for future roles. The model indicates that people involvement is mandatory in all the phases for knowledge management to be successfully implemented. It also reveals that the three phases (socialisation, internalisation and externalisation) are skewed towards people while the combination phase is more technologically inclined. The study thus affirms that technology becomes vital in an environment where the available knowledge is predominantly explicit. Hitherto, for most developing countries and SMEs, organisational knowledge has remained primarily tacit (Afrifa & Padachi, 2016:47), therefore making people

central to the adoption and implementation of knowledge management-based systems in these environments.



**Figure 3.6: The SECI Model**

Source: Nonaka and Takeuchi (1995:62)

### 3.2.5 Categorisation and definition of knowledge management systems

There is a noticeable perfect positive correlation between utilisation of organisational knowledge and the need for knowledge management, particularly in this knowledge economy era. The development has also motivated the formulation of KMSs that facilitate the management of organisational knowledge (Doong & Wang, 2009:317). KMSs are the operationalisation of knowledge management mainly designed to capture and distribute knowledge and obtain organisational benefits. However, KMSs have been viewed as complicated and very costly to implement. There are several critical success factors for KMS deployment including benchmark strategy, knowledge structure, organisational structure, information technology, employee involvement, employee training, leadership and commitment of senior management, learning environment, control of resources, professional training evaluation and teamwork. A well-built knowledge pattern should be embedded in the system for facilitating knowledge acquisition and sharing from knowledge workers.

As such, KMSs are designed and implemented to support the knowledge management processes



in an organisation as noted by Moreno and Cavazotte (2015:371). It is therefore important for any organisation before implementing a KMS to understand its knowledge management processes and to be guided by their knowledge management strategy and various equivalent models. Wang and Wang (2016:829) contend that a needs assessment is essential before implementing a KMS since the process is complex and quite different from implementing information systems. They also argue that information systems are mainly about technology while KMSs include both the people and the technology. Additionally, the use of information systems is usually mandatory, but the use of a KMS is an individual decision where employees may decide not to share what they know. As a result of this dual dimension of KMSs, there are also two perspectives in which KMSs have been defined, namely the IT-centred and people-centred approaches.

Knowledge management has also been defined from an IT-centred perspective by earlier knowledge management pioneers. Such authors include Alavi and Leidner (2001:114) who define a KMS from an IT-centred perspective and argue that a KMS is an information system designed and developed specifically to support the organisational knowledge management process within an organisation. Wang and Wang (2016:830) also agree and add that KMSs include tools such as knowledge repositories, databases, knowledge maps and collaborative tools (groupware and e-mail) for supporting knowledge transmission. Iskandar, Jambak, Kosala and Prabowo (2017:69) though accepting that knowledge management has people, technology and processes as its pillars, they define KMSs as technology-based systems. Other earlier knowledge management authors agree with the information technology perspective of defining a KMS (Hidayanto & Efendy, 2010:105; Greco, Grimaldi & Hanandi, 2013:3). These suggestions assume that there are no people-centred KMSs contrary to other authors such as Litvaj and Stancekova (2015:835). Besides, these definitions assume that all knowledge exists in explicit form and so supports a knowledge utilisation focus. In so doing, this approach is more likely to ignore the knowledge creation phase, which in fact is the source of all organisational knowledge.

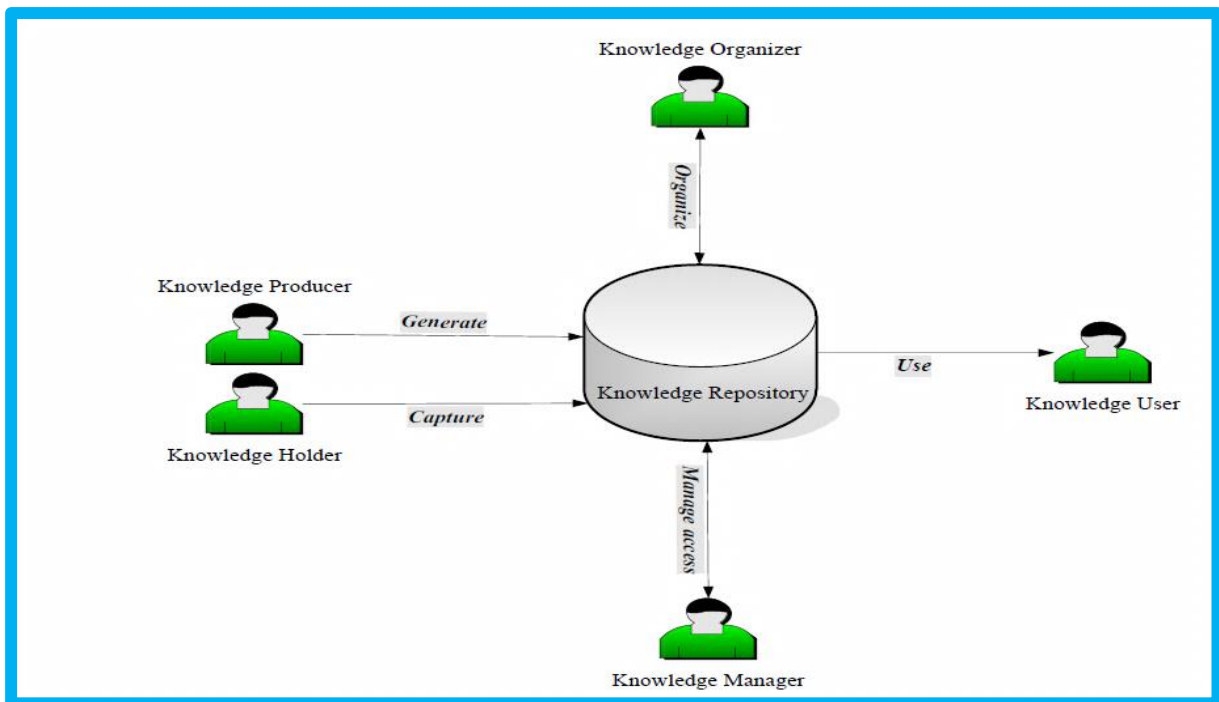
KMSs provide the framework for implementing knowledge management. Said (2015:76) takes a general approach and defines a KMS as a system for applying and using knowledge management principles throughout the knowledge management process. Unlike in other studies, the definition leaves room for the role of both people and technology in knowledge management activities in an organisation. This dual perspective to knowledge management was highlighted by Messo and

Smith (2000:229), who argued that there is a socio-technical perspective of a KMS. In their study, they define a KMS as a complex combination of technology infrastructure and the people within an organisation. Drawing from the different views and in the context of the current study, a KMS is a people-dominated system designed and developed to create, capture, transfer and store organisational knowledge for the purpose of improving organisational performance.

### **3.2.5.1 Information technology-centred knowledge management systems**

This section interrogates some of the IT-centered KMS models to unveil their limitation on enhancing knowledge management activities in business organisations. As outlined in the previous discourse, current KMS literature is focusing on the technological aspect of KMSs (Badpa, Yavar, Shakiba & Singh, 2013:790; Iskandar *et al.*, 2017:78). Various technologies have been developed to support knowledge management in supply chains including artificial intelligence and expert systems; big data which also encompass data warehousing, data mining, knowledge discovery in databases, big data analytics and web analytics; cloud computing, cryptographic algorithms, radio frequency identifiers, and machine learning (Wu, Qi, Li, Visvizi, Lytras, Alhalabi & Zhang, 2019:154; Singh, Kumar & Chand, 2018:4; Al-Shboul, 2018:887; Azevedo & Carvalho, 2011:128; Metaxiotis, Ergazakis, Samouilidis & Psarras, 2003:216; Mackerle & Orsborn, 1988:92; Liebowitz, 1998:171). Nevertheless, although these technologies suggest a fully automated environment where technology completely replaces the human being, the KMS models in extant literature prove otherwise. One such example is the repositories utilisation model by Wang and Wang (2016:829).

The model in Figure 3.7 exemplifies a real organisational environment where knowledge is stored in knowledge repositories through a technology-based infrastructure. Knowledge repositories are generally viewed as IT-centred KMSs that adopt technologies such as knowledge discovery in databases (KDD), data warehousing and data mining and are accessed through a computer network (Thierauf, 1999:65). The various elements of the IT-based systems that are in the model also support the multi-disciplinary nature of a KMS as argued by Dalkir (2005:7). The identified systems can be categorised as database-driven systems or when applied in complicated environments they can be viewed as artificial intelligence or decision support systems.

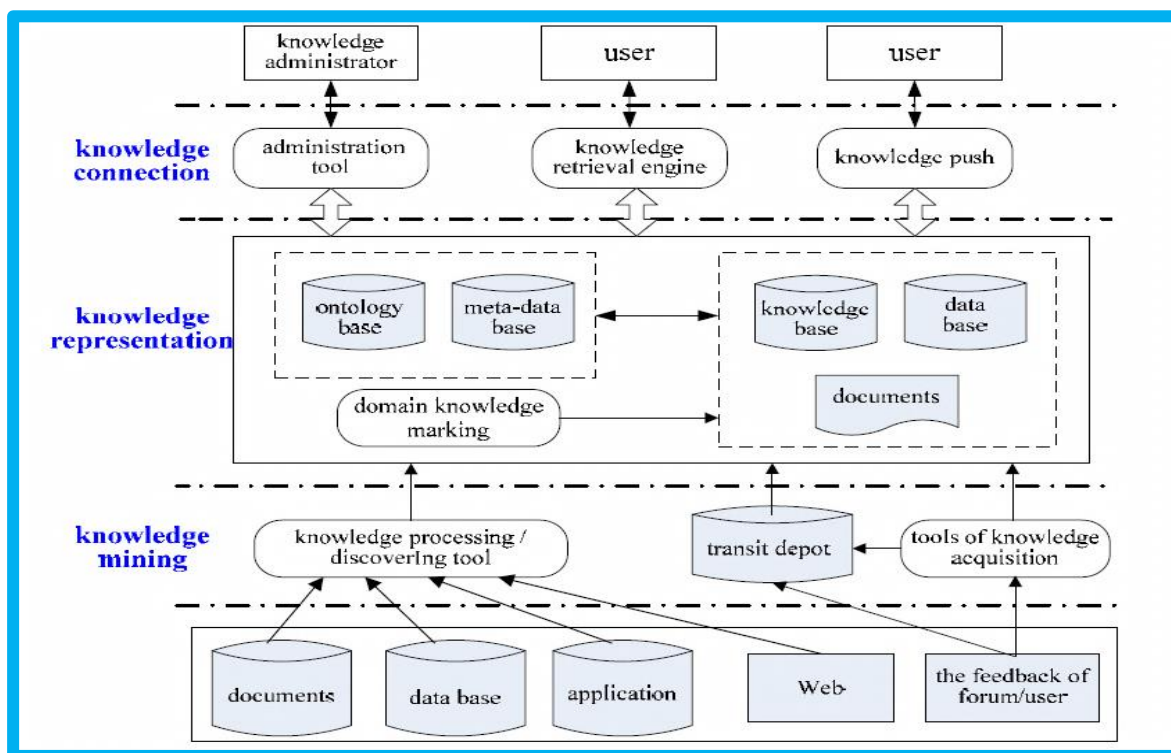


**Figure 3.7: Model for the utilisation of knowledge repositories**

Source: Wang and Wang (2016:829)

The knowledge repository as shown in the model is asserted to assume the role played by people through applying intelligent algorithms to understand and interpret data patterns. Nevertheless, people are still important, as the model shows that activities such as generation, capturing and utilisation require people for them to be accomplished. The model, as a result, contradicts a fully automated organisational environment based on artificial intelligence, electronic data interchange (EDI) and the Internet of Things (IoT) (Cahyaningsiha, Sensusea, Arymurthya & Wibowoa, 2017:62) as advocated by proponents of IT-centred KMSs. Conversely, the authors of the model uphold that knowledge repositories adopt a fully automated environment with no human intervention. This contradiction suggests a deliberate approach by recent KMS authors to view people as traditional components of a KMS although this is not easily achievable, particularly for developing countries.

KMSs have also been implemented in ontology-based systems. An example is the model by Zhang, Zhao, Xie and Chena (2011:1023), whose study suggests an ontology-based KMS. The study also adopts an entirely technological view of a KMS with tools such as databases, intranet, internet, document management systems and knowledge discovery systems to support artificial intelligence within organisations.



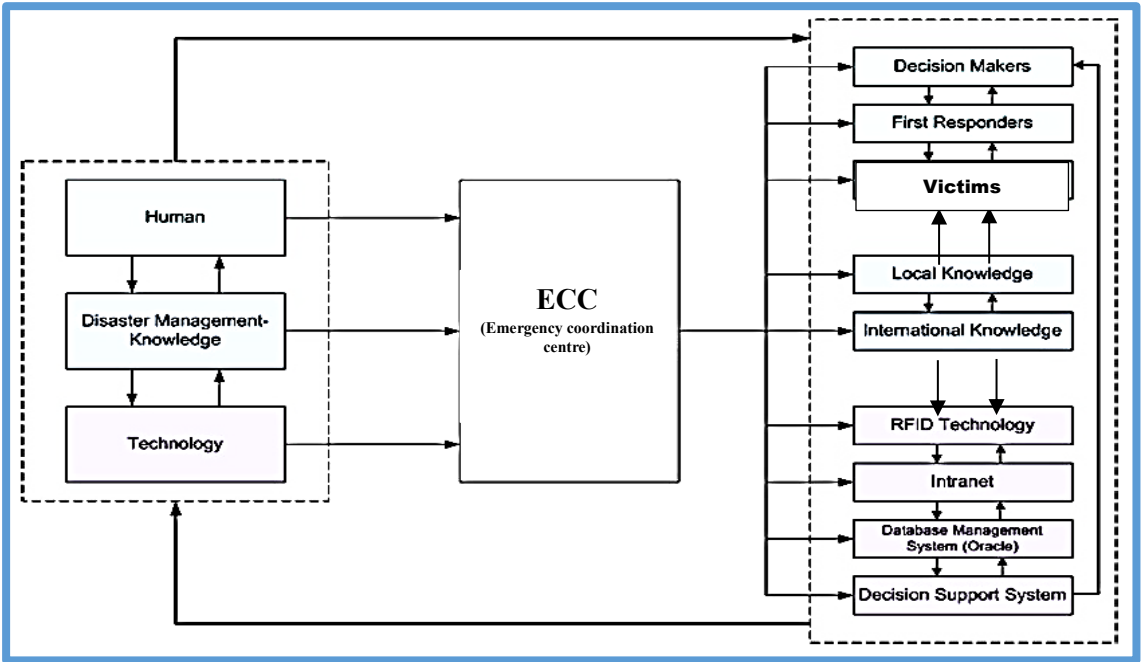
**Figure 3.8: Ontology-based KMSs**

Source: Zhang, Zhao, Xie and Chena (2011:1023)

The model in Figure 3.8 is a framework for a KMS that can be said to adopt modern technology to support organisational knowledge management activities. The model portrays three key stages, namely, the knowledge connection, knowledge representation and knowledge mining. Absolute automation based on technology can be attained in the knowledge representation and knowledge mining levels since the knowledge will be in explicit form. However, the knowledge connection level indicates that the lower levels are dependent on the people for knowledge captured through the knowledge push stage. Moreover, its effectiveness and accuracy will depend on the utilisation by the user and the management of the stored knowledge by the knowledge administrator, respectively. People therefore remain primary elements in modern KMS adoption and utilisation in the business environment although this dimension is not getting much attention in the current literature.

Disaster management is another area in which a KMS has been applied to automate processes. Badpa, Yavar, Shakiba and Singh (2013:791) developed such a KMS model for automating disaster management through the use of modern technologies. In their study, they proposed the use of KMSs to automate disaster responses and use knowledge from previous success

experiences to mitigate emerging challenges. The study suggested the use of sensors in the form of radio frequency identifiers (RFIDs) to be used in the knowledge creation and acquisition phase instead of having people as the primary source of knowledge. This model is presented in Figure 3.9.



**Figure 3.9: Disaster management KMS model**

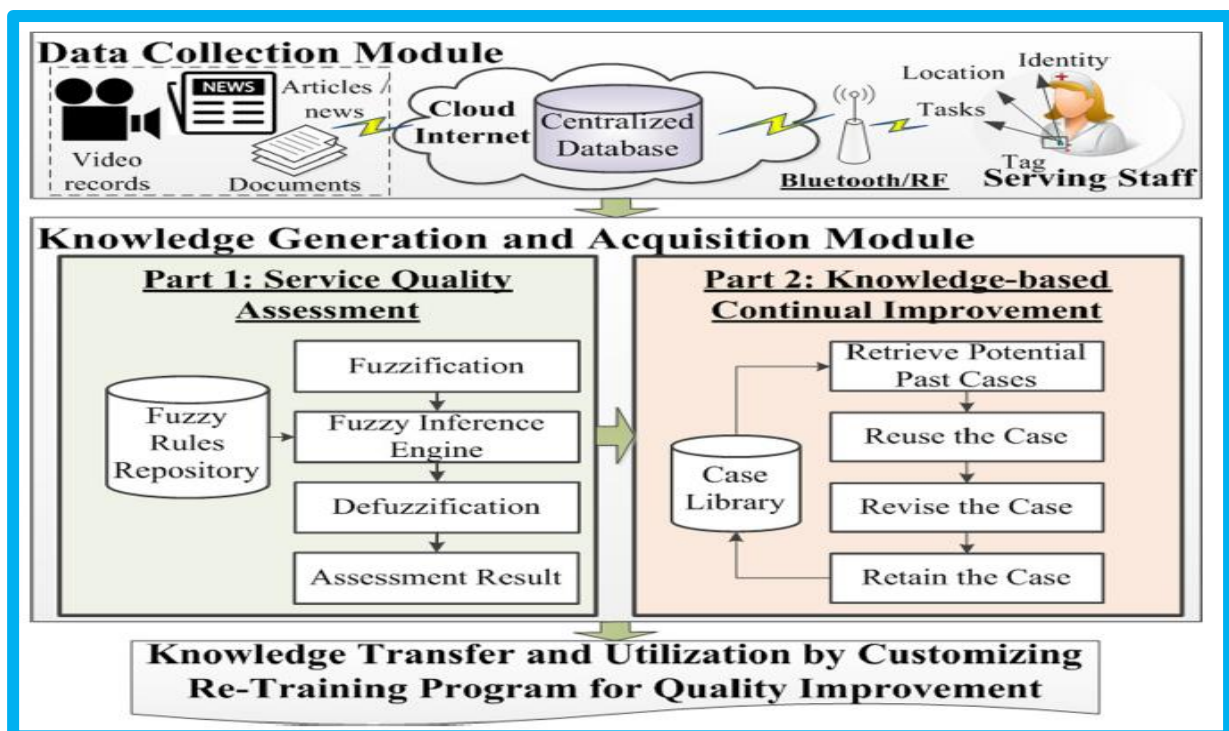
Source: Badpa, Yavar, Shakiba and Singh (2013:791)

It is important to note that Figure 3.9 also presents a KMS model with a greater percentage of it being people-centred rather than IT-centred although the proposed model is meant to be IT-centred. The model shows that the epicentre of the model is the emergency coordination centre (ECC) which requires humans, disaster management knowledge and technology. The humans are the decision makers, and the knowledge part is comprised of local and international knowledge; the technology is made up of RFIDs, database management systems (DBMS), intranets and decision support systems (DSSs). There is a need for collaboration amongst the various elements as shown by the direction of information flow.

For instance, the disaster management knowledge is coming from both technology and humans thereby supporting the view that explicit knowledge can be managed through technology while tacit knowledge requires people involvement. Furthermore, the available knowledge is being utilised by both the users and the technology, with the people depending more on local

knowledge, and technology aiding in international knowledge. As such, technology becomes necessary or mandatory in a KMS when people are geographically spaced as outlined in KMS literature (Lev-On, 2015:165; Aljuwaiber, 2016:733).

Another technology based KMS is the artificial intelligence system that adopts fuzzy logic, cloud computing and case-based reasoning. An example of such a system was modelled by Choy, Siu, Ho, Wu, Lam and Tsang's (2017:109) study on the performance of nurses and is depicted in Figure 3.10.



**Figure 3.10: Intelligence case-based KMS**

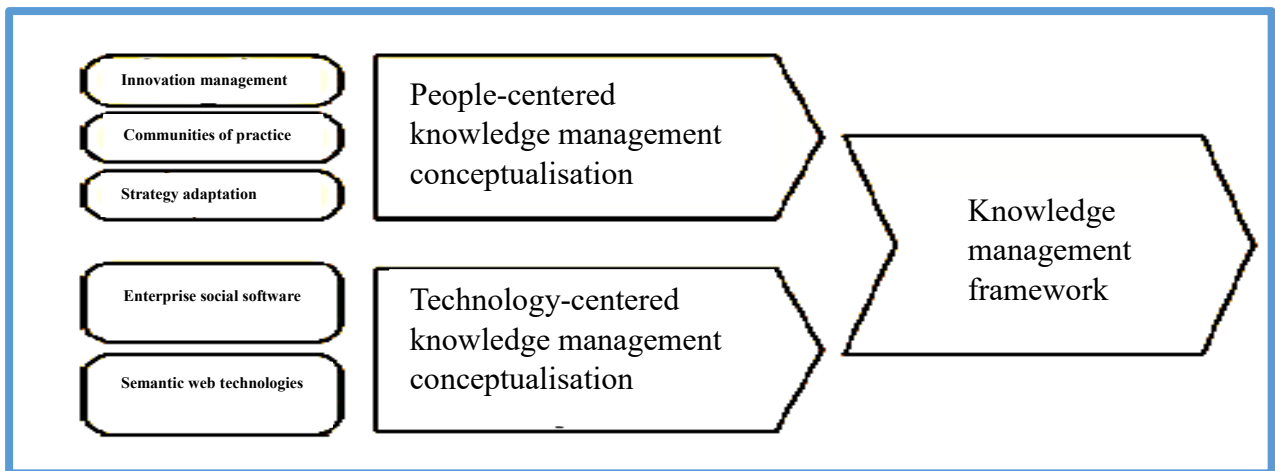
Source: Choy, Siu, Ho, Wu, Lam and Tsang (2017:109)

Figure 3.10 depicts an intelligent case-based knowledge management system (ICKMS), which was conducted in the medical sector. The figure incorporates the integration of two main AI techniques, namely, fuzzy logic and case-based reasoning (CBR). The KMS adopts a highly automated approach, which implements fuzzy logic to assess employee performance, and CBR to formulate a customised re-training program for the system. The study found that the ICKMS helped in the identification of nursing staff who could not meet the essential service standard. However, after a customised re-training program on the model, the performance of the nursing staff was greatly enhanced, as well as the reduction of medical errors and complaints.

Accordingly, highly automated KMSs implementing artificial intelligent are only effective to the level of model training conducted by the people, which implies that people remain key in the success of technology centred KMSs that are artificial intelligence-based. It can therefore be concluded that today the IT-centred KMS approach is more popular (Iskandar *et al.*, 2017:78) as business is drowned in the fallacy of considering technology as a panacea to all information and performance challenges. Nevertheless, most of the IT-centred KMS models, although they advocate for IT-based platforms, accept the role of people in KMSs due to IT limitations in automating the tacit-explicit knowledge conversion process. IT-centred KMSs focus on using technology to manage “explicit-explicit” processes while ignoring the “tacit-explicit-tacit” process, yet that is what the knowledge management process entails (Sajeva, 2010:766). Likewise, the adoption of these important technologies remains a global challenge in most SMEs as they still lag behind in implementing technology-based systems (O’Connor & Kelly, 2017:158).

### **3.2.5.2 People-centred knowledge management systems**

Literature presents evidence of KMSs as people-centred systems that emphasise the role of the people in organisations more than technology. Knowledge management and KMS literature (Dougherty, 1999:264; Sajeva, 2010:771) provides evidence of the existence of KMSs that are people-centred. This section explores the dotted literature on people-centred KMSs to identify the available types of such KMSs. The primary role of a KMS is to support creation, transfer and application of knowledge within organisations. There have been great strides in developing KMSs that achieve this objective, but a challenge remains on their adoption in organisations (Miklosik & Zak, 2015:517; Li, Liu & Liu, 2016:189). One wrong assumption is that knowledge is explicit and only needs technology to manage it and yet the existence of knowledge can hardly be separate from the people who possess and share it. This explicit view of knowledge has led to the downplaying of the role of people in the whole knowledge management process. However, Bibikas *et al.* (2008:47) conclude that KMSs are composed of both people-centred KMSs and technology-centred KMSs. They argue that the two dichotomies of KMSs can be modelled as illustrated in the framework given in Figure 3.11.

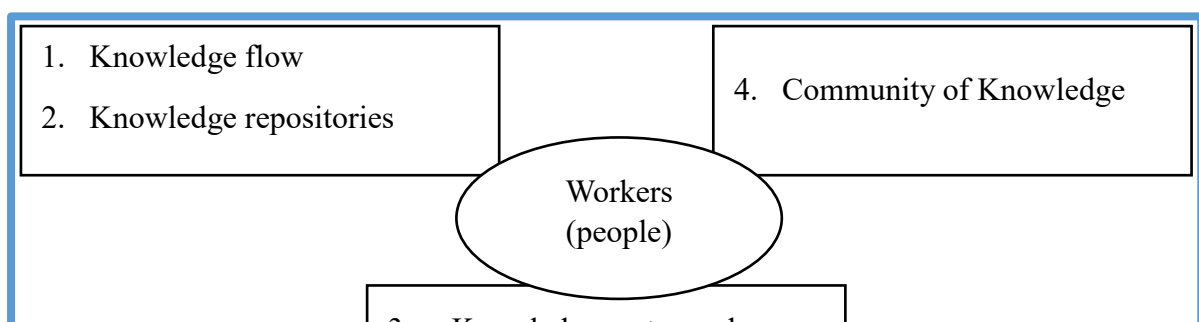


**Figure 3.11: Knowledge management systems framework design model**

Source: Adapted from Bibikas *et al.* (2008:49)

The framework in Figure 3.11 advocates that people-centred KMSs include innovation management, CoP and strategy adoption, while technology-centred KMSs consist of enterprise social software (database management systems, document management systems) and semantic web technology (intranets, content management systems and extranets). This viewpoint was also supported by Assegaf and Hussin (2012:2), who approve and conclude that there are both technology-based and social-based KMSs that facilitate the management of tacit and explicit knowledge. They suggest a balanced view to KMSs and developed a socio-technical model to KMSs where the social approach is people-centred while the technical approach is technology-centered. These studies substantiate the existence of the less discussed people-centred KMS within organisations.

Several studies are beginning to emerge that concur with the people-centred approach to a KMS. In acknowledging the people-centred approach, the study by Litjav and Stancekova (2015:835) suggests a KMS model that is based on the SECI model by Nonaka and Takeuchi (1995:62). They argue that there are people-centred KMSs that govern the knowledge management environment and are most suited to less developed countries. They further conclude that the people-centred KMSs exert more influence on the success of knowledge management implementation in organisations even in highly technological economies.





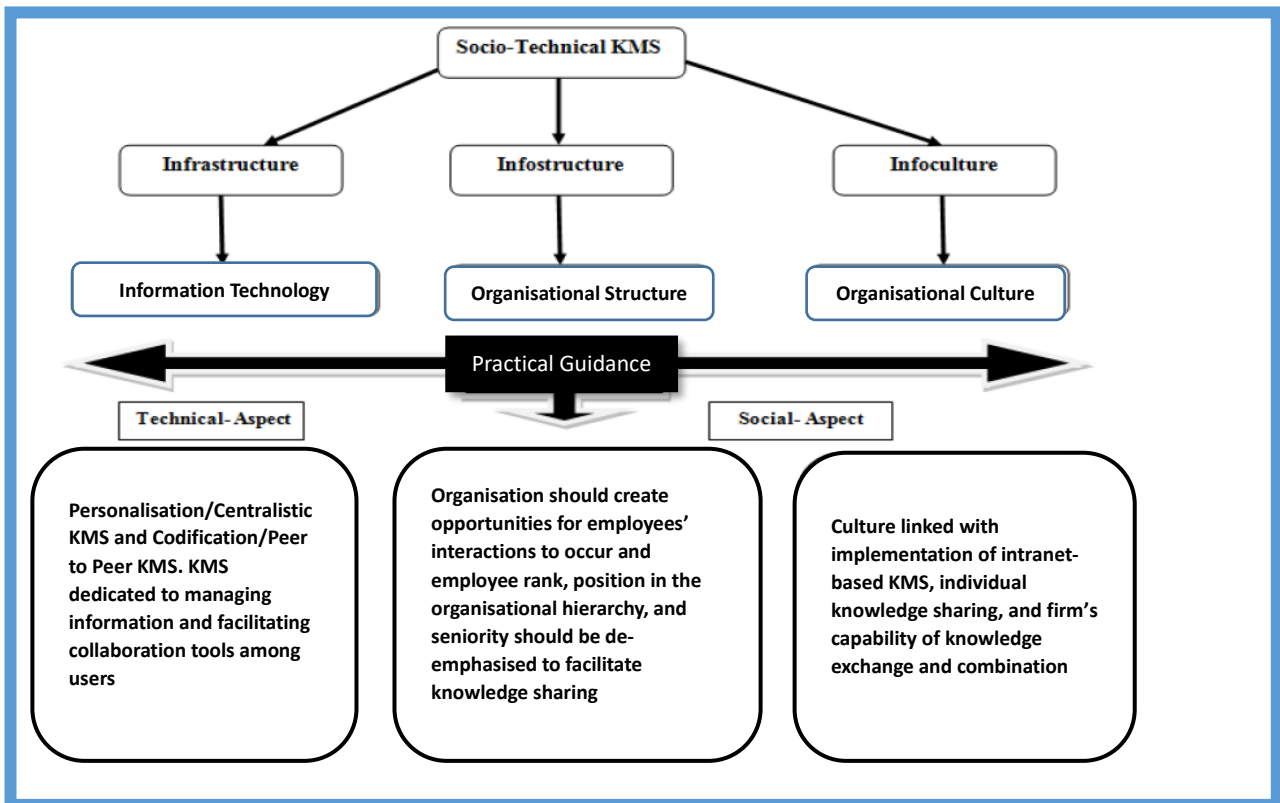
### **Figure 3.12: General knowledge management systems architecture**

Source: Litvaj and Stancekova (2015:835)

Figure 3.12 shows a KMS architecture based on the SECI model, and it has four related elements, namely: the knowledge flow and repositories, the knowledge community, as well as the knowledge navigation and mappings. The model suggests that in the socialisation stage, there will be knowledge flow and knowledge repositories. The externalisation phase is related to the communities of knowledge where experts interact and share knowledge. Davenport and Prusak (1998:31) called these knowledge communities the knowledge markets (Likar & Fatur, 2013:29), where they argue that the environment would be composed of knowledge buyers, sellers and brokers. The combination phase takes place through knowledge navigation and mapping. However, the model emphasises that in organisational knowledge management processes, the people are central to all activities. The view was earlier proposed by Takeuchi (2013:68), who found that organisational knowledge is created through human interaction (Davenport *et al.*, 1998:44); it is dynamic in nature, and it possesses a social agenda for guiding the firm strategy (Halawi, McCarthy & Aronson, 2006:385). These discoveries suggest that the more significant part of organisational knowledge has people as the principal actors. However, regardless of such evidence on the people-centredness of knowledge management, literature has ignored this viewpoint when tackling KMSs.

One common dimension that subscribes to the people-centred approach of a KMS is the socio-technical view which advocates the interrelatedness of technology and people. The socio-technical view of knowledge management by Assegaf and Hussin (2012:3) also acknowledges the existence of people-centred KMSs in organisations. They conclude that a KMS comprises three features, namely, infrastructure, infostructure and infoculture. They further argue that the infrastructure defines how technology will be applied in the KMS while infostructure and infoculture deal with the role of people in developing KMSs. On the one hand, the infrastructure focuses on centralistic KMSs, codification and collaboration tools among users. On the other

hand, the infostructure and infoculture emphasises organisational culture, knowledge communities, innovation and organisational structure to attain social capital from organisational knowledge (Dalkir, 2005:135; Lee, Park & Lee, 2015:886). Alavi and Leidner (1999:12) also note that information culture includes people-centred systems such as collective learning, intellectual property cultivation and organisational learning.



**Figure 3.13: Socio-technical knowledge management systems**

Source: Assegaf and Hussin (2012:3)

As other models that propose a combined IT-centred and people-centred approach to KMSs, the model in Figure 3.13 affirms the eighty-twenty percent rule of knowledge management activities. This rule was propounded by Hansen, Nohria and Tierney (1999:112), who maintain that 20 percent of knowledge management is achieved through IT-centred KMSs and 80 percent through people-centred KMSs as also supported by Davenport and Prusak (2000:63). The rule exudes the level of influence that people have on the success of knowledge management and KMSs in organisations. The model also suggests that although technology plays a pivotal role in supporting knowledge sharing, it is organisational culture as practised by the people that determines whether the technology will serve its intended purpose. Although the model suggests the importance of a people-centred KMS, it however, like all other models does not

provide details on how organisations can benefit from this branch of KMSs to improve performance.

### **3.2.6 Section summary**

Several issues emerged from the above discussion relating to knowledge, knowledge management and KMSs. It was established that there is a generalised approach to knowledge categorisation and also an organisational approach. As such, from an organisational perspective, knowledge has been categorised mainly as tacit and explicit knowledge. The two branches of knowledge have a direct influence on how knowledge management will be conducted within organisations. The discussion revealed that tacit knowledge resides in people and hence, it cannot be managed through technology, while explicit knowledge is well codified and can be easily managed through technology. These outcomes explain the limitation of technology in fully managing organisational knowledge, mainly when the knowledge is predominantly tacit.

The discussion also highlighted that in the field of KMSs it has been common to design IT-centred KMSs that are based on recent technologies such as databases, data warehouses, complex knowledge discovery and mining software while ignoring people-centred KMSs. The available KMS models show that there are also people-centred KMSs. These KMSs include organisational culture, organisational learning, knowledge markets, innovation management, organisational structure, CoPs and social capital. It was also unearthed that no single KMS approach can meet all organisational knowledge management requirements, but both approaches should be adopted. The knowledge management system strategy will then determine the extent of the adoption. Consequently people-centred KMSs are KMSs that adopt a people-oriented strategy with a very minimum focus on basic IT tools and are targeted at converting tacit knowledge into explicit knowledge. However, it was clear that their implementation in support of organisational performance has not been well addressed as businesses increasingly view technology as the finality of a KMS.

## **3.3 DRIVERS AND BENEFITS OF KNOWLEDGE MANAGEMENT SYSTEMS**

This section outlines the main drivers of a KMS in the modern organisation as the world moves towards an economy of intangibles where knowledge is becoming a key resource. This will help understand the best KMSs that SMEs in developing countries can adopt to enable them to survive global competition. It also provides evidence of the benefits of KMSs in improving organisational performance to support the need for the implementation of such systems in developing countries.

### **3.3.1 Knowledge management systems drivers**

There are number of KMS drivers that influence organisations to implement knowledge-based systems. Wu, Wu, Li and Huang (2011:4391) reviewed the literature on knowledge management drivers and define a driver as a factor influencing the adoption of knowledge management practices in an organisation. In their study they identify several knowledge management drivers, including leadership, learning culture, technology, hardware environment, human resource policy and the knowledge strategy. Other authors (Du Plessis, 2005:200; Cecere & Martinelli, 2017:930) have categorised the drivers as knowledge-based drivers (knowledge attrition and knowledge volume); technology drivers (internet and intranet); intra-organisational drivers (i.e. dispersed work environment); human resource drivers; process drivers and economic drivers. The studies show that extant literature has concentrated more on knowledge management drivers and little has been devoted to knowledge management system drivers. In fact, knowledge management literature covers the drivers or reasons why organisations decide to implement knowledge management but not much has been outlined on the same subjects for KMSs. As such, the drivers to be covered in the current study are derivatives of KMS drivers since there is a very insignificant difference between the adoption of knowledge management and a KMS in organisations.

The modern world is highly globalised and based on the concept of an open organisation. Consequently, organisations cannot exist without interacting with the outside world as they now must compete with both local and international companies and also meet global standards and certifications. As the world is evolving from the physical to the intangible economy, knowledge is increasingly becoming an important asset that every organisation must possess and manage. It is no longer an issue of whether or not to implement knowledge management but rather which KMS to adopt, hence the importance of having a broader view of a KMS. The nature of

available knowledge (tacit or explicit), technological infrastructure, affordability and human resource skills are some of the notable drivers to KMSs.

Some of the KMS drivers include the need to survive in an uncertain and competitive environment, adoption of an effective, sustainable competitive strategy that is affordable and inimitable. Technological advancement is also another driver that is pushing all organisations to require a KMS, particularly in highly developed countries. Additionally, the product range and product quality that meets customer choices as well as supplier needs are driving the organisation to adopt KMSs (Massaro, Handley, Bagnoli & Dumay, 2016:271). These requirements call for organisations to have current and correct knowledge of their market and market trends.

### **3.3.2 Benefits of KMSs in improving knowledge sharing and organisational performance**

KMS adoption comes with several knowledge-related benefits that help the organisation to resolve their challenges as argued by Abubakar *et al.* (2017:3). Alavi and Leidner (1999:20) found that the greatest perceived benefits of a KMS were mostly to do with both process and organisational outcomes. They argue from a technology perspective and suggest that the process outcome benefits include improved knowledge communication across the organisation and efficiency in resolving performance challenges. The organisational outcome benefits include improvement in financial performance, marketing activities, knowledge retention and successes in project management. Du, Quie and Xu (2011:1241) further support the idea of financial benefits in their study on KMSs in the Chinese financial sector. Also taking an IT-centred view, they note that a KMS helps in improving organisational core competencies by acquiring, storing, disseminating and utilising available financial knowledge. Said (2015:83) concludes that IT-centred KMSs improve knowledge sharing and knowledge utilisation in an organisation, which in turn exerts a positive impact on the organisation's overall performance. Kuriakose, Murty, Swaminathan and Raj (2010:673) also highlight KMS benefits from an IT-centred KMS perspective and note that a KMS improves the performance of all the activities of the organisation that include research, design, development, project execution and tacit-explicit knowledge conversion.

Another benefit of KMSs is their ability to support innovation, which is a critical success factor in the modern business environment. Moreno and Cavazotte (2015:361) regarding the effect of the task-technology fit (TTF) model on knowledge management, highlight that a KMS helps enhance innovation, flexibility, decision making, responsiveness and productivity. Their study, although supporting a people-centred KMS approach, also identified similar KMS benefits. Ishkandar *et al.* (2017:70) equate the benefits of IT-centred and people-centred KMSs in the review of KMS literature for over a ten-year period. They identified benefits such as innovation, sustainable competitive advantage, improved knowledge retention when employees change jobs, improved decision making, enhanced knowledge creation process and knowledge utilisation, and timely and accurate dissemination.

### **3.3.3 Section summary**

The benefits of KMSs identified from various studies can be summed up as encompassing improved innovation, knowledge sharing and utilisation, improved decision making and attainment of sustainable competitive advantage. There was no specific difference on the benefits of IT-centred and people-centred KMSs, but rather it was discovered that both KMSs could help organisations achieve the same benefits. It can be argued, therefore, that the adoption of either of the KMSs can yield the same outcomes making it necessary to consider people-centred KMS implementation in less technologically developed environments.

## **3.4 LIMITATIONS IN CURRENT KNOWLEDGE MANAGEMENT SYSTEMS**

This section explores knowledge management and KMS literature to attempt to identify efforts directed towards the adoption of KMSs in business organisations. It starts by focusing on KMSs in both large organisations and SMEs. After the interrogation, limitations will be discussed particularly from an SME and developing country perspective. Finally, the section draws divergent views from different authors in KMS literature to develop the hypotheses to be tested.

### **3.4.1 Knowledge management systems in large organisations**

A knowledge management system strategy can adopt the soft mechanism strategy, hard mechanism strategy or hybrid mechanism strategy (Jasimuddin, 2008:59). The selection of the strategy is based on the primary objective of the KMS. The soft mechanism is adopted when

knowledge is in tacit form (people-centred) and hard mechanism for knowledge in explicit form (IT-centred), while the hybrid is used when both tacit and explicit knowledge (socio-technical) is mandatory. Hansen *et al.* (1999:107) adopt a related dimension and argue that KMS strategies are categorised into codification (Dictator model, Broker model) and personalisation strategies (Psychology model, Peace-maker model) (Robinson, Carrillo, Anumba & Al-Ghassani, 2005:433; Palaniapan, 2010:1). The codification strategy employs an IT-based KMS to codify and store organisational knowledge for future access and reuse by other employees.

The first codification-oriented KMS strategy they suggest is the Dictator model, which emphasises integrating everything. It focuses more on integrating the entire firm's content regardless of source or format. It is normally adopted by time conscious organisations that believe in a control approach to knowledge management. This strategy normally implements a KMS in the form of enterprise resource planning (ERP) software, intranets and extranets. The second is the Broker model which emphasises connecting everyone. The strategy concentrates on avoiding the complexities and uncertainties associated with the storage of knowledge. It is typically adopted by firms that focus on employee relationships and collaboration for improving their performance. In the firms' KMS structure they are concerned about process and context. KMSs employed in this strategy are content management systems, document management systems and groupware systems.

The first personalisation-oriented strategy is the Psychologist model which takes a self-centered view of knowledge (Choi & Lee, 2002:180). In this approach, KMSs are not taken as core tools to the success of the organisation but rather knowledge sharing is considered to be more critical. The KMSs considered here usually are knowledge discovery in databases (KDD), data mining and data warehousing and have been mostly applied in large companies. The second is the Peace-maker model which focuses on embracing differences and multiple sources of knowledge. It focuses on organisational characteristics and is generally suited for large firms with complex and decentralised knowledge environments. KMSs adopted in this context are not especially specific but are normally situation dependent.

It is important to note that the discussed strategies are not definitive or exhaustive but have merely been selected to outline the broader view of KMS strategy in large organisations. These strategies although relevant in their context, have had some shortcomings, particularly for SMEs. Some of these include their bias towards knowledge management in large organisations

(Maguire, Koh & Magrys, 2007:37) and the need for large sums of money which SMEs cannot afford (Chong, Chong & Gan, 2011:38). The vast amounts are usually because of the expensive IT infrastructure required since the strategies promote an IT-centred perspective. Cahyaningsiha, Sensusea and Noprisona (2017:501) maintain that a complete KMS must incorporate three elements, namely: the people, the processes and the technology. Yet the strategies for large companies emphasise processes and technology while downplaying the importance of people in a KMS. As such, there are very few or no strategies that are relevant for KMSs to be implemented in the SME sector especially for developing countries. These major limitations make it complicated for SMEs and developing economies to also benefit from the adoption of KMSs, hence the need for an SME-oriented approach.

### **3.4.2 Knowledge management systems in small and medium enterprises**

Literature has had extremely limited coverage of KMSs in SMEs. Massaro, Handley, Bagnoli and Dumay (2016:1) conducted an extensive literature review on knowledge management in the SME sector and contend that the subject has received scant attention in literature. This trend in SME literature was reinforced by O'Connor and Kelly (2017:159), who also highlighted that SMEs were trailing behind in adopting KMSs such as big data analytics. Moreover, a literature search and review on KMSs in SMEs was further conducted, and this area was found to be highly dispossessed of literature with no research to the knowledge of the researcher that was found from an African country. These results show that the subject of knowledge management and KMSs in the SME sector has not been well researched, although evidence suggests that KMSs are the best practice for the success of this struggling sector. Some of the few studies that support the importance of knowledge management and KMSs for SMEs are discussed in the ensuing paragraphs.

Some studies are, however, suggesting the importance of KMSs within the SME sector. Fink and Plodder (2009:46) contend that KMSs are necessary for SMEs and suggest the use of the technology-social-social-technology (TSST) model as a strategic model for KMS adoption in SMEs. They found that generally the TSST model was more technology focused, but there was a need for a more social focus when applying it in SMEs because of their people-centred approach to knowledge management. Although they suggest both people-centred systems and IT-centred systems, the proposed IT-centred systems were fundamental and affordable, and these include e-mail, document management systems and groupware.



Evidence of the need to utilise knowledge management system in SMEs has been suggested in Malaysia. Chong, Chong and Gan (2011:39), in their study on Malaysian SMEs acknowledged the importance of KMS adoption in this sector. Their study found that knowledge transfer was an important strategic aspect for SMEs who need knowledge about suppliers, buyers and markets. However, they did not provide the detail on how the strategy could be implemented in the SME sector but cited technology utilisation as a constraint to resource-challenged SMEs. Massa and Testa (2011:484) also conducted a study on the Italian SME sector and noted that what SMEs need is not leap frogging from management information systems and scaling down IT-centred KMSs designed for large companies but a different KMS with features specially formulated for the sector. They suggest a strategic framework for KMS implementation based on the knowledge domain and innovation behaviour and conclude that it is applicable for KMS adoption in SMEs. O'Connor and Kelly (2017:170) surveyed the utilisation of big data in SMEs and they argue that they should also consider utilising big data for them to out-compete large companies and survive but they did not propose specific features for use with the data mining algorithms. They maintain that most SME knowledge management strategies should be focused on tacit knowledge conversion rather than explicit knowledge utilisation because they lack the technological resources needed in managing explicit knowledge.

The previous studies demonstrate that knowledge management and KMSs are necessary for the SME sector. They also highlight the existence of knowledge management practices within SMEs but to a lesser extent when compared to large companies. It was also unearthed that most SMEs prefer to adopt a tacit-explicit knowledge conversion strategy and shy away from the readily available explicit knowledge for lack of technological resources. Drawing from earlier discussions, coupled with the results from these studies, it was revealed that the point of entry for knowledge management and KMS adoption in SMEs would most suitably be a people-centred approach. The approach is best suited for this sector mainly because of the high levels of tacit knowledge they possess and their thirst to be innovative, as supported by Bashouri and Duncan (2014:51). However, what lacks in current literature is a model that illuminates how people-centred KMSs can influence knowledge sharing in SMEs to improve SCP within this sector.

### **3.4.2 Hypotheses development**

This subsection proposes that knowledge sharing mediates the relationship between SCP and people-centred KMSs, and therefore it seeks to theoretically answer the question: “Does knowledge sharing mediate the relationship between a people-centred KMS and SCP?” To answer this question, it adopts the proposed conceptual framework in Figure 1.1, which is based on the knowledge-based view (KBV) theory of the firm. The four predictor variables of people-centred KMSs (CoPs, innovation management, organisational culture, and social capital), as suggested by the conceptual framework, are hypothesised to influence knowledge sharing in an organisation positively. The criterion for choosing the predictor variables was based on their complementary nature in influencing knowledge management processes in the organisation as outlined in the extant literature. For instance, both CoPs and social capital are influenced by organisational culture (Bashouri & Duncan, 2014:49), while CoPs influence innovation management (Pattinson & Preece, 2014:111; Schiavone & Bozillo, 2014:992). The influence posed by these variables on knowledge sharing is discussed in the succeeding subsections.

#### **3.4.2.1 How communities of practice influence knowledge sharing in small and medium enterprises**

The concept of CoPs within organisational settings originated with Lave and Wenger (1991:98), and today it has grown to be one of the most important tools for sharing knowledge (Bolisani & Scarso, 2014:366; Aljuwaiber, 2016:733). Wenger (1999) affirms that the primary purpose of a CoP in an organisation is the unification of knowledge, people and experience. He (Wenger 2011:1) then defined CoPs as groups of people who have common interests and interact socially to share and learn from one another. Wenger, McDemott and Synder (2002:10) later expanded the definition from a knowledge management perspective and identified CoP elements as composed of the domain of interest, the community of participating individuals and the practices of sharing knowledge (Pavlin, 2006:138). They further reiterated that CoPs are useful tools for improving business performance as they create the best platform for sharing knowledge. Meessen and Berton (2012:11) agree and note that CoPs are an essential tool for sharing both explicit and tacit knowledge through people. This suggestion makes CoPs quite suitable for knowledge sharing in environments such as SMEs where the knowledge is largely tacit, and there is a need for tacit-explicit knowledge conversion as alluded to earlier. However, one limitation of CoPs is the difficulty in measuring their effectiveness (Wenger *et al.*, 2002:65). To address the measurement limitation, Meessen and Berton (2012:25) propose that

CoPs' contribution to organisational performance can be measured by evaluating the domain composition, community participation in meetings, workshops and resource utilisation.

CoPs in organisations can be enhanced through technology. Sarirete, Chikh and Noble (2011:456) adopted a technology-based approach to CoPs and argue that knowledge sharing within CoPs can only be improved through IT-based systems. However, they also agreed that the knowledge shared within CoPs was mainly tacit, thus confirming the importance of the role of people within the CoP on the knowledge process. Another study that looked at IT-based CoPs was conducted by Ardichvili, Maurer, Li, Wentling and Stuedemann (2006:104), who studied online CoPs in three countries and found that cultural differences played a major role in the knowledge sharing behaviour of members in an online CoP. They cited that the central IT-based systems used by CoP members for communications were primarily affordable systems such as e-mail and web-based technologies, for example, Skype, search engines and Facebook. Their study recommends that a KMS must be tailored to the values and cultural preferences of the host country or the members of the CoP for the community to effectively share knowledge (Hansen *et al.*, 1999:100; Bashouri & Duncan, 2014:49). The conclusion again confirms that although technology is necessary for CoPs, only simple IT tools are applied and face-to-face interactions remain the major technique of knowledge sharing within CoPs. These preceding arguments support the notion that CoPs are only more effective in supporting knowledge sharing when a people-centred approach is adopted.

Employee knowledge sharing behaviour can have some influence on the success of CoPs. Jeon, Kim and Koh (2011:264) found that knowledge sharing behaviour amongst employees was affected by CoP members' motivation. They also found that the way the CoP is structured (formal or informal) can also affect the knowledge sharing behaviour among employees. Their study concluded that intrinsic motivation exerts a more positive knowledge sharing behaviour within the CoP when compared to extrinsic motivation. They further contend that an informal and supported CoP presents a better platform for knowledge sharing (Saint-Onge & Wallace, 2003:36; Zboralski, 2009:91). Whereas when efforts were made to formalise the CoP through implementing IT-based systems to structure and monitor member collaboration and participation, knowledge sharing was reduced. This outcome suggests a conducive situation for SMEs to utilise CoPs as KMSs since the more profitable informally supported CoPs require little funding to formulate and manage. This view is supported by Connell, Kriz and Thorpe

(2014:147) who view CoPs as industry clusters and advance that these clusters are an antidote to SME challenges.

Employee attrition is one condition that can impact negatively on the effectiveness of CoPs. Lee, Suh and Lee (2014:392) investigated the negative influence of CoPs where they analysed the knowledge drain results that stem from the departure of a member. They argue that most companies have at one time or another, faced severe business failures when key CoP members left the organisation. The effect was cited as not only loss of knowledge but the loss of relationships since when members left they also took with them both their knowledge and their relationships (Dunford, 2000:296). They contend that CoPs are mainly affected by knowledge drain when key members of the community are either uncomfortable to share their knowledge or when they leave the group. The study highlighted that in environments where knowledge is treated as individual wealth, most experts do not share their knowledge as they consider the knowledge to be a competitive advantage. Paradoxically, these are the same people who possess the much-needed knowledge resources that are expected to sustain the organisation. The study then recommended that organisations identify and motivate such employees to share knowledge with CoP members, thus proving the significance of people as earlier suggested by Borzillo, Schmitt and Antino (2012:29).

In some instances, CoP members who possess knowledge, such as experts in certain domains, may wilfully decide not to share their knowledge. Cevellon and Wernerfelt (2012:189) scrutinised the reluctance by experts to share knowledge using CoPs in supply chains and conclude that this behaviour tends to reduce as the community matures and healthy relationships are built. These results indicate that when community members are motivated, they are likely to remain longer in the group and as their membership evolves to maturity level, they naturally share knowledge with other members. The outcomes support the finding by Peralta and Saldanha (2014:546), that trust among CoP members grows with the frequency of group interactions and is a key element in the enhancement of knowledge sharing in organisations. Once again, the findings in these studies prove that it is the people that matter most and not technology as has been suggested by proponents of IT-centred KMSs.

Consistent with the people-centred view of CoPs, Allee (2003:113) advances that even in highly technological environments people within CoPs will still require a face-to-face conversation and sharing of experiences. This view was buttressed by Aljuwaiber (2016:733) who found that

people prefer to ask from people they know as the first source of knowledge rather than rely on IT-based systems. He convincingly argued that virtual CoPs were never meant to replace face-to-face CoPs since critical elements of knowledge sharing such as trust, cohesion and interaction frequency usually lack in a situation where people have no physical relationships (Zboralski, 2009:92). Therefore, knowledge sharing reduces with the level of virtualisation in the CoPs, and this trend will, in turn, affect organisational performance as supported by Schenkel and Teigland (2008:107).

The evidence from the arguments raised in the literature show that CoPs are equally used for knowledge sharing, just like IT-based systems such as CoPs are another dimension of a KMS that is people-centred (Assegaf & Hussin, 2012:3; Litvaj & Stancekova, 2015:835; Bibikas *et al.*, 2008:49). Again, the studies revealed that face-to-face CoPs are necessary for improving knowledge creation and the rate at which knowledge is shared across the organisation as suggested by Saint-Onge and Wallace (2003:44). The evidence from the extant literature on the positive influence of CoPs on knowledge sharing is quite obvious, such as not to require further research. Nevertheless, the fact that negative CoP influences on knowledge sharing have been cited (Jeon, Kim & Koh, 2011:264; Lee, Suh & Lee, 2014:392), suggests the need for additional research. It is, therefore, logical to propose the following hypothesis to be tested as:

H<sub>1</sub>: CoPs have a positive influence on knowledge sharing in Zimbabwean SMEs.

### **3.4.2.2 The influence of innovation management in promoting knowledge sharing within small and medium enterprises**

Innovation management is another people-centred knowledge management system that can influence knowledge sharing in an organisation. Likar and Fatur (2013:49) define innovation as an idea or a practice that is perceived as new by an individual/group and can be applied within processes, procedures or delivery systems. Adopting a process bias on innovation, Goh (2005:6) argues that innovation management is a field that emphasises the effective management of the innovation process. Likar and Fatur (2013:50) took a broader perspective and defined innovation management as the management of either the innovation process or the procedures concerning the products/services or the delivery of existing products/services but not concurrently. These elements of innovation cover the entire supply chain suggesting that innovation must be applied to the whole supply chain for best outcomes as noted by Mandal

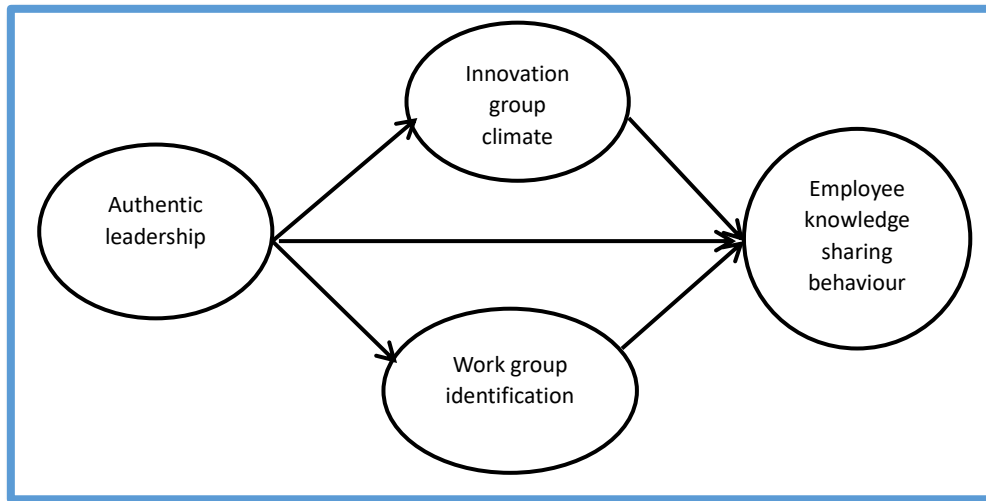
and Korasiga (2016:32). Due to the nature of the current study that focuses on SCP within the SME sector, innovation management will be considered as the concurrent management of innovation activities within the entire SME supply chain.

Innovation has been outlined in literature as the main strength of SMEs. Chatzoglou and Chatzoudes (2016:320), and Hyder and Lussier (2016:80) are amongst some of the authors who uphold this assertion. Several other studies have focused on the utilisation of innovation to enhance company performance (Laforet, 2009:188; Hitt, Ireland & Hoskisson, 2012:20; Scuotto, Del Giudice, Bresciani & Meissner, 2017:649; Oberg & Alexander, 2018:2), suggesting that innovation, when adopted in organisations, improves overall performance.

Another dimension on innovation research has been on how knowledge sharing influences innovation (Kamaşak & Bulutlar, 2010:306; Andreeva & Kianto, 2011:1016; Sindakis, Depeige & Anoyrkati, 2015:559; Scuotto, Del Giudice, Bresciani & Meissner, 2017:640). Taminiau, Smit and de Lange (2009:42) studied the relationship between knowledge sharing and innovation within consultancy firms. They found that informal platforms for sharing knowledge have a positive influence on innovation, which in turn improves organisational performance. Similarly, the argument by Takeuchi (2013:68) that knowledge creation is the fuel for innovation, coupled with the SECI model by Nonaka and Takeuchi (1995:62), suggests that sharing of tacit knowledge influences innovation. Wu, Lupton and Du (2015:74) highlight that innovation outcomes are improved when two merging companies share knowledge, and both companies are ready to integrate the acquired knowledge into their systems.

Generally, an extensive body of literature provides evidence that it is knowledge sharing that influences innovation. Still, most of the studies lack a strategic approach to innovation in which innovative activities were treated as a coincidence particularly within SMEs. The failure to adopt a strategic approach to innovation (Terziovski, 2010:898) suggests the reason behind the SMEs' persistent high failure rate regardless of them being known to be very innovative. The current study argues that when innovation is adopted strategically (i.e. innovation management) the reverse applies where innovative tendencies promoted within the organisation will motivate employees to share knowledge. There is limited literature on such studies that advance the view that innovation influences knowledge sharing more so from a strategic perspective (i.e. innovation management). For instance, Li, Shang, Liu, and Xi (2014:559), drawing evidence

from Chinese organisations, found that the provision of an innovative and fairness climate by leadership promoted employee collaboration, which in turn enhanced knowledge sharing among employees. Edu-Valsania, Moriano and Molero (2016:488) agreed with this view and alluded that available opportunities and an innovation work climate motivates employees to share knowledge. They highlight that leadership must adopt an authentic leadership style to create the relevant environment for innovation as summarised in Figure 3.14.



**Figure 3.14: Influence of leadership and innovation on knowledge sharing**

Source: Valsania, Moriano and Molero (2016:492)

The model shows that authentic leadership (which is based on integrity and trust) encourages an innovation group climate and a sense of belonging within the employees. This environment will then promote knowledge sharing behaviour by eliminating fear from the workers and encouraging openness. A study by Valsania *et al.* (2016:492) found that an innovation climate will improve the desire by employees to share knowledge when carrying out their duties. However, although the study suggests that innovation positively influences knowledge sharing, it does not consider the influence of innovation management on knowledge sharing within a supply chain.

Some people-centred characteristics, such as leadership influence, can also increase or decrease knowledge sharing activities. Hussein, Singh, Farouk and Sohal (2016:485) emphasise leadership influence on both innovation and knowledge sharing as suggested by Valsania *et al.* (2016:492). They argue that top management support is vital to the provision of an innovative climate that promotes knowledge sharing in an organisation. Podrug, Filipovic and Kovac (2017:633) highlight the importance of the role of top management support in enhancing

knowledge sharing behaviour among employees. Their study noted that when senior management provides both the support and an environment that encourages innovation, individuals are motivated to share their knowledge to solve problems (Liu, Cheng, Chao & Tseng, 2012:411). The study also concluded that top management support was primary in enhancing innovation activities in organisations, which in turn influences an open knowledge sharing culture. The support from top management suggests a strategic approach to innovation as postulated by Schneckenberg (2015:14), who contends that strategic innovation promotes an open, free flow of knowledge.

The review suggests that good leadership promotes an innovation environment, which in turn influences knowledge sharing behaviour amongst employees. In this regard, both innovation and knowledge sharing should be treated as people-centered concepts (Liu *et al.*, 2012:412). Besides, it can be established that effective innovation is one that has support from top management (Laforet, 2009:189; Mandal & Korasiga, 2017:42; Crema, Verbano & Venturini, 2014:22). Likewise, top management is responsible for the strategic direction of the organisation and when support for innovation activities is provided at this level, it is likely to improve knowledge sharing amongst the employees. Based on these findings, it is reasonable to argue that top management support for innovation entails the implementation of innovation management in organisations (Dickel & Moura, 2016:214). Therefore, it is logical to propose that innovation management influences knowledge sharing and presents the hypothesis to be tested as follows:

H<sub>2</sub>: Innovation management has a positive influence on knowledge sharing in Zimbabwean SMEs.

### **3.4.2.3 The influence of organisational culture on knowledge sharing amongst small and medium enterprises**

Several studies have shown that organisational culture influences business activities such as knowledge management practices in both small and large companies (Davenport & Prusak, 2000:120; Lin, 2007:316; Nguyen & Mohamed, 2011:218; Sanjaghi, Raazeenour & Ojaghi, 2014:228). Organisational culture, which depicts organisational characteristics such as individual or collective beliefs, values and artefacts (Schein, 1985:30) has been found to



positively or negatively affect knowledge management activities within organisations (Alavi, Kayworth & Leidner, 2005:196). Some of the knowledge management activities affected by organisational culture include knowledge acquisition, knowledge utilisation and more profoundly, knowledge sharing (Tong & Mitra, 2009:58; Rai, 2011:785; Saifi, 2015:181). Knowledge sharing, which refers to the individual behaviour of exchanging work-related knowledge (Sorakraikitikul & Siengthai, 2014:177) has been promoted as a means for organisations to benefit from their knowledge resources as highlighted by Islam, Jasimuddin and Hasan (2015:68). They also note that the process of knowledge sharing depends on the nature of knowledge with tacit knowledge known to be more complicated to share than explicit knowledge (Borges, 2012:90).

From a large organisation perspective, a KMS can be grouped as practices as suggested by Alavi, Kayworth and Leidner (2005:217). Their study concludes that organisational culture in the form of member's values influences the way employees utilise technology to share knowledge. They also found that it was individuals who had an innovative culture that were comfortable using technology as a knowledge management tool to share knowledge. These findings confirm that organisational culture influences knowledge sharing, and the negativity of the influence may increase with the adoption of technology. The study falls short in addressing the SME sector as its recommendations were targeted at KMSs in large companies.

Literature has been noted to lack evidence supporting the relationship between organisational culture and knowledge management from a process-based approach. Saifi (2015:165) notes that research on the relationship between organisational culture and knowledge management processes and their link to organisational performance is lacking in the current literature. His study, deriving evidence from scholarly articles spanning over a twenty-year period, suggests that creating a culture that supports knowledge sharing is critical for the success of an organisation. He also highlights that effective knowledge management must take into consideration the cultural characteristics of an organisation. He affirms that if the organisational culture promotes the sharing of tacit knowledge (espoused beliefs and values) among the employees, this will, in turn, improve organisational performance. Although the study gives positive insights into the relationship between knowledge sharing and organisational culture and their influence on organisational performance it did not directly consider the SME environment.

Studies that have attempted to relate organisational culture and knowledge management lack the SMEs' perspective particularly from a developing country perspective. Rai (2011:780) conducted a theoretical study on the influence of organisational culture on knowledge creation and conversion, and he integrated various organisational culture and knowledge management models. Though not in an SME context, the study focuses on the competing values framework and SECI model where the earlier model was used to understand performance and the later to explain knowledge management activities. He concludes that organisational culture has a direct impact on the knowledge creation and knowledge conversion process. By applying the SECI model to understand both the knowledge creation and conversion processes, the study is thus focused on strategies for tacit-explicit knowledge conversion. Likewise the study adopted a people-centred approach to knowledge management since the nature of conversion being studied happens in the socialisation phase where people are the key players as acknowledged by Nonaka and Takeuchi (1995:62).

Scant evidence of knowledge management in SMEs exists in literature. The survey by Nguyen and Mohamed (2011:209) is one of the few knowledge management studies that focus on the SME sector. They highlight that the SME context is highly unstructured and informal with the owner/manager being the sole decision maker. Based on these characteristics of the SME they propose a model where they argue that organisational culture moderates between owner/manager leadership style and knowledge management practices. Their theoretical review highlights that knowledge in SMEs is largely tacit (Afrifa & Padachi, 2016:47) and that tacit knowledge sharing because of its link to individuals is more prone to the effects of organisational culture as supported by Borges (2012:101). They found that transformational leaders can promote a culture that is supportive and receptive of knowledge management activities. The study then concludes that organisational culture can positively or negatively impact on knowledge management practices within an organisation. Although that study did not directly address knowledge sharing, the results suggest that organisational culture can influence knowledge sharing as a knowledge management practice.

In line with Nguyen and Mohamed's (2011:209) finding that organisational culture negatively impacts knowledge sharing, Riveira-Vazquez, Ortiz-Fournier and Flores (2009:262) identify some of the organisational cultures that can adversely affect knowledge sharing. For example, protection of one's position, varying technological backgrounds, lack of management commitment, fear and discrimination among others, promotion of end results while ignoring

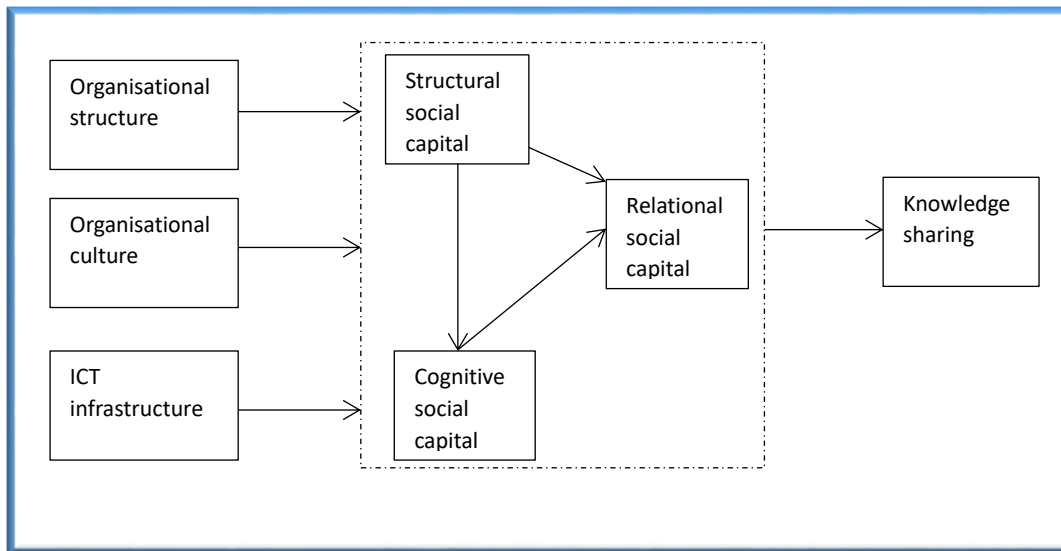
the earlier knowledge sharing. These cultures were later noted by Maldonado-Guzman *et al.* (2016:835) as factors affecting knowledge management activities in the SME sector. Therefore, the conclusion by Riveira-Vazquez *et al.* (2011:210) that all the identified barriers can be overcome suggests that organisational culture, when managed correctly, will always positively impact knowledge sharing. Furthermore Lin (2007:316) argues that knowledge sharing can be adopted as a culture that when inculcated into employees improves performance and helps achieve a competitive advantage. In addition, Peralta and Saldanha (2014:546) conclude that a knowledge-centred culture that is anchored on trust improves knowledge sharing amongst individuals. Ling-hsing and Lin (2015:451) reinforce the same view and conclude that job-oriented culture positively impacts on knowledge management activities. They additionally note that a positive knowledge management culture is a strong predictor of knowledge sharing behaviour in individual employees. These assertions, although lacking the SME context, further affirm the views from the discussion above that organisational culture influences knowledge sharing. The following hypothesis is thus proposed.

H<sub>3</sub>: Organisational culture has a positive influence on knowledge sharing in Zimbabwean SMEs.

#### **3.4.2.4 The influence of social capital on knowledge sharing in the small and medium enterprise sector**

Social capital is another people-centred KMS that may be adopted by SMEs for better performance. Mu, Peng and Love (2008:88) define social capital as the ability of a community/network to secure benefits from their participation in the social network. They also highlight that social capital provides members with access to valuable knowledge as it enhances knowledge creation and knowledge transfer, which in turn creates new ideas and improves innovation. Their study concludes that social capital plays a critical role in promoting knowledge flow amongst community members. Chow and Chan (2008:459) postulate that social capital involves three key dimensions, namely: structural (i.e. interaction patterns), relational (i.e. relationship assets such as trust) and cognitive (i.e. extent of common understanding). Their study identified these three dimensions as important factors in promoting knowledge sharing as they influence the knowledge sharing attitude among employees. These studies suggest that individuals are naturally inclined to share knowledge in communities where there is trust and perceived benefits.

Social capital when implemented in organisations can influence the level of knowledge sharing. Hooff and Huysman (2009:3) support the assertion that social capital influences knowledge sharing, and they suggest the model in Figure 3.15 to explain this relationship.



**Figure 3.15: Influence of social capital on knowledge sharing**

Source: Hooff and Huysman (2009:3)

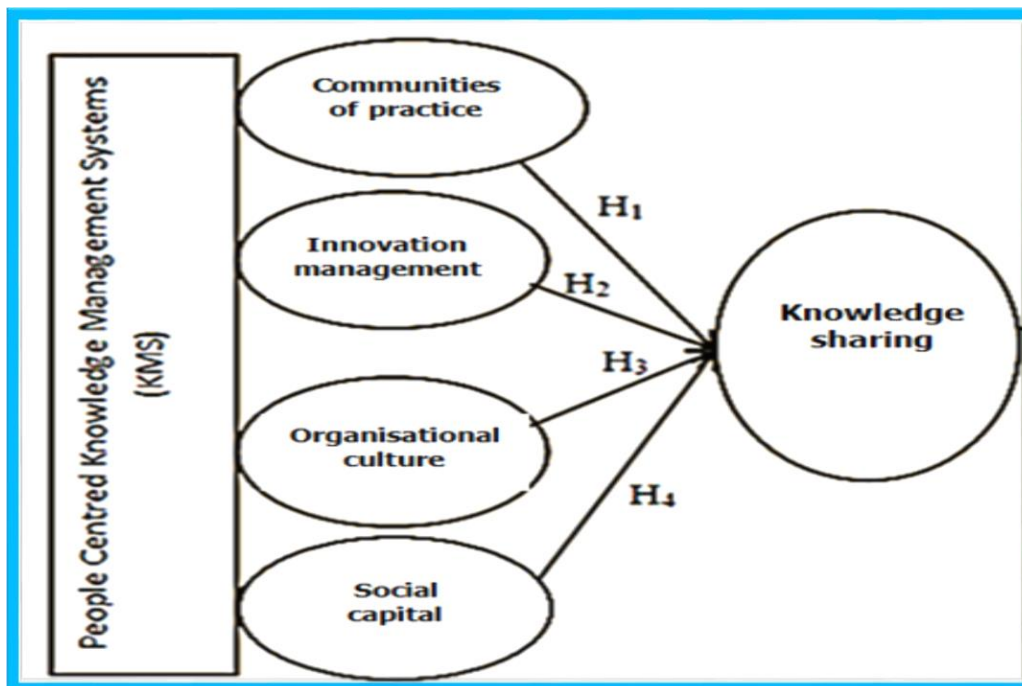
The model in Figure 3.15 explains first the interrelationship between organisational culture and social capital. Secondly, it indicates that all forms of social capital (structural, relational, cognitive) have a positive influence on knowledge sharing. However, the model lacks both an SME context and disregards the influence of knowledge sharing on SCP.

Some authors have argued that social capital improves the knowledge sharing environment. Bharati, Zhang and Chaudhury (2015:459) contend that social capital creates a conducive environment for promoting knowledge exchange. Wu and Lee (2016:525) conclude that social capital has an influence on knowledge sharing within groups and is also crucial in establishing trust amongst the group members. They also argue that social capital indirectly influences the overall competitive advantage of the firm as improved knowledge sharing results in effective knowledge utilisation (Lee, Park & Lee, 2015:895). Lamprinopoulou and Tregear (2011:423) found that the adoption of social networks within SMEs improved knowledge sharing as well as the marketing performance of these small and medium organisations. This finding suggests the effectiveness of social capital within the SME sector, and therefore leads to the following hypothesis:

H<sub>4</sub>: Social capital has a positive influence on knowledge sharing in Zimbabwean SMEs.

Based on the foregoing hypotheses derived and supported by the reviewed literature, the model in Figure 3.16 was presented for testing to conceptualise the relationship between people-centred KMSs and knowledge sharing.

Figure 3.16 depicts the conceptualised view of people-centred KMSs and knowledge sharing as revealed from the reviewed literature. This model was necessary since structural equation modelling requires the researcher to have developed a theoretically valid model that will then be subjected to statistical analysis to validate its fitness with the collected data.



**Figure 3.16: Conceptual model for the people-centred KMSs and knowledge sharing relationship**

Source: Adapted from literature review

### 3.4.3 Section summary

The area of KMSs has been greatly studied with three strategies being the main dividing factors, namely, the IT-centred, people-centred or a hybrid of the two approaches. The large number of

recent studies advocate for an IT-centred perspective and give less attention to the people-centred approach. The studies also suggest that KMS models were meant to enhance explicit-explicit knowledge sharing. However, the evidence on the adoption of KMSs within SMEs suggests that knowledge in this sector was primarily tacit, which required a people-centred approach. Additionally, the immense sums of money and skills requirements associated with the IT-centred approach are difficult to come by in this sector. The level of difficulty is also likely to increase in developing countries that are already faced with technological constraints. The proposed KMSs were thus too complicated to be applied in SMEs and more so in developing countries thereby requiring more research to address the limitation.

The discourse also highlighted that the limited SME evidence was suggestive of a people-centred approach influencing knowledge sharing in organisations. Furthermore, the people-centred approach, though not well-researched, was proposed as the most appropriate method for KMS implementation within SMEs though no model was provided. The limited research coupled with the suggested influence of people-centred KMSs on knowledge sharing then led to the development of the hypotheses to be tested.

### **3.5 CHAPTER SUMMARY**

Research on knowledge management and KMSs is taking centre stage in all disciplines as the world is moving towards an economy of intangibles. The literature on knowledge management has shown that organisational knowledge is categorised as explicit and tacit while KMSs are grouped as either IT-centred or people-centred. IT-centred KMSs (internet, intranet, databases, and artificial intelligence) are more effective in sharing explicit knowledge while people-centred KMSs (CoPs, social capital, innovation management, organisational culture) are best suited for sharing tacit knowledge.

The global trend towards technology has seen more research focusing on IT-centred KMSs, which require complex ICT infrastructure, which is not readily available in developing countries. Inconsistently, even when the infrastructure may be possible, the implemented systems would likely be of less value since it was revealed that knowledge in SMEs is mostly tacit. Moreover, the suggested models for KMS adoption, though clearly outlining the importance of people, were not developed with SMEs in mind, making it difficult for the sector to enjoy the benefits that come with KMSs. Based on the literature evidence, the chapter

suggests that people-centred KMSs are more suitable and affordable for implementing KMSs within SMEs. Hypotheses were then put forward to support this suggestion with empirical evidence. The next chapter looks at knowledge sharing to theoretically understand its mediating effect on people-centred KMSs and SCP within the SME sector.

## **CHAPTER FOUR**

### **A LITERATURE REVIEW OF KNOWLEDGE SHARING AND SUPPLY CHAIN PERFORMANCE**

#### **4.1 INTRODUCTION**

This chapter interrogates the theoretical relationship between knowledge sharing and SCP. This is aimed towards establishing the influence of knowledge sharing as a mediating variable on people-centred KMSs and SCP. The chapter begins by defining knowledge sharing before delineating an overview of knowledge sharing by discussing knowledge sharing activities in both large and small organisations. This background information will be expounded by exploring from literature the knowledge sharing techniques used by SMEs, particularly in their attempts to improve SCP. The ensuing section denotes SCP as the outcome variable by drawing causal concepts from supply chain management (SCM) theories after which the main antecedents and drivers for SCP will be determined. The approach to first deliberate on SCM is motivated by the fact that SCP is a derivative of SCM activities, therefore the two theories are intrinsically interwoven and can hardly be discussed independently.

The chapter then explores how knowledge sharing has been adopted in SME supply chains to improve SME SCP particularly through the exploitation of the abundant knowledge in the sector. This review is important as it provides the theoretical evidence from available literature to help explain how knowledge sharing has been utilised to support SCP and also to identify the current limitations. After exhausting all the possible details in current literature, the discourse then concludes by theorising the relationship between knowledge sharing and SCP.

The hypotheses will allow for the empirical testing of collected data, which then give a new insight into the influence of KMSs in SME SCP through knowledge sharing. The chapter suggests that the adoption of a people-centred knowledge sharing perspective is an antidote to poor SCP for SMEs in developing countries as it is likely to improve tacit knowledge sharing.

## **4.2 CONCEPTUALISATION OF KNOWLEDGE SHARING**

This section outlines, among other issues, the definition of knowledge sharing, the importance of the knowledge sharing process in the success of knowledge management activities in organisations, antecedents and barriers to knowledge sharing and limitations in current knowledge sharing literature. The discussion builds on the KMS to knowledge sharing relationship given in Chapter Three by taking a detailed analysis of knowledge sharing to derive a definition to be used for the study and understand the role of knowledge sharing in SMEs.

### **4.2.1 Overview and definition of knowledge sharing**

Knowledge sharing is a process that employees engage in to gain experience from each other, according to Norfadzilah, Faizuniah, Zinb, Azlina, Yunusc and Asnawic (2016:547). Their study presents knowledge sharing as a human behaviour signifying the process' inclination towards a people-centred perspective. Using three behavioural theories (i.e. planned behaviour, social exchange and reasoned action) to explain the people-centred view to knowledge sharing, they argued that successful knowledge sharing is anchored on an employee's willingness to share knowledge. Edu-Valsania, Moriano and Molero (2016:489) also support the behavioural nature of knowledge sharing and define it as the act of availing one's knowledge with the intention of fulfilling organisational goals. They further argue that since knowledge sharing also involves the sharing of personal experiences, it thus implies that behaviour is more important than technology in the sharing process. The aforementioned views suggest that even though technology is undoubtedly the best modern means of sharing knowledge, its influence is highly dependent on people's behaviour. This is simply because employees usually use



technology for work process enhancement but not as a means of sharing knowledge as argued by Kharabsheh, Bittel, Elnsour, Bettoni and Bernhard (2016:454).

Knowledge sharing has been defined from several other dimensions. Another view is by Hussein *et al.* (2016:485), who define knowledge sharing as a social culture where employees exchange ideas, experiences, expertise as well as explicit and tacit knowledge. Consistently, Podrug, Filipovic and Kovac (2017:633), after reviewing several knowledge sharing definitions from literature, established that knowledge sharing is the dissemination of knowledge framed in the cultural context of the employee as the source. They also noted that knowledge sharing was a voluntary process, which employees engaged in, as such the existence of the process was not necessarily dependent on the availability of formal knowledge sharing structures but on culture. Drawing evidence from all the above opinions, knowledge sharing in a business context can be defined as a people-centred activity, which employees voluntarily engage in to collect knowledge, donate knowledge and fulfil organisational goals.

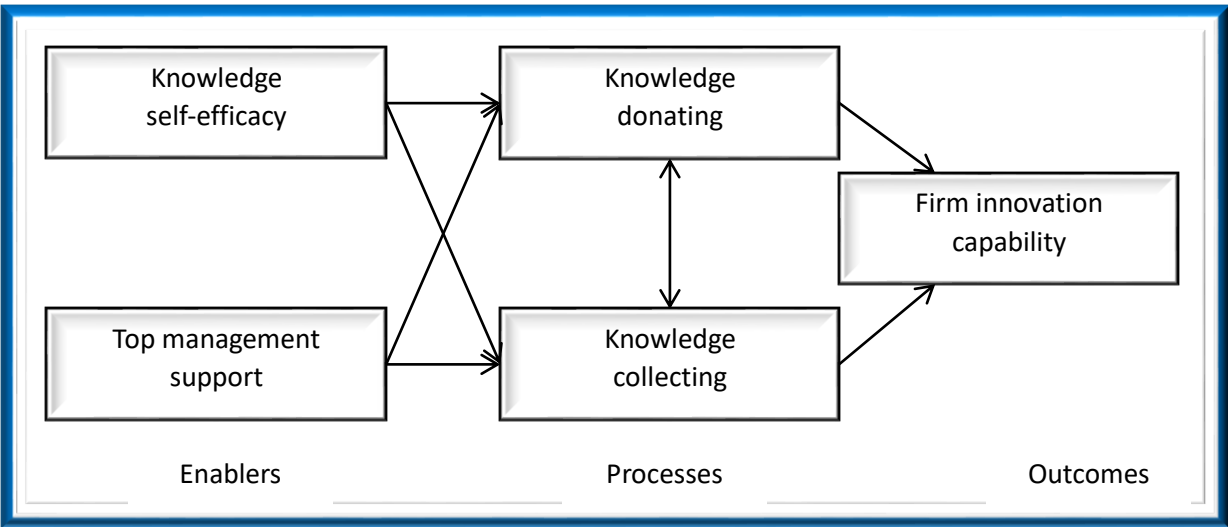
#### **4.2.2 The role and importance of the knowledge sharing process in organisations**

Knowledge sharing has been argued to be the most important knowledge management process in modern organisations since the dawn of knowledge economies (Haas & Hansen, 2007:1140; Norfadzilah *et al.*, 2016:545). Other authors have emphasised the importance of knowledge sharing by arguing that the organisational value of knowledge arises only from sharing (Inkpen, 2000:1024; Jasimuddin, 2008:59; Norfadzilah *et al.*, 2016:547; Asrar-ul-Haq & Anwar, 2016:2). In this manner, other knowledge management processes such as knowledge creation, capturing and storage, though obligatory, are defunct without knowledge sharing (Martini, 2016:81). The foci in this discourse will therefore be centred on understanding knowledge sharing to introduce its role as a primary driver for knowledge utilisation in organisations.

One such effort was made by Becerra-Fernandez and Sabherwal (2010:1), who viewed knowledge sharing as being composed of two major areas, which include knowledge collection and knowledge donation. They stress that knowledge collection involves the employee's interaction with experts to gain new knowledge while they refer to knowledge donation as the voluntary sharing of one's knowledge (Calantone, Cavusgil & Zhao, 2002:519; Prince, Burns & Winsor, 2015:208). They further note that effective knowledge sharing is one that is conducted in a free environment without coercion and is anchored on trust. On comparing the

two knowledge sharing areas, they argue that organisations should conduct both knowledge donation and knowledge collection for best results. They emphasise that knowledge collection without knowledge donation results in poor performance as a result of applying obsolete knowledge to solve performance challenges. Hussein *et al.* (2016:488) support the foregoing categorisation and note that knowledge sharing is an important factor in an organisation. Using innovation capability as an outcome variable for improved organisational performance, they suggest a model (depicted in Figure 4.1) to explain the necessity of knowledge sharing (collection and donation) in an organisation.

The figure shows three stages, namely: the enablers (i.e. knowledge self-efficacy and top management support), processes (i.e. knowledge donation and knowledge collection) and the outcome as firm innovation capability. The model presents interesting insights about knowledge sharing in that it suggests that the entire innovation process is centred on knowledge sharing activities since both knowledge donation and collection are elements of knowledge sharing. The model proves that knowledge sharing plays a pivotal and universal role in improving organisational performance through innovation (Zhang & Jiang, 2014:277).



**Figure 4.1: The influence of knowledge sharing in organisations**

Hussein, Singh, Farouk and Sohal (2016:488)

Literature has continued to present knowledge sharing as a dominant business success factor. The study by Asrar-ul-Haq and Anwar (2016:7), involving a five-year review of global knowledge sharing literature, concluded that knowledge sharing was a dominant success factor in contemporary business settings. Consequently, Witherspoon, Bergner, Cockrell and Stone

(2013:256) viewed knowledge sharing as a modern organisational survival strategy and endorsed the concept as one of the primary building blocks for success. In concurrence to that, Norfadzilah *et al.* (2016:548) highlighted that knowledge sharing, although generally considered a knowledge management process, has a role which spans across the entire knowledge management spectrum making the process mandatory in all knowledge management practices within an organisation. It is therefore evident that knowledge sharing is one of the best business practices that organisations can adopt to improve the value of knowledge resources in a highly competitive and fragile environment.

#### **4.2.3 Antecedents and barriers to knowledge sharing in organisations**

There are antecedents necessary for knowledge sharing in organisations, but they can also be barriers that hinder such activities. Asrar-ul-Haq and Anwar (2016:7) postulate that cultural diversity, reward systems, heavy workload and organisational structure are some of the barriers to knowledge sharing. The study went on to reveal that recent results regarding the barriers to knowledge sharing concurred that lack of trust inhibited both internal and external knowledge sharing immensely. The foregoing analysis of knowledge sharing provides consistent proof of the significance of trust in inhibiting or enhancing organisational knowledge sharing thereby placing people as key players in successful knowledge sharing. Additionally, Kathiravelua, Mansorb, Ramayahc and Idrisd (2014:121) note that social relations, individual willingness, ICT, top management support, nature of environment and openness to change were barriers to organisational knowledge sharing. Conclusively, the study results revealed that in as much as knowledge sharing is important, ignoring trust building and focusing on building supportive structures and incentivising the employees reduces the level of knowledge sharing. Riege (2005:21) agrees but goes on to group knowledge sharing barriers into three categories. However, besides mentioning the individual and group barriers he also adds technology barriers. He argues that technology barriers include failure to use systems, mismatch between offered and required, lack of infrastructure and technical support, reluctance to use ICT systems and lack of training (Chen, Nunes, Ragsdell & An, 2018:482).

The study by Ibrahim and Heng (2015:234) took a broader literature analysis of Malaysian companies to identify knowledge sharing antecedents from both large and small organisations. Their findings are summarised in Table 4.1.

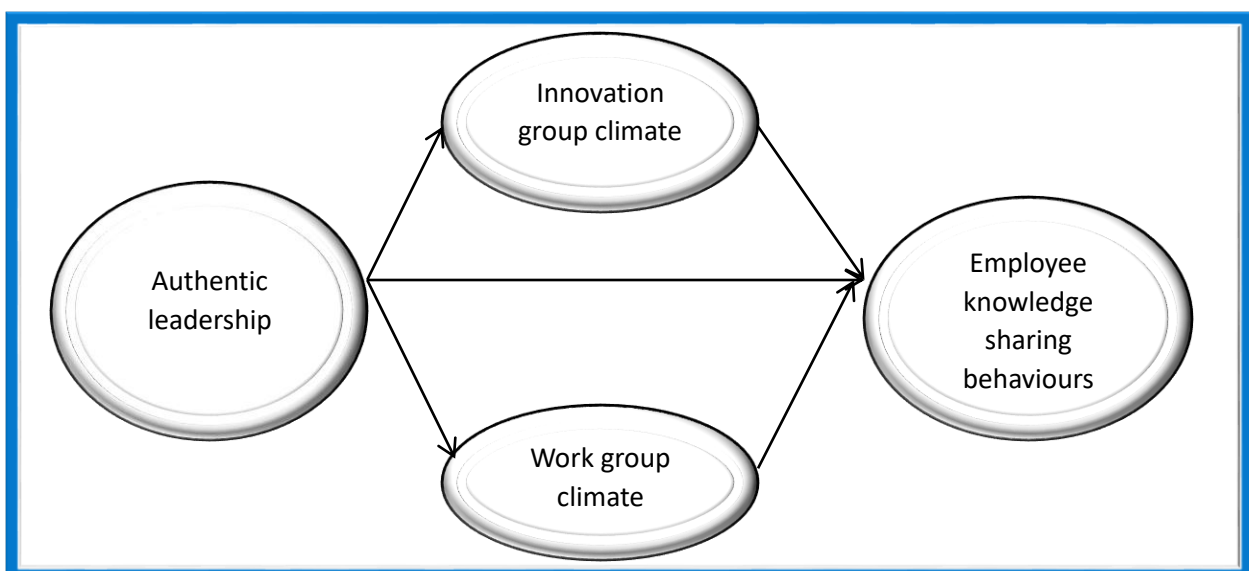
**Table 4.1: Summary of the key factors that influence knowledge sharing**

Knowledge sharing factors	Author
Job satisfaction, job involvement, organisational commitment, organisational citizenship behaviour	Teh and Sun (2012:66)
Incentives, reciprocal benefits, reputation enhancement, loss of knowledge power, enjoyment in helping others, organisational climate, technology	Wu and Zhu (2012:1463)
Achievement, responsibilities, recognition, operational power, promotional opportunities, challenge of work	Hendriks (1999:98)
Perceived losing face, reward, reduced workload, knowledge feedback, personal relationship, knowledge self-efficacy	Zhang and Ng (2012:77)
Knowledge technology (ICT), motivation, reward system, trust, empowering leadership, formalisation	Eze <i>et al.</i> (2013:210)
Individualism, collectivism, social network, trust, shared goal, Incentive system, Kiasuism, Self-efficacy, Attitude	Fathi <i>et al.</i> (2011:57)
Attitude, intention, individual technology usage, incentives, reciprocal benefits, reputation enhancement,	Chatzoglou and Vraimaki (2013:260)
Loss of knowledge power, enjoyment in helping others, technology, organisational climate	Anitha (2006:54)
Loss of personal competitiveness, trust, expected, contribution, learning, capability, fairness, supportive leadership, openness and ICT	Yee (2010:45)
Attitude, self-efficacy, subjective norm, rewards, social networks, Trust	Jolae (2012:65)

**Source: Adapted from Ibrahim and Heng (2015:234)**

The antecedents stated in Table 4.1, are mostly people-centred, for instance, organisational climate, fairness (Anita, 2006:54), attitude, intention, and individual technology usage (Chatzoglou & Vraimaki, 2013:260). More importantly the study by Hendriks (1999:98), which looked at the influence of ICT on knowledge sharing, identified only people-centred factors, namely: achievement, responsibilities, recognition, operational power, promotional opportunities and challenge of work. Although technology/ICT is also mentioned as one of the antecedents, its mention is very scarce and associated with studies on large organisations. The findings further substantiate the need for a people-centred perspective for promoting knowledge sharing in small organisations such as SMEs.

Trust is one of the commonly identified knowledge sharing antecedents in extant literature. Asrar-ul-Haq and Anwar (2016:8) highlighted that the existence of trust was a major antecedent in determining positive knowledge sharing in large organisations. Additionally, Eze, Goh, Goh and Tan (2013:210), besides mentioning trust, also identified other factors such as formalisation, motivation, reward systems and empowering leadership as SME specific antecedents to knowledge sharing. Thus, the continued emphasis on trust in both large and small organisational research studies further buttresses the view that the antecedent is primary to effective knowledge sharing within organisations. Other knowledge sharing antecedents as identified by Edu-Valsania *et al.* (2016:492), are summarised in the model in Figure 4.2.



**Figure 4.2: Antecedents of knowledge sharing**

Source: Edu-Valsania, Moriano and Molero (2016:492)

Figure 4.2 takes a behavioural approach to outline knowledge sharing antecedents and identifies authentic leadership, work group climate and innovation group climate as influencing factors to employee knowledge sharing behaviour. The study found that adoption of authentic leadership improved openness and trust amongst employees while work and innovation climate made the environment more conducive thereby increasing knowledge sharing behaviour. Witherspoon, Bergner, Cockrell and Stone (2013:253) categorise knowledge sharing antecedents into three groups, namely: intentions and attitudes; organisational culture; and rewards to knowledge sharing, basing their views on a three-year literature survey. These are illustrated in Figure 4.3.



**Figure 4.3: Antecedents of organisational knowledge sharing**

Source: Witherspoon, Bergner, Cockrell and Stone (2013:253)

As widely noted in extant knowledge sharing literature, the above model posits that the employee intentions and attitudes category encompasses antecedents such as intention to share knowledge, attitude towards knowledge sharing, knowledge self-efficacy and intrinsic knowledge sharing motivation. The organisational culture category has key cultural factors such as communication, participation, subjective norms, social trust (Javadi, 2012:213; Kumar & Che Rose, 2012:145; Mueller, 2014:193), organisational commitment, social networks, support for knowledge sharing, shared goals and knowledge sharing resources and technology. The third category is composed of rewards to knowledge sharing such as anticipated pay increases, anticipated promotions, anticipated reciprocal relationships, and reputation building.

Generally, it is clear that an extensive body of knowledge management literature provides evidence of knowledge sharing antecedents using varying terminology and categorisation. However, a close analysis of nearly all of the stated antecedents shows that none can be fully supported through absolute use of technology. Contrary to the general belief that technology adoption will improve knowledge sharing, the nature of the above reviewed antecedents suggests that knowledge sharing can best be improved through a people-centred approach. Nevertheless, all the reviewed studies were lacking in providing knowledge sharing antecedents for SME supply chains and none suggested KMSs as antecedents to knowledge sharing.

#### **4.2.4 Current limitations in knowledge sharing literature**

Although there is a growing interest in knowledge management literature to study the concept of knowledge sharing, the breadth of studies has been limited as alluded to earlier and supported by Ahmad and Karim (2019:207). Hitherto, most knowledge sharing studies have focused on knowledge sharing behaviour (Bock, Zmud, Kim & Lee, 2005:89; Cavaliere & Lombardi, 2015:144; Asrar-ul-Haq & Anwar, 2016:1; Edu-Valsania, Moriano & Molero, 2016:487; Podrug, Filipovic & Kovac, 2017:634); barriers to knowledge sharing (Ardichvill & Wentling, 2003:64; Casimir & Loon, 2012:740), antecedents of knowledge sharing (Cabrera, Collins & Salgado, 2006:247; Martini, 2016:87); knowledge sharing and innovation (Liebowitz, 2002:2; Liao, Fei & Chen, 2007:8; Hussein, Singh, Farouk & Sohal, 2016:484). Some of the studies (Lin & Chen, 2008:83; Javadi, 2012:210; Wang, Wang & Liang, 2014:230) only relate knowledge sharing to organisational performance but not to SCP. There has been no study to understand the effect of people-centred KMSs on knowledge sharing and how it impacts on the performance of SME supply chains.

It is also visible that there is a dearth in literature on knowledge sharing in SME supply chains and more so from a developing country perspective. In fact, the knowledge sharing literature survey by Asrar-ul-Haq and Anwar (2016:13) highlighted a lack of knowledge sharing research coverage in developing countries and called for similar research studies in developing countries. Yet the data sample they used though detailed, also provided evidence that even in developed countries knowledge sharing issues have not been fully addressed from an SME SCP perspective. Current literature is only comprised of fragmented evidence on knowledge sharing and SCP, thus, there is a need to bring all these disjointed views together and evaluate their influence on SME performance.

### **4.2.3 Section summary**

The discussion minimised the challenges that arise as a result of different ways in which knowledge sharing has been defined by deriving a definition to be specifically used for the current study. The foregoing discourse showed that there are varying views on the importance and role of knowledge sharing but all studies converge on organisational knowledge value improvement. Furthermore, various antecedents of knowledge sharing (for instance culture, ICT, technology, intentions, and willingness to share) were identified. Generally, the nature of the antecedents identified were mostly dependent on the KMS in use. However, all studies singled out trust as the primary antecedent in promoting knowledge sharing regardless of whether the KMS used was people-centred or IT-centred.

It was also unearthed that over and above facilitating tacit-explicit knowledge conversion, knowledge sharing amongst employees always precedes other knowledge management processes such as knowledge creation, capturing and storage. Conclusively, the discourse presented knowledge sharing as a people-centred activity, which can hardly be fully supported through technology, thereby proving the importance of people in influencing the knowledge sharing process within an organisation. Consequently, discussions on the SME context revealed that knowledge sharing was a new concept in the sector, was highly unstructured, based on manual interaction and knowledge was mainly tacit. In addition, there was limited research outlining the relationship between knowledge sharing and SCP in the sector, thus, the current chapter seeks to fill this missing link in literature.

## **4.3 ORGANISATIONAL METHODS OF KNOWLEDGE SHARING**

Though acknowledging the existence of several methods of knowledge sharing, this section makes inroads to identify only those methods that are applicable in an organisational setup. The discussion will also delve into SME literature to establish the methods that this sector has used to share knowledge. The inquiry into the knowledge sharing methods used by SMEs is meant to build up the preliminary facts to support or disapprove the role of knowledge sharing in influencing SME SCP.



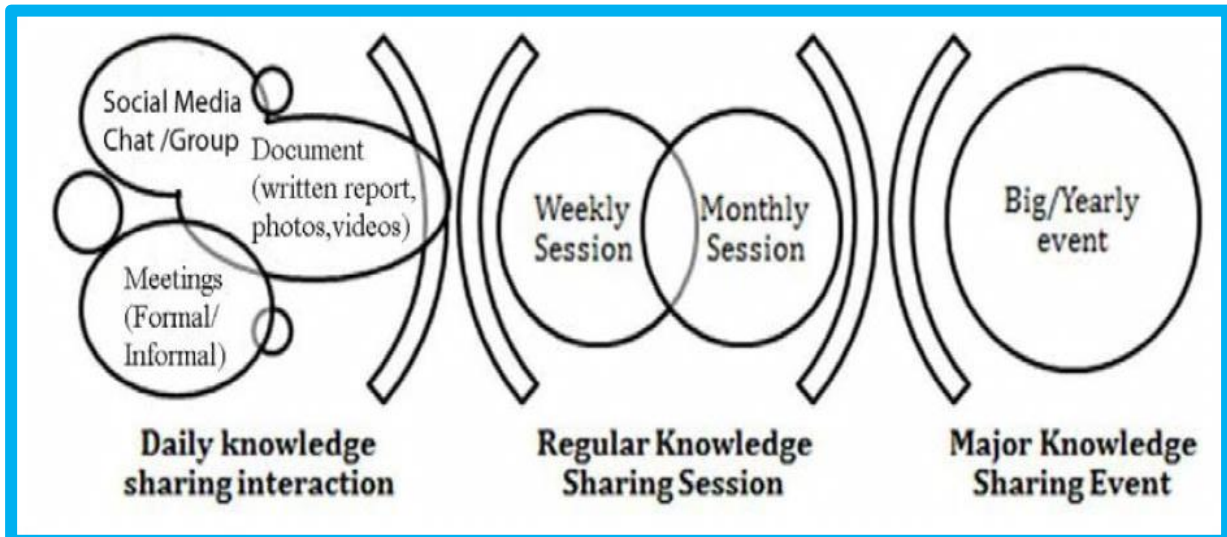
### **4.3.1 Methods of knowledge sharing**

Organisations intending to implement knowledge sharing can adopt any of the existing methods based on their strategy and expectations. Riege (2005:21) maintains that the method of knowledge sharing a company can adopt is greatly influenced by company size, nature of knowledge (tacit/explicit), frequency of sharing, and nature of receiver (group/individual). In support of the knowledge receiver perspective, Calantone, Cavusgil and Zhao (2002:518) argue that organisational knowledge sharing occurs at both the individual and collective level, thus, knowledge sharing should never ignore the sharing context (Nguyen, 2020:3). According to Nonaka (1994:110), knowledge sharing can also take place through informal and formal methods. Knowledge management literature agrees that formal knowledge sharing methods are institutionalised by the company's management and include meetings, handbooks and operating procedures. While informal knowledge sharing takes place within informal networks or grouping that include gatherings during meals and social activities. However, Riege (2005:20) notes that even when organisational knowledge sharing is institutionalised, the greater percentage of such activities has been known to happen within informal settings.

Most of the knowledge sharing methods adopt a more people-centred approach, rendering people as key players in knowledge sharing activities. Bashouri and Duncan (2014:51) identified storytelling, dialogue, conversations, lessons learnt and best practices as some of the knowledge sharing methods used in large organisations. The World Bank (2016:14) reports recognised knowledge sharing methods such as action learning, discussion groups, learning by observation, shared workspace interactions, and CoPs as some of the informal techniques used by organisations to disseminate knowledge. The report also groups methods such as interviewing experts, project teams, e-learning, e-mail groups, learning by being told, community yellow pages, learning from others, adhoc sessions, road maps, learning histories and CoPs as formal knowledge sharing strategies in large organisations (Laycock, 2005:526).

In large organisations, knowledge sharing methods adopt a socio-technical approach, which combines people-centred methods with technology. Riege (2005:21), taking a bias towards large enterprises, categorises knowledge sharing methods into five categories, which include serial transfer (one team shares knowledge in varying settings), near transfer (explicit

knowledge from one team is shared with another team), far transfer (tacit knowledge shared between two teams carrying out similar tasks), expert transfer (teams sought explicit knowledge from experts to accomplish task). While Martini (2016:88) categorises knowledge sharing techniques for the public sector into three major areas, including daily knowledge sharing interactions, regular knowledge sharing sessions and major knowledge sharing events. The sub-techniques are summarised in Figure 4.4.



**Figure 4.4: People-centred knowledge sharing methods in public organisations**

Source: Martini (2016:88)

The model in Figure 4.4 shows that daily knowledge sharing interaction is comprised of individual and group social media chats, formal and informal meetings as well as shared reports, photos and videos (Singh, Chandwani & Kumar, 2018:21; Aboelmaged, 2018: 362; Naeem, 2019:257). The regular knowledge sharing session category has weekly and monthly sessions where experts meet to exchange and share views, experiences and challenges including solutions to major challenges. Finally, the major knowledge sharing event is the climax of all annual knowledge sharing activities where reviews are made, and lessons learnt documented for future reference. The study proposes that adopting such organised knowledge sharing activities will improve public organisations such as cities. The model supports the importance of knowledge sharing in the attainment of positive organisational performance though it took a much more generalised approach to organisational knowledge sharing. Chen *et al.* (2018:486) support the view by adopting a more specific approach and contend that knowledge sharing can

be conducted through internal workshops, tutoring schemes, routine meetings, annual seminars and an annual work summary.

#### **4.3.2 Knowledge sharing practices in the small to medium enterprise sector**

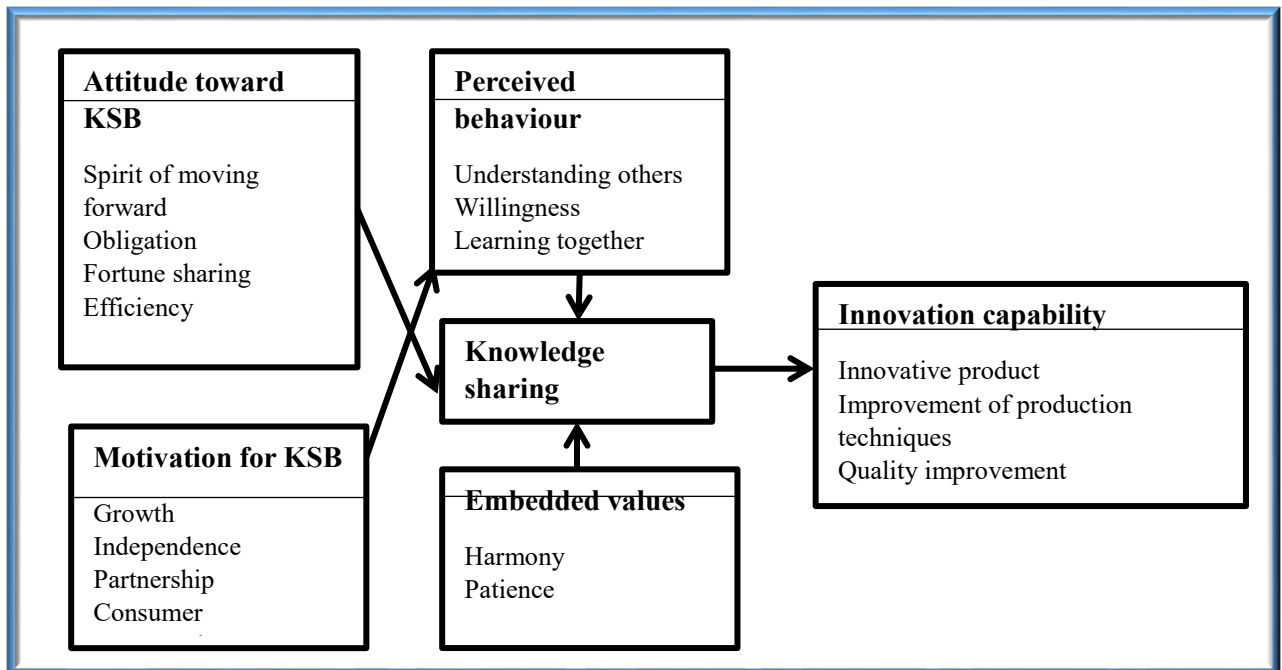
Many studies argue that knowledge management has been lowly valued by players in the SME sector (Anitha, 2006; Omerzel & Antoncic, 2008:1182). Nevertheless, knowledge sharing remains an important knowledge management process within these small organisations (Desouza & Awazu, 2006:32; Valkokari & Helander, 2007:597; Burke, 2011:12). Proving the existence and necessity of knowledge sharing in SMEs, Burke (2011:5) argues that knowledge sharing activities in SMEs begin naturally as information sharing and matured until adopted as formal activities. In support, Valkokari and Helander (2007:604) had earlier asserted that knowledge sharing is the primary ingredient for the establishment of business networks within the SME sector. Furthermore, SMEs need to engage in an unending “hire-train-leave” cycle as employees leave, since these organisations do not have enough resources to retain skilled manpower. Such a situation makes knowledge sharing mandatory as new employees will require training before resuming normal duties. These studies provide evidence to the existence and necessity of knowledge sharing activities in SMEs; thus, the succeeding paragraphs discuss these activities within the SME sector.

In reviewing knowledge management processes in SMEs, Nunes, Annansingh, Eaglestone and Wakefield (2006:103) note that most SMEs did not have formal knowledge management structures. They attributed the low adoption levels of knowledge management in SMEs to lack of formalised recording, sharing and exploitation of organisational knowledge (Fink & Ploder, 2009:37). They found that SMEs were only collecting and gathering knowledge and not considering it as an organisational resource resulting in low knowledge utilisation as noted by Wong and Aspinwall (2005:66). The study then concluded that although knowledge sharing proved to be important for SMEs, it was being conducted in a less formal way and not influenced by ICT availability. Riege (2005:20) agrees and notes that ICT plays a secondary role in knowledge management, which is that of providing support for sharing knowledge, but the people are the primary players. The aforementioned views, however, do not deny the existence of knowledge sharing in SMEs but rather suggest that these activities exist in an informal and social context with limited ICT utilisation.

SMEs are founded by highly knowledgeable individuals (Desouza & Awazu, 2006:33), hence knowledge is their source of competition as highlighted by Cuozzo, Dumay, Palmaccio and Lombardi (2017:10). The study highlighted that SMEs are poorly funded, cannot afford ICT equipment and have unskilled labour (McAdam & Reid, 2001:232), thus socialisation between owner/manager and employees is their main method of knowledge sharing. They also noted that such socialisation enhances the availability of common knowledge about the organisation amongst the employees. This outcome was seen to remarkably reduce the impact of knowledge loss when employees leave the company. Additionally, they found that SMEs rely more on available knowledge (mostly from external sources) due to lack of resources to create their own knowledge. Interestingly the study revealed that most SMEs were not free to share knowledge with other organisations although they expected these organisations to avail all the knowledge they possessed.

Like many knowledge sharing studies, Sulistiyani and Harwiki's (2016:746) also looked at SME knowledge sharing by drawing a relationship between KSB and innovation. The study identified the variables that influence KSB within an SME and proposed the model presented in Figure 4.5.

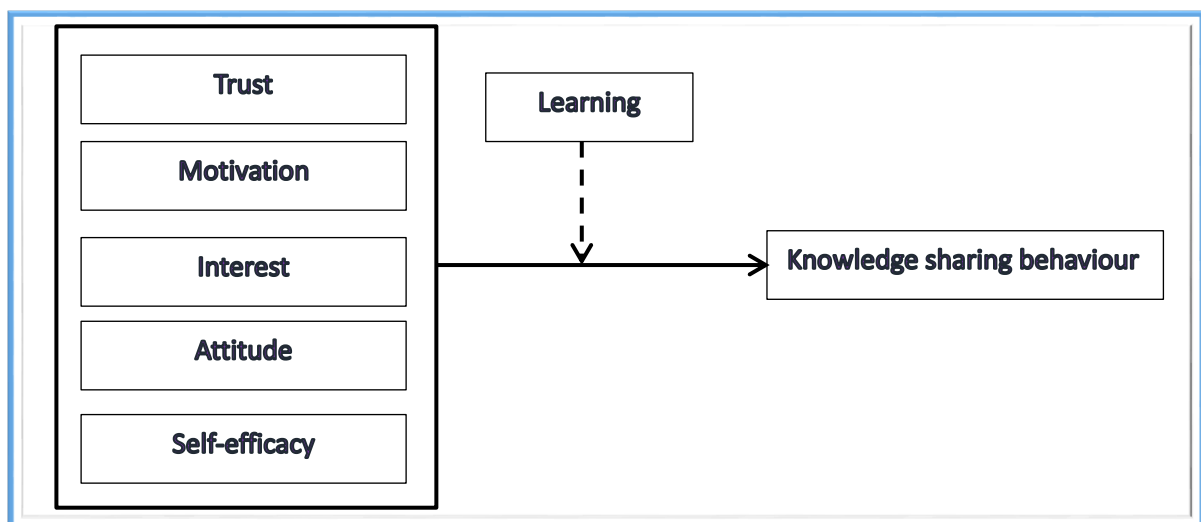
The model gives an illustration of various variables that influence KSB in SMEs such as motivation for KSB, embedded value, perceived behaviour, and attitude toward KSB. The model indicates that SMEs are motivated to share knowledge by factors such as the need to grow, to be independent, acquire partnerships and consumer consumption. Similarly, embedded values such as patience and harmony drive SMEs to share their knowledge with other organisations. Their attitude to share knowledge is influenced by the spirit of moving forward, obligation, fortune sharing and efficiency. The study found a largely positive correlation between SME knowledge sharing behaviour and the level of innovation. They concluded that positive KSB between SME owner/manager and employees as well as within SME clusters will enhance innovation capability, sustainability and competitiveness. Thus, the study also presents knowledge sharing as a behaviour thereby agreeing with most authors on the nature of knowledge sharing and further argues that its adoption in SMEs improves innovation capability.



**Figure 4.5: Knowledge sharing and innovation in SMEs**

Source: Sulistiyani and Harwiki (2016:746)

Some authors have developed models for antecedents of knowledge sharing within the SME sector. Ibrahim and Heng (2015:235), after a review of knowledge sharing literature, then hypothesised knowledge sharing antecedents in SMEs using the model shown in Figure 4.6.



**Figure 4.6: Factors influencing knowledge sharing in SMEs**

Source: Ibrahim and Heng (2015:235)

The model in Figure 4.6 presents knowledge sharing in SMEs from a behavioural perspective similar to most of the large company research. Thus, knowledge sharing is generally viewed as a people-driven process by most academics. The study also identifies the same antecedents as in large companies, suggesting that there are limited differences between the two environments in terms of factors that motivate employees to share knowledge. The study identifies motivation, interest, attitude, trust and self-efficacy as factors influencing knowledge sharing in the sector (Pour & Taheri, 2019:98). Consistent with the dominance of the people-centred perspective, none of the factors can be classified under the technology cluster when the Riege (2005:21) model is applied. Therefore, technology can be taken to exert little influence on knowledge sharing activities within the SMEs and the best approach would be the adoption of people-centred strategies.

One study that looked at barriers to knowledge sharing in SMEs in developing economies was by Burke (2011:11), who cited factors such as government, historical culture of secrecy, fear and missed opportunities (Wang, Yi- Wang & Chang, 2019:1039). He recommended that these barriers can be overcome by desire for collective improvement, being better than developed countries and push for government support. The barriers mentioned are all centred on lack of trust while the recommendations are mostly successful through building trust amongst stakeholders. Thus, promotion of a people-centred knowledge sharing perspective is best suited for the SME environment since it is difficult to build trust through technology.

### **4.3.3 Section summary**

The above discourse presents a clear picture of the knowledge hoarding nature of SMEs implying a low level of knowledge sharing amongst SMEs and a high level between SMEs and large organisations since the latter freely share knowledge. The scenario suggests that the current knowledge that SMEs are relying on are the experiences of large companies and to a lesser extent SMEs in the same sector. In view of the previously outlined impossibility of superimposing large company strategies to improve SMEs it means that there is a need to promote knowledge sharing amongst SMEs to enhance the utilisation of relevant ideas. These studies reveal that knowledge sharing activities within and amongst SMEs will be stalled since these organisations are mostly biased towards knowledge hoarding and not prepared to share their resources. Consistently, knowledge sharing in SMEs showed the supremacy of the people-

centred perspective as studies continued to place more emphasis on sharing through face-to-face methods as was the case with large companies.

The reviewed literature further presents knowledge sharing in both large and small organisations from a behavioural perspective suggesting that the subject can best be addressed from a people-centred approach. The discussion also revealed that knowledge sharing methods in both large and small organisations were generally categorised into three groups namely: individual, technology and organisation. However, it was ascertained that the technology cluster whenever used was mostly associated with large companies and rarely mentioned in small companies. This outcome was seen to be influenced by the type of knowledge. For instance, knowledge resources in large companies were in explicit form and hence easily shared using technology but for small companies they were in tacit form which hardly required technology.

#### **4.4 KNOWLEDGE SHARING AND KNOWLEDGE MANAGEMENT SYSTEMS IN SUPPLY CHAIN MANAGEMENT**

This section challenges the existing knowledge on knowledge sharing within a supply chain by introducing a third variable in the form of KMSs, which has previously been ignored. The section probes the existing knowledge on knowledge sharing by investigating knowledge sharing and KMSs in supply chain management.

##### **4.4.1 Knowledge sharing in supply chain management**

The term supply chain management (SCM), ever since it was coined by Oliver and Webber in the early 1980s (Huang, Tan & Ding, 2015:80), has grown to be accepted as a business concept and is now believed to improve organisational performance (Wang, Fergusson, Perry & Antony, 2008:147). Patil and Kant (2016:1) define supply chain management (SCM) as the organisation's collective efforts to convert inputs into outputs for efficient delivery to the end customer (Antonioll, 2016:31). Recent SCM studies postulate that modern supply chains have shifted focus from logistics and cash flows to efficient knowledge flows and knowledge sharing among partners (Awheda, Rahman, Ramli & Arshad, 2016:312). The contention that adoption of knowledge management practices such as knowledge sharing improves both supply chain

integration and attainment of a competitive advantage is also clearly delineated (Tyndall *et al.*, 1998:55; Mentzer *et al.*, 2001:3; Singh and Sharma, 2014:180).

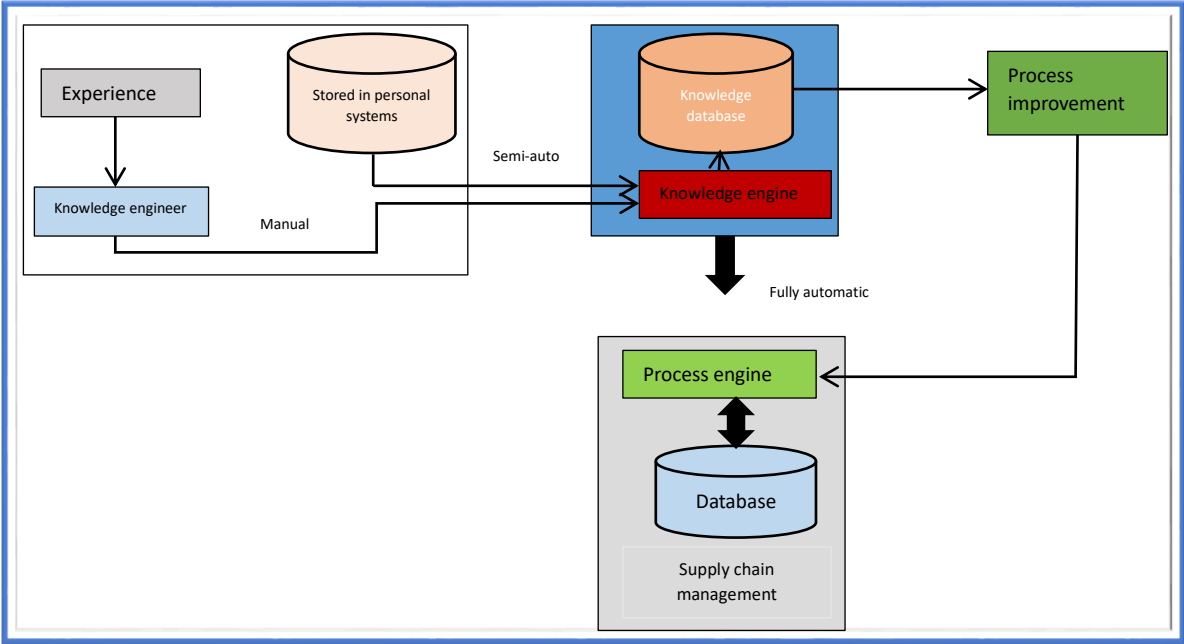
Elaborating on the integrative perspective of the supply chain, Desai and Rai (2016:1021) postulate that SCM is the integration of key business processes (i.e. downstream and upstream) for the provision of value adding products and services to the customers and stakeholders. In furtherance to that, Shakeriana, Dehnavia and Shaterib (2016:177) argue that the knowledge sharing process is a key competitive advantage for a successful supply chain based on trust (Cheng, Yeh & Tu, 2008:283) and present the process as an important tool for integrating supply chains. Outstandingly, they (Shakeriana *et al.*, 2016:179) found that the level of supply chain integration was strong if people-centred strategies were adopted and weak when using technology-centred strategies. Reliably, Wu (2008:245) found that Taiwanese companies preferred a soft human-oriented approach rather than the hard technology-oriented approach to SCK sharing.

Extant SCM literature emphasises stakeholder-customer collaboration through information sharing (Desai & Rai, 2016:1023); supply chain partnerships (Yu, Yan & Cheng, 2001:116; Patil & Kant, 2016:5) and social networks (Capo-Vicedo, Mula & Capo, 2011:380; Cheng, Yeh & Tu, 2008:284) as measures to mitigate for uncertainties within a supply chain (Hallavo, 2015:78). Notably, all these studies recommend the sharing of knowledge as a key strategy for achieving successful SCM. The perspective puts knowledge sharing (at times used interchangeably with information sharing) at the centre of successful SCM. Barrat (2004:32) backs the importance of knowledge sharing and argues that successful knowledge sharing in SCM must be vertical (i.e. collaboration internally, with suppliers and customer) and horizontal (i.e. collaboration externally, with other organisations and with competitors).

Literature has shown that knowledge sharing improves supply chain management operations. Desai and Rai (2016:1024) also conducted a study that supports the pivotal role of knowledge sharing in SCM. The study viewed the entire supply chain process as involving manual, semi-automatic and fully automatic knowledge sharing activities. The social activities are presented as manual in nature and thus require human intervention, tacit-explicit knowledge conversion and sharing. Fully automatic activities require computerised systems such as ERP systems) to transfer explicit knowledge through data mining and business intelligence techniques. For instance, experience regarding the supply chain (tacit knowledge) is coded by a knowledge



engineer into a format that can be captured into the knowledge database. Explicit knowledge (sales figures, demand projections, supplier and customer details) is stored in individual systems and transferred directly into the knowledge database. Finally, the two (tacit and explicit knowledge) will comprise the created organisational knowledge resources (Wu, 2008:243). Therefore, though not outrightly stated, their framework proposes the use of socio-technical KMSs as fully illustrated in the model below.

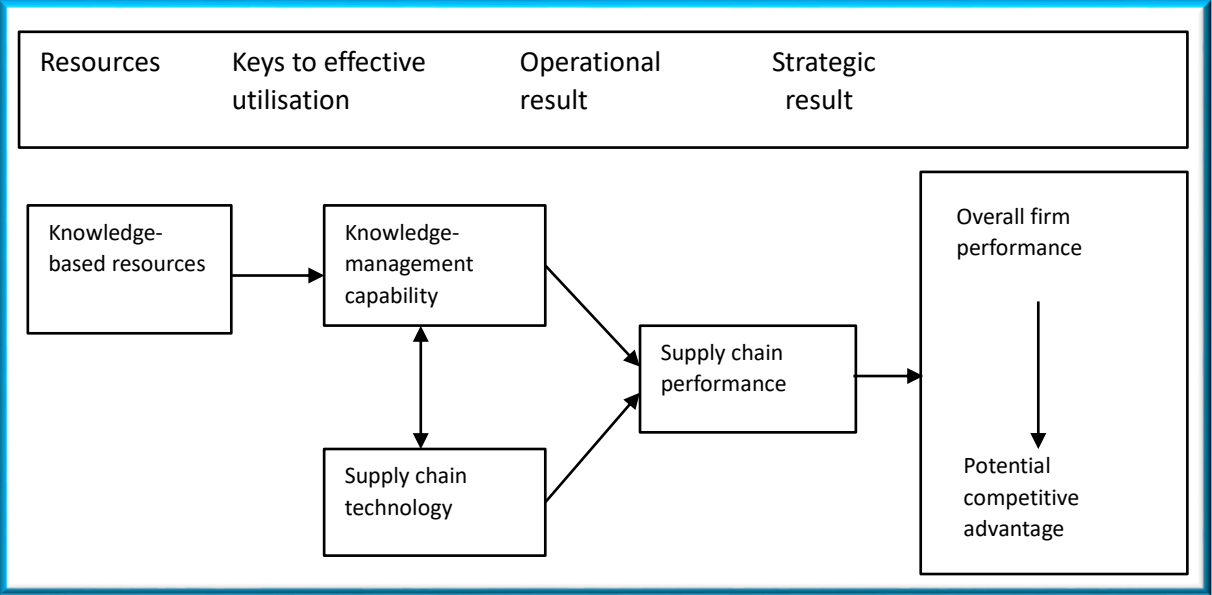


**Figure 4.7: Knowledge management, collaboration and supply chain management**  
 Source: Desai and Rai (2016:1024)

The model gives a picture of a socio-technical KMS perspective integrating knowledge resources and supply chain technology. The knowledge resources are then used to improve the supply chain management cycle and the lessons learnt are stored in the knowledge database for future use. These lessons are later accessed using techniques such as natural language processing, machine learning and deep learning to improve the SCM cycle, for instance, in demand forecasting, the information about sales and demand is retrieved to aid in making appropriate and accurate decisions. In using the model to test for collaborative decision making, the study found that the main hindering factor was low technology utilisation which resulted in low knowledge sharing within the supply chain (Desai & Rai, 2016:1026).

Persistently the provision of supply chain technology and experts such as knowledge engineers has remained a challenge to SMEs (Lee & Wong, 2015:719; Alamgir, 2015:106), making it

difficult for these companies to benefit from such complex systems. The outcome unveils technology limitations in supporting supply chain activities through knowledge sharing thereby isolating the people-centred approach as a panacea to effective collaboration in SCM. Woolliscroft, Caganova, Cambal, Holecek and Pucikova (2013:213) explain the adoption of knowledge management in supply chains using the value creation process and propose the model in Figure 4.8.



**Figure 4.8: Systematic knowledge management strategy process for supply chains**  
 Source: Woolliscroft *et al.* (2013:213)

The model depicts that knowledge resources can be utilised to improve SCP (Collins, Worthington & Romero, 2010:950). The initial phase indicates that the company is endowed with knowledge resources, which are utilised through combining knowledge management capabilities with supply chain technologies. The operational outcome from the combination of activities will be improved SCP while the strategic outcome will be overall firm performance and a sustainable competitive advantage. The study concluded that integrating knowledge management in an organisational supply chain has a positive impact on a firm’s performance. However, the model lacks evidence on the influence that can be exerted by a particular KMS (technology-centred or people-centred) particularly for SMEs since a generalised approach to knowledge management was again used more so in a large organisation context.

There have been limited studies on how supply chain performance can be implemented in SMEs particularly for countries such as Zimbabwe. The study by Simamora, Aiman and

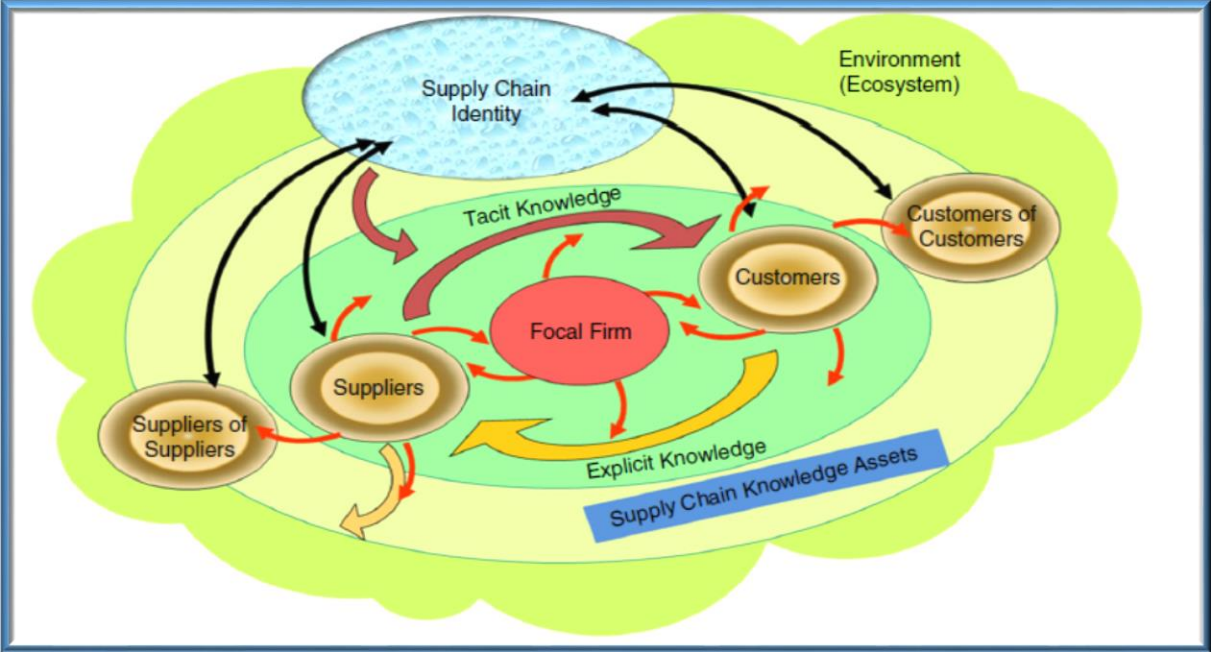
Subiyanto (2016:40) is one of the few research studies on SME supply chains. Awgheda, Ab-Rahman, Ramli and Arshad (2014:640) also denote that there is a scarcity of studies on SCM activities in SMEs particularly for developing countries. Based on the contentions by Barrat (2004:35), the study by Simamora *et al.* (2016:47) identifies success factors of SME SCM collaboration as the vertical collaboration (i.e. internal, market and suppliers) and horizontal collaboration (i.e. external, knowledge institution, competitor, training). As such, SMEs' knowledge sharing strategy need not focus on customers in the vertical collaboration strategy, and also not on other organisations in the horizontal strategy, instead they need to be concerned about the market, suppliers, training and knowledge institutions. However, a low customer-oriented focus may result in failure to meet customer needs and demands.

SMEs have been noted to face supply chain related challenges. Another study by Awgheda, Rahman, Ramli and Arshad (2016:313) notes that SME challenges such as delivery of poor products and delays in delivery are a clear demonstration of the shortcomings in the SME supply chains. Based on results from Malaysian and Ugandan SMEs, they concluded that the major barrier to successful supply chains in small organisations was a lack of SCK suggesting that adoption of knowledge management would help improve the situation. On the one hand, they found that a partnership within a cluster of companies improved both knowledge sharing and resultantly SCM. On the other hand, Wang *et al.* (2008:151) argue that every member of the supply chain has its own distinctive core competencies that determine its survival, which the company cannot share even when the members are partners. Thus, knowledge sharing practices within a supply chain must, over and above promoting knowledge flows, also address the challenge of how and what to share. This challenge can best be addressed by factoring in KMSs into SCM partnerships as these systems will determine the nature of knowledge to be captured; how to code, store and transfer knowledge while maintaining confidentiality.

#### **4.4.2 Knowledge management systems in supply chain management**

The subject of KMSs has not been well addressed in SCM literature besides a few unrelated suggestions dotted in extant literature. The main cause is the theoretical orientation in which the studies are presented. Yet practical enterprises such as SMEs though requiring theoretically sound models also need solutions that can be practically implemented using limited resources. However, literature has remained at a secondary level since knowledge management has been tackled from a broad generalised view without giving specific details on how it can be

implemented. It is only when the practical aspect (tackling knowledge management at KMS level) is clearly outlined that organisations can follow through and easily adopt the proposed models to improve their SCs. Wang *et al.* (2008:158) argue that the solutions academia provides to enterprises must be practically applicable in terms of efficiency, effectiveness, relevance and complexity. It is with relevance and complexity that current knowledge management and knowledge sharing literature has failed to address challenges facing the SME sector. For instance, solutions relating to utilising knowledge sharing to improve supply chain collaboration amongst partners are mainly IT-centred using complex KMSs such as ERP systems (Forslund, 2010:352; Antonioli, 2016:46; Awgheda, 2016:315), which SMEs cannot afford. The more applicable solutions that suggest a people-centred approach are depicted in Figure 4.9.



**Figure 4.9: Knowledge management systems in supply chains**

Source: Ramish and Aslam (2016:716)

The model in Figure 4.9 depicts the building of a supply chain identity through knowledge sharing, which has seen the success of companies like Toyota (Dyer & Nobeoka, 2000:346). In this scenario, new networking and knowledge sharing systems are put in place that encompass all supply chain factors and stakeholders for an organisation. SCK is shared amongst the customers, suppliers and the focal company such that every stakeholder can identify with the supply chain. In this setup, the focal company strategically makes the rules that govern the

sharing of SCK (i.e. both tacit and explicit knowledge) thereby building shared SCK assets. The model promotes a people-centred approach where relationships and trust within the supply chain is strengthened through inter-organisational assistance, social visits and multi-lateral knowledge sharing within the supply chain. Thus, the successful implementation of the model at Toyota is an indication of the effectiveness of adopting a people-centred approach to knowledge sharing within a supply chain. Furthermore, the outcome reveals that a strategic approach that governs and controls knowledge sharing within a supply chain improves supply chain identity and thus strengthens stakeholder trust (Ramish & Aslam, 2016:715). Such a result is most likely the key to the success of most SMEs in developing countries.

Regardless of such evidence, KMS literature has limited support for people-centred approaches that improve SCP. Focus has remained on the types of KMSs (i.e. IT and people-centred; socio-technical) (Maier, 2007:35; Hasan & Crawford, 2007:238); level of KMS adoption in organisations (Woodman & Zade, 2012:185; O'Connor & Kelly, 2017:160), defining KMS composition (Scuotto, Giudice, Bresciani & Meissner, 2017:641), outlining KMS factors, as well as challenges (Nikabadi, 2014; Wibowo & Grandhi, 2017:1229). Thus, research has lacked in providing a clearly outlined model to expand on how KMS adoption in organisations can improve or solve business challenges such as poor SCP. The near effort to fill the gap was initiated by Woolliscroft *et al.* (2013:215) who studied Slovakian companies and recommended that organisations only develop relevant KMSs if they are to benefit fully from knowledge management adoption in supply chains. The study also recommended development of knowledge experts and cited people as key players in fostering a knowledge-based supply chain. Such results give further evidence that adoption of KMSs to improve SCM should be strategic, companies should measure strategy relevance before implementation and lastly, KMSs should be people-centred for best outcomes.

#### **4.4.3 Section summary**

The section looked at knowledge sharing and KMSs as they have been applied in supply chain management. The views from the discussion reveal member/partner collaboration as the best approach to successful SCM. In support of this outcome, knowledge sharing was presented as the best tool for achieving supply chain collaboration. Nevertheless, not all knowledge can be shared as companies should remain distinct even if they are partners. The review of literature also shows that little evidence has so far been presented on KMS adoption in SCM. However,

there are some suggestive studies that provide grounds for the utilisation of KMSs to support supply chain activities in both large and small organisations.

## **4.5. SUPPLY CHAIN PERFORMANCE**

This section outlines the definition of SCP, its benefits and importance to the SME sector. The section further reviews the sub-components of SCP as well as the basic antecedents of SCP in modern supply chains. This effort will help give a basic understanding of the outcome variable and also the current SCP-related challenges that have been pointed out by other researchers. The discussion will attempt to establish the limitations in SCP measurement paradigms in an attempt to derive a new solution targeted at improving SME performance.

### **4.5.1 Definition of supply chain performance**

The SCP concept has been defined from various dimensions, including *inter alia* being an extension of the supply chain activities (Hausman, 2004:35; Whiten, Green & Zelbst, 2012:28); a sub-component of organisational performance (Collins, Worthington, Reyes & Romero, 2010:954); an integration of a sustainable (economic, environmental and social) supply chain for long term economic benefits (Carter & Rodgers, 2008:370) and the integration and coordination of supply chain members (Wong & Wong, 2007:362; Sundram, Ibrahim & Govindaraju, 2011:837). The multiplicity of the aforementioned descriptions unveils consensus challenges in defining organisational performance from a supply chain perspective. Nevertheless, this debate has not affected the relevance of SCP in business research as the ensuing recent studies reveal continued efforts to eliminate the problem by coining a universal definition.

Other definitions include one by Odongo, Sundram, Chandran and Bhatti (2015:1448), who viewed SCP from a performance measurement perspective and argued that SCP is a systematic process of measuring the effectiveness and efficiency of supply chain operations. Whilst Dora, Molnar, Ongeng and Gellynck (2016:1785) argue that SCP relates to the operational benefits realised by supply chain members both at an individual and group level as a result of their participation in the supply chain relationship. In agreement with the performance measurement perspective, Sindhuja (2014:456) defines SCP as the efficient and effective utilisation of supply chain resources to accomplish set supply chain goals, a view that is also supported by Patil and

Kant (2016:3). The study by Qin, Mai, Fry and Ratori (2016:173) conveys a new dimension by bringing the disclosure and fairness features into the SCP definition. They (Qin *et al.*, 2016:173) argue that SCP is the complete disclosure of information amongst supply chain members to promote supply chain fairness and improved benefits from supply chain relationships. Dolci, Macada and Paiva (2017:42) then add governance and argue that SCP is the use of supply chain governance variables to measure the effectiveness and efficiency of the entire supply chain.

The trend therefore is that earlier definitions of SCP (Hausman, 2004:35; Carter & Rodgers, 2008:370) took a more economic bias. Whilst recent studies (Qin *et al.*, 2016:173; Dolci *et al.*, 2017:42) now integrate the economic view with a people-centred perspective (i.e. a network-based perspective) as seen from the inclusion of information disclosure, fairness and governance. Thus, drawing evidence from the various network-based views, SCP encompasses essential elements such as supply chain member relationships; supply chain member participation at individual and collective level; measuring the sustainability of the supply chain (i.e. environmental, social and economic); measuring the effectiveness and efficiency of the supply chain and the benefits resulting from supply chain participation. In this regard, SCP has most of its essential elements incorporating a people-centred perspective making it a suitable outcome variable for the current study. The latest process-based view (Miri-Lavassani & Movahedi, 2018:673) further buttresses the foregoing assertion since this perspective argues that SCP is not just about linking organisations but is a process that ensures goals are achieved. As such, SCP can be defined as the effective and efficient process of governing supply chain relationships to attain quality, fairness, trust and economic benefits through participation in the supply chain.

#### **4.5.2 The benefits and antecedents of supply chain performance**

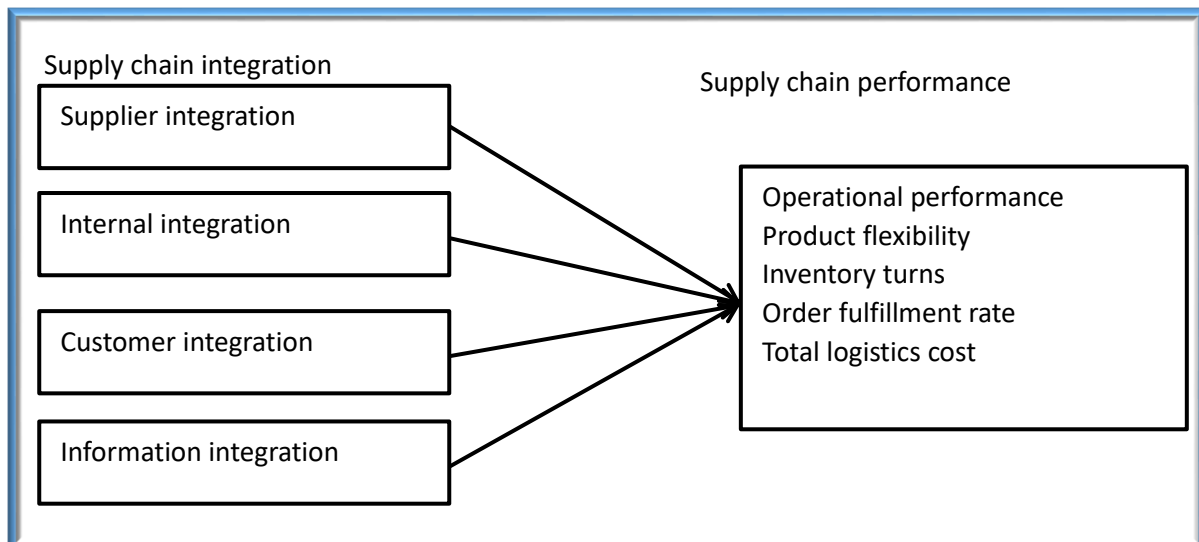
The benefits of SCP can best be drawn from the outcomes realised when the performance of the supply chain is measured; as such, this section outlines benefits-based on performance measurement variables. Gunasekaran, Papadopoulos, Dubey, Wamba, Childe, Hazen and Akter (2016:4) note that one of the major benefits of SCP is its positive impact on the performance of the organisation. They also highlight that SCP increases market performance through the reduction of overall supply chain costs. Tarasewicz's (2016:1437) study on the Polish market, notes that SCP can be realised through inventory idle time, customer satisfaction level and cash-to-cash cycle. As such, SCP will ensure the inventory idle time is reduced, on the customer side

it means improved satisfaction and on the organisational side it involves a shorter cash-to-cash cycle. Odongo, Dora, Molnar, Ongeng and Gellynck (2016:1785) argue from a people-centred approach and postulate that the quality of the relationship in a supply chain is the most important antecedent for effective SCP. They (Odongo *et al.*, 2016:1785) conclude that there is need for a bidirectional relationship that is based on trust with the firm being the focal point. This bidirectional trust is from the suppliers and customers, as noted by Ramish and Aslam (2016:716).

There are important antecedents for SCP in organisations. The study by Whitten, Green and Zelbst (2012:29) identified three antecedents for SCP, namely, agility, adaptability and alignment of the supply chains. They found that all three factors, which they called the “Triple-A supply chain strategy” have a positive impact on the performance of the entire supply chain. Chang, Tsai and Hsu (2013:48) reveal that partner relationships, information sharing, and supply chain integration are some of the antecedents to SCP. Their study concluded that supply chain integration had the greatest impact on the performance of the supply chain. Kumar *et al.* (2017:818) further amplify the elements of supply chain integration that positively influence SCP using the model in Figure 4.10.

Figure 4.10 explains SCI in a holistic manner by encompassing factors such as: supplier integration, internal integration, customer integration and information integration. The figure also shows that an integrated supply chain will improve both operational performance and product flexibility, as well as reducing inventory turns, order fulfilment rate and total logistics cost. The study found all the SCI factors would exert a positive influence on SCP if properly implemented. Although, focusing on information rather than knowledge, the study then concluded that information integration was the most critical factor to be considered in attaining improved SCP. This final outcome suggests the importance of knowledge sharing in attaining positive SCP.



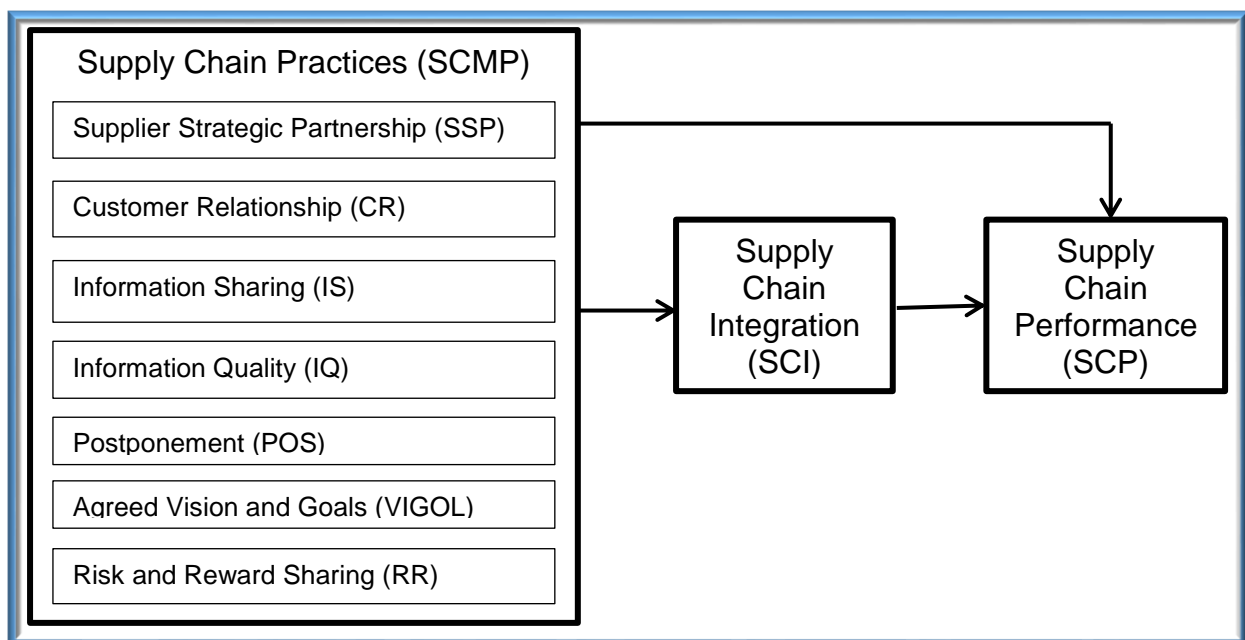


**Figure 4.10: Supply chain integration factors that influence supply chain performance**

Source: Kumar *et al.* (2017:818)

One example of a SCP antecedent is supply chain integration. Sundram, Chandran and Bhatti (2016:1449) also note supply chain integration (SCI) as an antecedent to SCP; however, they argue that SCI has both a direct and an indirect impact. They claim that when SCI is treated as a mediating variable, the predictor variable will be supply chain management practices as indicated in their model in Figure 4.11.

The model in Figure 4.11 expands on the model in Figure 4.10 and illustrates that SCI is a mediating antecedent between supply chain practices (i.e. risk and reward sharing, agreed vision and goals, postponement, information quality, information sharing, customer relationship, supplier strategic partnership) and SCP. The study tested supply management practices as both direct and indirect antecedents of SCP and found all scenarios to be significant. Sundram, Ibrahim and Govindaraju (2011:838) found similar antecedents to be significant without the mediating effect of SCI. SCI was also tested for both direct and mediating effects and was found to be significant, thus substantiating the findings by Kumar *et al.* (2017:818) that SCI is a key antecedent to SCP. Notably, a close analysis of the suggested supply chain practices constructs in both studies reveals the dominance of a people-centred process thereby supporting the need to consider SCP from a process rather than network perspective. Contrary to a technology-driven perspective, that supports a network approach to SCP, the outcome from recent studies (Sundram, Chandran & Bhatti, 2016:1449; Kumar *et al.*, 2017:818; Miri-Lavassani & Movahedi, 2018:675) shows that SCP should adopt a people-driven, process-oriented approach for better results.

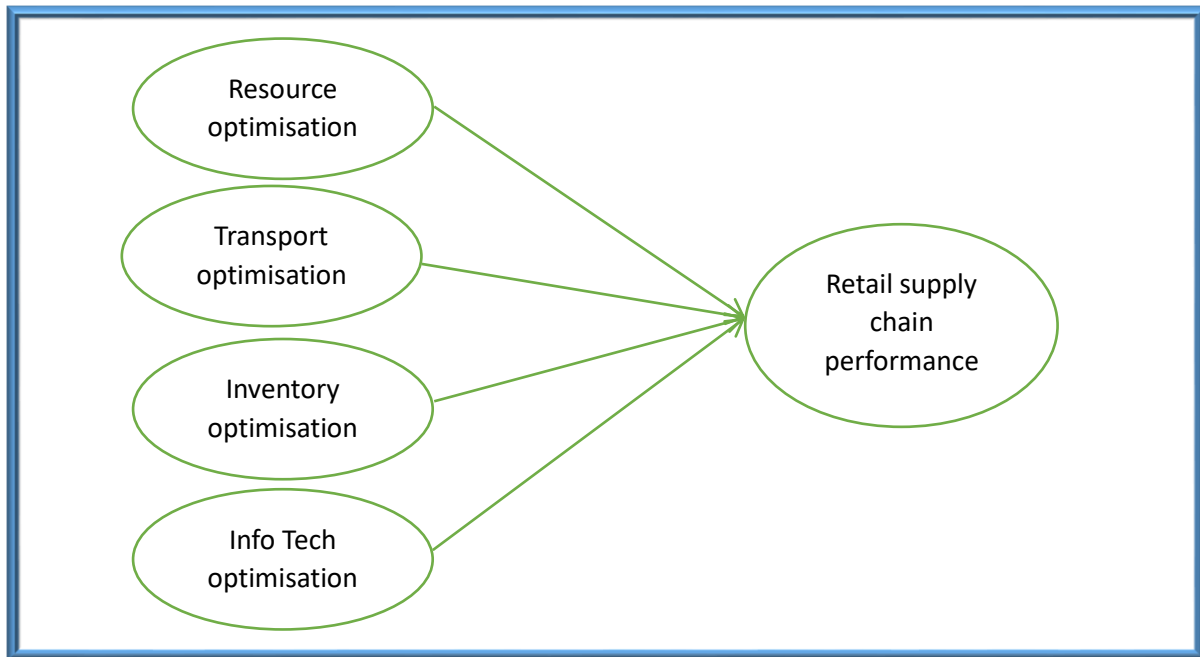


**Figure 4.11: Antecedents of SCP in the electronics manufacturing industry**

Source: Sundram, Chandran and Bhatti (2016:1449)

Other SCP antecedents that are based on the organisational supply chain strategy include economic, environmental, or operational (Azfar, Khan & Gabriel, 2014:808). They argue that for operational SCP the antecedents include inventory levels, quality, time, and customer satisfaction. The environmental SCP antecedent identified was business waste and economic antecedents were cost, environmental cost and cash-to-cash cycle. Although these are key factors, the studies that adopted them for measuring SCP, are silent on the process (i.e. how organisations may both measure and ensure the activities are taking place). There is a possibility that understanding SCP from a people-centred knowledge-driven process will alleviate this shortcoming.

SCP antecedents are not necessarily standardised but are rather industry or situation specific, according to Anand and Grover (2015:135). Their study focused on the retail sector and noted four factors, namely: resource optimisation, transport optimisation, information technology optimisation and inventory optimisation as illustrated in Figure 4.12.



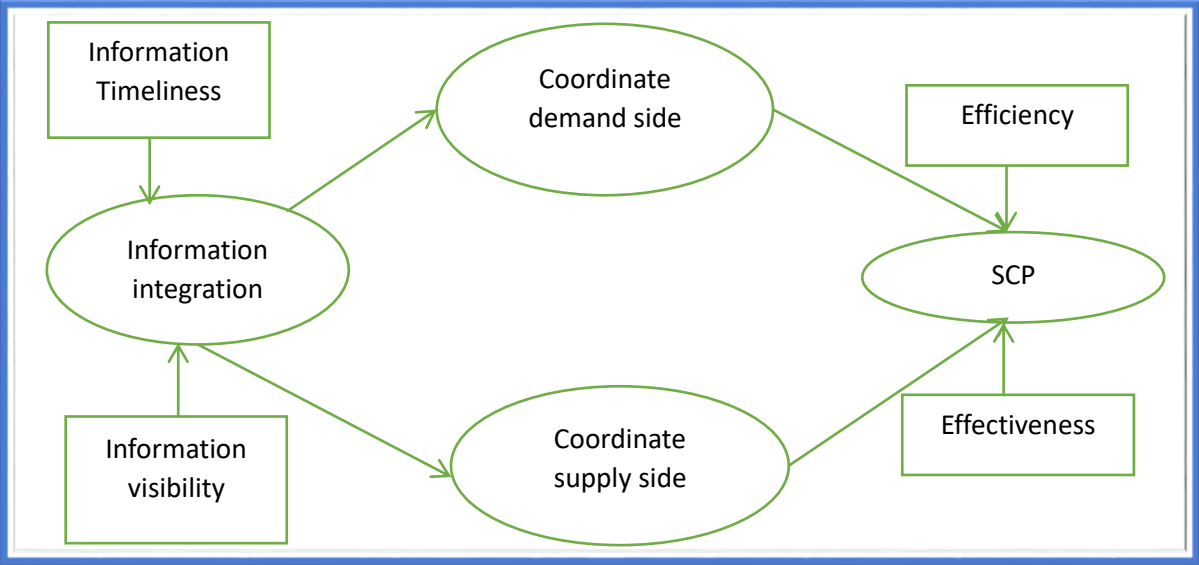
**Figure 4.12: Antecedents of SCP in the retail sector**

Source: Anand and Grover (2015:155)

The study (Anand & Grover, 2015:155) that was based on a review of SCP literature, revealed that optimisation of resources, transport, inventory and information technology are key SCP antecedents within the retail sector as shown in Figure 4.12. However, the study highlighted that effective optimisation is attainable only if knowledge sharing exists within the entire supply chain. The view proves the importance of knowledge sharing in sustainable supply chains. The study further concluded that although a broader approach was adopted, these antecedents can be grouped as financial and non-financial and also be further sub-divided. For instance, transport optimisation (delivery, time, frequency, and capacity-related performance indicators); inventory optimisation (cost, time, quantity, and service performance indicators); information technology optimisation (level of IT implementation, service, responsiveness, cost-related performance indicators) and resource optimisation (cost, service, time and financial-related performance indicators). Similarly, the model by Odongo *et al.* (2016:1787) broadly mentions supply chain relationship, although to operationalise it they used variables such as quality, trust, information sharing, commitment and power. The same view is supported by Miri-Lavassani and Movahedi (2018:677), who adopted the more recent business process perspective to SCP and used a multiple industry sample. They identified cost, time, responsiveness, operations quality and innovations as significant factors.

It can be seen that when grouped categorisations are treated at process level, the idea of sector/industry-based SCP antecedents (Azfar, Khan & Gabriel, 2014:808; Sundram, Chandran & Bhatti, 2016:1449; Tarasewicz, 2016:1437) is eliminated. Thus, their (Anand & Grover, 2015:155) findings prove that the existence of industry-specific categorisations of SCP antecedents (Gopal & Thakkr, 2012:522) is only a reality when the network view to SCP is adopted. However, when the process-oriented approach is used, the scope of the antecedents crosses the sector by sector boundaries. This outcome suggests that the same SCP antecedents can be used in varying situations and still remain significant. As such, it is possible to derive a set of individual SCP antecedents that can be used effectively across sectors without compromising the outcome.

SCP antecedents can also be viewed from a coordination perspective in which successful SCs are hinged on supplier side and demand side coordination (Tsanos & Zografos, 2016:681). The antecedents they identified are outlined in the subsequent figure.

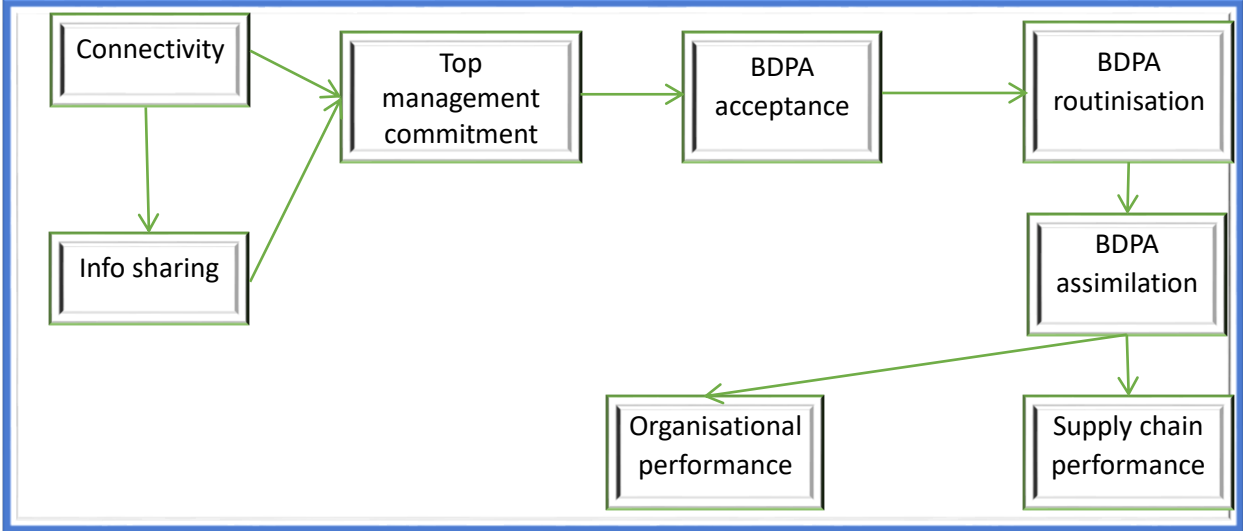


**Figure 4.13: Antecedents of SCP from a coordination perspective**

Source: Tsanos and Zografos (2016:681)

The model in Figure 4.13 depicts that information integration is important in supporting coordination activities on both the demand and supply side. However, the study also notes that information integration should be preceded by mutual reciprocity, trust and commitment thereby expounding on the importance of processes rather than network. Thus, supply chain networks supported with the right processes, will yield an efficient and effective SCP. However,

it is also important to note that the people are the major stakeholders in attaining effective processes while technology can only provide information integration, which does not necessarily imply improved performance. The next model looks at a technology perspective of SCP in detail to support the preceding view.



**Figure 4.14: SCP antecedents from a big data predictive analysis (BDPA) perspective**

Source: Gunasekaran *et al.* (2016:3)

The IT-centred supply chain network perspective illustrates that big data predictive analysis (BDPA) is an antecedent to SCP (Gunasekaran *et al.*, 2016:3). However, the results for testing the model in Figure 4.14 showed that the key technological factors, i.e. information sharing, and connectivity are only effective where top management commitment is guaranteed, thus indicating the importance of processes. Conclusions from the study proved that BDPA adoption within a supply chain that follows a three-phased approach (i.e. acceptance, routinisation and assimilation) will impact positively on SCP. All the aforementioned outcomes thus reduce the model to a people-centred process base SCP model that encompasses IT support, showing that technology though necessary to attain process integration is in fact a secondary factor in influencing successful SCP.

The challenges of adopting technology form some of the primary antecedents for SCP (Li, Wu, Zong & Li, 2017:1327). In their study on the utilisation of ERP systems to improve a supply chain, highlighted that these systems differ from organisation to organisation. Thus, using them for attaining integration in a supply chain becomes difficult since it is difficult to pass data between two dissimilar platforms. They further emphasise that when technology is used to

support supply chain activities there are more problems (i.e. delays, employee resistance, unbearable budgets and no profitability) than benefits. The study contends that companies that were faced with these challenges adopted a knowledge sharing approach to minimise the effects on the performance of the supply chain (Li *et al.*, 2017:1328). These views indicate the weakness of a technology-based approach in solving the supply chain problems of any sector.

#### **4.5.4 Sub-components of supply chain performance**

SCP is a concept that crosses physical company boundaries as suggested by Hausman (2004). He supports the view by arguing that SCP components include basic materials, components, subassemblies and finished products, and distribution through various channels to the end customer. In view of these components it is clear that even the traditional functional organisation lines such as procurement, manufacturing, distribution, marketing and sales, and research & development are superseded. Tarasewicz (2016:1441) views SCP as a complex subject composed of the coordination of organisations, people, technologies, resources and processes to meet customer requirements.

Components of SCP can be categorised based on the supply chain operations reference (SCOR) model by the supply chain council (Thakkar, Kanda & Deshmukh, 2009:707). Based on the SCOR model they highlighted that SCP is composed of five subcomponents, namely, source, make, plan, deliver and return. Their study on SMEs noted that although the SCOR model is one of the widely used SCP tools it is overly complex and cannot be easily adapted to the SME sector. They recommended the combination of the SCOR model strengths with the balanced score card model to minimise complexity and allow adoption in SMEs. This outcome suggests that if the process is not the foci of SCP but instead attention is diverted to the networks (integration), there is a tendency to invest in expensive technology that does not necessarily meet organisational goals.

#### **4.5.5 Section summary**

SCP has been defined and measured in various ways but the people-centred process-oriented perspective that integrates KMSs in SCs is lacking in extant literature. Various antecedents (or SCP measurement constructs) have been outlined in literature but there is also an agreed view that these have not been tested effectively in SMEs, particularly from a process-oriented

approach to SCP. However, some constructs (for example, cost, time, responsiveness and quality) have shown to cross industry borders and remain significant. To this end, SCP in literature has continued to adopt a more technology-based network approach while driving research away from the people-centred process-oriented perspective, regardless of its importance in improving SME SCP. Since SMEs lack trust, SCK and resources coupled with low technological development in countries such as Zimbabwe raise the need for a more practical SME SCP model.

#### **4.6 THE RELATIONSHIP BETWEEN KNOWLEDGE SHARING AND SUPPLY CHAIN PERFORMANCE**

This final section will analyse existing results, conclusions and models that earlier attempted to explain SCP from a knowledge-based approach. The primary purpose of the analysis is aimed at deriving a valid definition for knowledge sharing in the context of the study. It also seeks to derive a theoretical argument that will lead to the development of hypotheses and the conceptual model to be tested while acknowledging the multidimensional nature of SCP.

##### **4.6.1 Supply chain performance and knowledge sharing**

Scant literature evidence such as the study by Wang *et al.* (2008:153) suggests that all organisations and more so SMEs must understand SCP from a knowledge-based approach as also noted by Li *et al.* (2017:13240). In their study on Chinese firms, Li *et al.* (2017:1330) stress that the knowledge sharing process, when implemented within a supply chain, demands a contextual definition applicable to the field of supply chain management. They then defined knowledge sharing in an SCM context as the sharing of knowledge by stakeholders within a supply chain. They argue that the process involves first the identification of relevant SCK from the source organisation, then the transfer of the identified knowledge from one organisation to another and finally the application of the knowledge in the improvement of the supply chain. Wang *et al.* (2008:155) view SCK sharing using eight major areas that they suggest are spread across the levels of management. The areas include knowledge shared at operational level (i.e. customer service management, order fulfilment, manufacturing flow management and procurement); and at strategic level such as customer relationship management, demand management, product development and commercialisation, as well as returns (Lambert, Cooper & Pagh, 1998:9; Croxton, Garcia-Dastugue, Lambert & Rogers, 2001:16). Although

knowledge sharing was earlier defined in Section 4.2.1 from a business context as a people-centred activity, which employees voluntarily engage in to collect knowledge, donate knowledge and fulfil organisational goals, this definition is limited in scope. Thus, in the context of the current study, knowledge sharing is defined as the process of collating, donating and utilising SCK that organisations engage in in order to improve the performance of their supply chains.

The subsequent section outlines the hypotheses that were used in the study to measure the mediating effect of knowledge sharing on people-centred KMSs and SCP. The other SCP constructs discussed earlier were not relevant for this study and only the four as suggested by Miri-Lavassani and Movahedi (2018:692), namely, time; operation quality; responsiveness and cost were selected for the study. These variables were suitable since they were initially used in a process-oriented SCP study, the same domain as the mediating variable, and thus were applicable in testing the effect laid out in the conceptual framework. Furthermore, the constructs were relevant since they were tested across industries including SMEs in developing countries (Sundram, Chandran & Bhatti, 2016:1449; Tarasewicz, 2016:1437). Thus, the constructs can help address the multi-sectorial approach of the current study. The next subsection discusses the development of the hypotheses.

#### **4.6.2 Hypotheses development**

Modern competition has moved from the product and service level to a supply chain level as earlier noted by Ross (1998:100) thereby demanding efficiency within the supply chain. Such efficiency can be provided through sufficient knowledge sharing which reduces time required in innovation and decision making (Marouf, 2016:155). The supply chain lead time can be greatly influenced by the level at which organisations participating within a supply chain share their knowledge. The improvement of the lead time within the supply chain, through knowledge sharing, has been supported by Grant and Pretson (2018:1). Their study on the insurance sector found that people play a pivotal role in ensuring the efficient sharing of SCK. They further highlight that the time taken for supply chain activity can be significantly reduced if knowledge sharing is adopted. Knowledge sharing has also been known to shorten the innovation cycle or the new product development life cycle as well as supply chain lead time (Ebrahim *et al.*, 2008; Kuo, Kuo & Ho, 2014:697; Wulf & Butel, 2017:1410; Keszey, 2018:1061), but from a network-based perspective, ignoring the emerging process-oriented approach. Nevertheless, the



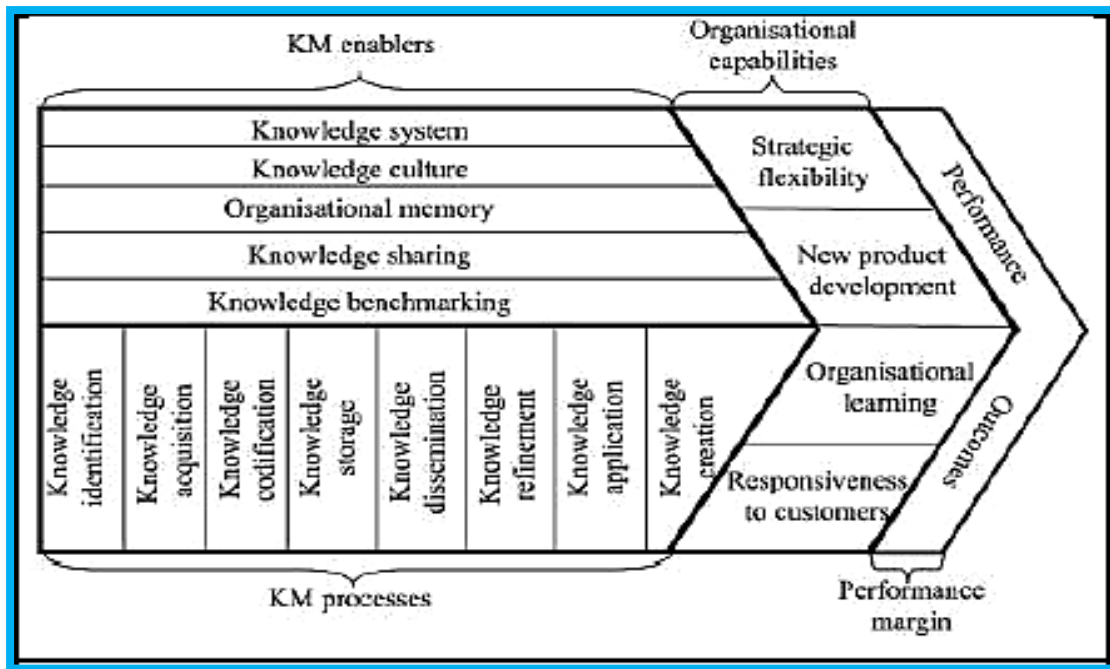
network-based approach has also been suggested in literature (Qin *et al.*, 2016:173; Dolci *et al.*, 2017:42) but not from a knowledge-based approach, hence there is a need to test whether the network-based approach to SCP applies in knowledge-based supply chains. The SME study by Song *et al.* (2018:6) further highlights that the sharing of SCK improves the time taken to attain end to end delivery of products. Thus, the hypotheses to be tested are put forward as follows:

H<sub>5</sub>: Knowledge sharing exerts a negative influence on TRP in Zimbabwean SMEs.

H<sub>9</sub>: Knowledge sharing exerts a positive influence on SCP in Zimbabwean SMEs.

SCM, in an attempt to address the needs of SCP, has to this end, adopted the lean, agile, resilient and green paradigms. The focus on the lean paradigm has been the time, whereas the agile paradigm concentrates on the speed (Rigby, Day, Forrester & Burnett, 2000:178; Al-Shboul, 2017:172) and the green paradigm emphasises the natural environment (Ghadge, Kaklamanou, Choudhary & Bourlakis, 2017:1995), and lastly, resilience attempts to avert disruptions and improve responsiveness to any such disruptions (Rajagopal, 2016:1). These paradigms, though effective in improving SCP, focus more on connectivity (using technology) while willingness (of the people to use the technology) is ignored (Fawcett, Osterhaus, Magnan, Brau & McCarter, 2007:358). In furtherance to that they have not been tested using the emerging knowledge-based perspective of SCP.

In order to effectively respond to disruption in both the internal and external supply chain environment, organisations must possess and share the relevant environmental knowledge (Wu, Lee & Tsai, 2012:67). This emerging dimension has been expounded on by Wang and Ahmed (2005:322) as the knowledge value chain as depicted in Figure 4.15.



**Figure 4.15: The knowledge value chain**

Source: Wang and Ahmed (2005:322)

The value chain model in Figure 4.15 indicates how knowledge processes and enablers can be integrated into an organisation’s supply chain to attain effective customer responsiveness in terms of product development. Notwithstanding this ever-increasing importance of the process-oriented approach in supply chains (Sangari, Hosnavi & Zahedi, 2015:603), literature has continued to adopt a network perspective bias. For instance, SCP studies have placed very little attention on the people paradigm and the mediatory role of a people-centred knowledge sharing approach in SME supply chains. Yet the people are the major link in the sharing of SCK in these capital-stricken small organisations (Forslund, 2010:352; Antonioli, 2016:46; Desai & Rai, 2016:1023; Patil & Kant, 2016:5). Li, Tarafdar and Rao (2012:402) found that knowledge sharing by the source organisation improves supply chain responsiveness and partner relationships. These studies infer that knowledge sharing influences responsiveness of players within a supply chain; accordingly the hypothesis is framed as:

H<sub>6</sub>: Knowledge sharing exerts a positive influence on RRP in Zimbabwean SMEs.

Knowledge sharing if adopted in SMEs can improve responsiveness within the supply chain. The research study by Chow, Choy and Lee (2007:882) focuses on the utilisation of KMSs in improving supply chains through stakeholder integrating. They found that KMSs improve

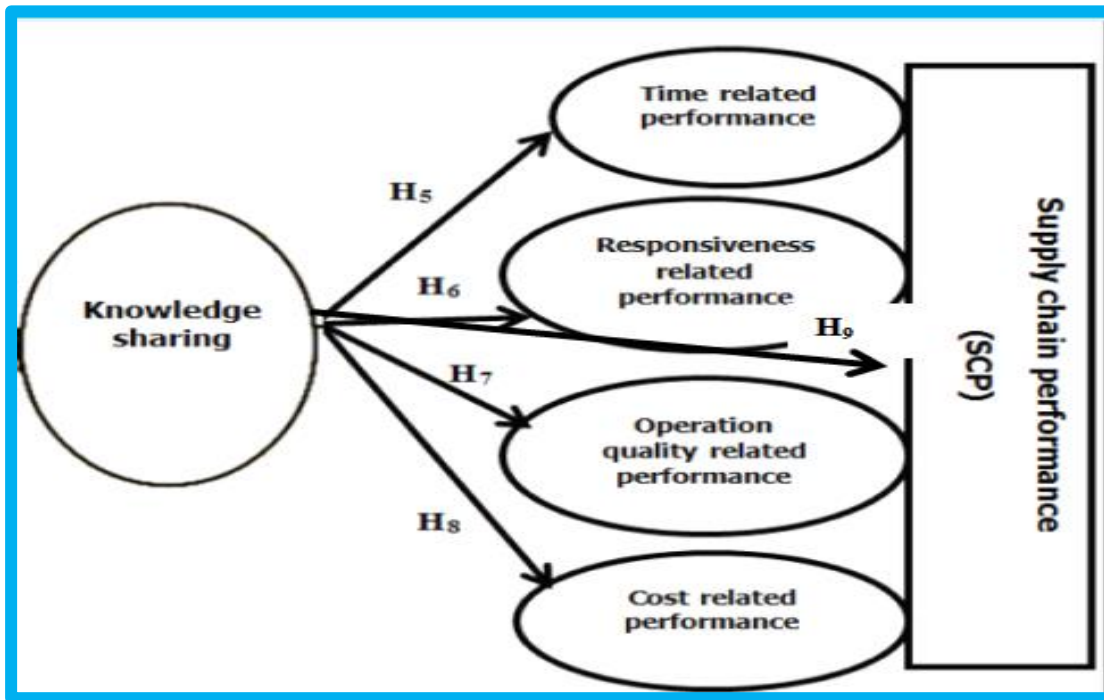
organisational SCP by enhancing the quality of the shared knowledge. Yoo (2014:525) divides knowledge quality into actionable knowledge quality, intrinsic knowledge quality and contextual knowledge quality, and concluded that the quality of knowledge influences product innovation. These studies provide evidence of the value that knowledge sharing can bring to SCs though they fall short of both testing the relationship in an SME context and a process-oriented view of SCP. Furthermore, the studies limit knowledge sharing to the network view of a supply chain, which does not advise organisations on how to interpret the abundant SCK received, resulting in negative results. Haque and Islam (2018:306), in their study on the drug manufacturing industry, found that sharing SCK had a positive impact on the operational quality leading to better product quality and resultantly an improved competitive advantage. All these findings further support the influence that both the quality of the knowledge, and the operations of the supply chain have on the SCP, thus the hypothesis to be tested is proposed as follows:

H<sub>7</sub>: Knowledge sharing exerts a positive influence on OQRP in Zimbabwean SMEs.

Operation quality of the SME supply chain can derive benefits from the adoption of knowledge sharing. Song, Lu, Yu and Qian (2018:2) argue that supply chain financing is an effective strategy for managing the costs involved in the sharing of SCK within SMEs. Knowledge sharing theories such as the social exchange theory (Wu & Lee, 2017:475) emphasise that organisations make decisions based on the benefits-to-cost ratio. Consistent with this theory, literature (Tarasewicz, 2016:1437; Azfar, Khan & Gabriel, 2014:808) reveals that the perceived benefits by both the knowledge source and receiver influence expected organisational performance gains from the SCK sharing activities. The cost associated with sharing of knowledge assets to outsiders is always a potential risk to organisations as this is bound to lead to loss of core competencies (Asrar-ul-Haq & Anwar, 2016:7; Ibrahim & Heng, 2015:234). Thus, the decision to engage in SCK sharing activities involves the assessment of the possible cost and benefits enjoyed by the concerned organisation (Dyer & Nobeoka, 2000:346; Ramish & Aslam, 2016:716; Li *et al.*, 2017:1334; Miri-Lavassani & Movahedi, 2018:689). The perceived benefits from sharing knowledge must be viewed as positive (i.e. improving supply chain productivity, efficiency and profit margin) for organisations to share SCK. While Myers (2015:5) concludes that although sharing SCK was universally agreed to positively impact on cost, organisations were still losing millions due to failure to effectively implement the concept, thus the hypothesis to be tested is given as follows:

H<sub>8</sub>: Knowledge sharing exerts a positive influence on CRP in Zimbabwean SMEs.

In light of the above proposed hypotheses the model in Figure 4.16 was also presented for testing using structural equation modelling.



**Figure 4.16: Conceptual model for the knowledge sharing supply chain performance relationship**

Source: Adapted from literature review

The conceptual model in Figure 4.16 shows the relationship between knowledge sharing and SCP from both a network-based approach and a process-based approach. The model thus presents the literature evidence and allows for the testing of the model fitness using structural equation modelling analysis.

#### **4.7 THE MEDIATING EFFECT OF KNOWLEDGE SHARING ON PEOPLE-CENTRED KNOWLEDGE MANAGEMENT SYSTEMS AND SUPPLY CHAIN PERFORMANCE**

Knowledge sharing has been presented in literature as a pivotal concept for improving organisational performance (Thuan, 2020:7; Ganguly, Talukdar & Chatterjee, 2019:1111;

Stojanovic-Aleksic, Nielsen & Boškovic, 2019:1543; Ali, Musawir & Ali, 2018:453). It emerged from the literature as expounded on in Chapter Three that people-centred KMSs such as organisational culture, CoPs, innovation management and social capital improve knowledge.

Recent literature has continued to show the same trend, for instance Li (2017:850), after a review of knowledge management literature found that knowledge sharing levels were directly related to the culture of the employees in the organisations. The view is also strongly supported by several authors (Sedighi, Lukosch, Brazier, Hamedi & van-Beers, 2018:1264; Al-Dari, Jabeen & Papastathopoulos, 2018:488; Yi, 2019:593; Goswami & Agrawal, 2020:172). Another study by Nugroho (2018:1138), on non-profit state-owned organisations also concluded that organisational culture greatly influences knowledge sharing and resultantly organisational learning. Aljuwaiber (2020:3), in his study on CoPs within Saudi Arabian companies, concluded that implementation of CoPs was crucial in improving knowledge sharing as also supported by Ali, Musawir and Ali (2018:458).

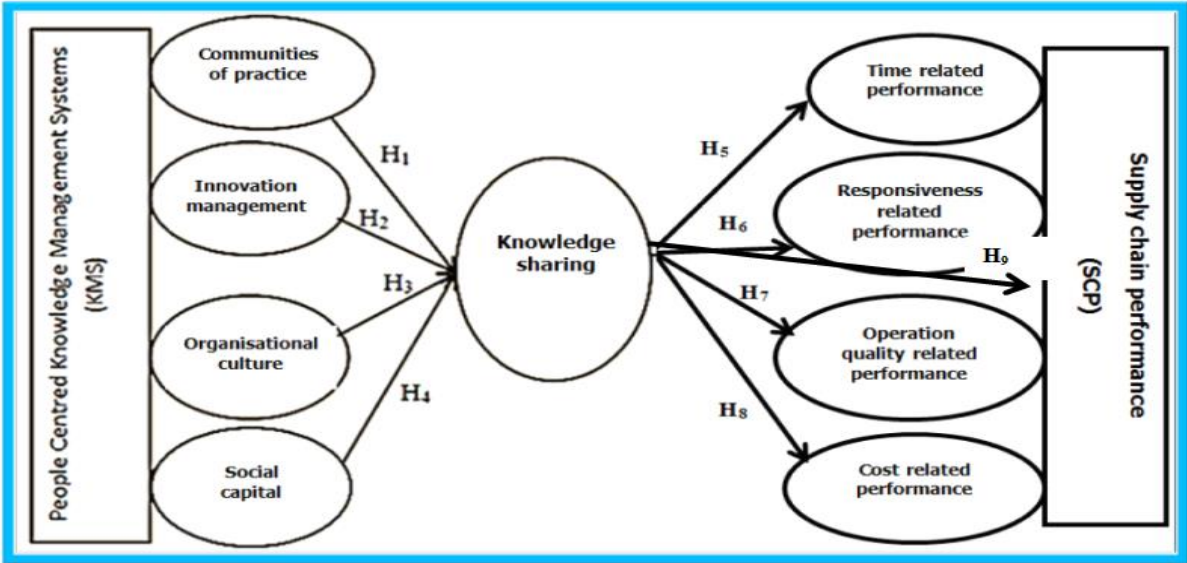
CoPs improve team knowledge sharing behaviours. Zufadil, Hendriani and Machasin (2020:269) note that CoPs improve knowledge sharing amongst team members, which in turn improves the overall performance of the organisation. Ritala, Husted, Olander and Michailova (2018: 1104) suggest that leakages in the knowledge sharing process negatively impact on innovation management within an organisation. Similarly, Rahmi and Indarti (2019:299), in their study amongst broadcasting employees in Indonesia found that team innovation was positively associated with knowledge sharing (Ying & Chen, 2018:38; Yao, Crupi, Di-Minin & Zhang, 2020:30). Ganguly, Talukdar and Chatterjee (2019:1110) argue that social capital improves the sharing of knowledge within an organisation. Kim and Shin (2017:2417), in the study on SMEs in the tourism sector found that social capital positively influences knowledge sharing. Thus, the disjointed evidence in recent literature suggests that people-centred KMSs improve knowledge sharing, hence the need to test the integrated relationship of these systems on knowledge sharing.

Knowledge sharing is an effective knowledge management concept for improving organisational performance. Lin, Huang, and Huang (2020:7) relate knowledge sharing to organisational performance and conclude that the relationship between organisational performance and knowledge sharing was not mediated by job tenure suggesting that there was a directed relationship. Thus, knowledge sharing can be said to directly improve organisational

performance (Ali, Selvam, Paris & Gunasekaran, 2018:1806). Knowledge sharing was also known to play a mediatory role between organisational culture and organisational performance (Dwivedi, Chaturvedi & Vashist, 2020:6). Another study concluded that knowledge sharing improves the performance of supply chains as noted by Haque and Islam (2018:309) in their study on the Bangladeshi manufacturing industry. Similarly, Fantazy and Tipu (2018:936) in their study on supply chain and logistics managers in Pakistan found that a knowledge sharing culture enhances the performance of the supply chain. Research supporting the influence of knowledge sharing on SCP had continued to increase as established from recent extant literature (Panahifar, Byrne, Salam and Heavey, 2018:358; Wang & Shi, 2018:989; Attia & Eldin, 2018:1217). Mehdikhani and Valmohammadi (2019:778) argue that knowledge sharing had a significant mediating effect between supply chain collaboration and SCP. Lin (2017:699) suggests that when applied in an electronic supply chain, knowledge sharing showed a significant positive moderating effect.

The foregoing literature suggests that on the one hand, knowledge sharing is improved by people-centred KMSs (Yao, Crupi, Di-Minin & Zhang, 2020:30; Lin, Huang & Huang, 2020:7; Zulfadil, Hendriani, Machasin, 2020:269; Kim & Shin, 2017:2417). On the other hand, knowledge sharing improves SCP (Mehdikhani & Valmohammadi, 2019:778; Haque & Islam, 2018:309). The evidence reveals a transitive relationship between people-centred KMSs and SCP. Thus, the following hypothesis and model were presented for further testing:

H<sub>10</sub>: Knowledge sharing mediates the effect of people-centred KMSs on SCP in Zimbabwean SMEs.



### **Figure 4.17 Conceptual framework for the mediating effect of knowledge sharing on people-centred KMSs and supply chain performance**

Source: Adapted from literature study

Due to the need to fulfil the objective of developing a model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector, the above model was presented for testing using structural equation modelling. The model presupposes that knowledge sharing mediates between people-centred KMSs and SCP and is based on the transitive relationship derived from the literature review.

## **4.8 CHAPTER SUMMARY**

The chapter reviewed the challenges that arise as a result of varying knowledge sharing definitions and suggested a definition to be used for the current study. It also emerged that there are varying opinions on the importance and role of knowledge sharing but organisational knowledge value improvement was identified as the major goal for knowledge sharing. Furthermore, various antecedents of knowledge sharing were identified, and these were mostly determined by the nature of the KMS. Overall, trust among stakeholders was viewed as a necessity in enhancing knowledge sharing in organisations.

The chapter also revealed knowledge sharing, although viewed as a secondary process in most knowledge management models, is in fact the first knowledge management process that initiates the other processes. Furthermore, although knowledge sharing is presented from multiple perspectives, the largest percentage of literature proved that it is a people-centred process, which can then be enhanced through technology. A review of knowledge sharing literature, particularly for developing countries, showed that the SME context was lacking, and that knowledge sharing was a new concept in the sector. The dotted evidence only helped to show that knowledge sharing in SMEs is highly unstructured, based on manual interaction with knowledge being mainly in the tacit form. The limitation is more pronounced judging by the availability of literature evidence to explain the relationship between knowledge sharing and SCP within SMEs.

The chapter also unearthed that knowledge hoarding was a key characteristic of SMEs, inferring the possibility of a reduced level of knowledge sharing amongst SMEs but a high level

between SMEs and large corporates. The outcome from literature thus suggests that the current knowledge that SMEs are relying on are the experiences of large companies and to a lesser extent SMEs in the same sector. The chapter also presupposes that knowledge sharing activities within and amongst SME SCs are likely to be reduced because of the knowledge hoarding behaviour and this must be attended to if SMEs are to be used as vehicles for economic development.

The discussion further revealed that knowledge sharing activities in both large and small organisations were viewed as a process and categorised into three groups, namely: individual, technology and organisation. Technology utilisation in supply chains was mostly associated with large companies and rarely mentioned in the small company context. Knowledge resources in large companies were in explicit form and hence easily shared using technology, but for small companies it was mostly in tacit form, which hardly required technology.

The views from the supply chain literature revealed that member/partner collaboration was the best approach to successful SCM. Additionally, the knowledge sharing process was presented as the best tool for achieving supply chain collaboration. The review of literature also shows that little evidence has to date been presented on KMS adoption in SCM. However, there are some suggestive studies that provide grounds for the utilisation of KMSs to support supply chain activities in both large and small organisations but do not focus on the process-oriented perspective of SCP. Consequently, current antecedents of SCP were viewed as difficult to implement for SMEs probably due to their network-oriented bias to SCs.



## CHAPTER FIVE

### RESEARCH METHODOLOGY AND DESIGN

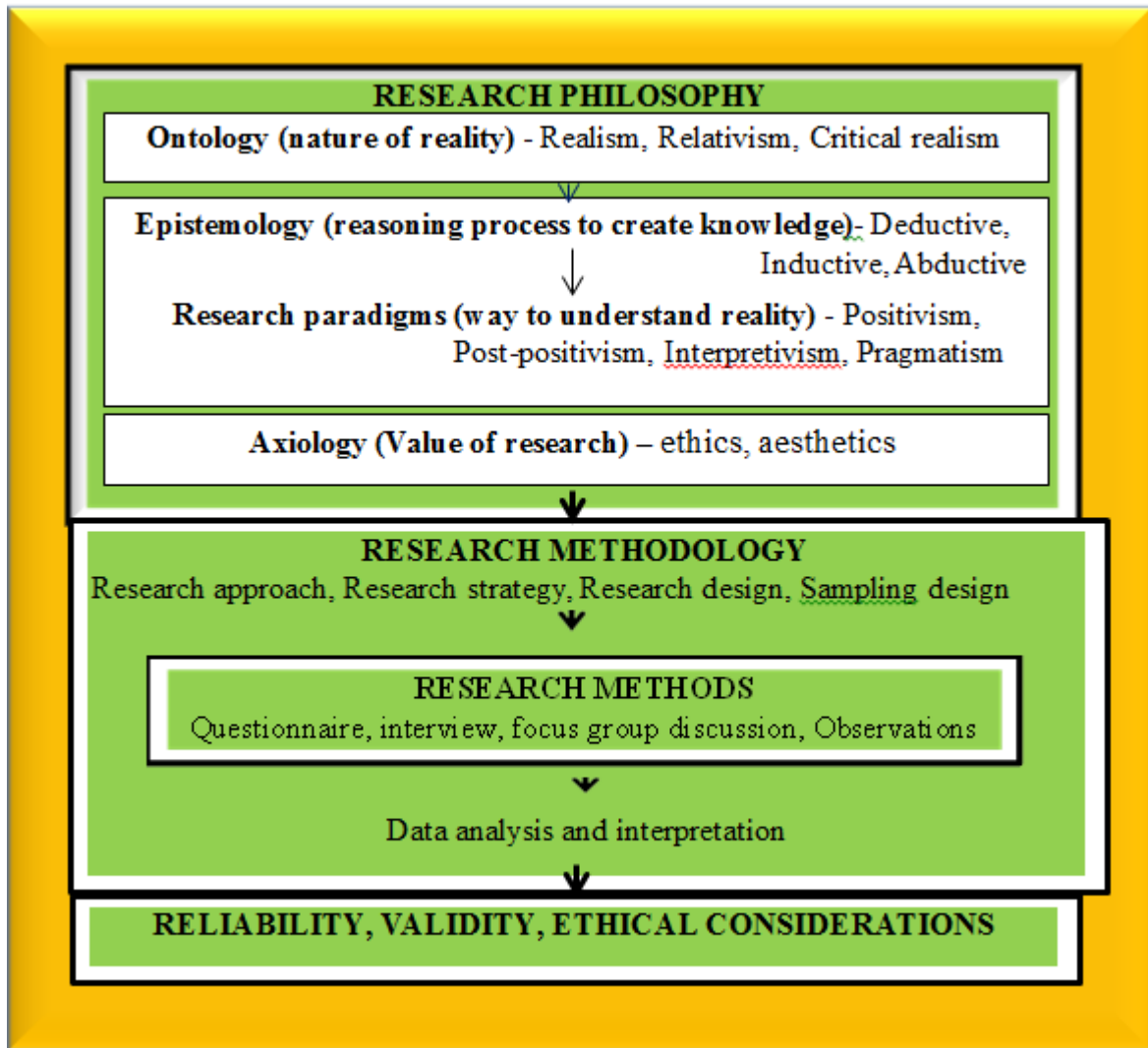
#### 5.1 INTRODUCTION

Having outlined the research gap and research problem (objectives, hypotheses, conceptual framework) in the previous chapters, the current chapter expounds on the research methodology introduced in Chapter One. In this chapter, emphasis is directed toward the fundamental philosophical and methodological prerequisites in research. These aforementioned fundamentals hinge on providing evidence on what influenced the nature of the study and how the data were collected, why the data were collected, where the data were collected and how the data were analysed, respectively. On the one hand, the fundamentals form the basis for addressing the main objective of the current study, which is to investigate the relationships among knowledge sharing, people-centred KMSs and SCP within Zimbabwean SMEs. On the other hand, although literature presents conflicting views on types of research approaches, research strategies and research designs, the sources of the ideas used in this chapter were provided to blend the different perspectives.

The chapter commences by outlining the research philosophy, focusing on the three primary branches of philosophy in research, namely: ontology, epistemology and axiology. Secondly, the chapter delineates key methodological issues such as the research approach and research strategy. Thirdly, the discourse then details the research design, describing how the literature review was used to address the theoretical objectives and achieve research synthesis. The discussion then switches to show how the empirical objectives were addressed by looking at the sampling design that outlines the study population, the target population, sampling frame and the sampling procedure. The next aspect discussed regarding the research design is the research method, which deliberates how the instrument used in data collection was developed and distributed. Fourthly, data analysis is discussed, highlighting how statistical methods were used in the analysis and presentation of data. Finally, the critical matters of reliability, validity and ethical considerations are discussed.

Literature (Saunders, Lewis & Thornhill, 2012:114; Carnaghan, 2013:90; Li, 2016:110) suggests that the ontology determines the epistemology (together with the paradigms), which

then influences the axiology. These three branches of philosophy then influence the methodology, which influences the methods that lead to the determination of the way data are to be analysed (Lee & Lings, 2008:130; Venkatesh, Thong & Xu, 2012:160). The summary of the chapter as outlined in Figure 5.1, was influenced by the foregoing argument while the various decisions that were taken at each stage are woven into the narratives.



**Figure 5.1: Framework for research methodology**

Source: Adapted from literature

## 5.2 RESEARCH PHILOSOPHY

This section addresses the underlying factors of a research philosophy. Although the section seems to discuss issues outside the primary elements of a research methodology (i.e. collection and analysis of data to reach reliable conclusions), this helps to understand the theoretical foundations of scientific research. The section thus outlines the three branches of research

philosophy, namely: ontology, epistemology and axiology, which are the gateway and genesis to nearly all scientific research with the aim of highlighting how the aforementioned concepts were adopted for the current study. Since reasoning and research paradigms form part of the epistemology (Nicolson, 2013:1; Tracy, 2013:38), they will also be discussed in this section.

### **5.2.1 Branches of philosophy in scientific research**

A research philosophy explains the knowledge development process and gives specificity of the knowledge with regards to the research at hand (Kuhn, 1970:10; Schiffman & Kanuk, 2004:47; Greener, 2008:34). Thus, the philosophy to be adopted by a researcher depends on the researcher's perception of research (Mihic, Engelmann & Wingrove, 2005:483) and the nature of the research questions to be addressed since there is no single rule to a given situation (Saunders, Lewis & Thornhill, 2009:109). Although philosophy has a plethora of branches, there are basically three main branches of philosophy in business research, namely: ontology, epistemology and axiology. The earlier two philosophies are argued to greatly influence the way a research study is to be conducted (Couch, 1987:106; Collier, 2005:327; Dagnino & Cinici, 2016:79), while the later (axiology) is not given much recognition, particularly in quantitative studies. The branches of philosophy are discussed next, to outline their relevance in the current study.

### **5.2.2 Ontology of the study**

Derived from the word "onto" which means "being" or "reality", the term ontology can thus be defined as the understanding of the nature of reality (Creswell, 2009:21; Merriam, 2009:8; Neuman, 2014:94; Greener & Martelli, 2015:41). Ontology has been mainly grouped into two different categories. On the one hand, there is the category that argues that there is only one meaning to reality where meanings are derived independent of the actors and terms used, include, objectivism, realism or being. On the other hand, there is the perspective that reality has multiple meanings where social actors are continually involved and terms used, include, relativism, constructivism, subjectivism or becoming.

Some ontology terminology and authors include "being" and "becoming" (Weick, 1979:44; Tsoukas & Chia, 2002:110; Elkjaer & Simpson, 2011:30); objectivism and subjectivism or constructivism (Bryman, 2008:18; Saunders, Lewis & Thornhill, 2009:110); realism and

relativism/idealism (Blaikie, 2003:94; Dagnino & Cinici, 2016:79). However, all the terms can be narrowed down to relate to either a single meaning (realism) or multiple meanings (relativism) to reality. It is these two dimensions that determine how researchers view the world around them thereby influencing the choice of paradigm and methodology they make in any given study, as noted by Tracy (2013:38). The other emerging though old (i.e. it has been defunct since the late 60s) dimension of ontology is critical realism which attempts to bring a balance between realism and relativism by combining the strengths of each (Andrew, 2000:200; Frederic, 2015:126; Timothy, 2016:339). The choice of ontology is based on the nature of the variables in a study.

The predictor and mediating variables in the current study, namely: people-centred KMSs (i.e. organisational behaviour, CoPs, innovation management, and social capital) and knowledge sharing may be viewed as concerned with multiple realities. The aforementioned view would suggest the adoption of relativism ontology. However, the outcome variable that is SCP (i.e. cost-related performance, time-related performance, responsiveness-related performance, and operation quality-related performance) has a single reality. The second condition suggests the utilisation of realism ontology. Nevertheless, the current study seeks to investigate the integrated relationships between the research constructs rather than try to derive scales, since these have been clearly outlined in extant literature. Thus, concluding on a single reality and therefore, the adoption of realism ontology was more logical.

The adoption of a realism ontology has been a common phenomenon in previous studies on knowledge sharing, KMSs and SCP (Maheshi, Raisinghani & Meade, 2005:118; Wu, 2008:244; Capo-Vicedo, Mula & Capo, 2011:383; Teh & Sun, 2011:68; Wong & Wong, 2011:949; Tuan, 2013:151; Nikabadi, 2014:384; Sudhindra, Ganesh & Arshinder, 2014:814; Eriksson, 2015:360; Ramish & Aslam, 2016:716). In furtherance to that, Tracy (2013:44) argues that qualitative studies generally adopt the relativism ontology while those that are quantitative use the realism ontology. In view of Tracy's (2013:44) standpoint and the quantitative nature of the study, coupled with the prevailing trends in existing knowledge sharing, KMSs and SCP literature, a realism ontology was deemed to be most suitable.

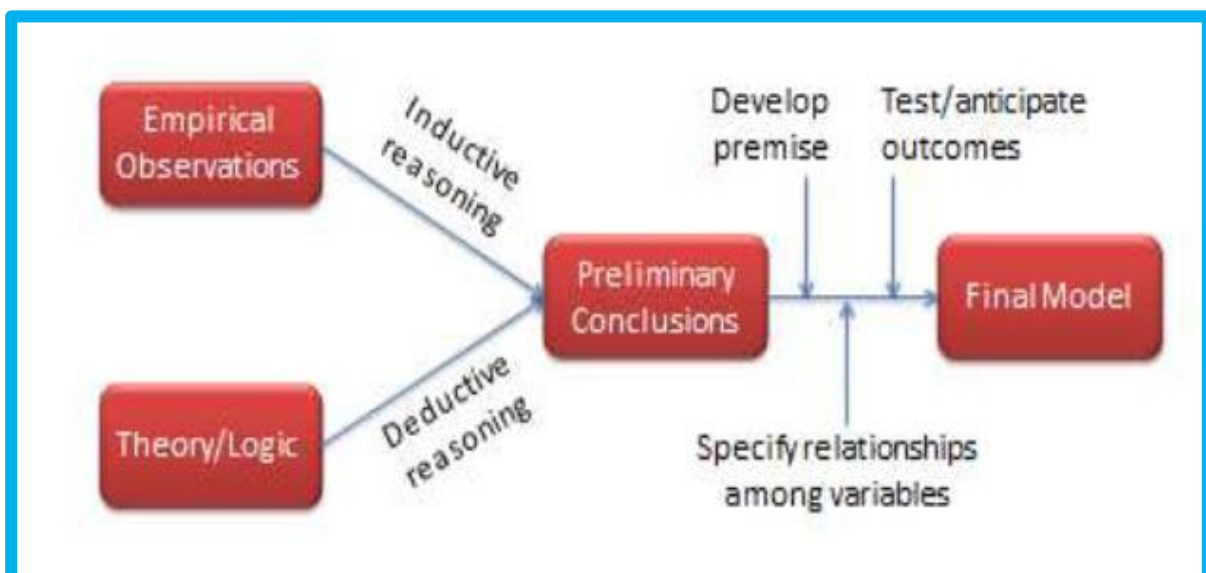
### **5.2.3 Epistemology and paradigm of the study**

An epistemology in research outlines how knowledge can be acquired (Zelic, 2005:310; Jakubik, 2007:11) or the steps taken to come up with the truth, as argued by Walliman

(2011:16). Walliman (2011:17) further categorises the way knowledge is gained into empiricism (i.e. knowledge gained through inductive reasoning) and rationalism (i.e. knowledge gained by deductive reasoning). In support, O’Gorman and MacIntosh (2017:1) argue that epistemology can best be understood by looking at two key issues, namely, forms of reasoning and the research paradigms. Williman (2011:176) defines reasoning as a technique for reaching conclusions to gather new knowledge through logical arguments known as premises (Goel & Dolan, 2004:109). Thus, the epistemology of the study will be discussed in view of the forms of reasoning and the research paradigms as explained in the succeeding subsections.

### 5.2.3.1 Forms of reasoning in research

As noted earlier, the gaining of knowledge through reasoning starts with two opposite ends of the spectrum as inductive and deductive reasoning. Williman (2011:22) argues that deductive reasoning starts with some general theory and then reaches a specific conclusion (“top-down”) by following some logical arguments (Tracy, 2013:23). Tracy (2013:22) defines inductive reasoning as involving observations of sensory experiences as also supported by Williman (2011:17) and then developing some general conclusions (“bottom-up”). The relationship between inductive and deductive reasoning can be summarised using Figure 5.2.



**Figure 5.2: Inductive and deductive reasoning**

Source: Bhattacharjee (2012:15)

The figure contrasts inductive reasoning with deductive reasoning and shows that deductive reasoning originates with some theory or logic leading to some specification of relationships among variables. Inductive reasoning, on the other hand, begins with empirical observation; as such, it is more associated with relativist ontology and deals mostly with qualitative studies (Sekeran & Bougie, 2009:38; Heit & Rotello, 2010:805; Goel & Dolan, 2004:110). Tracy (2013:23) further notes that deductive reasoning starts with the identification of a broad theory, followed by a hypothesis based on the theory. A quantitative research study is then conducted, and the hypothesis is tested to gather evidence that will be used to confirm or reject the hypothesis; hence, such a study is more inclined towards a realist ontology. The difference between these two ends of reasoning was resolved by the introduction of a third type, which is abductive reasoning, as suggested by Charmaz (2006:103). He argues that abductive reasoning balances inductive and deductive reasoning by blending the strengths from both perspectives.

In-line with the abovementioned discourse, the study adopts a deductive reasoning epistemology which fits well with the realist ontology earlier suggested in Section 5.2.2. Furthermore, the study sought to address the hypotheses suggested in Chapter One using quantitative data and statistical analyses, which again fall within the domain of a deductive epistemology (Williman, 2011:22; Tracy, 2013:23). The study has also presented a clearly defined problem statement and used some ideas from other theories, such as knowledge management, knowledge sharing and SCP to develop a conceptual framework that explains the abstract connection among constructs, as noted by Neuman (2014:69). In furtherance to that, the study uses the conceptual framework together with the hypotheses to move from the general to the specific. The aforementioned descriptions are key features of a deductive reasoning approach as argued by Singh (2007:401).

### **5.2.3.2 Research paradigms**

Paradigms are a researcher's preferred way of understanding a number of issues, including reality, gathering information and building knowledge (Kuhn, 1962:96; Guba, 1990:103; Coghlan & Brannick, 2005:4; Hakansson, 2013:4; Tracy, 2013:38). The choice of a paradigm can best be understood using the ontology, epistemology and axiology of the study (Deetz, 2001:34; Lincoln, Lynham & Guba, 2011:115). Tracy (2013:48) cites five paradigms, namely: positivist, post-positivist, interpretivist, critical and postmodern. The relationship between the

paradigms and the varying areas of research philosophy and methodology are summarised in Figure 5.3.

	<b>(Post-)Positivist</b>	<b>Interpretive</b>	<b>Critical</b>	<b>Postmodern/ Poststructural</b>
<b>Ontology</b> (nature of reality)	Single, true, apprehensible	Socially constructed	Constructed through power relations and shaped over history	Multiple, fragmented, layered, fluid, and multi-faceted
<b>Epistemology</b> (nature of knowledge)	Discovered; a priori, true, objective	Produced; dependent and value-laden; subjective, co-created	Mediated, hidden, distorted, and produced through power relations	Relative, skeptical, "truth" is a myth; knowledge is as much fantasy as it is reality
<b>Goal of research</b>	To measure, predict, control; to be formally generalizable, reliable, and a mirroring representation	To understand why and how; to be useful and interesting; to provide opportunities for participant voice	To ask "what should be?" to improve and transform; to disrupt power relations	To highlight chaos, show multiple points of view, and examine absence and the relativism of meaning
<b>A good researcher...</b>	Expertly uses research and measurement devices; brackets out background and biases so they do not taint research findings	Is a self-reflexive research instrument, aware of biases and subjectivities; background is imperative for understanding the research	Considers social class and powerful structures such as "isms" (sexism, homophobia, racism, ageism); asks how the scene is affected by, and constructs, power relations	Acknowledges the crisis of representation, writes stories that open up multiple themes, examines the reappropriation and layering of reality

**Figure 5.3: Summary of research paradigms**

Source: Tracy (2013:48)

The positivism paradigm argues that the world operates using fixed laws of cause and effect and thus scientific thinking can be used to test these laws and reject or accept the results based on outcomes of the tests (Bellinger, 2004:220; Creswell, 2009:8; Denscombe, 2014:88). The positivists therefore argue that by using the results from the scientific tests we can come to understand how the world works. According to this argument, positivists believe in realist ontology and a deductive epistemology. A positivist paradigm necessitates the testing of social constructs such as knowledge sharing and knowledge management by developing measurement scales (Ragab & Arisha, 2013:96; Singh & Gupta, 2014:785; Lee & Wong, 2015:715). The interpretivist paradigm, however, holds an opposing view and believes there is no way to objectively measure reality since findings are strongly influenced by the beliefs of those who form the study population (Greener, 2008:16; Greener & Mortelli, 2015:22). Thus, interpretivists believe in relativism ontology and a deductive epistemology.

The pragmatism paradigm maintains an eclectic approach rather than the extremes of both positivism and interpretivism. In the pragmatism view, reality is constantly debated and

negotiated in light of its relevance to the situation at hand and the method that solves the problem is considered as most appropriate (Menand, 1998:210; Saunders *et al.*, 2009:120). Thus, pragmatists believe in critical realism ontology and abductive or hypothetico-deductive epistemology.

Among the identified paradigms in literature as outlined above, the positivist paradigm was adopted for the current study. The choice of the paradigm was largely informed by knowledge management and knowledge sharing literature (Singh & Gupta, 2014:785; Lee & Wong, 2015:715) which affirms that scales can be developed to measure social constructs from a positivist perspective. Thus, though some of the constructs in the current study are social in nature, scales have been adapted to operationalise them and thus enable measurement from a positivist point of view. Furthermore, the data collection instrument used is highly structured, making it fully quantitative and this conforms to the positivist paradigm as argued by Creswell (2009:8). Quantitative studies have been known to be associated with the positivist paradigm (Greener, 2008:16; Neuman, 2014:97; Kumar, 2011:33) Therefore, the positivist paradigm was more befitting as it related to the requirements of the current study.

#### **5.2.4 Axiology of the study**

Axiology in research aims at studying the judgments about the role of values in any given study (Saunders *et al.*, 2009:587). Axiology also tries to understand the involvement of the researcher throughout the research process (Mouton, 2001:249; Adebisin *et al.*, 2011:310). Axiology can be viewed from two broad perspectives: ethics and aesthetics, as argued by Kalpesh (2013:2). Saunders *et al.* (2009:587) note that interpretivists undertake studies that are value laden (aesthetic), where there is high involvement of the researcher so as to fully understand the matters being studied. Positivists have less involvement and studies are carried out mostly independently of the researcher (ethics) as stated by Greener (2008:33). The current study was conducted independently of the researcher thus the ethical approach to axiology was adopted since it supports the positivist paradigm (Li, 2016:119) as stated in Section 5.2.3.1 above. As such, Section 5.7 on ethical considerations was included in the study to further explain the axiology of the study by outlining the level of researcher involvement. The remaining sections will now discuss the research methodology with the aim of relating it to the preceding research philosophy.



### **5.2.5 Section summary**

The key issue that emerged from the section is the importance of a research philosophy in any study. The section revealed that the research philosophy (i.e. the ontology, epistemology and axiology) determines how the entire study will be conducted. The choices made on the three branches of philosophy pertaining to the current study were also highlighted as realism ontology, deductive epistemology, the positivist paradigm and ethical axiology. Furthermore, the section unearthed that the aforementioned choices can only be fully applied with quantitative studies. Thus, justification of the choices made was also provided to show the relevance of the research philosophy to the study.

## **5.3 RESEARCH METHODOLOGY**

Although in most cases the term ‘research methodology’ is loosely applied, particularly in dissertations, to mean the entire research process, theory contradicts that common practice. In practice, methodology refers to the research approach, research strategy and research design and these three features of a research methodology are discussed in this section. The section attempts to outline the methodology, which produced a blueprint that was used for guiding the study as denoted by Stephen (2016:203). The section begins by discussing the three major research approaches, namely: quantitative, qualitative and mixed method approaches. The section further elaborates on the methodology by discussing the research strategy in accordance with the research approach delineated in Section 5.3.1. The section concludes by outlining the implementation of the research design in line with the research philosophy (Crotty, 1998:3) and this includes mainly the literature review, sampling procedure and the research methods.

### **5.3.1 Research approaches**

A research approach is a plan of procedures consisting of broad assumptions that detail ways of collecting, analysing and interpreting data (Bryman & Bell, 2015:27). They posit that a research approach can be viewed from both a data collection and data analysis or reasoning perspective. Arguing from this viewpoint, Chetty (2016:1) contends that the data collection research approach is divided into quantitative and qualitative approaches, while the data analysis research approach has inductive and deductive approaches. The inductive and deductive approach has been addressed in Section 5.2.3.1; thus this section will focus on

quantitative and qualitative approaches to research. Kumar (2011:31) concurs with the two approaches (i.e. quantitative and qualitative). However, he adds mixed methods as a third dimension of a research approach. He highlights that qualitative approaches are exploratory, highly unstructured and associated with small samples while quantitative approaches are conclusive (i.e. causal or descriptive), very structured and use much larger samples. In support of the mixed method approach, Greener (2008:35) argues that when a study involves both structured and unstructured data, the two approaches should be combined resulting in a mixed method approach. Creswell (2009:15) notes that the mixed method approach can be conducted using the sequential, concurrent or transformative approaches. Zou, Sunindijo and Dainty (2014:318) take an ontological perspective and argue that qualitative approaches are subjective in nature while on the other hand, quantitative approaches are objective (Ponteretto, 2005:128; Flick, 2014:14).

Quantitative research strives to explain phenomena as specifically as possible, using numerical data that are analysed by means of statistical methods (Kumar, 2011:31). He also highlights that the quantitative approach directs effort towards narrowing the magnitude of the study, developing a framework within which to confine the search. Creswell and Clark (2011:120) add that quantitative research involves the stating of the research problem before data are collected. Creswell (2013:202) further notes that quantitative studies emphasise exploring commonalities in the study population by use of a sample and generalising the findings to the entire population. He (Creswell, 2013:202) also mentions that the quantitative approach includes measurements and variables, which play an important role in drawing conclusions, thus making the quantitative approach more suitable in testing hypotheses.

A qualitative approach was thus not suitable because only numerical data derived from the structured questionnaire were available to answer the questions. Furthermore, the characteristics of the qualitative approach are based on describing realities to understand phenomena by focusing on meaning, process and description based on words, which is also out of the context of this study. The qualitative approach also requires a high level of involvement from the researcher and a very small sample, whereas the current study had less researcher involvement and used a large sample. Similarly, a mixed method approach that requires collection of both qualitative and quantitative data were not appropriate for the same reasons stated above. The foregoing arguments form the basis of not considering qualitative and mixed method approaches in the study.

The chronological logic in the previous sections reveals that the current study is suited for realism ontology, a deductive epistemology and a positivist paradigm. This outcome demands the adoption of a quantitative approach as supported in literature (Ponteretto, 2005:128; Kumar, 2011:31; Flick, 2014:14; Greener & Mortelli, 2015:43). This decision is anchored on the fact that firstly, the study involved a detailed literature review in which constructs were identified and a conceptual framework was developed based on the literature evidence. Secondly, though composed of seemingly qualitative constructs, the study used a sample drawn from the population to explain the relationships amongst constructs and compile a description of the phenomena that is generalisable to other environments. Thus, numeric data were collected using a structured questionnaire where scales were developed to operationalise all the qualitative constructs. Lastly, statistical analyses that included structural equation modelling (SEM), path analysis, multiple linear regression, correlation and chi-square were conducted using software such as SPSS and AMOS to test the hypotheses. Based on the views outlined by several authors (Tashakkori & Teddlie, 2003:98; Creswell, 2013:202; Marx, Rihoux & Ragin, 2013:131; Dagnino & Cinici, 2016:319), these steps fulfil the conditions and characteristics in quantitative approaches. In view of the foregoing factors applicable to the current study, the quantitative approach was thus adopted.

### **5.3.2 Research strategies**

A research strategy outlines the researcher's planned intentions on how to implement the research design to answer and address the research questions (Saunders *et al.*, 2009:90). They contend that research strategies include experiments, surveys, case studies, ethnography, grounded theory and action research; a view also shared by Creswell (2009:13). They further contend that the choice of a research strategy is based on the objectives, research questions, extent of existing knowledge, available time and research philosophy as also supported by Gray (2014:22). Datt (2016:1) further divides research strategies based on the epistemology used, i.e. deductive, inductive or abductive. He argues that strategies such as ethnography and action research can be used together with an inductive epistemology while experimental and survey strategies are suitable for a deductive epistemology. The case study and grounded theory strategies are, however, more appropriate for an abductive epistemology. Collis and Hussey (2003:55) group strategies according to the research paradigm and argue that surveys and

experiments are positivist strategies, while case studies, ethnography, action research and grounded theory are interpretivist strategies.

Action research is research that is aimed at bringing change and knowledge creation (Sarantakos, 2012:465). Neuman (2014:30), taking a social research view, identifies action research as including active participation of the people being studied; incorporating popular knowledge and concerns of the ordinary, and sharing of study findings. Greener (2008:86) posits that ethnography involves the submersion of the researcher into the actual context under study. He also notes that participant observation can be applied to allow researchers to have direct experience of a specific situation or event. Bhattacharjee (2012:41) agrees and contends that ethnography is highly inductive and may involve, for instance, understanding of culture, symbols, rituals and languages of a given community. Case study strategy involves the in-depth study of a situation or problem (Stack, 1995:200) from one or more situations, by collecting and analysing data from documents, surveys or interviewing people as suggested by Greener (2008:81).

An experimental research strategy relates to research that is conducted under carefully controlled and structured environments so as to identify and analyse the causal relationships of a given phenomenon (Creswell, 2014:41). Leedy and Ormrod (2001:10) identify three research designs associated with experimental strategies, namely: pre-experimental, quasi-experimental and true-experimental. They (Leedy & Ormrod, 2001:11) also argue that variables or subjects in an experimental study can be manipulated or controlled to observe the effects. Experimental strategies, according to Field and Hole (2003:90), are best suited for studies conducted in laboratories.

A survey strategy entails the selection of a sample, which can then be used to quantitatively describe the trends, attitudes or opinions of a population (Babbie, 1990:98). He argues from a time horizon perspective and further suggests that surveys can be longitudinal or cross-sectional in nature. Blair, Czaja and Blair (2014:110) argue that surveys use questionnaires or structured interviews to collect data so as to generalise from a sample to a population. In order to achieve this goal, Creswell (2009:148) posits that surveys require careful identification of the population, the sample frame, sample and sampling techniques in selecting the respondents. He also emphasises that meticulous consideration of the validity and reliability of instruments is important in avoiding researcher error, which may in turn affect research results. DeVellis

(2012:47) argues that to reduce researcher error in surveys, instruments must be pilot tested. Blair *et al.* (2014:210) concur and note that factor analysis eliminates researcher bias during scale development of a survey instrument. According to Peterson (2009:76), surveys have advantages that include high external and internal validity, efficient data collection, use of geographically spread samples, and high levels of ethical consideration. Fowler (2002:119) agrees and adds that the survey strategy provides economy of design and rapid turn-around in data collection. Bryman (2012:73) posits that surveys are highly versatile and can be applied with descriptive, exploratory or explanatory research designs. He, however, emphasises that surveys are best suited for non-experimental descriptive studies that seek to describe reality.

In line with the current study, a structured questionnaire was used to collect quantitative data from a large sample drawn from all ten provinces in Zimbabwe. The use of a questionnaire helped to reach a geographically spaced sample within the limited time schedule. A sample frame from the SMEAZ database was adopted and a random sampling technique was used in selecting the sample as stated in Section 5.5.4.1, to increase external validity. All scales in the instrument were adapted from previous studies. Nevertheless, the instrument was still revised by experts, pilot-tested and adjustments were factored into the measurement. Furthermore, an exploratory factor analysis was conducted to determine the valid scales to achieve internal validity and eliminate researcher error. Then the instrument was administered to the selected sample, data were statistically analysed, and the results were generalised to the entire population. The aforementioned procedures meet the core characteristics of conducting a survey strategy, hence its adoption for the current study. Furthermore, literature recommends the survey strategy as highly suitable for effectively describing phenomena as noted by Chauvel and Despres (2002:222), in their review of knowledge management studies from 1997-2001.

### **5.3.3 Research design**

Literature has cited a research design, on the one hand, as composed of quantitative and qualitative designs (Bryman & Bell, 2007:68; Creswell, 2009:3), whereby emphasis is more on just the type of data and the way of analysing them. On the other hand, some authors have viewed a research design as more comprehensive and focused on where the data will be collected, what will be used to collect the data and how the data will be analysed regardless of the nature of the data (Malhotra & Peterson, 2006:71; Saunders *et al.*, 2012:38; Bryman, 2012:46; Dudovskiy, 2018:10). The later proponents thus contend that a research design

involves decisions about the literature review, sampling design, and instrument development, over and above methods used for data collection and analysis. Bhattacharjee (2012:35) also agrees with the second dimension and adds that a research design is a blueprint for empirical research aimed at testing hypotheses. He further buttresses that a research design includes not only data collection and analysis but also the sampling process and the development of an instrument to be used in collecting the data. Since the current research design is mainly aimed at addressing the empirical objectives by testing the research hypotheses, this latter perspective was adopted for the study. Thus, the section directs emphasis towards the adopted design, literature review, sampling design, data collection methods and data analysis.

Research designs can be divided into two major groups, namely, exploratory and conclusive (Dudovskiy, 2018:10). He contends that exploratory designs aim at gaining insights into specific phenomena using small samples and qualitative data; thus, they only provide tentative findings, and a case study is one such example. Conclusive designs intend to generate findings that are useful in reaching conclusions by using larger samples, quantitative data and testing of hypotheses. Nargundkar (2008:39) points out that conclusive designs can be further divided into descriptive designs and causal designs.

Causal designs aim at testing cause and effect as suggested by Bhattacharjee (2012:38). A common example of a causal design is experiments and these can be further grouped into pre-experiments, quasi-experiments and true-experiments. Pre-experiments have no control over variables, quasi-experiments do not apply random assignment between groups and true-experiments implement full control of variables by random assignment on groups (Leedy & Ormrod, 2001:10; Bryman, 2012:56). Descriptive designs involve making careful observations to describe phenomena (Bryman, 2012:6) and are grouped into longitudinal surveys and cross-sectional surveys (Dudovskiy, 2018:18), based on the period taken to collect the data. Blumberg, Cooper and Schindler (2011:149) agree and define descriptive research designs as designs that aim mainly at describing an existing phenomenon. The description in these designs is most commonly from a quantitative perspective since descriptive survey designs are best suited for handling quantitative data as noted by Field (2009:312). Bryman (2012:63) posits that cross-sectional designs use a single questionnaire to collect data at one point in time and are grouped as single or multiple cross-sectional designs. Longitudinal designs involve data being collected over different time periods and can be categorised into panel and cohort designs; the categorisation being determined by how the respondents are treated.

In view of the above discourse, the study used a quantitative, descriptive, cross-sectional survey design with a national sample of 1100 SMEs, from all ten provinces in Zimbabwe, which are registered with the SMEAZ. Business professionals, classified as supply chain managers, ICT managers and SME owners/managers (since no organisation had employed a knowledge officer), were selected as respondents. They were supposed to have at least a diploma in Marketing, Supply Chain Management or ICT. The quantitative, descriptive, cross-sectional survey design was most suitable because the current study collected quantitative data from the sample at once using one structured questionnaire and also in one time period from January 2019 – April 2019. The study also sought to use the constructs identified from literature to describe the Zimbabwean SME environment. Furthermore, the literature on SCP supports the use of quantitative, descriptive, single cross-sectional survey designs as found by Zhang, Donk and Vaart (2011:1234) in their review of several publications on the subject. The details of the research design process, which included a literature review, and an empirical study are outlined next.

### **5.3.3.1 Literature review**

A literature review is the researcher's effort to read through existing knowledge so as to learn, compare, replicate or critique and then build new knowledge that is grounded on the existing body of knowledge (Cooper, 2010:10; Sekaran & Bougie, 2013:50; Creswell, 2014:57). A literature review also gives insights into what has already been done in a given area of study (Creswell, 2009:26). An appreciation of existing knowledge helps the researcher in identifying knowledge gaps, methods used, major theories and conflicting views as well as develop hypotheses (Bruce, 1994:223; Charmaz, 2006:168; Bryman, 2012:99). Thus, a literature review is the researcher's acknowledgment that knowledge is not cyclical, but it accumulates in an incremental approach. Accordingly, emerging research must build on prior knowledge rather than reinvent the wheel (Neuman, 2011:126). Therefore, the literature review had three chapters that were focused on reviewing extant literature pertaining to the context of the study (i.e. the SME sector) and the key constructs of the study as outlined below.

Firstly, Chapter Two was mainly focused on understanding the research context from a broader perspective and developing a usable SME definition for the study. The chapter was thus dedicated to understanding the SME sector in developed, developing and under-developed

countries. The chapter identified common SME benefits, challenges and contributions, for instance, supporting economic development, high failure rate and reduction of unemployment, respectively. Key in the chapter is the analysis of the recommended best practices and the continued failure by some of these practices to reduce the mortality rate of SMEs. The chapter revealed that the integration of people-centred KMSs, knowledge sharing, and SCP has not been effectively implemented as an antidote to SME failure. This information thus created the knowledge gap that led to the identification of the constructs used in Chapters Three and Four.

Secondly, Chapter Three outlined the predictor variable, people-centred KMSs and the guiding theory of the study, which was the knowledge-based view (KBV) theory. The chapter listed several KMSs and then identified organisational culture, CoPs, social capital and innovation management as relevant to the study. Based on the evidence from the reviewed literature, four hypotheses (H<sub>1</sub>- H<sub>4</sub>) were developed for testing. The review also helped in the development of measurement scales that were used in the operationalisation of the latent variables as required in survey studies. Lastly, Chapter Four was dedicated to reviewing literature on the mediating variable (knowledge sharing) and the outcome variable (SCP). Several SCP measures were identified, but cost-related supply chain, time-related supply chain, operational quality-related supply chain and responsiveness-related supply chain measures were used for the study. The chapter attempted to theoretically explain the relationships among the variables, which led to the development of the study's conceptual framework. The review then led to the formulation of the last four hypotheses (H<sub>5</sub>-H<sub>8</sub>) and the development of measurement scales for the moderating and outcome variables.

Some of the literature sources were gathered using internet-based platforms such as Google Scholar, free journals and eBooks websites, official company websites, research journals such as Science direct, JStor, Wiley, Ebsco-host and Emerald insight. Other sources included newspapers, published printed books, dissertations and organisational publications. Key words, including SMEs, knowledge management, KMSs, knowledge sharing, supply chain management and SCP were used to search for sources. The searching was achieved with the aid of computer-based search tools such as Google, Bing, journal search and book search tools provided by the VUT library system.



### **5.3.3.2 Empirical research**

This subsection outlines the sampling design, detailed sampling, instrument development, procedures for data collection, data analysis, validity and reliability. This discourse helps outline the correct sampling design that addresses the empirical objectives of the study while conforming to reliability, validity and ethical principles required in quantitative surveys.

### **5.3.3.3 Sampling design**

Sampling design is the researcher's provisional plan for a quantitative description of trends, attitudes or opinions of a population by studying a sample of that population (Creswell, 2013:235; Alison & Gass, 2015:11). The primary aim of sampling is to make inferences about a given population using the selected sample (Uprichard, 2013:4). The sampling design is an important part of a study, particularly in surveys that adopt a cross-sectional design as is the case in this study. One of the reasons why this emphasis is placed is that the validity and reliability of the results in a survey study are heavily dependent on the sample design. Another reason is that poor sample designs cause sampling bias and non-response bias making the results not generalisable to the population (Bhattacharjee, 2012:71). Thus, a thorough process that ensures respondent representativeness and responsiveness must be followed.

In accordance with the aforementioned view, the sampling design for this study followed a procedural approach in coming up with the sample design so as to eliminate the stated challenges. The approach involves a sequential process that begins with determining the target population then the sampling frame, sample size, and the sampling techniques. The stated steps will then be followed by development of measurement scales, data collection and analysis procedures, as suggested by Feldmann (2014:1), and discussed in the subsequent sections.

### **5.3.3.3.1 Target population**

A target population can be defined as a domain of elements (units of analysis), animate or inanimate, where a valid and relevant sample (comprising characteristics to be studied) can be selected (Bhattacharjee, 2012:75; Berndt & Petzer, 2013:347). The target population for the current study comprised SMEs that were operating in Zimbabwe and were officially registered with the Zimbabwean registrar of companies through the Companies Act. These SMEs were

also supposed to be registered with the Zimbabwe Revenue authority (ZIMRA) and actively doing business in any one of the ten Zimbabwean provinces. The actual number of the officially registered SMEs in Zimbabwe could not be established as the responsible institutions could not readily provide the actual figures.

#### **5.3.3.3.2 Sampling frame**

A sampling frame refers to a list containing a subset of the target population (Turner, 2003:3) from which the final sample is selected, as noted by Walliman (2011:94). According to Groves, Fowler, Couper, Lepkowski, Singer and Tourangeau (2004:25), a sampling frame is a pre-requisite in achieving probability sampling. Since the study adopted probability sampling, a sampling frame for the study was drawn from the list of registered SMEs maintained by the SMEAZ database. The list contains the names of SMEs, their contact details, area of specialisation, sector and any other details that market the SME online. According to the official SMEAZ website, the association had approximately 1684 registered SMEs operating in nearly 38 disciplines across all sectors and were doing business in one of the ten provinces in Zimbabwe (SMEAZ, 2019:1).

#### **5.3.3.3.3. Sample size**

A sample size is the determination by the researcher of the number of respondents that can be feasibly included in a statistical sample (Singh & Masuku, 2014:6; Kumar, 2011:194; Kothari, 2004:56). The appropriate sample size for this study was determined after considering a combination of methods anchored on recommendations in literature regarding the determination of a sample size for a survey study. The recommendations include using a sample size that: ensures reliability and validity of results; recognises among other issues the time factor, cost and general practices of quantitative studies (Aaker *et al.*, 2007:410; Tabachnick & Fidell, 2007:613; Saunders *et al.*, 2009:218). Guided by the foregoing factors that may negatively affect the results of a survey study due to poor sample size determination, the historical approach was considered first. In this approach, other international related studies were reviewed to establish the average sample size and response rate, and the results are presented and discussed in the next section.

**Table 5.1: Basis for sample size of the study**

<b>Construct</b>	<b>Previous study</b>	<b>Sample size used</b>
Community of practice	Cervellon & Wenerfelt (2012:181)	196
	Akhavan, Marzieh & Mirjafari (2015:205)	450
Supply chain performance	Bonomyyong & Supatn (2011:24)	500
	Ramish & Aslam (2016:716)	800
Social capital	Hoof & Huysen (2009:7)	650
	Wu & Lee (2015:528)	640
Organisational culture	Lin (2007:321)	500
	Peralta & Saldanha (2014:541)	128
<b>Construct</b>	<b>Previous study</b>	<b>Sample size used</b>
Innovation management	Saenz, Aramburu & Blanco (2012:926)	446
	Andreeva & Kianto (2012:1022)	261
Knowledge sharing	Zhang & Jiang (2015:285)	258
	Wang, Sharma & Cao (2016:4653)	356

**Source: Literature study**

As indicated in Table 5.1, when related studies for all the research constructs were considered, the lowest sample size used was 128 and the highest was 800, resulting in an average sample size of 430 respondents. Furthermore, it was revealed that the average response rate in all the studies was 40 percent. Since there may still be room for sampling bias due to variations in the research context, the recommendation on sample size determination in survey studies by Mathers, Fox and Hunn (2009:16) was further applied to support the historical approach. They (Mathers *et al.*, 2009:16) suggest that if the response rate history and the confidence interval are known, the sample size can be extrapolated using sample size determination tables (Mathers, Fox & Hunn, 2009:18). Therefore, deriving the response rate from the above historical approach as 40 percent and adopting a 95 percent confidence interval to meet quantitative research needs, resulted in a sample size of 400 respondents.

The figures above are higher than the recommendations by Pallant (2010:181) and Dagnino and Cinici (2016:101), who suggest quantitative study figures above 100 and 200 to allow for factor analysis and SEM, respectively. However, Field (2009:822) argues that if survey data are

to be factor analysed, an item-to-respondent ratio can be considered. His suggestion was implemented by use of the upper limit ratio of 1:10 for number of items and respondents, respectively. Since the instrument used in this study had 52 items this resulted in a sample size of 520 (i.e. 52x10) thereby addressing the need for a quantitative survey sample size. The foregoing suggestions from different methods of eliminating sample size limitations reveal that the highest sample size used was N=800; average sample size N=430 and smallest sample size N=128.

Guided by the above observations and the need to conform to proven practices while meeting validity and reliability requirements for the current study, the sample size was then set at N=1100. The highest sample was considered most suitable for achieving the required levels of statistical significance since smaller samples usually present some limitations in quantitative survey studies (Wang, Noe & Wang, 2015:1003; Lebedev, 2015:295). Furthermore, structural equation modelling (SEM) was conducted using the AMOS 24 software programme and the use of larger samples was also supported by Arbuckle (2012:31) in the AMOS guide, who noted that accuracy in SEM increases with larger samples sizes. Nevertheless, to ascertain the accuracy of the sample size and avoid opinion-based selection, which is not required in quantitative studies, a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was performed. As outlined in Chapter Six, the sample size was found to be statistically significant for each of the constructs under investigation in the study.

#### **5.3.3.3.4 Sampling procedure**

Sampling procedures can be grouped as probability (i.e. simple random, systematic, stratified, clustered) (Malhotra & Birks, 2007:19; Levy & Lemeshow, 2013:17) and non-probability (i.e. quota, snowballing, convenience, judgment) (Wretman, 2010:31; Robinson, 2014:30). The study used probability sampling to select the respondents since the list of respondents forming the sampling frame was already known (Uprichard, 2013:3). As put across by Schiffman and Kanuk (2009:123), probability sampling implements randomisation to provide equal representation, thus it is best suited for quantitative surveys. They argue that respondent representativeness eliminates sampling bias making it possible to generalise results to the entire population as well as increase internal validity.

Amongst the probability sampling techniques available for use in research as stated in extant literature, the stratified sampling technique was utilised to select enterprises from the sampling frame. The stratified technique ensured that certain cases varying on preselected parameters were included and equally represented in the sample in order to decrease the error in the estimation (Sandelwoski, 2000:250). This technique requires that the sampling frame be divided into non-overlapping homogenous subgroups called strata (Groves *et al.*, 2004:25). As such, the SME sectors defined within the sample frame were considered as strata since these were believed to be homogenous in nature. However, the statistics from the SMEAZ database revealed that the sampling frame had more small enterprises than medium enterprises (i.e. a ratio of 1:20, respectively) based on the definition of an SME adopted for this study.

Proportional stratified sampling using the aforementioned ratios and simple random sampling were thus implemented on the sampling frame to ensure that small enterprises do not dominate the sample. This approach ensured consistency of proportionality between the sampling frame and the sample. The sampling process was conducted with assistance from the SMEAZ who used software-based programs for achieving sample selection. Firstly, the parameters for the study's sampling requirements were configured in the software. Secondly, the software was executed and the randomisation facility in the software automatically selected the proportionally distributed sample of 1100 SMEs at a ratio of 1:20 from the strata in the sample frame. Lastly, based on the enterprise profile records maintained at the association, one respondent from each of the sample enterprises who possessed ICT, SCM or knowledge management expertise or similar was randomly selected to form the final sample of actual respondents.

Stratified sampling was probable since its nature fitted well with the study context; as such, the sectors comprising the SMEs as provided by the SMEAZ were used as strata. This ensured unbiased proportional selection and internal validity was thus guaranteed. Furthermore, the technique facilitates more accurate representation of the entire target population with a sample by ensuring that no sector/type of enterprise dominates the sample (Zikmund, Babin, Carr & Griffin, 2013:400). Non-probability sampling techniques were not suitable for this study since they are known to increase sampling design biases in quantitative surveys because of poor representativeness (Mathers *et al.*, 2009:13). Furthermore, Bhattacharjee (2012:69) argues that since non-probability sampling techniques allow for zero chance of selection of other units of the sample, results from such a sample are not generalisable to the population. This failure to

generalise results would thus violate the requirements of the current study, which intends to test hypotheses based on the survey data collected from the sample and generalise the results to the entire population. When the sample, sample frame and the sample size has been determined, the next aspect is selecting a relevant data collection instrument, and this is discussed and emphasised in subsection 5.3.3.4.

#### **5.3.3.4 Research methods**

Research methods are techniques used in gathering research data as highlighted by Zikmund and Babin (2007:78). Research methods can be categorised as primary (i.e. collect data directly from the respondents) or secondary (i.e. gather evidence from extant literature sources). Primary research methods can include focus group discussions, observations, experiments, questionnaires, and interviews (Saunders *et al.*, 2009:288), and secondary sources include published literature and organisational websites. Methods can also be categorised as qualitative or quantitative based on the nature of the data to be collected. The current study used quantitative, primary, as well as secondary data collection methods. Secondary sources were used to gather data for addressing the theoretical objectives as outlined in Section 5.3.3.1. Similarly, the empirical data were gathered using a primary quantitative source in the form of a structured questionnaire as guided by suggestions in existing literature (Drew *et al.*, 2008:16; Johnson & Reynolds, 2008:49; Mertens, 2010:172). After selecting a structured questionnaire as the most suitable data collection method for the study, there was a need to determine the measurement scales to be used since the data requirements were quantitative. The concepts (i.e. variables and constructs) to be measured were derived from the literature as presented in the conceptual framework in Chapter One.

Variables can be easily measured while constructs may need further operationalisation by identifying relevant scales and scale measurements (Zikmund & Babin, 2007:299). Operationalisation of scale measurements is achieved by using four levels of measurement, namely: nominal, ordinal, interval and ratio (Zikmund & Babin, 2007:300; Kumar, 2011:315). There are other scales that Kumar (2011:330) identifies as attitudinal scales, which are mainly used in the operationalisation of latent constructs. These scales include Likert scales, semantic differential scales, staple scales, rank order scales, graphic rating scales, constant sum scales and behavioural intention scales (Hair Jr. *et al.*, 2008:155). Due to the nature of the research data, the nominal, ordinal and Likert scales were adopted for this study. The nominal scale was

used to operationalise the demographic variables while the Likert scale together with ordinal scaling were used to operationalise the research constructs as explained in the next subsection.

#### **5.3.3.4.1 Measurement instrument**

The design of a measurement instrument is a key step in the research process since poor design may lead to wrong data being collected (Aaker *et al.*, 2007:316; Mertens, 2010:172). Thus, detailed consideration was given to the development of the instrument (i.e. structured questionnaire) using the nineteen (19) constructs identified from the review of the literature. The identified concepts include gender, age, highest qualification, nationality, work experience, number of employees, type of industry, years in existence. Furthermore, the theoretical concept of a people-centred KMS was represented by four constructs, namely: organisational culture, innovation management, CoPs and social capital. The other construct was knowledge sharing and lastly SCP, which was represented by four constructs, namely: time-related performance, cost-related performance, responsiveness-related performance, and operational quality-related performance. The ordering of questions to improve responses by facilitating responses to less confidential issues first (Aaker *et al.*, 2007:330), was not considered since the study data were considered non-confidential.

The questionnaire is partitioned into seven sections. Initially, Section A consisted of eight variables (A1-A8) that elicited information about the demographic details of respondents and their SME profiles. This was later split into two sections, with Section A focusing on respondent demographic information and Section B on SME business profile. Sections C to F were comprised of varying questions that were measuring the four people-centred KMS constructs under consideration in this study.

##### **5.3.3.4.1.1 Section C construct items**

Section C had six variables (OC1-OC6) that sought responses on organisational culture using questions adapted from Cockrell and Stone (2010:855). The scale was used to collect responses from certified management accountants, which makes it suitable for use on respondents with expert knowledge, as is the case in the current study. The detailed measurement scales are presented in Table 5.2.

**Table 5.2: Scale development and reliability for organisational culture**

Item code	Code description	Author(s) and year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) ( $\alpha$ )
OC1	Our culture promotes the trust that is needed to encourage knowledge sharing among employees.	Cockrell and Stone (2010:855)	Various industries globally	0.912
OC2	Our organisation has a knowledge-sharing rather than a knowledge-hoarding culture.			
OC3	Our culture makes it easy to share ideas with others through computer-based systems.			
OC4	Our culture encourages people who work in groups and teams to share knowledge with one another.			
OC5	Our culture emphasises that knowledge-sharing activities earn praise that indicates people are doing their jobs well if they share knowledge.			
OC6	Our culture emphasises that knowledge-sharing activities earn praise that indicates what a good employee should do.			

**Source: Adapted from Cockrell and Stone (2010:855)**

As depicted in Table 5.2, the scale adapted for use in this study was used by Cockrell and Stone (2010:855) and attained a Cronbach's alpha value of 0.912. Hence, the scale can be deemed reliable and suitable for the current study.

#### **5.3.3.4.1.2 Section D construct items**

Section D consists of seven variables (IM1-IM7) that sought responses on innovation management using questions adapted from Wang *et al.* (2016:4656). The scales and the



reliability as tested by Wang *et al.* (2016:4656) within Chinese high-technology industries are shown in Table 5.3.

**Table 5.3: Scale development and reliability for innovation management**

Item code	Code description	Author(s) and year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) ( $\alpha$ )
IM1	Our organisation utilises knowledge sharing as a tool for coming up with novel ideas quicker than our key competitors.	Wang <i>et al.</i> (2016:4656)	Chinese high-technology industries	0.84
IM2	Our organisation depends on knowledge sharing to be faster in launching quality products than our key competitors.			
IM3	Our organisation promotes knowledge sharing so that we are quicker in new product development than most of our key competitors.			
IM4	Our organisation relies on knowledge sharing to be quicker in environmental adaptation.			
IM5	Our organisation is quicker in improving processes than most of our key competitors because of the value we place in knowledge sharing.			
IM6	Our organisation is quicker in problem-solving than most of our key competitors because employees are encouraged to share knowledge.			
IM7	Knowledge sharing through computer-based systems is important in supporting innovation activities in our organisation.			

**Source: Adapted from Wang *et al.* (2016:4656)**

As shown in Table 5.3, the above scale adapted for use in this study, was initially used by Wang *et al.* (2016:4656) and attained a Cronbach's alpha value of 0.84. Therefore, the scale can be deemed reliable and suitable for the current study.

### 5.3.3.4.1.3 Section E construct items

Section E has six variables (CoP1-CoP6) that sought responses on CoP using questions adapted from Zboralski (2009:97). The CoP they used are detailed in Table 5.4 together with the achieved reliability level.

**Table 5.4: Scale development and reliability for communities of practice**

Item code	Code description	Author(s) and year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) ( $\alpha$ )
CoP1	I participate in the group to learn new things and pass on my knowledge.	Zboralski (2009:97)	Global multi-national company	0.90
CoP2	I participate in the group to get specialist support from members.			
CoP3	Management speaks positively to others about participation and involvement in groups.			
CoP4	I often share knowledge with others through face-to-face meetings in groups.			
CoP5	I often share knowledge with others through discussion forums/News boards.			
CoP6	My interaction with others is based on trust and cohesion.			

**Source: Adapted from Zboralski (2009:97)**

As depicted in Table 5.4, the scale adapted for use in this study was used by Zboralski (2009:97) to test CoPs in a global, multi-national company and attained a Cronbach's alpha value of 0.90. Hence, the scale can be said to be reliable and suitable for the current study.

### 5.3.3.4.1.4 Section F construct items

Section F comprises five variables (SC1-SC5) that sought responses on social capital using questions adapted from Hoof and Huysman (2009:8). The scales are outlined in Table 5.5.

**Table 5.5: Scale development and reliability for social capital**

<b>Item code</b>	<b>Code description</b>	<b>Author(s) and year</b>	<b>Industry and region where the scale was applied</b>	<b>Reliability (Cronbach's Alpha) (<math>\alpha</math>)</b>
SC1	My workmates and I speak the same 'technical' language about our work.	Hoof and Huysman (2009:8)	Multiple industries across the globe	0.86
SC2	I can rely on my colleagues when I need support in anything concerning my work.			
SC3	I tell someone what I know, and I can count on it that they will also tell me what they know.			
SC4	I view this organisation as a group to which I belong.			
SC5	Discussions with workmates through computer-based platforms improve my interaction with others in the organisation.			

**Source: Adapted from Hoof and Huysman (2009:8)**

As indicated in Table 5.5, the scale adapted for use in this study was used by Hoof and Huysman (2009:8) to test social capital using respondents from several industries across the globe and attained a Cronbach's alpha value of 0.86. As such, the scale can be considered reliable and suitable for use in the current study.

#### **5.3.3.4.1.5 Section G construct items**

Section G contains five variables (KS1-KS5) that sought responses on knowledge sharing, where the first question was adapted from Ali, Ul Musawir and Ali (2018:475), the second from Ho and Ganesan (2013:105), and the remainder from Jahmani, Fadiya, Abubakar and Elrehail (2018:490). The scales are shown in detail in Table 5.6.

**Table 5.6: Scale development and reliability for knowledge sharing**

<b>Item code</b>	<b>Code description</b>	<b>Author(s) and year</b>	<b>Industry and region where the scale was applied</b>	<b>Reliability (Cronbach's Alpha) (<math>\alpha</math>)</b>
KS1	Through sharing information and knowledge, we often come up with new ideas that can be used to improve our supply chain operations.	Ali, UI Musawir and Ali (2018:475)	Project-based organisations in Pakistan	0.89
KS2	My firm has exchanged many ideas with the partners about how to improve each other's capabilities in manufacturing, research, Logistics, services etc.	Ho and Ganesan (2013:105)	Education sector in Western United States	0.87
KS3	The supply chain knowledge provided through knowledge sharing is up-to-date.	Jahmani, Fadiya, Abubakar and Elrehail (2018:490)	Health-care establishments in Jordan	0.91
KS4	The supply chain words and phrases provided from the knowledge sharing processes are consistent.			
KS5	Knowledge sharing processes provide contextual supply chain knowledge so that we can truly understand how to accurately carry out forecasts.			

**Source: Adapted from Ali, UI Musawir & Ali (2018:475); Ho and Ganesan (2013:105); Jahmani, Fadiya, Abubakar and Elrehail (2018:490)**

As depicted in Table 5.6, the scale adapted for use in this study was used by multiple authors (Ali, UI Musawir & Ali, 2018:475; Ho & Ganesan, 2013:105; Jahmani, Fadiya, Abubakar & Elrehail, 2018:490) and in each measurement item a Cronbach's alpha value of 0.89, 0.87 and 0.91 was attained, respectively. Therefore, the scale can be deemed reliable and suitable for the current study.

### 5.3.3.4.1.6 Section H construct items

Section H first had twelve variables, which were used for measuring SCP from both a network-based approach and a process-based approach. The same scales when used for measuring using the network-based approach, were named as variable SCP1-SCP12 and from a process-based approach they were represented by four constructs each with four variables. These variables were time-related performance (TRP1-TRP4), cost-related performance (CRP1-CRP4), responsiveness-related performance (RRP1-RRP4) and operational quality-related performance (OQRP1-OQRP4). Each construct sought to gather responses on SCP using questions adapted from Miri-Lavassani and Movahedi (2018:692). The adapted scales and their original sources and reliability are summarised in Table 5.7.

**Table 5.7: Scale development and reliability for supply chain performance**

Item code	Code description	Author(s) and year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) ( $\alpha$ )
CRP1	Supply chain productivity (e.g. ratio of production to asset/staff)	Miri-Lavassani and Movahedi (2018:692)	SMEs in Canada	0.88
CRP2	Supply chain efficiency (e.g. ratio of output to input)			
CRP3	Profit margin (e.g. return on investment)			
CRP4	Supply chain financing (e.g. budgetary constraints)			
TRP1	Manufacturing or service-processing lead time (i.e. time taken to make a product)			0.90
TRP2	Delivery lead time (i.e. time taken to make a delivery)			
TRP3	Supply lead time (i.e. time taken to make a supply)			
TRP4	Cash to cash cycle (i.e. time taken to convert cash to cash)			
RRP1	Flexibility: ability to handle small disruptions			0.91
RRS2	Resilience: ability to handle large disruptions			
RRP3	Agility: ability to recover from short-term changes			

Item code	Code description	Author(s) and year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) ( $\alpha$ )
RRSCP4	Adaptability: ability to adapt to long-term changes			0.86
OQRP1	Perceived quality of products or services (by customers)			
OQRP2	Knowledge accuracy (by your organisation and its suppliers)			
OQRP3	Current or real-time knowledge			
OQRP4	Forecasting accuracy (e.g. demand)			

**Source: Adapted from Miri-Lavassani and Movahedi (2018:692)**

As depicted in Table 5.2, the scale adapted for use in this study was used by Miri-Lavassani and Movahedi (2018:692) and attained a Cronbach's alpha value above the allowable minimum of 0.70. Hence, the scale can be considered reliable and suitable for the current study.

Measurement scales in Sections C-E were measured using seven-point Likert-type scales, anchored by 1=strongly disagree and 7=strongly agree. However, Section F and G also used a seven-point Likert-type scale that was anchored on 1=Never and 7=Always. Finally, Section H used a five-point Likert-type scale that was anchored on 1= significantly worse and 5=significantly better. The adapted questions were not a mirror of the original questions but were adjusted and developed to contextualise them to the current study, using feedback from the pilot study as discussed below. The questions were closed-ended for simplicity of answering. To the best of the author's knowledge, none of the adapted scales were copyrighted, thus no prior permission was sought to reuse the adapted scales. Regardless of all the scales being adapted from literature there was a need to pre-test and pilot test the questionnaire since the original scales were modified, drawn from different studies and had never been subjected to an integrated test. The final list of measurement scales that were used in this study after validity and reliability tests is provided in Appendix 1.

#### **5.3.3.4.2 Pre-testing and piloting the questionnaire**

Pre-testing refers to a pilot run or simulated testing of the questionnaire on a small group of respondents. The test is mainly targeted at identifying and eliminating potential instrument

reliability and validity problems before conducting the actual collection of data. (Malhotra, 2010:319; Hair Jr. *et al.*, 2008:350; Zikmund & Babin, 2013:183). Before the questionnaire was pre-tested, it was tested for readability using the Microsoft Word Flesch reading ease score. This score computes readability of any text based on the average number of syllables per word and the average number of words per sentence using a score range of 0 (zero) to 100. Microsoft (2015) recommends a score of between 60 and 70; however, they also argue that the lower the score, the greater the number of people who can easily understand the document. The questionnaire score was computed and found to be 45 which justified the fact that the questionnaire was technically structured hence required technical respondents.

Therefore, due the technical nature of the questionnaire, it was reviewed by supply chain, knowledge management and IT experts from two Zimbabwean universities and one South African university. Their views were considered, and a few questions were reworded, and some questions totally removed owing to duplication. A pilot study was then conducted to ensure that the questionnaire was reliable and valid since validated scales that fully met the research context could not be located from literature. The pilot study was conducted using 53 respondents selected with the assistance and guidance of the SMEAZ and trends in similar studies (Lin, 2007:321; Lin, Sandhu & Jain, 2009:131; Zaqout & Abbas, 2012:351). Feedback from the pilot study was received from all the respondents, resulting in more questions being removed for failure to meet the normally acceptable reliability thresholds and cross loadings. However, no changes were required on the content of the remaining questions, thus all the sections in the final questionnaire had acceptable levels of reliability and validity. The results of the pilot study are reported on in Chapter Six. The final questionnaire as presented in Appendix 1 was then used to collect the data from the sample. The next section addresses the data collection procedure.

#### **5.3.3.4.3 Data collection procedure**

Data collection is a research process that informs how relevant information to address the research problem will be gathered (Sani, 2013:40). Survey data collected using a questionnaire may adopt various methods, which are categorised as manual (for instance, drop-and-collect) or online (for example, email surveys and web surveys) (Bryman, 2012:670). In email surveys, a questionnaire is attached or embedded with an email message, which the respondent fills in and returns. In a web survey, the email has a link, which if clicked redirects respondents to the

online questionnaire. This study used the attached questionnaire approach and the fears associated with email attachments were eliminated by sending the email through the affiliate institution, the SMEAZ. A notice informing the 1100 SMEAZ members that were part of the sample in the intended survey was sent a week earlier to alert them of the survey and increase the response rate. At the end of the week the questionnaire was sent in batches (i.e. sector by sector) as a group email and two weeks were allowed before a reminder email was sent to non-respondents. This resulted in 450 responses.

The non-responses were complemented by a drop-and-collect approach (Fowler, 2013:61; De Vaus, 2013:55). This follow-up method was adopted after it was established that some of the SMEs were faced with internet access challenges due to high data costs and/or electricity challenges that were prevailing at the time of data collection. This resulted in 130 more late responses, which were also used to predict the influence of non-response on the final outcome and the values were significant, indicating the study data were not affected by non-response bias. The entire data collection process was done over a period of four and half months from January 2019 to mid-April 2019, thus, the questionnaire was administered using the cross-sectional design. The final response rate (i.e. the percentage of properly completed questionnaires) from the survey is presented in Chapter Six, Section 6.4.1.

A total of 1100 questionnaires were first emailed to all targeted SMEs. Some 250 questionnaires were later dropped and collected from some of the SMEs that had been established to be faced with email-related challenges. A combined total of 580 questionnaires from both email and drop-and-collect methods were returned. No questionnaires were found to be improperly completed and this can be attributed to the fact that the respondents were highly skilled professionals in the area of study and had confidence in the source of the questionnaire. Thus, the final number of valid questionnaires available for analysis was 580, which represented a response rate of 53 percent. This response rate was considered acceptable according to a number of similar previous studies (Lin, 2007:321; Laforet, 2009:195; Tohidinia & Mosakhani, 2010:616; Luring & Selmer, 2011:331; Islam, Jasimuddin & Hassan, 2015:75; Mandal & Korasiga, 2016:38; Miri-Lavassani & Movahedi, 2018:679) that only averaged around a 40 percent response rate.



#### **5.3.3.4.4 Data analysis and statistical approaches**

Before anything can be done on raw data, they should be prepared (Aaker *et al.*, 2007:432) so that they are usable in data analysis software packages. The data analysis process involved three preparatory stages of data editing, data coding and statistical adjustment as detailed in the subsequent paragraphs.

Data editing was done on the completed questionnaires by scrutinising each response to check for completion-related errors in all sections. After all questionnaires were verified as error free, the next step taken by the researcher was data coding, where all research variables were given codes while the scales were assigned with numeric values to allow for the data to be entered into Microsoft Excel 2013. As such, all the responses were captured into an Excel 2013 file, the entered data were then cleaned for any errors which may have resulted from the capturing and then were later exported to the Statistical Package for the Social Sciences (SPSS 25.0). The next step was data adjustment, and this was achieved through a factor analysis as explained later in this section. Finally, the data were analysed using the SPSS 25.0 and the Analysis of Moment Structures (AMOS 25.0) software packages. Various statistical techniques were applied in SPSS 25.0, such as frequency distributions, measures of central tendency and dispersion, cross tabulations, reliability analysis, factor analysis, and multiple linear regression analysis. Structural equation modelling and path analysis were conducted using AMOS 25.0. These techniques can be grouped into descriptive and inferential statistics and are expounded on in the ensuing subsections.

##### **5.3.3.4.4.1 Descriptive statistics**

Data from Section A of the questionnaire, which sought to establish the demographic details of respondents, were analysed using descriptive statistics. The descriptive statistics were used to organise and summarise data, summarise the frequency distribution of the data and describe how data are dispersed around a central value so as to analyse the variability of the data (Zikmund & Babin, 2007:407; Zikmund *et al.*, 2013:168). This step is especially important for ensuring that the data are suitable for path analysis and structural equation modelling. In this study, the descriptive statistics that were used are frequencies, percentages, mean scores, standard deviations, skewness, and kurtosis, as well as exploratory factor analysis and were presented using frequency tables and figures.

#### **5.3.3.4.4.2 Inferential statistics**

Data from the sections B-G, which sought to test the hypotheses were analysed using inferential statistics. The SPSS 25.0 and AMOS 25.0 software packages were utilised in the statistical analyses. Since the construct measurements were adapted from previous literature and consisted of multiple scales, there was a need to test whether the scales formed valid factors. A factor analysis is considered the best approach for determining valid factors and for also reducing the number of factors since fewer numbers are more preferable (Bryman, 2008:161). Factor analysis involves confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). Accordingly, an EFA was applied to extract the applicable and valid fewer items, which was then followed by a CFA that tested the psychometric properties and the goodness-of-fit of the scales since none that fitted the research context could be established from literature. Factor loadings were used to establish the level of factors to construct correlations, and eigenvalues were used to extract the number of factors that existed by measuring the variance explained by each factor. Generally, eigenvalues greater than 1 (one) as recommended by Field (2005:633) were considered as valid in the current study. The factor analysis was then followed by a path analysis, which attempted to establish the mediating effect of knowledge sharing on people-centred KMSs and SCP. Path analysis explains construct relationships by using correlation ratios and this explanation is considered key when there is an intention to further test the data using SEM (Mitchell, 1992:124; Schreiber *et al.*, 2006:330). Finally, the data were subjected to structural equation modelling (SEM) as explained in the ensuing subsections.

The entire model was then tested to establish whether it fitted well with the sample data and AMOS 25.0 was used to achieve this task. Indices such as the comparative fit index (CFI), goodness-of-fit index (GFI), incremental fit index (IFI), normed fit index (NFI), and random measure of standard error approximation (RMSEA) were used to establish whether the collected data support the conceptualised model. Nevertheless, some academics do not recommend the use of GFI and AGFI for complex models (Garson, 2015:96). Complex models with mediating variables should use indices such as RMSEA, TLI, and CFI, where Chi-squares with values lower than 4 can be considered to achieve a good model fit as suggested by Schermelleh *et al.* (2003:210). Based on this recommendation, the three SEM indices, namely, RMSEA, TLI, and CFI were used to establish the fitness of the model. The set indices were

considered appropriate since they span across the two major classes of indices, namely, incremental and absolute, as recommended by Shi and Maydeu-Olivares (2018:21), who argued that a combination of indices is the best approach in determining model fitness. The path analysis revealed the data were linear and randomly distributed and thus SEM was conducted, and remodelling effected as the situation demanded.

The mediating effect of knowledge sharing on people-centred KMSs and SCP was tested in a three-step procedure as recommended by Barron and Kenny (1986:19). The steps they suggest include: Step 1: Regress the mediator variable on the predictor variables; Step 2: Regress the outcome variable on the same set of predictor variables in Step 1; and lastly, Step 3: Regress the outcome variable on both the predictor variables of Step 1 and the mediator variable. Thus, a multiple linear regression was conducted using SPSS 25.0 on the mediator variable, knowledge sharing, and the predictor variables that constituted the people-centred KMSs, namely, organisational culture, innovation management, CoPs and social capital. In Step Two, each of the four people-centred KMSs were regressed with each of the constructs that formed the SCP construct. Lastly, a combined regression of each of the SCP sub-constructs was done with people-centred KMSs and knowledge sharing. The details of the results from the different tests are reported in Chapter Six.

#### **5.3.4 Section summary**

The section outlined the major areas of research methodology by looking at the research approach, research strategy and research design. The section showed that research strategies can be viewed from a data collection and reasoning perspective. It was also revealed that research strategies fit into either quantitative or qualitative categories. More importantly, the features of survey studies were stated as: suitable for quantitative studies, subject to sampling error and easy to adopt when collecting data from large samples. The section also highlighted the matters that are involved in determining a research design by outlining the importance of sampling, sampling frame and sampling procedures. Data analysis was also discussed, showing the distinction between descriptive and inferential statistics and how they were applied in the current study. The section further unearthed that the quantitative approach, survey strategy, random sampling, descriptive and inferential statistical analysis were most appropriate for the study. The issues of reliability and validity are discussed next.

## 5.4 RELIABILITY AND VALIDITY

The inclusion of validity and reliability in this study is necessary. This is because as suggested by Golafshani (2003:598), reliability and validity are concepts that are typically associated with quantitative research. Boyce (2002:43) also notes that the two concepts are very important tools in assessing the appropriateness of a research instrument and increasing reader confidence. Thus, various procedures were followed to ascertain the validity and reliability of the study.

### 5.4.1 Reliability

Reliability of research is how closely the same constructs in a research instrument replicate similar results (Travakol & Dennick, 2011:53). Literature identifies several methods of ensuring reliability, which include the Test and Retest method, Alternative-Form method, Split-Halves method, Internal Consistency method and Correction for Attenuation (Carmines & Zeller, 1999:37). In this study, reliability was ascertained through the use of the internal consistency method, since a single measurement instrument was administered to a group of respondents in a distinct period of time. Reliability can also be determined statistically through Cronbach's alpha, composite reliability and item-to-total correlations. Saunders *et al.* (2009:374) argue that the most common method is the use of the Cronbach's alpha. A pilot study was conducted as earlier explained. The Cronbach's alpha coefficient, composite reliability and the average variance extracted (AVE) were used for testing internal consistency.

The recommended value of between zero (0) and one (1) for the Cronbach's alpha is used to justify internal consistency of measurement scales. However, in practice, the most commonly used values for the  $\alpha$  coefficient are 0.7 (Zikmund *et al.*, 2010:306) or even up to 0.8 (Bryman, 2008:151) for any instrument or scale to be considered reliable. Reliability can also be computed by use of composite reliability as suggested by Peterson and Kim (2013:6). The range for composite reliability values to be acceptable is between 0.5 and 0.7 as noted by Hair, Anderson, Tatham and Black (2006:55). They further argue that the actual acceptable values depend on the type of research, for instance, basic research allows for 0.5 while exploratory accepts 0.6. Item-to-total correlation also explains the level of scale consistency, using, for instance, the Kuder-Richardson Formula 20 (K-R 20) as noted by Huck (2004:80), and thresholds of 0.5 are usually acceptable (Nunnally, 1978:1). The outcomes of all the reliability computations for the current study are detailed in the next chapter.

## **5.4.2 Validity**

Validity can be ascertained through testing the instrument for face validity, content validity, and construct validity (Carmines & Zeller, 1999:17). Some of the methods of testing for validity are outlined below.

### **5.4.2.1 Face validity/content validity**

The two terms, face validity and content validity have been used interchangeably in research to refer to expert judgement or consensus of experts on the content of an instrument (Lawshe, 1975:363; Zikmund & Babin, 2007:310; Aaker *et al.*, 2007:307; Cooper & Schindler, 2008:290). Thus, face validity was established through a thorough review of literature after which experts in the field of study were consulted. The questionnaire was further reviewed by a panel of experts whose lines of expertise were in management sciences and information systems from a South African university of technology and two Zimbabwean universities. Content validity was applied to check the content of all constructs through Cronbach's alpha values and constructs with low values were dropped.

### **5.4.2.2 Construct validity**

Construct validity includes convergent validity and discriminant validity (Moutinho & Hutcheson, 2011:327). Convergent validity was achieved through the item-to-total correlation and factor loadings as was earlier suggested by Chinomona (2011:1). Factor loadings of above 0.5 were accepted for the testing of convergent validity on each of the test items (Malhotra, 1996:10). The Spearman's RHO was used to test for item correlation considering that the data were mostly ordinal and not scaled. Discriminant validity was ascertained through the correlation matrix (Anderson & Gerbing, 1988:411; Bagozzi & Yi, 1988:74) as well as the average variance extracted (AVE). Discriminant validity requires correlations between items to be below 0.7 so that they will measure distinct issues (Zikmund & Babin, 2007:311). Both convergent and discriminant validity were used to establish the validity of the research instrument.

## **5.5 ETHICAL CONSIDERATIONS**

Research ethics refers to the reasonable approaches adopted by the researcher before collecting data, during data collection and during reporting of research results to avoid violating the rights of respondents (Creswell, 2013:92). Saunders *et al.* (2009:185) suggest that ethical considerations entail issues such as informed consent of respondents, privacy, confidentiality, anonymity, voluntary participation, among others. Ethical considerations were also observed in this study with regard to the literature review and data collection process. In respect of the literature review, all efforts were made to ensure that as far as possible, sources are provided for the literature evidence. The final research was further subjected to a plagiarism test using the Turn-it-in software package, which produced acceptable margins as per the university standards of the ethics committee. Prior to that, a topic search had been conducted by the university librarian to prove that the topic of the study had not been conducted earlier and the report is provided in Appendix 3. In terms of the data collection process, the following considerations were followed:

### **5.5.1 Informed consent**

Informed consent was achieved through seeking the authority to conduct the research. The authority was granted by the SMEAZ, which is a registered SMEs affiliate organisation in Zimbabwe (refer to letter in Appendix 2). Formal consent was also sought from respondents before they responded to the questions by asking a question to acknowledge their understanding of the research and to participate.

### **5.5.2. Privacy and confidentiality**

The identities of the respondents were not required in the questionnaire to ensure that they remain confidential. However, where identification may happen inadvertently, the respondents were assured that their identities were to be kept in confidence throughout the study and thereafter. In addition, respondents were protected from victimisation by maintaining their anonymity and keeping all collected data securely including email details.

### **5.5.3. Voluntary participation**

All the respondents were given full details about the research and made aware that their involvement in the study was voluntary. Respondents were able to make informed decisions regarding their participation and contribution to the study since all necessary details were supplied (Myers & Venable, 2014:803), and further explained by the SMEAZ, thus, all ethical matters in this regard were followed.

## **5.6 CHAPTER SUMMARY**

The key issue that emerged from the chapter is the importance of a research philosophy in any study. The chapter revealed that the research philosophy (i.e. the ontology, epistemology and axiology) must relate to the methodology and the methodology with the methods for valid and reliable results. Thus, the choices made on the three branches of philosophy pertaining to the current study followed that chronological argument and were highlighted as realism ontology, objective epistemology, the positivist paradigm and ethical ontology. Furthermore, the chapter unearthed that the aforementioned procedures can only be fully applied with quantitative studies. Thus, justification of the choices made was also provided to show the relevance of the research philosophy to the study.

The chapter further outlined the major areas of research methodology by looking at the research approach, research strategy and research design. The discourse showed that research strategies can be viewed from a data collection and reasoning perspective. It was also revealed that research strategies fit into either quantitative or qualitative categories. More importantly, the features of survey studies were stated as: suitable for quantitative studies, subject to sampling error and easy to adopt when collecting data from large samples. The chapter also highlighted the areas that are involved in determining a research design, by outlining the importance of sampling, sampling frame and sampling procedures. Data analysis was also discussed, showing the distinction between descriptive and inferential statistics and how they were applied in the current study. The section further unearthed that the quantitative approach, survey strategy, random sampling, descriptive and inferential statistical analysis were most appropriate for the study. The issues of reliability and validity were discussed, and it was clear that these concepts are particularly important in ensuring that the research measures the intended elements. Finally, ethical considerations were deliberated on and all efforts to ensure research integrity and protection of respondents were outlined. The next chapter presents a detailed analysis of the collected data.

## CHAPTER 6

### DATA PRESENTATION, DATA ANALYSIS RESULTS AND INTERPRETATION

#### 6.1 INTRODUCTION

The previous chapter (i.e. Chapter Five) presented a detailed overview of the ontology, philosophy, approach, strategy, design, methodology and methods used in gathering data for the study. Also put forward in the previous chapter were the matters of ethical research, validity, reliability as well as the techniques that were adopted in data presentation, analysis and interpretation. All the data collected to address the main objective of the study (the mediating role of knowledge sharing on people-centred KMSs and SCP) were quantitative. Thus, the current chapter directs its focus to various statistical methods, in an attempt to answer the main objective and related hypotheses.

This chapter outlines the screening of data, the presentation of data, the data analysis results up to the assessment of the research model fit to validate the proposed conceptual framework using the model comparison approach to structural equation modelling (SEM). The two-model approach to SEM was used because the reviewed literature revealed that the conceptualised model could be operationalised using two approaches, namely, the network-based approach and process-based approach. The literature review suggested that there were no differences on the model predictor and mediation variables for both approaches, but the models differed only on the nature of the outcome variable (i.e. SCP). As such, the network-based approach supported the testing of SCP as one consolidated construct (Gopal & Thakkr, 2012:522; Anand & Grover, 2015:155), and in contrast, the process-based approach advocated splitting SCP into sub-constructs, namely, cost-related performance, time-related performance, responsiveness-related performance and operational quality-related performance (Azfar, Khan & Gabriel, 2014:808; Sundram, Chandran & Bhatti, 2016:1449; Tarasewicz, 2016:1437; Miri-Lavassani & Movahedi, 2018:689). Both conceptual models were thus initially considered for fitness using SEM to find the one that could closely fit the collected data.

As a point of departure, the chapter begins by briefly discussing the data screening process, which will be followed by the validity and reliability tests done on the instrument. The final section then focuses on the sample descriptions and the hypotheses testing using mainly



multiple linear regression analysis and SEM. The Cronbach's alpha, communalities and item-total correlations were calculated using SPSS 25.0, the composite reliability values and the average value extracted (AVE) indices were manually calculated and then used for determining reliability. Factor analysis was used to determine convergent validity while correlation matrix and chi-square were used to ascertain discriminant/divergent validity and resultantly select the relevant items for each of the extracted factors. The presentation of the research model fitness and hypothesis testing used indices such as the normed fit index (NFI), chi-square value, incremental fit index (IFI), goodness-of-fit index (GFI), Tucker-Lewis index (TLI), comparative fit index (CFI) and root mean square error of approximation (RMSEA), which were computed using AMOS 25.0. Finally, the entire chapter is concluded by a summary outlining the salient issues outlined throughout the chapter.

## **6.2 DATA SCREENING**

Data screening is an important step in statistical analysis as it helps eliminate errors, minimise missing values and ensure the data meet the basic assumptions of the intended inferential statistical tests (Leech, Barrett & Morgan, 2005:24). They (Leech *et al.*, 2005:25) recommend the need for proper data coding before the data are captured into a statistical package or a text editor. After capturing, the data should be subjected to screening by cross checking entries on the original source documents against captured values and also by conducting a data screening analysis using statistical techniques. The analysis could involve identifying missing values, outliers (i.e. values that are either below or above stipulated values) and errors (Churchill, 1999:209; Chinomona, 2011:94). In most cases existence of large numbers of missing values is usually associated with poor data capturing or data importing procedures. For instance, leaving the "Range" value empty when importing from Microsoft Excel to SPSS may result in empty cells being imported into SPSS and these cells will be reported as missing values.

The variable values for the current study were coded numerically as recommended by Leech *et al.* (2005:25) who argue that although SPSS can work with string data, numerical values give the best statistical results. Furthermore, all codes used were also mutually exclusive, the relevant data measurement scales (ordinal, interval, scaled) were selected and then the data were captured into a Microsoft Excel file before being imported into SPSS 25.0 software. A data screening analysis was then done and the values for all the items were found to be within the defined ranges, i.e. there were no outliers in the dataset. However, some missing values

were present, which were associated with wrong importation and these were removed by specifying data import parameters as explained. There were 143 missing values, and these were coded to represent missing values. The foregoing state was confirmed by the measures of central tendency, which had an average standard deviation of 1.00 and mean of 4.30, which was acceptable according to the collected data. Due to its importance to statistical data analysis, the data screening process was conducted during the pilot survey and repeated for the main survey data and was found to be appropriate in both situations.

### **6.3 RESULTS OF THE PILOT STUDY**

A pilot survey ensures that the questions and layout of a questionnaire are applicable for the wider intended population, as mentioned by Bryman (2012:263). He suggests that a pilot study may be conducted using a panel of reviewers selected from colleagues or experts that have expertise or knowledge of the research subject. A pilot study may also be done using a subset of the actual sample. The feedback from the pilot survey allows for detection of ambiguous statements and resolves problems and errors before they distort the result of the main survey thereby improving to some extent the validity and reliability of the survey instrument (Mohorko & Hlebec, 2016:79; Burns & Kho, 2015:198; Adair, Holland, Patterson, Mason, Goering & Hwang, 2011:38).

A panel of academics in either knowledge management, KMSs or supply chain management from two Zimbabwean universities and one South African university successively reviewed the questionnaire. Each review revealed unclear issues through an incremental improvement approach since suggestions from earlier reviews were first effected before the next review. Suggestions that emerged include the length of sentences, which was argued to be contributing to multiple meanings; technical jargon which needed clarity; spelling errors and lack of clarity in demographic data with respect to the potential respondents. The identified areas were improved and corrected, where adapted scales were slightly reworded to fit the context of the study while maintaining the original meaning. Technical SCP terms were explained to improve understanding. The demographics section was split into two sections with one section focusing on the respondent data and the other section on the SME firm profile thereby enhancing the accuracy of the survey demographic data (see Appendix 1 for the copy of the final questionnaire).

The sample questionnaire was then pre-tested using a predetermined sample of 15 (n=15) SME firms that were selected with the help of the SMEAZ research and surveys department. The pre-testing results confirmed the accuracy of the questionnaire with no meaningful adjustments except one change which required the inclusion of respondent consent to participate in the survey. This change was implemented, and the questionnaire was considered ready for a pilot study.

A total of 53 (n=53) SME firms were selected and used to carry out a pilot study and test for content validity and reliability of the questionnaire. The participating organisations did not then form part of the final survey to avoid distortion of main survey data as suggested by Bryman (2012:265). All the 53 (n=53) questionnaires were usable and thus used in the analysis of pilot data and the high response rate was attributed to the assistance provided by experts from the SMEAZ.

In purifying the scales, some items were deleted for failing to meet the minimum thresholds for reliability and validity. For instance, Item OC7 (*Our organisation does things that make sharing knowledge with others fun*) with an item-to-total correlation of 0.225; OC3 (*Our culture makes it easy to share ideas with others through computer-based systems*) with an item-to-total correlation of 0.331; OC4 (*Our culture encourages people who work in groups and teams to share knowledge with one another*) with an item-to-total correlation of 0.222 were deleted on the organisation culture scale thereby improving the scale validity from  $\alpha=0.758$  to  $\alpha=0.954$ . On innovation management scale items, IM1 (*Our organisation utilises knowledge sharing as a tool for coming up with novel ideas quicker than our key competitors*) and IM2 (*Our organisation depends on knowledge sharing to be faster in launching quality products than our key competitors*), IM7 (*Knowledge sharing through computer-based systems is important in supporting innovation activities in our organisation*) were removed for having an item-to-total correlation of 0.322, 0.279 and 0.355, respectively, thus improving validity from  $\alpha=0.700$  to  $\alpha=0.900$ .

On the CoPs scale, item CoP1 (*I participate in the group to learn new things and pass on my knowledge*), CoP5 (*I often share knowledge with others through discussion forums/News boards*), CoP6 (*My interaction with others is based on trust and cohesion*), and CoP7 (*Our organisation often shares knowledge with others through computer based platforms*) had an item-to-total correlation of 0.40 and below, the items were deleted improving Cronbach's alpha

from  $\alpha=0.803$  to  $\alpha=0.886$ . On the social capital scale, item SC1 (*My workmates and I speak the same 'technical' language about our work*) and SC5 (*Discussions with workmates through computer-based platforms improve my interaction with others in the organisation*) were also deleted since they both had a weak item-to-total correlation of 0.290. The deletion improved the validity of the scale from  $\alpha=0.755$  to  $\alpha=0.964$ . On the knowledge sharing scale, item KS1 (*Through sharing information and knowledge, we often come up with new ideas that can be used to improve our supply chain operations*) with an item-to-total correlation of 0.333 was deleted and the validity subsequently improved from  $\alpha=0.784$  to  $\alpha=0.914$ .

On the four constructs used in the second model (i.e. the process based approach to SCP), the cost-related performance scale items CRP4 (*Supply chain financing (e.g. budgetary constraints)*) and CRP5 (*Supply chain logistics (e.g. cost of delivery)*) were deleted and validity improved from  $\alpha=0.873$  to  $\alpha=0.890$ . On the time-related performance scale, items TRP3 (*Supply lead time (i.e. time taken to make a supply)*) and TRP4 (*New product development cycle (i.e. time taken to develop new products/services)*) were deleted and validity improved from  $\alpha=0.810$  to  $\alpha=0.911$ . On the responsiveness-related performance scale, items RRP4 (*Adaptability: ability to adapt to long-term changes*) and RRP5 (*Resistance: ability to adapt to economic changes*) were deleted and validity improved from  $\alpha=0.883$  to  $\alpha=0.933$ . On the operation quality-related performance scale, items OQRP4 (*Forecasting accuracy (e.g. demand)*) and OQRP5 (*Budgeting accuracy*) were deleted and validity improved from  $\alpha=0.877$  to  $\alpha=0.953$ .

The scale purification results show that all of the technology-centred KMS questions that were answered by the respondents were removed for poor validity and reliability. The inconsistency on technology related questions may suggest a low adoption or inconsistent use of technology-centred KMSs within the Zimbabwean SMEs, probably due to low utilisation of computer-based systems. The results may also show the dichotomy that exists between people-centred KMSs and IT-centred KMSs. This was confirmed by the outcome that all the coded missing values were unanswered responses based on the technology-centred KMSs. Overall, the results of the pilot study showed that the respondents moderately agreed with the questions posed in the questionnaire as indicated by a final average mean score for all scales of  $\bar{x}=4.62$  and a standard deviation of  $SD=1.100$ . A minimum of three items per scale was considered as they had been used in prior knowledge management studies (Jia, Liao, Van der Heijden & Guo, 2019:3654). The details of the results are presented in Table 6.1, which shows the averaged

Cronbach's alpha values before and after the aforementioned deletions, which were done to purify the scale and provide grounds for the factor extraction process.

**Table 6.1: Pilot test results for the network approach and process approach to SCP**

	Measurement Scales n=53	Average Means	Average SD	Average item-total correlation	Cronbach's alpha Before deletion	Number of items	Number of items deleted	Number of items remaining	Revised Cronbach's Alpha
<b>NETWORK APPROACH</b>	Organisational culture	6.45	1.00	0.510	0.758	7	3	4	0.954
	Innovation management	4.43	1.10	0.630	0.700	7	3	4	0.900
	Communities of practice	6.18	1.10	0.692	0.806	7	4	3	0.883
	Social capital	5.54	0.900	0.543	0.755	5	2	3	0.964
	Knowledge sharing	4.85	0.900	0.690	0.784	5	1	4	0.914
	Supply chain performance	3.30	1.300	0.540	0.373	12	0	12	0.535
<b>PROCESS APPROACH</b>	Cost-related performance	3.30	1.222	0.600	0.873	5	2	3	0.890
	Time-related performance	5.20	1.100	0.515	0.810	5	2	3	0.911
	Responsiveness-related performance	4.53	1.115	0.684	0.883	5	2	3	0.933
	Operation quality-related performance	2.33	1.200	0.677	0.877	5	2	3	0.953

**Source: Author's own compilation**

Table 6.1 shows that all the average item-to-total correlations for the predictor and mediating constructs were between 0.5 and 0.7, showing that they were fairly correlated, thus suggesting that there were no challenges of multicollinearity. The averaged Cronbach's alpha values were also above 0.7, thus confirming their internal consistency reliability as suggested in literature (Churchill, 1979:64; Bagozzi & Yi, 1988:74I; Zikmund & Babin, 2007:308; Bryman, 2008:151; Saunders *et al.*, 2009:374). The average item-to-total correlation and average Cronbach's alpha values for the four predictor variables and one mediating variable, which applied to both the first and the second model were as follows: organisational culture (0.510,  $\alpha=0.954$ ); innovation management (0.630,  $\alpha=0.900$ ); CoPs (0.692,  $\alpha=0.883$ ); social capital (0.543,  $\alpha=0.964$ ); and knowledge sharing (0.690,  $\alpha=0.914$ ), respectively. However, the two models differed on the outcome variable (i.e. SCP), in that the first model adopted the network-

based approach to SCP and treated the construct as one consolidated variable with twenty initial items identified from literature. The second model adopted the process-based approach and split the same twenty items across four constructs, namely, cost-related performance, time-related performance, responsiveness-related performance and operational quality-related performance. A principal component analysis on the twenty items led to the selection of twelve key items that explained a total variance of 94 percent as explained in Section 6.4.3, these were then used to test the SCP scales for both models. The results for using the network-based approach to measure the relationship between knowledge sharing and SCP were characterised by multi-dimensionality, making further analysis impossible. In furtherance to that, the same results indicated a low Cronbach's alpha of  $\alpha=0.535$ . However, after implementing the process-based approach, results showed that all the four SCP sub-constructs were uni-dimensional with an average item-to-total correction of less than 0.7 and greater than 0.3. The average Cronbach's alpha values were also above the expected minimum threshold of  $\alpha=0.700$ , suggesting internal consistency reliability of the scales as indicated in Table 6.1.

Conclusively, the pilot survey results for the first model (network approach to people-centred KMSs and SCP) revealed that the model was unreliable ( $\alpha=0.535$ ), had multi-dimensional scales (i.e. extracted 4 factors) with a determinant below 0.0001 when used together. The first model was thus rejected on that basis as also supported by Field (2009:300). Thus, instead of solving the challenge by eliminating some of the items, the process-based approach was adopted, and factor analysis conducted to group the initial 14 (fourteen) SCP items into four sub-factors based on collinearity. Thus, eliminating multidimensionality and making room for carrying out SEM tests. The switching to the second model was motivated by the fact that reviewed literature supported more research on the process-based approach as opposed to the network-based approach as initially intended (Miri-Lavassani & Movahedi, 2018:673; Ahmad & Karim, 2019:210; Human Resource Management International Digest, 2020:21). Therefore, the results reported in the main survey section are focused on the remodelled conceptual framework (i.e. process-based approach to SCP in KMSs). As stated earlier, the decision was influenced by recent literature as reviewed in Chapter Three coupled with the pilot survey results, which both seemed to support the process-based approach for research in knowledge-based supply chains.

## 6.4 RESULTS OF THE MAIN SURVEY

This section discusses the results from the main survey, which was conducted between January and April 2019. The section covers the response rate, demographic details of the respondents, the profiles of the SMEs used in the study, the descriptive and inferential statistics used in testing the data to answer the hypotheses posed in Chapter One and developed in Chapters Three and Four.

### 6.4.1 Response rate analysis

A response rate is the number of properly completed survey units over the total determined sample size as postulated by Fan and Yan (2010:132). Table 6.2 presents the response rate of the survey, which ascertains the actual number of responses from the respondents to the survey.

**Table 6.2: Response rate**

Description	Frequency for drop and collect	Frequency for email survey	Total/ average
Number of questionnaires administered	250	850	<b>1100</b>
Number of questionnaires returned	130	450	<b>580</b>
Unusable responses	0	0	<b>0</b>
Valid questionnaires retained	130	450	<b>580</b>
Survey Response rate (%)	52	52.94	<b>53</b>

**Source: Author's own compilation**

Table 6.2 shows the allotment of the 1100 questionnaires that were distributed during the survey. The table shows that 850 questionnaires were emailed, while another 250 questionnaires were dropped and collected from those SMEs who were facing email-related challenges. A combined total of 580 questionnaires from both email and drop-and-collect methods were returned. No questionnaires were found to be improperly completed and this outcome could be attributed to the respondents' level of skill and professionalism in the area of study coupled with the confidence and interest in the source and content of the questionnaire. Thus, the final number of valid questionnaires available for analysis was 580, which

represented a composite response rate of 53 percent. This response rate was considered acceptable according to a number of similar studies (Lin, 2007:321; Laforet, 2009:195; Tohidinia & Mosakhani, 2010:616; Luring & Selmer, 2011:331; Islam, Jasimuddin & Hassan, 2015:75; Mandal & Korasiga, 2016:38; Miri-Lavassani & Movahedi, 2018:679; Li, Yuan, Ning & Li-Ying, 2019:1152), which averaged around a 50 percent response rate.

The general attitude of all the respondents towards the survey was positive as shown by the accurate and comprehensive completion of the questionnaires which all had no errors and were usable. However, it was realised that nearly half of the administered questionnaires were not returned, and this could explain the rate of failure of the SMEs. Since it emerged that 96 percent of the SMEs that had not responded were either having subscription arrears with SMEAZ thereby suggesting viability challenges or were faced with closure. This outcome is consistent with SMEs' survival trends identified in literature (Small Business UK, 2019:1; Yeboah, 2015:4; Rahman *et al.*, 2015:511). The other 4 percent had not responded for various reasons, which ranged from internal organisational protocol (Afrifa & Padachi, 2016:46) and fear of revealing business strategies to competitors, a fact also supported by Gou, Li, Lyu, Lyu and Zhang (2019:12).

The results suggest that there is no significant difference in the data collection method used since the response for the email method and the drop and collect method was 52.94 percent and 52 percent, respectively. The quality of the responses was also the same in both methods, thus either of the methods can be used to collect data without much difference. A more detailed explanation of the results is provided in the next section on demographic details of the respondents.

#### **6.4.2 Descriptive statistics**

This section discusses the descriptive statistics of the study stemming from Section A (i.e. respondent demographic information) and Section B (i.e. characteristics of participating SMEs) of the questionnaire. The descriptive statistics for the study constructs, namely, organisational culture, innovation management, CoPs, social capital, knowledge sharing and the four sub-constructs of SCP as outlined in Section C to H of the survey questionnaire will be discussed later.



### 6.4.2.1 Descriptive statistics for the respondent demographics and SME characteristics

This section presents the demographic characteristics of the study sample in order to try and understand how these characteristics influence SME performance in terms of duration of survival. The current study adopts a people-centred approach to KMSs, this approach makes reporting demographic data important. The importance of demographic data in the current study is mainly because these data constitute the variables used to define SMEs and also determine SME survival as outlined in Chapter Two. Thus, this section will present the descriptive statistics of the demographic data as well as the association between respondent demographics and participating SME characteristics variables. The demographic results were reported in three parts, the first part presents the demographics of the respondents, the second part shows the characteristics of the participating SMEs and the third part puts forward the associations amongst the variables. Table 6.3 presents the results that relate to gender, nationality, age category, highest qualification, and work experience of the respondents.

**Table 6.3: Descriptive statistics results of the respondents**

VARIABLE AND CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
Gender (A1)		
Male	395	68.1
Female	185	31.9
Total	n= 580	100
Age (A2)		
18-25 years of age	41	7.1
26-33 years of age	81	14.0
34-41 years of age	239	41.3
42-50 years of age	88	15.2
50> years of age	130	22.5
Total	n= 580	100
Highest Qualification (A3)		
Ordinary Level	70	12.1
Advanced Level	179	30.9
Diploma	212	36.6
First Degree	88	15.2
Masters	4	7

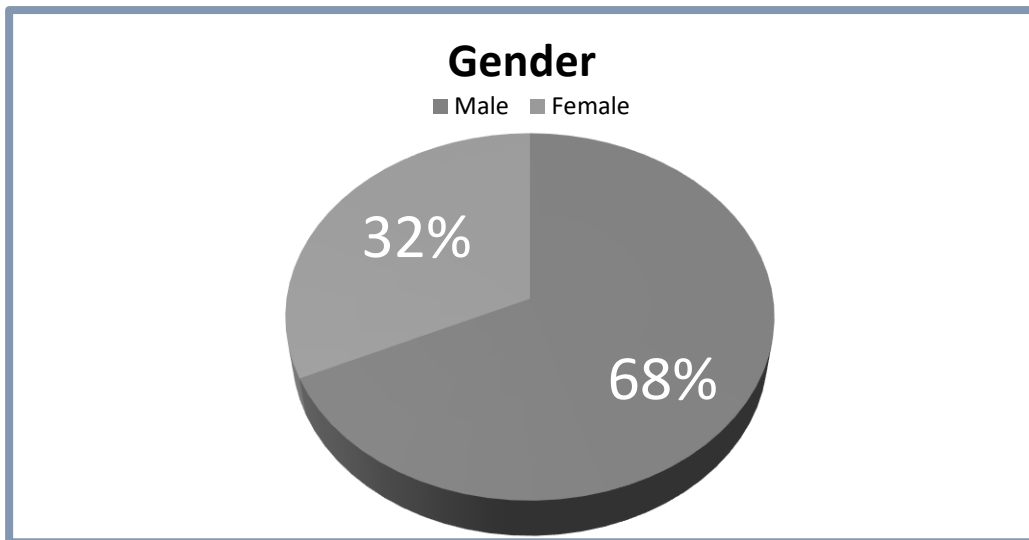
<b>VARIABLE AND CATEGORY</b>	<b>FREQUENCY (n)</b>	<b>PERCENTAGE (%)</b>
Doctorate	27	4.7
Other	0	0.0
Total	n= 580	100
Nationality (A4)		
Zimbabwean	506	87.2
African	2	0.3
Asian	67	11.6
European/American	5	0.9
Other	0	0.0
Total	n= 580	100
Work Experience (A5)		
Less than 1 year	45	7.8
Between 1 to 5 years	85	14.7
Between 6 to 10 years	310	53.4
Between 11 to 15 years	122	21.0
15 years and above	18	3.1
Total	n= 580	100

**Source: Author's own compilation**

Table 6.3 is a summary description of the study sample (n=580) based on the respondent's gender, highest qualification, nationality, age and work experience. The foregoing demographic factors can be utilised in predicting SME performance as discussed in section 2.6 of chapter 2. The discussions of each specific category are provided in the succeeding subsections.

#### **6.4.2.1.1 Gender of respondents**

The frequencies and percentages for the gender of respondents are presented in Figure 6.1.



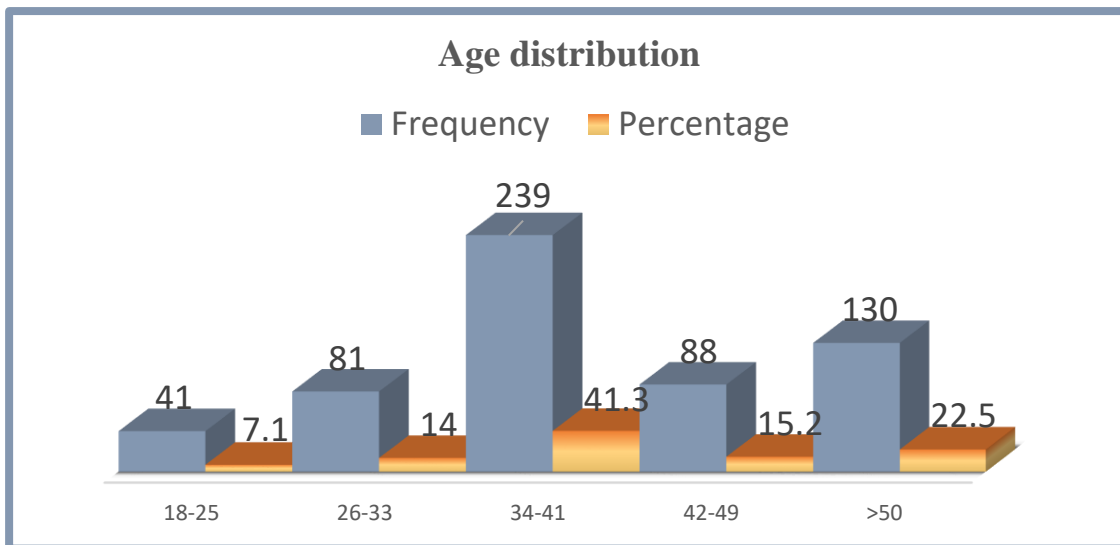
**Figure 6.1: Gender distribution of respondents**

Source: Author's own compilation

The results from Figure 6.1 show that (68%; n=395) of the survey respondents were male, while (32%; n=185) were female. The results indicate that the number of male SME employees was double that of females. According to statistics from the SMEAZ (2019) and the parent SMEs ministry in Zimbabwe, there were more male SME employees (70%) than females (30%). Thus, efforts by government such as women empowerment programmes were meant to reduce the gender gap in SME entrepreneurs.

#### **6.4.2.1.2 The age distribution of respondents**

The age distribution of the respondents is shown in Figure 6.2 and discussed thereafter.



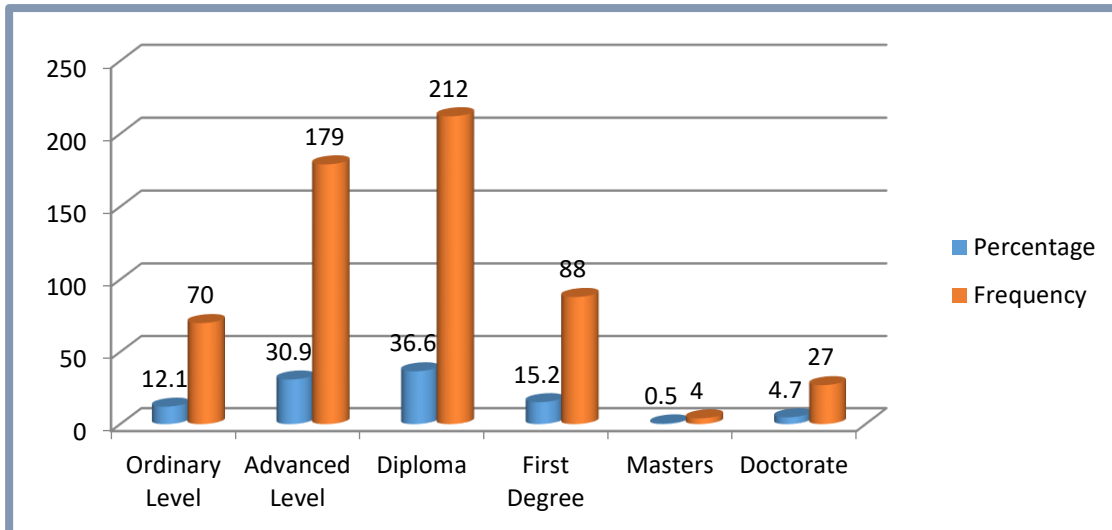
**Figure 6.2: Age distribution of respondents**

Source: Author's own compilation

The results in Figure 6.2, show that almost half of the SMEs' employees were aged between 34-41 years (41.3%; n=239). This is followed by those above 50 years of age (22.5%; n=130). A total of (7.1%; n=41) respondents were aged between 18-25 years. Another (14.0%; n=81) of respondents were aged between 26-33 years and (15.2%; n=88) were aged between 42-49 years. The statistics from the last official Zimbabwean census by FinScope (2012:2) showed that 79 percent of Zimbabweans were aged between 21-50 years. The reports from the Zimbabwean registrar of companies also showed that the individuals who showed interest in starting new businesses were between 25-45 years of age, probably due to the youth empowerment program which was being conducted and promoted by the government.

#### **6.4.2.1.3 The distribution of respondents by highest qualification**

Figure 6.3 shows the results of the distribution of the respondents based on their highest qualification.



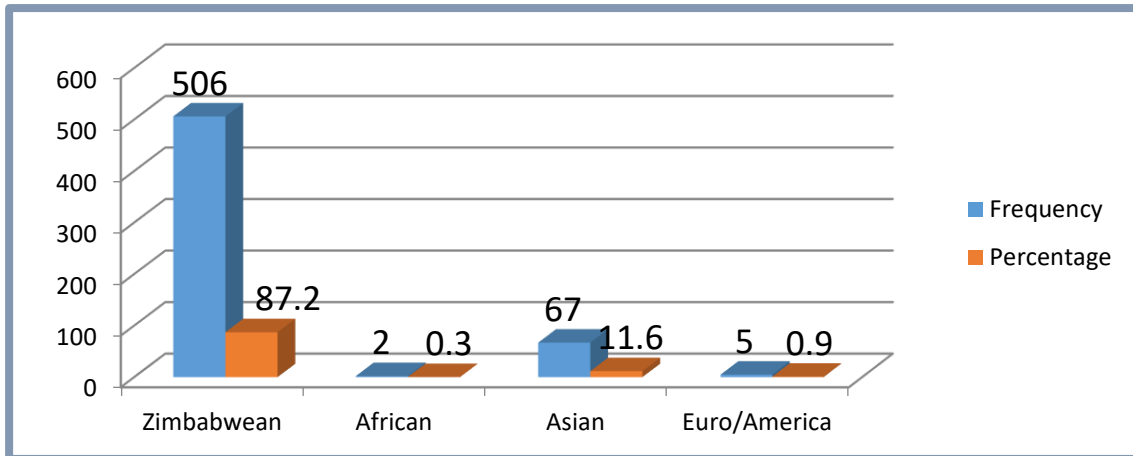
**Figure 6.3: Respondent distribution by highest qualification**

Source: Author's own compilation

It can be established from Figure 6.3 that the majority of the respondents (57.10%; n=331) had attained a diploma or better. The remaining (30.90%; n=179) and (12.1%; n=70) had attained advanced level and ordinary level qualifications, respectively. This implies that the sample was made up of qualified experts. This can be attributed to the sampling procedure as outlined in Section 5.3.3.3.4 that prioritised individuals who possessed ICT, SCM or knowledge management expertise for the study due to its technical nature. The respondent level of education can also to some extent justify the accuracy of the responses, which had no errors on all returned questionnaires.

#### **6.4.2.1.4 The distribution of respondents by nationality**

The nationality of the respondents is presented in Figure 6.4. The results show that the study sample was dominated by Zimbabwean citizens (87.20%; n=506) versus non Zimbabweans (12.80%; n=74) who were distributed as follows: the highest numbers were Asians (11.60%; n=67), followed by (0.9%; n=5) Europeans/American and lastly (0.3%; n=2) who were Africans.



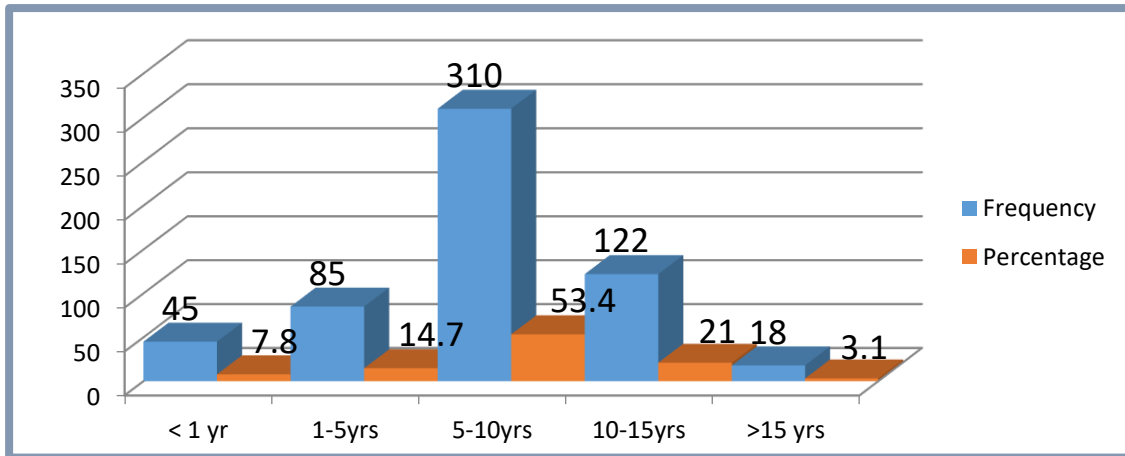
**Figure 6.4: Respondent distribution by nationality**

Source: Author's own compilation

The nationality distribution of the respondents in Figure 6.4 could have been influenced by two policies that Zimbabwe had implemented at the time the survey data were collected, namely, the indigenisation policy and the “Look east” policy as outlined in the ZimASSET (2018:7) policy document. These two policies saw a number of Zimbabwean and Asian citizens going into business while European and American-owned companies were closing down. The SMEAZ attributed the low number of African owned business to lack of formalisation and non-availability of necessary documentation which hindered their registration with the association.

#### **6.4.2.1.5 The distribution of respondents by work experience**

The results show that (7.80%; n=45) had less than one year of work experience, (14.71%; n=85) had between one and five years of work experience, (53.43%; n=310) had between five and ten years of work experience, (21.00%; n=122) had between ten and fifteen years of work experience. There were very few respondents (3.1%; n=18) with above fifteen years of work experience. Thus, the majority of the respondents (77.59%; n=450) had work experience above 5 years while a few (22.41%; n=130) had less than five years work experience. More than half of the respondents (53.4%; n=310) had work experience between five and ten years. The results show that the sample was composed of very experienced employees. The summary of the results is presented in Figure 6.5.



**Figure 6.5: Respondent distribution by work experience**

Source: Author's own compilation.

### 6.4.2.2 Descriptive statistics for characteristics of the participating SMEs

This subsection forms the second part of the demographic analysis, which focuses on the profile of all SMEs that participated in the survey. The results are presented in Table 6.4 based on the identified constructs, namely, the province where the business was headquartered, the type and nature of the business, the number of employees and the number of years the business had been in operation.

#### 6.4.2.2.1 Province where business has headquarters

The results in Table 6.4 show that most of the SMEs (69.0%; n=400) were headquartered within the two metropolitan provinces, with Harare province having the highest number of SMEs (49.0%; n=284), followed by Bulawayo (20.0%; n=116). The remainder was scattered all over the remaining eight provinces, i.e. Manicaland (10.0%; n=58), Mashonaland East (10.0%; n=58), Midlands (4.8%; n=28), Mashonaland West (1.0%; n=6), Masholand Central (1.9%; n=11), Masvingo (1.0%; n=6), Matabeleland North (1.0%; n=6) and Matabeleland South (1.2%; n=7). The report by the Zimbabwean Ministry of Industry and Commerce (2019:2), revealed that most businesses were headquartered in Harare and Bulawayo due to the centralised nature of service provision that the government had adopted. The same report was proposing the implementation of decentralised services to allow for provinces to benefit from their own resources.

#### 6.4.2.2.2 Nature of business

The results from Table 6.4 also reveal that the businesses are predominantly in the retail and agricultural sector (44.7%; n=259) and (21.9%; n=127) respectively. Other sectors include manufacturing (14.0%; n=81), mining (12.8%; n=74), and hospitality and tourism (6.7%; n=39). These statistics support the view by Chinamasa (2016:15) who stated that the Zimbabwean economy was slowly being turned into a supermarket economy where most of its products were imports.

**Table 6.4: SME profile results**

VARIABLE AND CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
Province where business has HQ:		
Harare	284	49.0
Bulawayo	116	20.0
Manicaland	58	10.0
Mashonaland East	58	10.0
Midlands	28	4.8
Mashonaland West	6	1.0
Mashonaland Central	11	1.9
Masvingo	6	1.0
Matabeleland North	6	1.0
Matabeleland South	7	1.2
Total	n= 580	100
Nature of business		
Manufacturing	81	14.0
Retail	259	44.7
Mining	74	12.8
Hospitality and tourism	39	6.7
Agriculture	127	21.9
Total	n= 580	100
Number of people employed		
Less than 50	545	94.0
51-100	35	6.0
101-150	0	0.0
151-200	0	0.0
Total	n= 580	100



VARIABLE AND CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
Number of years in operation		
Less than 1 year	149	25.7
1- 5 years	259	44.7
5-10 years	147	25.3
10-15years	22	3.8
Above 15years	3	0.5
Total	n= 580	100

Source: Author's compilation

#### 6.4.2.2.3 Number of people employed

The results for the SME characteristics revealed that (94.0%; n=545) of the SMEs had less than 50 employees and the remaining (6.0%; n=35) had between 51 and 100 employees. The results further show that although the SMEs could employ up to 200 employees by Zimbabwean regulations, none of the SMEs from the sample had more than 100 employees. The outcome supports the report by the World Bank (2019:7), which argued that unemployment in Zimbabwe was estimated at around 85 percent due to downsizing of manpower by most businesses (CZI Report, 2019:2). The results on the number of people employed by SMEs are summarised in Figure 6.6.

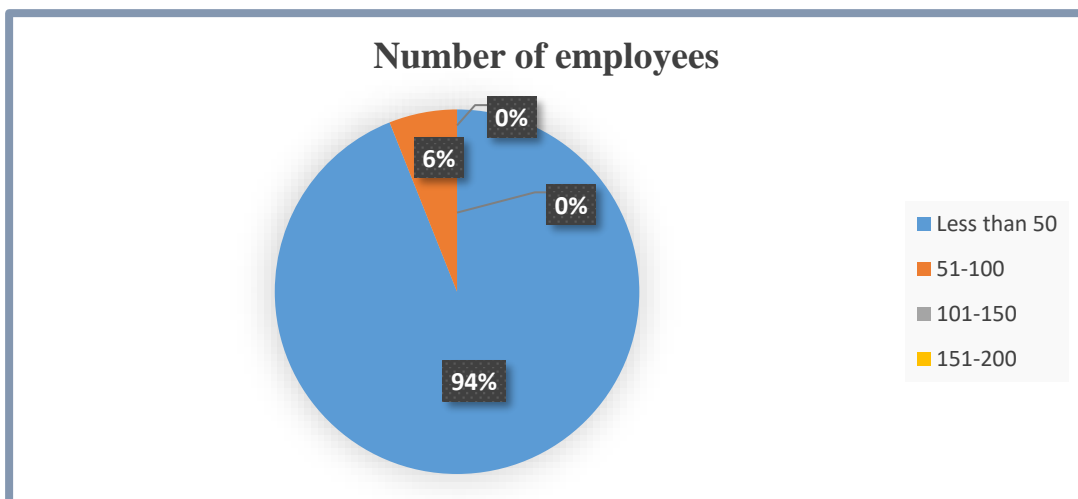


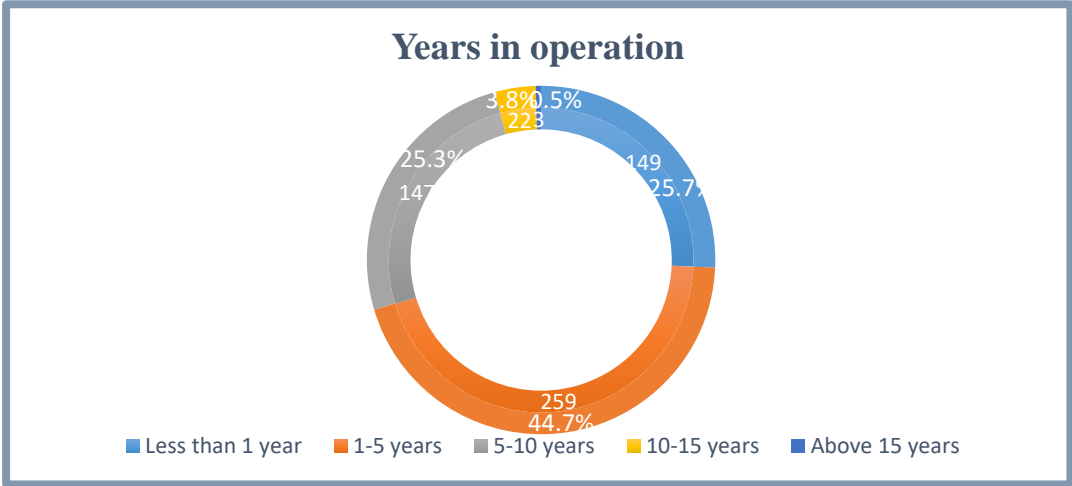
Figure 6.6: Number of people employed by the SMEs

Source: Author's compilation

The results unveiled some interesting insights in that all the 35 companies that had more than 50 employees were all in the manufacturing sector. The economic challenges that the country was facing had forced some large corporates to downsize to SMEs due to low annual turnover and small numbers of employees. This suggests that large corporates can hardly survive during economic downturn while SMEs are able to thrive, as competition will be reduced because of closure or scaling down by large corporates. This outcome supports the views in extant SME literature (Cucculelli, Bettinelli & Renoldi, 2014:1493; Gherhes, Williams, Vorley & Vasconcelos, 2016:939) that SMEs are the key drivers of economic recovery during difficult times.

**6.4.2.2.4 Number of years in operation**

The results in Table 6.4 show that the SMEs that have less than one year in operation were (25.7%; n=149), 1- 5 years (44.7%; n=259), 5-10 years (25.3%; n=147), 10-15years (3.8%; n=22), and those above 15 years were only (0.5%; n=3). These results are consistent with the general life span of an SME of less than five years, as it is stated in literature that 90 percent of SMEs fail within the first three to five years of operation (Small Business UK, 2014:1; Yeboah, 2015:4; Rahman *et al.*, 2015:511). The results of SMEs’ years in operation can be observed in Figure 6.7.



**Figure 6.7: Years in operation of SMEs**

Source: Author’s own compilation

The results in Figure 6.7 show that there was a general reduction in the number of new SME businesses (25.7%; n=149), which suggests poor economic performance. The results in Table 6.4 also show an increase in the number of SMEs surviving beyond the first five years to approximately 30 percent. The increase in survival rate from an expected 10 percent as stated in literature to 30 percent could be attributed to the economic challenges which had affected the large corporates as outlined in Section 6.4.2.2.3.

### **6.4.2.3 Association between socio-demographic variables**

This third section of the demographic analysis attempts to identify the demographic factors that may contribute to SME survival, in line with the first empirical objective of the study. The understanding of such factors can help businesses with the best approaches to perpetuate SME existence. The possible combinations used that related to employee demographics were work experience and years in existence; qualification and years in existence; nationality and years in existence. While combinations related to the business profile were number of employees and years in existence, as well as nature of business and years in existence. The Kendall's rank order correlation coefficient (Kendall's tau) was used to ascertain the reliability since the data had ordinal scaled variables as suggested by Leech *et al.* (2005:191).

#### **6.4.2.3.1 Association between work experience and SME existence**

The association between work experience and SME years of existence was analysed using cross tabulations and Kendall's rank order correlation coefficient, which must be greater than 0.7 to be significant, according to Leech *et al.* (2005:49). The results of the cross tabulations are presented in Table 6.5.

**Table 6.5: Cross tabulation of work experience and SME existence**

<b>A5 * A9 Cross tabulation</b>								
		<b>Years in existence</b>					<b>Total</b>	
		<1yr	1-5yrs	5-10yrs	10-15yrs	>15yrs		
<b>Work experience        (years)</b>	<1	Count	36	1	1	7	0	<b>45</b>
		% within A5	80.0	2.2	2.2	15.6	0.0	<b>100.0</b>
	1-5	Count	55	25	1	4	0	<b>85</b>
		% within A5	64.7	29.4	1.2	4.7	0.0	<b>100.0</b>
	<b>A5 * A9 Cross tabulation</b>							
			<b>Years in existence</b>					<b>Total</b>
			<1yr	1-5yrs	5-10yrs	10-15yrs	>15yrs	
	5-10	Count	54	157	87	9	3	<b>310</b>
% within A5		17.4	50.6	28.1	2.9	1.0	<b>100.0</b>	
10-15	Count	4	65	52	1	0	<b>122</b>	
	% within A5	3.3	53.3	42.6	0.8	0.0	<b>100.0</b>	
>15	Count	0	11	6	1	0	<b>18</b>	
	% within A5	0.0	61.1	33.3	5.6	0.0	<b>100.0</b>	
<b>Total</b>	<b>Count</b>	<b>149</b>	<b>259</b>	<b>147</b>	<b>22</b>	<b>3</b>	<b>580</b>	
	<b>% within A5</b>	<b>25.7</b>	<b>44.7</b>	<b>25.3</b>	<b>3.8</b>	<b>0.5</b>	<b>100.0</b>	
<i>Kendall-tau = 0.86; p=.001</i>								

**Source: Author’s own compilation**

At a 5 percent level of significance, the results suggest that SME years in existence are significantly associated with employee work experience (*Kendall-tau = 0.86; p=.001*). To understand the nature of the association, cross tabulations were computed, which showed that SMEs with employees possessing good work experience (i.e. above 5 years of work experience) (27.4%; n=159) compared to less experienced (2.2%; n=13) had a high chance of surviving beyond the first five years. The outcome suggests that employee work experience is important for the survival of SMEs.

**6.4.2.3.2 Association between highest qualification and SME existence**

The association between employees’ highest qualification and the SME years in existence was also done using cross tabulations and Kendall’s rank order correlation coefficient. The results are presented in Table 6.6.

**Table 6.6: Cross tabulation of highest qualification and SME existence**

<b>A3 * A9 Cross tabulation</b>								
		<b>Years in existence</b>					<b>Total</b>	
		<b>&lt;1yr</b>	<b>1-5yrs</b>	<b>5-10yrs</b>	<b>10-15yrs</b>	<b>&gt;15yrs</b>		
<b>Highest qualification</b>	‘O’ Level	Count	27	31	8	4	0	<b>70</b>
		% within A3	38.6	44.3	11.4	5.7	0.0	<b>100.0</b>
	‘A’ Level	Count	46	103	21	9	0	<b>179</b>
		% within A3	25.7	57.5	11.7	5.0	0.0	<b>100.0</b>
	<b>A3 * A9 Cross tabulation</b>							
			<b>Years in existence</b>					<b>Total</b>
			<b>&lt;1yr</b>	<b>1-5yrs</b>	<b>5-10yrs</b>	<b>10-15yrs</b>	<b>&gt;15yrs</b>	
	Diploma	Count	48	85	67	9	3	<b>212</b>
		% within A3	22.6	40.1	31.6	4.2	1.4	<b>100.0</b>
	First Degree	Count	27	33	28	0	0	<b>88</b>
		% within A3	30.7	37.5	31.8	0.0	0.0	<b>100.0</b>
	Master’s Degree	Count	0	2	2	0	0	<b>4</b>
		% within A3	0.0	50.0	50.0	0.0	0.0	<b>100.0</b>
	Doctoral Degree	Count	1	5	21	0	0	<b>27</b>
% within A3		3.7	18.5	77.8	0.0	0.0	<b>100.0</b>	
<b>Total</b>	<b>Count</b>	<b>149</b>	<b>259</b>	<b>147</b>	<b>22</b>	<b>3</b>	<b>580</b>	
	<b>% within A3</b>	<b>25.7</b>	<b>44.7</b>	<b>25.3</b>	<b>3.8</b>	<b>0.5</b>	<b>100.0</b>	
<i>Kendall-tau = 0.88; p=.000</i>								

**Source: Author’s own compilation**

The results in Table 6.6 indicate that at a 5 percent level of significance the association between employee qualifications and SME years in existence is significant (*Kendall-tau = 0.88; p=.000*). The examination of the cells shows that as the employee’s qualification increases the chance of the SME surviving also increases. For instance, employees with ordinary level (11.4%; n=8), advanced level (11.7%; n=21), diploma (31.6%; n=67), first degree (31.8%; n=28), master’s

degree (50.0%; n=2) and doctorate degree (77.8%; n=21) are of the SMEs surviving beyond the first five years. Interestingly, the SMEs with employees holding a diploma have the highest chance of surviving longer, probably because these employees possess the relevant practical and theoretical skills required to keep a going concern. The results suggest that qualifications are important in ensuring that SMEs survive beyond the general failure range of three to five years. However, it also emerged that a diploma qualification is more appropriate although higher qualifications can add more value.

**6.4.2.3.3 Association between nationality and SME existence**

The association between employees’ nationality and the SME years in existence was established using cross tabulations and Kendall’s rank order correlation coefficient. The results are presented in Table 6.7.

**Table 6.7: Cross tabulation of nationality and SME existence**

<b>A4 * A9 Cross tabulation</b>									
			<b>Years in existence</b>					<b>Total</b>	
			<b>&lt;1yr</b>	<b>1-5yrs</b>	<b>5-10yrs</b>	<b>10-15yrs</b>	<b>&gt;15yrs</b>		
<b>Nationality</b>	Zimbabwean	Count	87	252	144	20	3	<b>506</b>	
		% within A4	17.2	49.8	28.5	3.9	0.6	<b>100.0</b>	
	African	Count	0	2	0	0	0	<b>2</b>	
		% within A4	0.0	100.0	0.0	0.0	0.0	<b>100.0</b>	
	Asian	Count	65	2	0	0	0	<b>67</b>	
		% within A4	97.0	3.0	0.0	0.0	0.0	<b>100.0</b>	
	Europe/America	Count	0	0	3	2	0	<b>5</b>	
		% within A4	0.0	0.0	60.0	40.0	0.0	<b>100.0</b>	
	<b>Total</b>		<b>Count</b>	<b>149</b>	<b>259</b>	<b>147</b>	<b>22</b>	<b>3</b>	<b>580</b>
			<b>% within A4</b>	<b>25.7</b>	<b>44.7</b>	<b>25.3</b>	<b>3.8</b>	<b>0.5</b>	<b>100.0</b>
<i>Kendall-tau =0.79; p=.010</i>									

**Source: Author’s own compilation.**

The data presented in Table 6.7 show that at a 5 percent level of significance the association between nationality and SME years in existence is significant (*Kendall-tau =0.79; p=.010*). The

results in Table 6.7 show that all (100.0% ) SMEs with Asian and African employees do not survive beyond five years. While (30.0%; n=167) of SMEs with indigenous employees will manage to survive beyond five years and all (100.0%) SMEs with European/American employees survive beyond the average three to five-year life span. The results imply that nationality has an influence on the number of years an SMEs will remain in operation. The results suggest that the indigenisation policy that promoted the formation of Zimbabwean organisations is a better policy when compared to the “Look east” policy that supported Asian-owned organisations. The results further imply that establishment of European and American-owned organisations increases the survival rate of SMEs.

#### 6.4.2.3.4 Association between SME sector and SME existence

The association between SME sector and the SME years in existence was established using cross tabulations and Kendall’s rank order correlation coefficient. The results are presented in Table 6.8.

**Table 6.8: Cross tabulation of sector and SME existence**

<b>A7 * A9 Cross tabulation</b>								
			<b>Years in existence</b>					<b>Total</b>
			<b>&lt;1yr</b>	<b>1-5yrs</b>	<b>5-10yrs</b>	<b>10-15yrs</b>	<b>&gt;15yrs</b>	
<b>Type of industry</b>	<b>Manufacturing</b>	<b>Count</b>	6	33	38	1	3	<b>81</b>
		<b>% within A7</b>	7.4	40.7	46.9	1.2	3.7	<b>100.0</b>
	<b>Retail</b>	<b>Count</b>	104	105	50	0	0	<b>259</b>
		<b>% within A7</b>	40.7	40.5	19.3	0.0	0.0	<b>100.0</b>
	<b>Mining</b>	<b>Count</b>	17	52	5	0	0	<b>74</b>
		<b>% within A7</b>	22.3	70.3	6.8	0.0	0.0	<b>100.0</b>
	<b>Hospitality &amp; Tourism</b>	<b>Count</b>	13	20	6	0	0	<b>39</b>
		<b>% within A7</b>	28.2	51.3	15.4	0.0	0.0	<b>100.0</b>
	<b>Agriculture</b>	<b>Count</b>	9	49	48	21	0	<b>127</b>
		<b>% within A7</b>	3.9	38.6	37.8	19.7	0.0	<b>100.0</b>
	<b>Total</b>	<b>Count</b>	<b>149</b>	<b>259</b>	<b>147</b>	<b>22</b>	<b>3</b>	<b>580</b>
		<b>% within A7</b>	<b>25.7</b>	<b>44.7</b>	<b>25.3</b>	<b>3.8</b>	<b>0.5</b>	<b>100.0</b>
<i>Kendall-tau =0.89; p=.000</i>								

**Source: Author’s own compilation**

Table 6.8 shows that at a 5 percent level of significance, the association between SME sector and SME years in existence is very significant (Kendall-tau =0.89; p=.000). The results in Table 6.8 show that (51.9%; n=42), (19.3%; n=50), (6.8%; n=5), (15.4%; n=6) and (54.3%; n=69) of SMEs in the manufacturing, retail, mining, hospitality and tourism, and agriculture sector, respectively have a chance of surviving beyond the first three to five years. The results show that although the bulk of the SMEs (44.7%; n=259) were in the retail sector, the best sectors to depend on for SME survival in Zimbabwe are the manufacturing and agriculture sectors.

The cross tabulations and correlation tests revealed that employee work experience, highest qualification, and nationality together with SME business sector are significant factors that can be used to predict the life span of an SME. However, factors such as the location of the business, number of employees and annual turnover were not significant predictors of SME life span. The insignificant factors were, however, being used for classifying the SMEs into small enterprises and medium enterprises in many countries (Kachlami & Yazdanfar, 2016:967). The utilisation of insignificant factors could be a major contributor to an inconsistent definition of an SME. Thus, consideration of the significant factors in classifying the SME could help achieve the much-needed standardisation.

### **6.4.3 Factor analysis**

Factor analysis comprises two main techniques, namely, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). On the one hand, EFA aims at uncovering the complex patterns in the data by exploring the dataset (i.e. variable extraction) and testing predictions. On the other hand, CFA assesses scale accuracy by testing for the psychometric properties (i.e. variable selection) and can be conducted using either the traditional approach or the structural equation modelling (SEM) approach (Glen, 2016:2). Although the factors for the study had already been adapted from theory, an EFA was still conducted to extract and identify the key items on each scale and also achieve unidimensionality which was a necessary assumption for the inferential tests. A CFA was then conducted using the SEM approach to select the most important items from the extracted items that could be used to predict the mediating effect of knowledge sharing on people-centred KMSs and SCP. The EFA will be discussed in the next section while the CFA will be discussed later when testing the hypotheses and the model fitness.



### 6.4.3.1 Preliminary analysis

A Kaiser-Meyer Olkin (KMO) test of sampling adequacy and the Bartlett's test of sphericity and anti-image matrices were computed using SPSS 25.0 to assess whether the data captured were suitable for EFA. The KMO statistic varies between 0 (zero) and 1 (one) with a value of 0 indicating that the sum of partial correlations is large in relation to the sum of correlations. The foregoing condition suggests that factor analysis on the sample will lead to statistical problems whilst a value closer to 1 (one) suggests that patterns of correlations are relatively compact, thus making factor analysis possible. The original acceptance level of values greater than 0.5 was suggested by Kaiser (1974:201) while Field (2009:647) added that values between 0.5 and 0.7 are mediocre, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values above 0.9 are superb as earlier noted by Hutcheson and Sofroniou (1999:305). However, he (Field, 2009:648) also notes that with larger samples (above 500) a KMO value of 0.7 is also superb. The Bartlett's test shows that a correlation matrix (R-matrix) is significantly different from an identity matrix and it should be significant at  $p < 0.05$  for factor analysis to be performed.

The anti-image matrix of covariance and correlation analyses each variable's adequacy. The values along the diagonal of the matrix should be  $>0.5$  and off-diagonal should all be very close to zero if the sample is adequate for a given pair of variables; anything lower should be dropped (Field, 2009:659). The results of the data factorability tests are presented in Table 6.9.

**Table 6.9: Data factorability tests results**

Constructs (latent variables)	KMO measure	Bartlett's test	Anti- image matrices			
		Approximate Chi-Square ( $\chi^2$ )	Degrees of freedom (Df)	Sig. level (p value)	Diagonal	Off - diagonal
People-centred KMSs	0.773	9965.313	91	0.000	$\geq .883$	$\leq 0.001$
Organisational culture	0.925	1445.140	6	0.000	$\geq .883$	$\leq 0.008$
Innovation Management	0.943	1482.139	6	0.000	$\geq .900$	$\leq 0.006$

Constructs (latent variables)	KMO measure	Bartlett's test	Anti- image matrices			
		Approximate Chi-Square ( $\chi^2$ )	Degrees of freedom (Df)	Sig. level ( $p$ value)	Diagonal	Off - diagonal
CoP	0.910	1858.841	3	0.000	$\geq .850$	$\leq 0.020$
Social capital	0.933	854.943	3	0.000	$\geq .914$	$\leq 0.012$
Knowledge sharing	0.902	461.662	6	0.000	$\geq .889$	$\leq 0.023$
SCP	0.510	6455.467	66	0.000	$\geq .728$	$\leq 0.011$
CRP	0.904	443.441	3	0.000	$\geq .910$	$\leq 0.023$
TRP	0.944	1387.195	3	0.000	$\geq .866$	$\leq 0.044$
RRP	0.911	681.868	3	0.000	$\geq .620$	$\leq -.001$
OQRP	0.921	289.681	3	0.000	$\geq .887$	$\leq 0.002$

Source: Author's own compilation

As indicated in Figure 6.9, KMO values for all the constructs were greater than the minimum cut-off value of 0.5 as recommended by Kaiser (1974:201) and all except SCP were superb according to Field (2009:647). Additionally, values for the Bartlett's test show that all the factors were significant as indicated by  $p$  values of less than 0.05 as recommended by Field (2005:644). The anti-image matrices for the diagonals were also greater than 0.5 and the off-diagonals were very close to zero further confirming that each variable was significant as recommended by Field (2009:647). Thus, the results for the KMO, Bartlett's tests and anti-image matrices were above the recommended thresholds. Furthermore, the computed correlation matrices showed that values were between 0.3 and 0.7 (i.e. no multicollinearity) with determinant values above 0.0001, thus the structure of the data was considered factorable, hence further statistical tests were possible on all the study constructs. The next section explains the exploratory factor analysis.

#### 6.4.3.2 Exploratory factor analysis

In order for a researcher to identify the underlying factors from a given dataset they can use EFA to extract the relevant factors from multi-item scales (Bryman, 2008:161) before using the scales to predict a model or test some hypotheses. In the current study, EFA was applied as a dimension reduction technique to extract the key variables in a scale, simplify analysis and eliminate rubble variables (Zikmund & Babin, 2007:564) so as to develop the proposed

knowledge-based SCP process model. Field (2005:648) notes that simplification of both factor extraction and interpretation of EFA results in SPSS can be achieved through factor rotation. He cited two major methods of factor rotation, namely, orthogonal and oblique, of which orthogonal can further be subdivided into varimax, quartimax, and equamax while oblique rotation has subdivisions including promax and direct oblimin (Tabachnick & Fidell, 2007:115). Orthogonal rotation in the form of the Varimax method of rotation was used because the method maximises the dispersion of loadings within factors producing clusters that are much easier to interpret as suggested by Field (2005:644).

The factor structure of the data collected in the study was ascertained using Kaiser's criterion where items with factor loadings  $\geq 0.50$ , an eigenvalue  $\geq 1$  and communalities  $\geq 0.60$  as recommended by several authors (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664) are considered. The Cronbach's alpha was used to test the reliability of each Likert-type item within the study measurement scales (Field, 2005:644). The communalities were used to show the level of common variances amongst the factors as required in regressions and SEM, and the percentage of total variance was also provided. In order to visualise the extraction process, a scree plot was provided to further show the fraction of total variance in the data as represented by each component based on eigenvalues (Woods & Edwards, 2011:3). The EFA for the study factors (KMSs (i.e. organisational culture, innovation management, CoP, social capital), knowledge sharing, SCP, TRP, CRP, RRP, and OQRP) will be discussed next.

#### **6.4.3.2.1 Exploratory factor analysis for the people-centred knowledge management systems scale**

Principal component factor analysis with varimax rotation was applied to assess the underlying structure for the 14 (fourteen) items of the people-centred KMS scale drawn from extant literature. A total of four factors were requested, based on the fact that the study had initially chosen four factors as guided by the reviewed literature. As such the available items were designed to index four constructs, namely, organisational culture, innovation management, CoPs and social capital. After rotation, the first factor (i.e. organisational culture) accounted for 45.5 percent of the variance, the second factor accounted for 22.5 percent, the third factor accounted for 10.182 percent and the fourth factor for 7.8 percent. The scale items, factor loadings, communalities and eigenvalues are shown in Table 6.10.

The results given in Table 6.10 are also visualised and supported by the succeeding scree plot in Figure 6.8. The scree plot illustrates a four-factor structure for the people-centred KMS scale in which the eigenvalues were 6.376 for Factor 1; 3.152 for Factor 2; 1.426 for Factor 3 and 1.087 for Factor 4. Thus, both the scree-plot and the eigenvalues results support the assumption that these 14 items can be reduced to four factors as initially derived from the literature review and explained below.

**Table 6.10: Extraction of people-centred knowledge management systems factors**

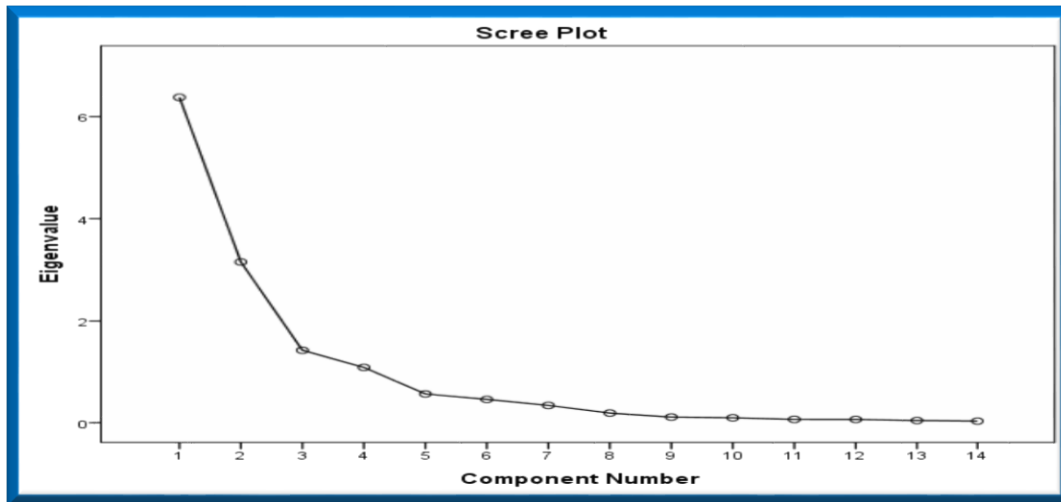
<b>Item Code</b>	<b>Description</b>	<b>Factor 1 loadings</b>	<b>Factor 2 loadings</b>	<b>Factor 3 loadings</b>	<b>Factor 4 loadings</b>	<b>Communalities</b>
OC 1	Our culture promotes the trust that is needed to encourage knowledge sharing among employees.	<b>.628</b>	-.298	.395	-.151	.662
OC 2	Our organisation has a knowledge-sharing rather than a knowledge-hoarding culture.	<b>.590</b>	.101	.387	.445	.902
<b>Item Code</b>	<b>Description</b>	<b>Factor 1 loadings</b>	<b>Factor 2 loadings</b>	<b>Factor 3 loadings</b>	<b>Factor 4 loadings</b>	<b>Communalities</b>
OC 3	Our culture emphasises that knowledge-sharing activities earn praise that indicates people are doing their jobs well if they share knowledge.	<b>.897</b>	-.240	.057	-.090	.873
OC 4	Our culture emphasises that knowledge-sharing activities earn praise that indicates what a good employee should do.	<b>.907</b>	-.169	.023	-.101	.863
IM1	Our organisation promotes knowledge sharing so that we are quicker in new product development than most of our key competitors.	.224	<b>.626</b>	-.360	-.095	.920
IM2	Our organisation relies on knowledge sharing to be	.216	<b>.859</b>	.275	.068	.865

	quicker in environmental adaptation.					
IM3	Our organisation is quicker in improving processes than most of our key competitors because of the value we place in knowledge sharing.	.449	<b>.708</b>	.162	.430	.914
IM4	Our organisation is quicker in problem-solving than most of our key competitors because employees are encouraged to share knowledge.	.204	<b>.849</b>	-.361	-.143	.914
CoP 1	I participate in the group to get specialist support from members.	.161	-.032	<b>.846</b>	-.373	.881
CoP 2	Management speaks positively to others about participation and involvement in groups.	-.194	-.013	<b>.938</b>	-.130	.935
CoP 3	I often share knowledge with others through face-to-face meetings in groups.	.057	-.085	<b>.891</b>	-.360	.934
SC1	I can rely on my colleagues when I need support in anything concerning my work.	.234	.235	-.284	<b>.690</b>	.667
SC2	I tell someone what I know, and I can count on it that they will also tell me what they know.	.450	-.311	-.256	<b>.728</b>	.894
SC3	I view this organisation as a group to which I belong.	.293	-.178	-.328	<b>.770</b>	.818
<b>Eigenvalue</b>		<b>6.376</b>	<b>3.152</b>	<b>1.426</b>	<b>1.087</b>	
<b>Total variance explained (TVE)</b>		<b>45.546</b>	<b>22.512</b>	<b>10.182</b>	<b>7.767</b>	
<b>Cumulative TVE</b>		<b>45.546</b>	<b>68.058</b>	<b>78.241</b>	<b>86.008</b>	
<b>Extraction Method:</b> Principal Component Analysis. <b>Rotation Method:</b> Varimax with Kaiser Normalisation. <b>Rotation convergence:</b> 25 iterations. <b>Eigenvalues:</b> > 1.00. Total Variance Exp: 86%						

**Source: Author's own compilation**

The results shown in Table 6.10 indicate that four factors were extracted from the sample data confirming the initial suggestion made in the literature review as discussed in Chapter Three. After scale purification, all the items collectively explained a total variance of 86 percent which

was sufficient to carry out the study using the factors. Thus, the data empirically confirmed that the four factors were indeed measures of people-centred KMSs. Further visualisation detail is given in the scree plot in Figure 6.8 below.



**Figure 6.8: Scree plot for people-centred knowledge management systems factors**

Source: Extracted from SPSS

Principal component factor analysis with varimax rotation was conducted to assess the underlying structure for the 4 (four) items of the organisational culture scale. The results show that only one factor was extracted, thus confirming the unidimensionality of the scale. The communalities also indicate that 66.2 percent of the variance associated with item OC1, 90.2 percent of the variance associated with item OC 2, 87.3 percent of the variance associated with item OC3 and 86.3 percent of variance associated with item OC4 is all shared or common variance.

In order to evaluate whether the four items that were adapted to create the organisational culture scale were reliable, a Cronbach's alpha was calculated using SPSS 25.0. The alpha for the four items was  $\alpha=0.954$ , which shows that the items formed a scale that had an acceptable internal consistency reliability. The items also explained 64.7 percent of the total variance after scale purification. The loadings for all the items were above the minimum recommended threshold of 0.5 and an eigenvalue of 2.589 was attained for the organisational culture factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664).

The results proved that innovation management was a valid people-centred KMS factor. The communalities also indicate that 92.0 percent of variance associated with item IM1, 86.5 percent of the variance associated with item IM2, 91.4 percent of the variance associated with item IM3 and 91.4 percent of the variance associated with item IM4 is all shared or common variance.

As a way of ascertaining whether the four items that were adapted to create the innovation management scale were reliable, a Cronbach's alpha was computed using SPSS 25.0. The alpha for the four items was  $\alpha=0.900$ , which indicates that the items formed a scale that had reasonable internal consistency reliability. The four items also explained 74.2 percent of the total variance after scale purification. The loadings for all the items were above the minimum recommended threshold of 0.5 and an eigenvalue of 2.998 was attained for the innovation management factor. The results are all considered as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664).

The common variance explained by each of the CoP items was 88.1 for item CoP1, 93.5 percent for item CoP2 and 93.4 percent for item CoP3. A Cronbach's alpha was calculated using SPSS 25.0 for the three items that were adapted to create the CoPs scale in order to evaluate the reliability of the scale. The Cronbach's alpha for the three scale items was  $\alpha=0.883$ , which shows that the items summed to form a scale that had an acceptable internal consistency reliability. The total variance explained by the three items was 90.6 percent. The loadings for all the items were confirmed to be above the minimum recommended threshold of 0.5 and an eigenvalue of 2.789 was attained for the CoPs factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664). The results also show that CoPs was extracted as a people-centred KMS factor. The communalities also indicate that 66.7 percent of the variance associated with item SC1, 89.4 percent of the variance associated with item SC2 and 81.8 percent of the variance associated with item SC3 is all shared or common variance.

In an effort to evaluate whether the three items that were adapted to create the social capital scale were reliable, a Cronbach's alpha was calculated using SPSS 25.0. The resultant alpha for the three-item scale was  $\alpha=0.964$ , which showed that the items formed a scale that had reasonable internal consistency reliability. Collectively, the three items explained 71.6 percent of the total variance. The factor loadings for all three of the items were above the generally

recommended minimum threshold of 0.5 and an eigenvalue of 2.289 was attained for the social capital factor. The results are all considered as acceptable in extant literature (Woods & Edwards, 2011:3; Field, 2005:664).

#### 6.4.3.1.2 Exploratory factor analysis for the knowledge sharing scale

An EFA using the principal component factor analysis with varimax rotation method was conducted to assess the underlying structure for the 3 (three) items of the knowledge sharing scale that remained after scale purification. The results of the analysis indicate that only one factor was extracted. The outcome thus confirms the unidimensionality of the scale. The common variance for each item as shown by the communalities on the scale items are as follows: 73.1 percent for item KS1, 77.8 percent for item KS2 and 79.6 percent for item KS3. The scale items, factor loadings, communalities and eigenvalues are shown in Table 6.11.

**Table 6.11: Unidimensional factor structure of knowledge sharing construct**

Item code	Description	Factor loadings	Communalities
KS1	My firm has exchanged many ideas with the partners about how to improve each other's capabilities in manufacturing, research, Logistics, services, etc.	.855	.731
KS2	The supply chain knowledge provided through knowledge sharing is up-to-date.	.692	.778
KS3	Knowledge sharing processes provide contextual supply chain knowledge so that we can truly understand how to accurately carry out forecasts.	.629	.796
KS4	The supply chain words and phrases provided from the knowledge sharing processes are consistent.	-.609	.241
<b>Eigenvalue</b>		<b>2.230</b>	
<b>Total variance explained</b>		<b>51.889</b>	
<b>Extraction Method:</b> Principal Component Analysis. <b>Rotation Method:</b> Varimax with Kaiser Normalisation. <b>Rotation convergence:</b> 25 iterations. <b>Eigenvalues:</b> > 1.00.			

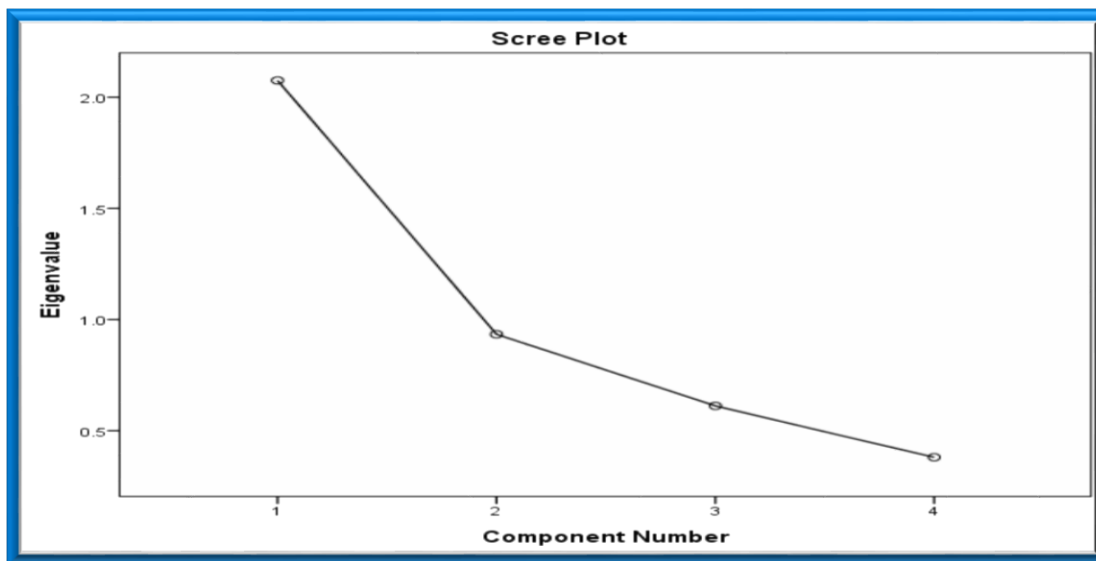
**Source: Author's own compilation**

In order to evaluate whether the three items that were adapted to create the knowledge sharing scale were reliable, a Cronbach's alpha was computed using SPSS 25.0 resulting in a value of  $\alpha=0.914$ . The outcome confirmed that the items formed a scale that had reasonable internal



consistency reliability. The three items that were retained explained 51.9 percent of the total variance after scale purification. The loadings for all items were above the minimum recommended threshold of 0.5 and an eigenvalue of 2.230 was attained for the knowledge sharing factor. The results are all regarded as acceptable in literature (Woods & Edwards, 2011:3; Bryman, 2008:151).

In addition, visualised results were provided through the scree plot criterion and the plot ascertained that only one factor was extracted as illustrated in Figure 6.9.



**Figure 6.9: Scree plot for knowledge sharing values**

Source: Extracted from SPSS

The scree plot in Figure 6.9 indicates that the scree plot has a single eigenvalue at 2.230; the rest of the eigenvalues for the knowledge sharing scale decrease gradually to values below 1.0. Thus, the plot extracted one factor above the recommended  $\geq 1$  upper limit for retention, which verifies that the three items for the knowledge sharing scale converge to form one factor.

#### **6.4.3.1.3 Exploratory factor analysis for the supply chain performance scale**

Principal components factor analysis with varimax rotation was conducted to evaluate the structure for the twelve items of the initial network-based approach to SCP model which had one predictor variable as SCP with a 12-item scale. One factor was requested, based on the fact that the items were designed to index one construct in line with the proposed conceptual

framework and reviewed literature. However, four factors were extracted from the data and after rotation, the first factor accounted for 33.7 percent of the variance, the second factor accounted for 21.6 percent, the third factor accounted for 20.1 percent and the fourth factor for 18.7 percent. The results led to the revision of the proposed conceptual framework, which was remodelled in line with the EFA results to adopt the process-based approach to SCP using the extracted four sub-factors. Table 6.12 displays the items and factor loadings for the rotated factors.

**Table 6.12: Multidimensional factor structure of SCP construct**

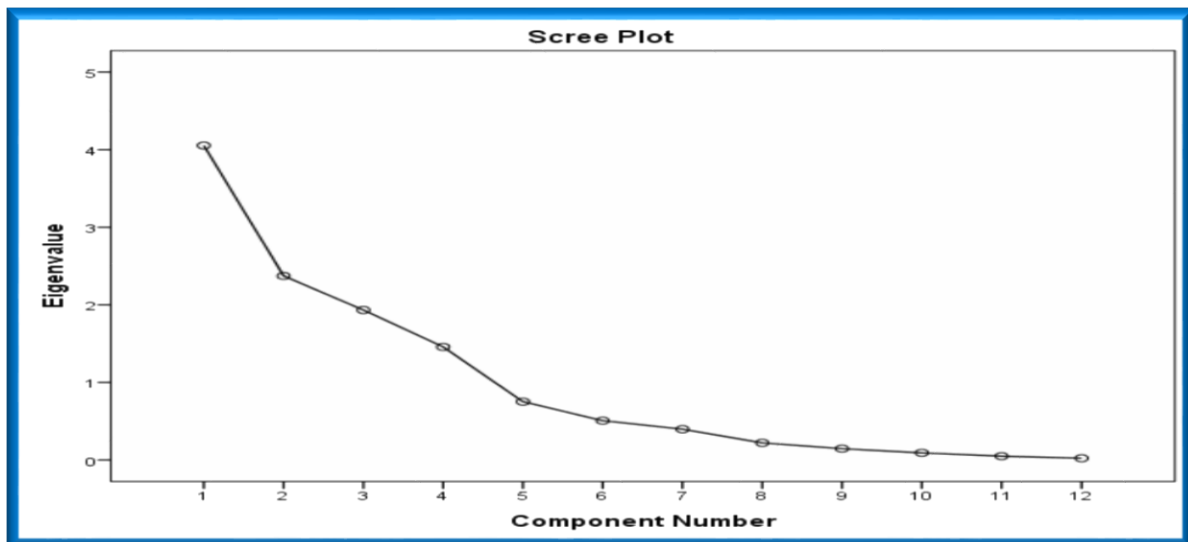
<b>Item code</b>	<b>Description</b>	<b>Factor 1 loadings</b>	<b>Factor 2 loadings</b>	<b>Factor 3 loadings</b>	<b>Factor 4 Loadings</b>	<b>Communality</b>
SCP1	Supply chain productivity (e.g. ratio of production to asset/staff)	<b>.968</b>	.022	.210	.301	.77
SCP2	Supply chain efficiency (e.g. ratio of output to input)	<b>.901</b>	-.148	.202	.358	.60
SCP3	Profit margin (e.g. return on investment)	<b>.891</b>	-.300	.199	.300	.59
SCP4	Manufacturing or service processing lead time (i.e. time taken to make a product)	.109	<b>.609</b>	.274	.344	.61
SCP5	Delivery lead time (i.e. time taken to make a delivery)	.207	<b>.740</b>	-.214	.341	.66
SCP6	Cash to cash cycle (i.e. time taken to convert cash to cash)	.344	<b>.925</b>	-.322	.298	.78
SCP7	Flexibility: ability to handle small disruptions	.365	.388	<b>.871</b>	.100	.77
SCP8	Resilience: ability to handle large disruptions	-.208	.214	<b>.655</b>	.288	.64
SCP9	Agility: ability to recover from short-term changes	.366	.266	<b>.756</b>	.382	.62

Item code	Description	Factor 1 loadings	Factor 2 loadings	Factor 3 loadings	Factor 4 Loadings	Communality
SCP10	Perceived quality of products or services (by customers)	.275	.274	.371	<b>.908</b>	.61
SCP11	Knowledge accuracy (by your organisation and its suppliers)	.178	.297	.362	<b>.663</b>	.74
SCP12	Current or real-time knowledge	-.233	-.258	-.054	<b>.793</b>	.73
<b>Eigenvalue</b>		<b>4.240</b>	<b>2.553</b>	<b>2.096</b>	<b>1.785</b>	
<b>Total variance explained</b>		<b>33.668</b>	<b>21.550</b>	<b>20.098</b>	<b>18.684</b>	
<b>Cumulative total variance explained</b>		<b>33.668</b>	<b>55.218</b>	<b>75.316</b>	<b>94.000</b>	
<b>Extraction Method:</b> Principal Component Analysis. <b>Rotation Method:</b> Varimax with Kaiser Normalisation. <b>Rotation convergence:</b> 25 iterations. <b>Eigenvalues:</b> > 1.00. Total Variance Exp: 94%						

**Source: Author's own compilation**

The results given in Table 6.12 are supported by the scree plot in Figure 6.9. The results illustrate a four-factor structure for the SCP scale in which the eigenvalues were 4.240 for Factor 1; 2.553 for Factor 2; 2.096 for Factor 3 and 1.785 for Factor 4.

Since unidimensionality was required in further statistical tests such as regression analysis and structural equation modelling, the proposed conceptual framework was remodelled using the extracted factors resulting in four predictor variables as earlier stated and discussed in the next section. Furthermore, the results led to the rejection of the H<sub>9</sub> hypothesis, which had suggested a positive relationship between knowledge sharing and SCP from a network-based approach to SCP. In addition, a scree plot was used to achieve visualisation as indicated in Figure 6.10.



**Figure 6.10: Scree plot for supply chain performance values**

Source: Extracted from SPSS

The results given in Table 6.12 are further supported by the scree plot in Figure 6.10. The scree plot illuminates a four-factor structure for the SCP 12-item scale in which the eigenvalues were 4.240 for Factor 1; 2.553 for Factor 2; 2.096 for Factor 3 and 1.785 for Factor 4. Consequently, both the scree plot and the computed eigenvalues results concur that the scale is multidimensional. Thus, the results suggest that the SCP items do not measure a single factor. But rather the 12 scale items can be reduced to four factors; a view that was later derived during the literature review as the process-based approach to SCP.

Based on the foregoing outcome, the initially modelled conceptual framework, which was based on the network approach assumption was dropped as it failed to meet the unidimensionality requirement. The results suggest that knowledge-based supply chains are best measured using the process-based approach and not the network-based approach, a view that also gets support from recent literature (Miri-Lavassani & Movahedi, 2018:673; Ahmad & Karim, 2019:210; Human Resource Management International Digest, 2020:21).

The first factor was labelled TRP. The communalities also indicate that 93.7 percent of the variance associated with item TRP1, 81.3 percent of the variance associated with item TRP2, 79.5 percent of the variance associated with item TRP3 is shared or common variance. The three items also explained 84.8 percent of the total variance after scale purification. The factor loadings for all the items were above the minimum recommended threshold of 0.5 and an

eigenvalue of 2.544 was attained for the TRP factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3). The eigenvalues for the TRP scale decrease gradually after the first factor to below 1.0. Thus, the plot extracted one factor above the  $\geq 1$  upper limit for retention, which supports the conclusion that these three variables can be reduced to one factor.

The second factor was labelled RRP. The communalities computed also indicate that 74.9 percent of the variance associated with item RRP1, 91.6 percent of the variance associated with item RRP2 and 87.0 percent of the variance associated with item RRP3, is all shared or common variance. The three items also explained 71.9 percent of the total variance after scale purification. The factor loadings for all three items were well above the minimum recommended threshold of 0.5 and an eigenvalue of 2.157 was attained for the RRP factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Field, 2005:664). The eigenvalues for the RRP scale decrease gradually after the first factor to values below 1.0. Thus, the plot extracted only one factor above the  $\geq 1$  threshold for retention, which proves that these three variables can be reduced to one factor thereby achieving unidimensionality.

The third factor was labelled OQRP. The communalities also indicate that 75.9 percent of the variance associated with item OQRP1, 22.9 percent of the variance associated with item OQRP2 and 77.2 percent of the variance associated with item OQRP3 is all shared or common variance. The two items explained 58.7 percent of the total variance after scale purification. The loadings for all the items were above the minimum recommended threshold of 0.5 and an eigenvalue of 1.760 was attained for the OQRP factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664). The eigenvalues for the OQRP scale decrease gradually after the first factor to below 1.0. Thus, the plot extracted one factor above the  $\geq 1$  upper limit for retention, which confirms the conclusion that these three variables can be reduced to one factor.

The fourth factor was labelled CRP. The communalities also indicate that 82.4 percent of the variance associated with item CRP1, 23.9 percent of the variance associated with item CRP2 and 72.9 percent of the variance associated with item CRP3 is all shared or common variance. The three items also explained 63.1 percent of the total variance after scale purification. The factor loadings for all the items were above the minimum recommended threshold of 0.5 and

an eigenvalue of 1.892 was attained for the CRP factor. The results are all regarded as acceptable in literature (Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664). The eigenvalues for the CRP scale decrease gradually after the first factor to below 1.0. Thus, the plot extracted one factor above the  $\geq 1$  threshold for retention, which proves that these three variables can be reduced to one factor. The next section looks at the model fitness and the hypotheses testing that was conducted using AMOS 25.0.

#### **6.4.4 Descriptive statistics for the study constructs**

After extracting and selecting the key factors using the principal component analysis method coupled with item correlations, a descriptive analysis of the selected factors was done. This section thus presents results on descriptive statistics for the study constructs, namely, organisational culture, innovation management, CoP, social capital, knowledge sharing, TRP, RRP, CRP and OQRP. The descriptive analysis helped to examine the selected factors of the main dataset to confirm if the data met all the required assumptions to carry out inferential statistical tests. Analysis was conducted using the mean (a numerical average for a set of responses), standard deviation (the consistency of the distribution of the responses around the mean), kurtosis and skewness. The mean ratings were used to establish the perceptions of the respondents on the study constructs. The standard deviation, skewness and kurtosis were used to ascertain the distribution of the data whether they were normally distributed or not and then decide on the relevant statistical tests to be used.

Skewness (i.e. the two left or right inclines of the tails of a frequency distribution resulting in different mean and median) must be checked before conducting statistical analysis. Skewness values of more than +1.0 or less than -1.0, mean the distribution is markedly skewed, thus the use of nonparametric statistics is recommended (Leech *et al.*, 2005:21). Kurtosis (i.e. frequency distribution is peaked more than a normal curve (i.e. leptokurtic) or is relatively flat with heavy tails (i.e. platykurtic)) value helps identify outliers in the data. A small standard deviation (SD) value suggests that the responses under review are fairly uniform while a large SD suggests non-uniform responses and a zero value means the responses are uniform. Likert type questions were used on each of the scales to collect data where the extent to which the respondents agreed with the questions for each construct are given at the bottom of each corresponding table as outlined and explained in the succeeding subsections.

#### 6.4.4.1 Descriptive statistics for organisational culture

The results of the descriptive statistics for all the four items used to measure organisational culture are presented in Table 6.13. The kurtosis and skewness values indicated in the table have been converted to their *z*-score equivalence, derived by subtracting the mean and dividing by the standard error. In this case, values above 1.96 represent a normal distribution as suggested by Field (2009:139) who also notes that significance values are not necessary in large samples.

**Table 6.13: Descriptive statistics for organisational culture**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
OC1	Our culture promotes the trust that is needed to encourage knowledge sharing among employees.	580	2	6	5.38	1.122	2.045	2.031
OC2	Our organisation has a knowledge sharing rather than a knowledge hoarding culture.	580	4	6	5.79	1.229	-1.986	-1.996
OC3	Our culture emphasises that knowledge sharing activities earn praise that indicates people are doing their jobs well if they share knowledge.	580	5	7	6.89	1.201	-2.061	-2.117
OC4	Our culture emphasises that knowledge sharing activities earn praise that indicates what a good employee should do.	580	5	6	6.74	1.272	-3.041	-3.138
Overall scores		580	4	6.25	6.20	1.206	-1.261	-1.305

Scale: 1=Strongly disagree, 2=Partially disagree, 3= Disagree, 4=Neutral 5=Partially agree, 6=Agree, 7=Strongly agree

**Source: Author's own compilation**

Table 6.13 provides detailed results about the respondents' perceptions on the organisational culture. The construct was measured using a four-item scale as mentioned earlier. The results show that the skewness (*z*-score) values for Item 1, Item 2, Item 3 and Item 4 were 2.045, -1.986, -2.061 and -3.041. The kurtosis (*z*-score) values for the four items in the scale were 2.031, -1.996, -2.117 and -3.338, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("Our culture promotes the trust that is needed to

encourage knowledge sharing among employees”) had the lowest rating with a mean rating of  $\bar{x} = 5.38$ ;  $SD = \pm 1.122$  and a minimum response of 2. The other three items had higher ratings with Item 2 (“Our organisation has a knowledge sharing rather than a knowledge hoarding culture”) had a mean rating of  $\bar{x} = 5.79$ ;  $SD = \pm 1.229$  and a minimum response of 4; Item 3 (“Our culture emphasises that knowledge sharing activities earn praise that indicates people are doing their jobs well if they share knowledge”) had a mean rating of  $\bar{x} = 6.89$ ,  $SD = \pm 1.201$  and a minimum response of 5; Item 4 (“Our culture emphasises that knowledge sharing activities earn praise that indicates what a good employee should do”) had a mean rating  $\bar{x} = 6.74$ ,  $SD = \pm 1.272$  and a minimum response of 5.

The results show that the respondents viewed both Item 3 and 4 as key measures of organisational culture since they had the highest mean rating ( $\bar{x} = 6.89$ ;  $\bar{x} = 6.74$ ) and the minimum rating was around 5. This outcome implies that praising employees who share knowledge is an important measure of organisational culture in promoting knowledge sharing. Item 1 had the lowest mean rating ( $\bar{x} = 5.38$ ) and a minimum rating of 2, suggesting that though important, trust was not considered as a measure of organisational culture in promoting a knowledge sharing culture.

The above results demonstrate that the majority of SME employees view organisational culture as an important people-centred KMS (average mean  $\bar{x} = 6.20$ ;  $SD = \pm 1.206$ ) that promotes knowledge sharing within SMEs. However, trust is viewed as less important than employee praises in terms of promoting a knowledge sharing culture. These results contradict prior studies that viewed trust as the most important cultural measure in promoting knowledge sharing in organisations. The study on US-based organisations, by Peralta and Saldanha (2014:546), argued that trust was a key factor in building a knowledge sharing culture. The study, however, had mixed respondents from both SMEs and large corporates which could have distorted the views of the SMEs when treated exclusively. Other earlier studies (Jia, Liao, Van der Heijden & Guo 2019:3657; Strategic Direction, 2015:17; Sorakraikitikul & Siengthai, 2014:177) have also concluded that trust was fundamental to aiding a knowledge sharing culture and again none of these abovementioned studies had focused specifically on SMEs. Nevertheless, studies focusing on SMEs (Sharif, Kalafatis & Samouel, 2005:410; Pattinson & Preece, 2014:112; Buganza *et al.*, 2014:73) also placed trust as the most important measure in



achieving successful knowledge sharing culture ahead of other factors such as technology, collaboration, relationships, employee incentives and motivation.

These results bring an interesting and new insight which has practical implications for organisations and SME businesses willing to nurture a knowledge sharing culture. The current study reveals that employee praise by leadership is an outstanding success factor for promoting a knowledge sharing culture (Wu & Lee, 2017:484) within SMEs. This result finds supporting evidence from Sang, Xia, Ni, Cui, Wang and Wang (2019:258) who defined employee praises as “positive affect”. Their study (Xia, *et al.*, 2019:258) on Chinese organisations, concluded that when job satisfaction is lacking, positive affect influences knowledge sharing more than trust. Thus, the downplaying of trust as a measurement could, however, be influenced by the Zimbabwean economic situation that was characterised by supply chain uncertainty, which could have affected job satisfaction. Thus, it can be argued that in an environment characterised by supply chain uncertainty, trust is reduced, and it ceases to be a key measurement for knowledge sharing culture, and employee praise (positive affect) becomes its substitute. As such, SMEs willing to implement a knowledge sharing culture in uncertain supply chains should value a culture of employee positive affect above trust if they are to be successful.

#### **6.4.4.2 Descriptive statistics for innovation management**

The results in Table 6.14 give insight into how the respondents perceived the innovation management measurement scale. The results show that the skewness (z-score) values for Item 1, Item 2, Item 3 and Item 4 were 2.401, 2.496, 2.400 and -2.423. The kurtosis (z-score) values for the four items were as follows -2.780, -2.618, -2.941 and -2.725, which were within the 1.96 to 3.29 range. Used together, the standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 (“Our organisation promotes knowledge sharing so that we are quicker in new product development than most of our key competitors”) had a very low rating with a mean rating of  $\bar{x}=3.71$ ,  $SD=\pm 1.298$  and a minimum response of 1. The respondents placed high value on Item 2 (“Our organisation relies on knowledge sharing to be quicker in environmental adaptation”), which had a mean rating of  $\bar{x}=5.80$ ,  $SD=\pm 1.221$  and a minimum response of 4. Item 3 (“Our organisation is quicker in improving processes than most of our key competitors because of the value we place in knowledge sharing”) was also lowly rated with a mean rating of  $\bar{x}=3.78$ ,

SD=±1.295 and a minimum response of 1. Item 4 (“Our organisation is quicker in problem-solving than most of our key competitors because employees are encouraged to share knowledge”) had a slightly above moderate rating with mean rating  $\bar{x}$ =4.41, SD=±1.287 and a minimum response of 4.

**Table 6.14: Descriptive statistics for innovation management**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
IM1	Our organisation promotes knowledge sharing so that we are quicker in new product development than most of our key competitors.	580	1	4	3.71	1.298	2.401	-2.780
IM2	Our organisation relies on knowledge sharing to be quicker in environmental adaptation.	580	4	6	5.80	1.221	2.496	-2.618
IM3	Our organisation is quicker in improving processes than most of our key competitors because of the value we place in knowledge sharing.	580	1	4	3.78	1.295	2.400	-2.941
IM4	Our organisation is quicker in problem-solving than most of our key competitors because employees are encouraged to share knowledge.	580	4	5	4.41	1.287	-2.423	-2.725
Overall scores		580	2.5	4.75	4.42	1.280	2.430	-2.766

Scale: 1=Strongly disagree, 2=Partially disagree, 3= Disagree, 4=Neutral 5=Partially agree, 6=Agree, 7=Strongly agree

**Source: Author’s own compilation**

The results show that the respondents believed that environmental adaptation was the most effective innovation management measurement they were using as shown by a mean rating of  $\bar{x}$ =5.80, SD=±1.221. The second most important measure was speed in solving problems ( $\bar{x}$ =4.41, SD=±1.287). However, the respondents did not agree that new product development ( $\bar{x}$  =3.71, SD=±1.298) and process improvement ( $\bar{x}$ =3.78, SD=±1.295) were part of innovation management measurements that motivated them to share knowledge. The results suggest that the respondents moderately agreed (i.e.  $\bar{x}$ =4.42, SD=1.280) that innovation management was a key people-centred KMS that influences knowledge sharing within SMEs. This outcome implies that the SMEs perceived innovation management as less important, which is contrary to SME literature (Chatzoglou & Chatzoudes, 2016:320; Hyder & Lussier, 2016:80; Oberg & Alexander, 2018:2) and argues that the strength of SMEs lies in innovation management when

compared to large organisations. This conclusion could have been influenced by the way the scale was designed in which there was a bias towards viewing innovation management with regards to the available definitions that are based only on processes, products and services. Yet it emerged that these measurements are of less value in the performance of uncertain supply chains where innovation tends to be defined from a business environment perspective as explained below.

The respondents highly valued environmental adaptation as an important innovation management measurement consecutively ahead of speed in problem solving, new product development and process improvement. However, extant innovation management literature (Laforet, 2009:189; Crema, Verbano & Venturini, 2014:22; Mandal & Korasiga, 2017:42; Scuotto, Del Giudice, Bresciani & Meissner, 2017:640) contradicts and views new product development and process management as primary measurements of innovation management. In fact, innovation management has been defined based on changes in the process, products and services (Mandal & Korasiga, 2016:32; Likar & Fatur, 2013:49; Goh, 2005:6) and has less or limited inclination to an environmental adaptation perspective. Nevertheless, the value placed on environmental adaptation may still support the results in Section 6.4.4.1 that a culture of trust had been downplayed due to the supply chain uncertainty in the business environment. Thus, organisations could have been concerned about adapting to the risks and crises in the environment more than product development and process management.

The results on placing importance on the business environment in the performance of uncertain supply chains, are supported by Wang (2017:690). In his (Wang, 2017:690) study on Australian SMEs he found that most of the organisations relied heavily on the risk management theory and crisis management theory as innovation management strategies to discourse the uncertainty in the supply chain. This view suggests that when studying performance in uncertain supply chains, innovation management is re-defined, and it places emphasis on the business environment more than the products and services. Therefore, SMEs intending to improve performance in uncertain supply chains should implement knowledge sharing strategies that provide knowledge on environmental risk and crisis management so that they are able to adapt and quickly solve problems.

### 6.4.4.3 Descriptive statistics for communities of practice

The results of the descriptive statistics (i.e. the mean ratings, standard deviation, skewness and kurtosis) of the three-item scale used to measure CoPs are presented in Table 6.15.

**Table 6.15: Descriptive statistics for communities of practice**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
CoP1	I participate in the group to get specialist support from members.	580	5	7	6.72	1.201	-2.324	-1.974
CoP2	Management speaks positively to others about participation and involvement in groups.	580	4	7	6.00	1.252	-2.464	-2.738
CoP3	I often share knowledge with others through face-to-face meetings in groups.	580	5	7	6.58	1.584	-2.449	-2.855
Overall scores		580	4.67	7	6.43	1.35	-2.413	-2.53

Scale: 1=Strongly disagree, 2=Partially disagree, 3= Disagree, 4=Neutral 5=Partially agree, 6=Agree, 7=Strongly agree

**Source: Author's own compilation**

Table 6.15 provides detailed results about the respondents' perceptions on the CoPs measurement scale. The results show that the skewness (z-score) for Item 1, Item 2 and Item 3 were -2.324, -2.464 and -2.449. The kurtosis (z-score) values for the three items in the scale were -1.974, -2.738, and -2.855, which were all within the 1.96 to 3.28 range. The standard deviation, skewness and kurtosis value confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("I participate in the group to get specialist support from members") had a mean rating of  $\bar{x}=6.72$ ,  $SD=\pm 1.201$  and a minimum response of 5. Item 2 ("Management speaks positively to others about participation and involvement in groups") had a mean rating of  $\bar{x}=6.00$ ,  $SD=\pm 1.252$  and a minimum response of 4; Item 3 ("I often share knowledge with others through face-to-face meetings in groups") had a mean rating of  $\bar{x}=6.58$ ,  $SD=\pm 1.584$  and a minimum response of 5.

The results show that the respondents placed high value on all items in the scale (average mean rating  $\bar{x}=6.43$ ,  $SD=\pm 1.350$ ) implying that CoPs are highly valued people-centred KMSs that influence knowledge sharing within SMEs. The outcome on Item 2 ( $\bar{x}=6.00$ ,  $SD=\pm 1.252$ ) is

consistent with the results on organisational culture, which revealed that employee praises (positive affect) by management improves knowledge sharing amongst employees.

The results (i.e. average mean rating  $\bar{x}=6.43$ ,  $SD=\pm 1.350$ ) demonstrate that the SMEs agreed that CoPs were an important people-centred knowledge management system. The results also suggest that the SMEs had successfully adopted CoPs as key to the promotion of knowledge sharing in their organisations. This result not only supports but extends existing CoP studies in that previous CoP literature has presented the positive (Zboralski, 2009:91; Connell, Kriz & Thorpe, 2014:147) and negative (Dunford, 2000:296; Lee, Suh & Lee, 2014:392) effects of CoPs in influencing knowledge sharing within organisations. Thus, extant literature advocates a moderate effect of CoPs in influencing knowledge sharing within organisations, which is contrary to the current results.

Other scholars have focused on methods of knowledge sharing used by CoP members (Saint-Onge & Wallace, 2003:44; Litvaj & Stancekova, 2015:835; Rahmi & Indarti, 2019:308). Other studies have concentrated on factors that enhance knowledge sharing within CoPs. For instance, Wu and Lee (2017:484) discuss CoPs in the form of teams and groups (Nugroho, 2018:1142; Kim, 2020:207) and conclude that knowledge sharing is enhanced if group leaders are empowered. The current results, however, go beyond just identifying CoPs as important in influencing knowledge sharing or how they can be enhanced, and present CoPs as the most outstanding KMS for adoption within SMEs. Thus, endorsing CoPs as the most appropriate people-centred KMS for adoption in SMEs to enhance knowledge sharing. Important to note is that the aforementioned outcome could have been influenced by the prevailing uncertainty in the supply chain, which further suggests that technology loses importance in uncertain supply chains' performance.

#### **6.4.4.4 Descriptive statistics for social capital**

The results of the descriptive statistics (i.e. the mean ratings, standard deviation, skewness and kurtosis) of the three-item scale used for measuring social capital are presented in Table 6.16.

**Table 6.16: Descriptive statistics for social capital**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
SC1	I can rely on my colleagues when I need support in anything concerning my work.	580	5	6	6.63	1.181	-2.479	-2.867
SC2	I tell someone what I know, and I can count on it that they will also tell me what they know.	580	4	7	5.88	1.013	-2.623	-2.043
SC3	I view this organisation as a group to which I belong.	580	4	7	5.84	1.105	-2.149	2.082
<b>Overall scores</b>		580	4.7	6.67	6.12	1.100	-2.417	-2.331
Scale: 1=Never, 2=Partially, 3= Less often, 4=Neutral 5=Less frequent, 6= Frequently, 7=Always								

**Source: Author's own compilation**

Table 6.16 provides detailed results about the respondents' perceptions on the social capital measurement scale. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -2.479, -2.623 and -2.149. The kurtosis (z-score) values for the three items in the scale were -2.867, -2.043 and 2.082, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("I can rely on my colleagues when I need support in anything concerning my work") had the highest rating with a mean rating of  $\bar{x}$  =6.63, SD=±1.181 and a minimum response of 5. Item 2 ("I tell someone what I know, and I can count on it that they will also tell me what they know") had a mean rating of  $\bar{x}$ =5.88, SD=±1.013 and a minimum response of 4; Item 3 ("I view this organisation as a group to which I belong") had a mean rating of  $\bar{x}$ =5.84, ±1.105 and a minimum response of 4.

The results show that the respondents viewed Item 1 as the most important measure of social capital since it had the highest rating ( $\bar{x}$ =6.63, SD=±1.181). The result implies that the SME employees placed value in group (CoP) members thus confirming the importance of CoPs outlined in the previous subsection. Overall, the respondents perceived social capital as a valid people-centred KMS as shown by an average mean rating of  $\bar{x}$  =6.12, SD=±1.100. The

responses for Item 2 ( $\bar{x}$  =5.88, SD=±1.013) and Item 3 ( $\bar{x}$  =5.84, ±1.105) further confirm that the key social capital measurement item was the collaborative environment (i.e. CoPs), a view supported by Dijk, Hendriks and Romo-Leroux (2015:329). The results confirm that the SMEs social capital was mostly emanating from CoPs as compared to organisational culture and innovation management. This premise is supported by Wu and Lee (2016:525), who concluded that social capital had an influence on knowledge sharing within groups and was also crucial in establishing trust amongst the group members. However, the fact that social capital was being realised but trust was low, suggests that positive affect can equally be used in establishing group member collaboration. As such, social capital can be argued to influence knowledge sharing and can also be vital in creating positive affect amongst the community members.

#### 6.4.4.5 Descriptive statistics for knowledge sharing

The results of the descriptive statistics of all the three items used to measure knowledge sharing and its influence on SCP are presented in Table 6.17.

**Table 6.17: Descriptive statistics for knowledge sharing**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
KS1	My firm has exchanged many ideas with the partners about how to improve each other's capabilities in manufacturing, research, Logistics, services, etc.	580	1	6	2.50	0.645	-1.971	2.976
KS2	The supply chain knowledge provided through knowledge sharing is up-to-date.	580	5	6	6.38	0.507	2.058	2.590
KS3	Knowledge sharing processes provide contextual supply chain knowledge so that we can truly understand how	580	4	6	5.39	0.488	2.461	-2.794

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
	to accurately carry out forecasts.							
Overall scores		580	3.3	6	4.76	0.550	2.163	2.79
Scale: 1=Never, 2=Partially, 3= Less often, 4=Neutral 5=Less frequent, 6=Frequently, 7=Always								

**Source: Author's own compilation**

Table 6.17 provides detailed results about the respondents' perceptions on the effect of the knowledge sharing measurement scale. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -1.971, -2.058 and -2.46. The kurtosis values for the three items in the scale were 2.976, 2.590 and -2.794, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis (z-score) value confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("My firm has exchanged many ideas with the partners about how to improve each other's capabilities in manufacturing, research, logistics, services etc") had the lowest rating with a mean rating of  $\bar{x} = 2.50$ ,  $SD = \pm 0.645$  and a minimum response of 1. Item 2 ("The supply chain knowledge provided through knowledge sharing is up-to-date") had a mean rating of  $\bar{x} = 6.38$ ,  $SD = \pm 0.507$  and a minimum response of 5. Item 3 ("Knowledge sharing processes provide contextual supply chain knowledge so that we can truly understand how to accurately carry out forecasts") had a mean rating of  $\bar{x} = 5.39$ ,  $SD = \pm 0.488$  and a minimum response of 4.

The results show that the respondents agreed that knowledge sharing was a mediating factor between people-centred KMSs and SCP, as supported by an average mean rating of  $\bar{x} = 4.76$ ,  $SD = \pm 0.550$ . The respondents also held that knowledge sharing was the contributing factor to the availability of up to date supply chain knowledge, which in turn helped them to accurately forecast as confirmed by a mean rating of  $\bar{x} = 6.38$ ,  $SD = \pm 0.507$ , and a minimum response of 5. However, the respondents confirmed that they were never (minimum =1) or partially exchanging information ( $\bar{x} = 2.50$ ,  $SD = \pm 0.645$ ) relating to manufacturing, research and logistics implying that these elements played an insignificant role and were rarely shared. This outcome



might explain the poor performance observed in the manufacturing sector as outlined in Chapter One.

The above results that indicate that knowledge sharing provides SCK within SMEs are also supported in extant knowledge sharing and SCP literature. For instance, Awgheda, Rahman, Ramli and Arshad (2016:313), in their study on Malaysian and Ugandan SMEs, concluded that the major barrier to successful supply chain in small organisations was lack of SCK. The study recommended the adoption of knowledge management and knowledge sharing in particular as a solution to the problem, thus proving that knowledge sharing can enhance the availability of SCK (Desai & Rai, 2016:1024). The outcome suggests that SMEs can improve SCK access by implementing knowledge sharing.

#### 6.4.4.6 Descriptive statistics for cost-related supply chain performance

The results of the descriptive statistics of all the three items used to measure CRP are presented in Table 6.18.

**Table 6.18: Descriptive statistics for cost-related performance**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
CRP1	Supply chain productivity (e.g. ratio of production to asset/staff)	580	1	2	1.62	1.130	-2.413	-2.063
CRP2	Supply chain efficiency (e.g. ratio of output to input)	580	1	4	4.32	1.138	-2.495	-2.894
CRP3	Profit margin (e.g. return on investment)	580	1	3	2.52	1.131	2.448	2.926
Overall scores		580	1	3	2.82	1.133	-2.452	-2.630
Scale: 1=Significantly worse; 2= Worse; 3= Neutral; 4= Better; 5=Significantly better								

**Source: Author's own compilation**

Table 6.18 provides detailed results about the respondents' perceptions on the scale used to measure CRP. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -2.413, -2.495 and 2.448. The kurtosis (z-score) values for the three items in the scale were -2.063, -2.894 and 2.926, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In regard to the respondent perceptions, Item 1 ("Supply chain productivity (e.g. ratio of production to asset/staff)") had a mean rating of  $\bar{x}=1.62$ ,  $SD=\pm 1.130$  and a minimum response of 1. Item 2 ("Supply chain efficiency (e.g. ratio of output to input)") had a mean rating of  $\bar{x}=4.32$ ,  $SD=\pm 1.138$  and a minimum response of 1. Item 3 ("Profit margin (e.g. return on investment)") had a mean rating of  $\bar{x}=2.52$ ,  $SD=\pm 1.131$  and a minimum response of 1.

The results show that the respondents' views were neutral in terms of cost-related SCK implying that they did not place any importance on cost as seen from an average mean rating of  $\bar{x}=2.82$ ,  $SD=\pm 1.133$  and minimum rating of 1. Item 1 and Item 3 had very low mean ratings ( $\bar{x}=1.62$ ,  $SD=\pm 1.130$ ;  $\bar{x}=2.52$ ,  $SD=\pm 1.131$ ) suggesting that productivity, return on investment and profit were lowly considered by the respondents. However, the respondents were neutral about the efficiency of the supply chain, implying that the SMEs, though not concerned much about cost, viewed supply chain efficiency (i.e. ratio of output to input) as an important measure of cost within the supply chain. The overall result is not consistent with SCP literature since it considers cost as a less important factor contrary to previous SCP literature (Dyer & Nobeoka, 2000:346; Ramish & Aslam, 2016:716; Li *et al.*, 2017:1334). However, the revealed importance of supply chain efficiency is supported by Miri-Lavassani and Movahedi (2018:683), who argue that supply chain efficiency is an important measure of cost in supply chain planning, sourcing and delivering processes. Thus, efficiency in the supply chain can be argued to supersede profit and productivity particularly for the performance of SMEs operating within uncertain supply chains.

#### **6.4.4.7 Descriptive statistics for time-related performance**

The results of the descriptive statistics of all three items used to measure TRP are presented in Table 6.19.

**Table 6.19: Descriptive statistics for time-related performance**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
TRP1	Manufacturing or service processing lead time (i.e. time taken to make a product)	580	1	4	3.98	1.131	-2.803	-2.734
TRP2	Delivery lead time (i.e. time taken to make a delivery)	580	4	5	5.15	1.229	-2.146	-2.273
TRP3	Cash to cash cycle (i.e. time taken to convert cash to cash)	580	4	5	6.35	0.910	2.043	2.246
Overall scores		580	3	4.7	5.16	1.090	-2.330	-2.417
Scale: Scale: 1=Significantly worse; 2= Worse; 3= Neutral; 4= Better; 5=Significantly better								

**Source: Author’s own compilation**

Table 6.19 provides detailed results about the respondents’ perceptions on the measurement scale for TRP. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -2.803, -2.146 and 2.043, and standard deviation (SD) of  $\pm 1.131$ ,  $\pm 1.229$  and  $\pm 0.910$  respectively. The kurtosis (z-score) values for the three items in the scale were -2.734, -2.273 and 2.246, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 (“Manufacturing or service processing lead time (i.e. time taken to make a product)”) had a mean rating of  $\bar{x} = 3.98$ ,  $SD = \pm 1.131$  and a minimum response of 1. Item 2 (“Delivery lead time (i.e. time taken to make a delivery)”) had a mean rating of  $\bar{x} = 5.15$ ,  $SD = \pm 1.229$  and a minimum response of 4. Item 3 (“Cash to cash cycle (i.e. time taken to convert cash to cash)”) had a mean rating of  $\bar{x} = 6.35$ ,  $SD = \pm 0.910$  and a minimum response of 4.

The results show that the respondents placed high value on both Item 2 and 3 since they had the highest rating ( $\bar{x} = 5.15$ ,  $SD = \pm 1.229$ ;  $\bar{x} = 6.35$ ,  $SD = \pm 0.910$ ), respectively, implying that delivery lead time and cash to cash cycle are important measures of time within the supply

chain delivery process. The results concur with the SME study by Song *et al.* (2018:6), which highlighted that the sharing of SCK improves the time taken to attain end to end delivery of products. Item 1 had the lowest mean rating ( $\bar{x} = 3.00$ ,  $SD = \pm 1.131$ ) and also a very low minimum rating of 1, suggesting that manufacturing as well as the making process were not viewed as important measures of TRP. The results, however, contradict existing studies (Kuo, Kuo, & Ho, 2014:697; Wulf & Butel, 2017:1410; Keszey, 2018:1061) though these studies did not adopt a process-based approach. Thus, the results may suggest that manufacturing tends to lose its time measurement importance when the process-based approach is adapted to measure performance in uncertain supply chains.

#### 6.4.4.8 Descriptive statistics for responsiveness-related performance

The results of the descriptive statistics of all the three items used to measure RRP are presented in Table 6.20. The table provides detailed results about the respondents' perceptions on the measurement scale for RRP. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -2.251, -2.678 and 2.082. The kurtosis (z-score) values for the three items in the scale were 2.886, 2.708 and 2.408, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis values confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("Flexibility: ability to handle small disruptions") had a mean rating of  $\bar{x} = 6.45$ ,  $SD = \pm 0.755$  and a minimum response of 5. Item 2 ("Resilience: Ability to handle large disruptions") had a mean rating of  $\bar{x} = 6.55$ ,  $SD = \pm 0.707$  and a minimum response of 5. Item 3 ("Agility: ability to recover from short-term changes") had a mean rating of  $\bar{x} = 6.85$ ,  $SD = \pm 0.864$  and a minimum response of 5.

**Table 6.20: Descriptive statistics for responsiveness-related performance**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
RRP1	Flexibility: ability to handle small disruptions	580	5	7	6.45	0.755	-2.251	2.886
RRP2	Resilience: ability to handle large disruptions	580	5	7	6.55	0.707	-2.678	2.708
RRP3	Agility: ability to recover from short-term changes	580	5	7	6.85	0.864	2.082	2.408

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
Overall scores		580	5	7	6.67	0.775	-2.337	2.667
Scale: Scale: 1=Significantly worse; 2= Worse; 3= Neutral; 4= Better; 5=Significantly better								

**Source: Author's own compilation**

The results show that the respondents placed value on all the measurements elements for responsiveness (i.e. flexibility  $\bar{x}$  =6.45, SD=±0.755, resilience  $\bar{x}$  =6.55, SD=±0.707 and agility  $\bar{x}$  =6.85, SD=±0.864). The results are supported by Luo and Yu (2015:863), who noted that flexibility and agility are important measures of responsiveness in determining the performance of uncertain supply chains. Shee, Miah, Fairfield and Pujawan (2017:501) also noted that the best measures of SCP are responsiveness, flexibility, reliability and efficiency although they did not relate to uncertain supply chains. The outcome as supported by literature, thus suggests that responsiveness is a key measurement factor of performance in uncertain supply chains.

#### **6.4.4.9 Descriptive statistics for operation quality-related performance**

The results of the descriptive statistics of all the three items used to measure OQRP are presented in Table 6.21. Table 6.21 provides detailed results about the respondents' perceptions on the measurement scale for OQRP. The results show that the skewness (z-score) values for Item 1, Item 2 and Item 3 were -2.721, 2.740 and 2.236. The kurtosis (z-score) values for the three items in the scale were 2.015, 2.413 and 2.912, which were all within the 1.96 to 3.29 range. The standard deviation, skewness and kurtosis value confirm that the data were normally distributed. In terms of the respondent perceptions, Item 1 ("Perceived quality of products or services (by customers)") had a mean rating of  $\bar{x}$  =2.50, SD=±0.640 and a minimum response of 1. Item 2 ("Knowledge accuracy (by your organisation and its suppliers)") had a mean rating of  $\bar{x}$ =2.38, SD=±0.500 and a minimum response of 1. Item 3 ("Current or real-time knowledge") had a mean rating of  $\bar{x}$ =2.09, SD=±0.588 and a minimum response of 1.

**Table 6.21: Descriptive statistics for operation quality-related performance**

Item	Description	N	Minimum	Maximum	Mean rating	Standard deviation	Skewness (z-score)	Kurtosis (z-score)
OQRP1	Perceived quality of products or services (by customers)	580	1	3	2.50	0.640	-2.721	2.015
OQRP2	Knowledge accuracy (by your organisation and its suppliers)	580	1	3	2.38	0.500	2.740	-2.413
OQRP3	Current or real-time knowledge	580	1	3	2.09	0.588	2.236	2.912
Overall scores		580	1	3	2.32	0.576	2.566	2.447
Scale: Scale: 1=Significantly worse; 2= Worse; 3= Neutral; 4= Better; 5=Significantly better								

**Source: Author’s own compilation**

The results show that the respondents did not value operation quality as an important performance measurement for supply chain as confirmed by an average mean rating of  $\bar{x}=2.32$ ,  $SD=\pm 0.576$  and a minimum rating of 1. The results is contrary to Banchuen, Sadler and Shee (2017:115) who argued that the more the suppliers and customers are involved, coupled with operational coordination to joint collaboration, the greater the positive effect would be on SCP across cost, quality, delivery and flexibility dimensions. The study by Simangunsong, Hendry and Stevenson (2014:1276), on the Indonesian manufacturing industry also contradicts the results since they concluded that operational quality was a key performance measure in uncertain supply chains. Thus, the current results are supportive of the low manufacturing activities and show that operational quality only matters where manufacturing is taking place.

**6.4.5 Inferential statistics**

The kurtosis, skewness, and standard deviation values in the preceding sections showed that the sample data were normally distributed, which then facilitated the carrying out of further

inferential statistics. Leech *et al.* (2005:4) argue that inferential statistics can be categorised into two main categories. Firstly, associational inferential statistics that test the strength of associations on variables using methods such as correlation and regression, among others. Secondly, difference inferential statistics that test the significance of the proposed model. According to Soiferman (2010:5), inferential statistics infer the properties of a population by testing some proposed hypothesis and deriving estimates that lead to assumptions that generalise a population from a selected sample. This section explains the model fitness which was tested using structural equation modeling (SEM) to check if the conceptual model fitted well with the collected sample data.

#### **6.4.5.1 Model fitness and hypothesis testing results**

This section uses the sample dataset to validate the theoretically driven conceptual framework using structural equation modelling (SEM) and multiple linear regressions. SEM was deemed most suitable for testing the model since the model includes latent variables such as organisational culture, innovation management, CoPs, knowledge sharing and SCP related variables. SEM is composed of two techniques, namely, the measurement model (i.e. usually the confirmatory factor analysis) and the structural model (i.e. path analysis techniques) as highlighted by Pearl and Mckenzie (2018:6). Thus, the section begins with a confirmatory factor analysis (CFA), which was then followed by a path analysis. Path coefficients were tested with emphasis on direction, strength and significance of the relationships and the model as a whole was assessed using fit indices. SEM has its own limitations in producing credible predictability of a model (Fan, Thompson & Wang, 1999:57; Schreiber, Stage & King, 2006:323; Kenny, Kaniskan & McCoach, 2015:458). Thus, multiple regression analysis was conducted using SPSS 25.0 to check the causality of the model constructs to address this limitation, which was supposed to have affected study results as outlined below.

##### **6.4.5.1.1 Results of the confirmatory factor analysis (CFA)**

Confirmatory factor analysis (CFA) is the second method for conducting a factor analysis after the exploratory factor analysis (EFA), which was outlined earlier. Since CFA is a theory-based technique, a conceptual model was presented in Figure 4.17 of Chapter Four based on existing theory as reviewed from extant literature and confirmed by the EFA results mentioned

previously. The model was used to estimate the population covariance matrix, which was then compared with the observed covariance matrix using AMOS 25.0 software.

In essence, CFA is aimed at establishing the proposed relationship between study factors (i.e. manifest variables) and their measurement constructs (i.e. latent variables) through testing of the proposed hypothesis (Pearl & Mckenzie, 2018:6; Schreiber, Stage & King, 2006:323; Kline, 2005:188). In that dimension, CFA is viewed as being more complex than EFA. There are common software packages that have been used for conducting CFA such as AMOS and LISREL. The results discussed here were obtained in AMOS 25.0, which enabled the testing of the psychometric properties of the adapted measurement scales. Generally, indices including CFI, TLI and IFI must have a value greater than 0.9 while RMSEA must be smaller than .05 for any SEM results to establish the model as reasonably fit (Hooper, Coughlan & Mullen, 2008:54; Garson, 2015:96).

The SEM approach was used to conduct a CFA on the model. The CFA followed some steps in which latent constructs for people-centred KMSs, knowledge sharing, and SCP derived from literature as outlined in Figure 3.16 and Figure 4.16 were tested separately for fitness before testing the final covariance structural model. The results for the properties and fitness of the predictor variables, mediating variables and outcome variables measurement models are presented in Table 6.22.

**Table 6.22: Parameter estimates and regression weights for the measurement models**

Indicators	Std regression weights	Unstd regression weights	Std error	Critical ratio	<i>p</i>
OC1	.890	1.000			
OC2	.987	1.211	.026	47.174	***
OC3	.540	.678	.046	14.676	***
OC4	.725	1.000			
IM1	.800	1.000			
IM2	.678	.813	.040	20.272	***
IM3	.615	.639	.037	17.459	***
IM4	.957	1.000			
COP1	.890	1.000			
COP2	.941	.944	.020	47.012	***
COP3	.904	1.000			
SC1	.892	1.000			



Indicators	Std regression weights	Unstd regression weights	Std error	Critical ratio	<i>p</i>
SC2	.904	.907	.025	36.550	***
SC3	.877	1.000			
Model fitness for the people-centred KMS measurement model					
	X <sup>2</sup> /df	CFI	TLI	RMSEA	
	1.791	.990	.984	.042	
KS1	.707	1.000			
KS2	.283	.464	.075	6.193	***
KS3	.661	.943	.064	14.822	***
KS4	-.688	-.832	-.063	-13.305	.519
Model fitness for the knowledge sharing measurement model					
	X <sup>2</sup> /df	CFI	TLI	RMSEA	
Before revising	5.304	.944	.928	.098	
After revising	2.043	.991	.985	.48	
CRSCP1	.756	1.000			
CRSCP2	-.436	-.652	-.065	-10.019	.533
CRSCP3	.866	1.000			
TRSCP1	.910	1.000			
TRSCP2	.640	.862	.045	19.237	***
TRSCP3	.814	1.000			
RRSCP1	.758	1.000			
RRSCP2	.880	1.034	.042	24.908	***
RRSCP3	.709	1.000			
OQRSCP1	.753	1.000			
OQRSCP2	.341	.380	.054	7.012	***
OQRSCP3	-.028	-0.39	.047	-0.28	.398
Model fitness for the process-based approach supply chain performance measurement model					
	X <sup>2</sup> /df	CFI	TLI	RMSEA	
Before revising	6.071	.894	.880	.106	
After revising	2.063	.985	.976	.049	

Source: Extracted from AMOS 25.0

The results in Table 6.22 show that the regression parameter estimates of the people-centred KMS model depicted that all of the items were statistically significant at the significance level of  $p=0.00$ . Additionally, all the factor loadings exceeded the predetermined criteria of 0.30,

thus all the items were kept for the measurement model. The results also indicate that all of the model fit indices met the minimum thresholds for a good model fit and the measurement model for the latent construct was therefore validated and was considered ready for the covariance structure model.

The results in Table 6.22 also show that the regression parameter estimates of the knowledge sharing and SCP measurement models depicted that some of the items were not statistically significant at first. Based on the EFA results, one item (KS4) was removed and after revision, statistical significance at  $p=0.01$  was achieved. Additionally, all the factor loadings exceeded the predetermined criteria of 0.30, thus the remaining items were kept for the measurement model. The results also indicate that after revision the model fit indices improved and met the predetermined thresholds for a good model fit. The measurement model was thus validated and was considered ready for the covariance structure model.

Similarly, revisions were made on the CRP and OQRP scales resulting in the removal of items CRP2 and OQRP3. After the revisions, all the factor loadings exceeded the predetermined criteria of 0.30, thus all the remaining items were kept for the measurement model. The model fit indices also improved and met the minimum thresholds for a good model fit and the measurement model for the latent construct was thus validated and considered ready for the covariance structure model.

#### **6.4.5.1.2 Validity and reliability testing of scales**

This subsection summarises the validity and reliability tests that the measurement scales were subjected to before the covariance structure model analysis. Over and above the previously discussed measures of reliability, the section also directs emphasis on measures of validity. The highest shared variance is the variance that is derived from the square of a variable's highest correlation with other variables. Normally highest shared variance should be lower than the average variance extracted. It is used to test the validity of the CFA model. This section presents the results of the calculation of the highest shared variance. The results of the analysis are represented in Table 6.23.

**Table 6.23: Computation of the highest shared variance**

<b>Research constructs</b>	<b>Highest correlation with other variables</b>	<b>Highest shared variance</b>
Organisational culture	0.619	0.38
Innovation management	0.630	0.40
Communities of practice (CoPs)	0.694	0.48
Social capital	0.604	0.36
Knowledge sharing	0.695	0.48
Time related performance (TRP)	0.518	0.27
Cost related performance (CRP)	0.610	0.37
Responsiveness related performance (RRP)	0.693	0.48
Operation quality related performance (OQRP)	0.687	0.47

**Source: Author's computation**

As indicated in Table 6.23, the assessment of the highest shared variance of each construct was calculated by squaring its highest correlation value with other constructs. The results demonstrate that CoPs, knowledge sharing and RRP had the highest shared variance with a common score of 0.48, followed by OQRP which had a shared variance of 0.47, followed by innovation management, which had a shared variance of 0.40, followed by organisational culture with a shared variance of 0.38, followed by CRP, which had a shared variance of 0.37, followed by social capital with a shared variance of 0.36, and the lowest shared variance was on TRP which had a value of 0.27.

Table 6.24 shows the summarised measurement scale reliability and validity. The table also shows the factor loadings, AVE, critical ration, average mean, average standard deviation and item correlation for each of the scale items and study constructs.

**Table 6.24: Summary of measurement scale reliability and validity**

Research constructs		Descriptive statistics		Cronbach's alpha		Factor loading	CR	AVE
		Average mean	Average SD	Item-total correlations	Alpha value			
Organisational culture	OC1	6.45	1.00	0.510	0.954	.890	0.97	0.89
	OC2			0.533		.987		
	OC3			0.515		.540		
	OC4			0.619		.725		
Innovation management	IM1	4.43	1.10	0.630	0.900	.678	0.97	0.91
	IM2			0.622		.615		
	IM3			0.598		.957		
	IM4			0.600		.890		
CoP	CoP1	6.18	1.10	0.694	0.883	.904	0.99	0.98
	CoP2			0.688		.892		
	CoP3			0.691		.904		
Social capital	SC1	5.54	0.900	0.538	0.964	.890	0.96	0.90
	SC2			0.604		.987		
	SC3			0.487		.540		
Knowledge sharing	KS1	4.85	0.900	0.666	0.914	.707	0.79	0.58
	KS2			0.694		.283		
	KS3			0.695		.661		
CRP	CRP1	3.30	1.222	0.610	0.890	.756	0.98	0.96
	CRP2			0.597		.866		
	CRP3			0.601		.910		
TRP	TRP1	5.20	1.100	0.499	0.911	.814	0.98	0.94
	TRP2			0.518		.758		
	TRP3			0.511		.880		
Research constructs		Descriptive statistics		Cronbach's alpha		Factor loading	CR	AVE
		Average mean	Average SD	Item-total correlations	Alpha value			
RRP	RRP1	4.53	1.115	0.693	0.933	.753	0.86	0.69
	RRP2			0.599		.341		
	RRP3			0.684		.756		
OQRP	OQRP1	2.33	1.200	0.671	0.953	.910	0.97	0.91
	OQRP2			0.687		.640		
	OQRP3			0.664		.814		

Source: Author's own compilation

The composite reliability (CR) and average variance extracted (AVE) values were computed manually based on the formulae provided by Fornell and Lacker (1981:65). The formulae are given as:

$$CR = \frac{(\sum FL)^2}{[\sum FL^2 + \sum err]} \quad \text{and} \quad AVE = \frac{\sum FL^2}{[\sum FL^2 + \sum err]} \quad \text{and} \quad err = (\sum(1 - FL)^2)$$

Where: **FL**=factor loadings and **err**=error variance.

The summations for all factor loadings and error variances for each scale were computed and the resultant values substituted into the two formulae and the results are shown in Table 6.24. The other values were computed using AMOS 25.0 and SPSS 25.0. Table 6.24 shows that the average variance extracted (AVE) estimates which reflects the overall number of variances in the indicators accounted for by the latent construct were all greater than 0.50. This outcome reveals that the indicators represent the latent construct well, as recommended by Anderson and Gerbing (1988:411), thus providing an acceptable degree of convergent validity. Similarly, all the computed composite reliability values were above the recommended minimum threshold of 0.5, which is suggested by Hulland (1999:195) thereby confirming the adequacy of the internal reliability amongst the research constructs. The highest shared variance values were all less than the AVE values, thus confirming the discriminant validity as suggested by Anderson and Gerbing (1988:412). Discriminant validity was further confirmed using the inter-factor correlation matrix and the results are shown in Table 6.25.

**Table 6.25: Inter-construct correlations**

Research construct	OC	IM	CoPs	SC	KS	TRP	CRP	RRP	OQR P
OC	1.00								
IM	0.643	1.00							
CoPs	0.654	0.689	1.00						
SC	0.633	0.692	0.699	1.00					
KS	0.675	0.675	0.697	0.647	1.00				
TRP	0.478	0.435	0.351	0.464	0.769	1.00			
CRP	0.439	0.416	0.488	0.421	0.743	0.637	1.00		
RRP	0.451	0.396	0.492	0.378	0.654	0.619	0.677	1.00	
OQRP	0.400	0.367	0.314	0.319	0.672	0.630	0.689	0.676	1.00
CoP-Communities of practice; TRP-Time-related performance; CRP-Cost-related performance; RRP-Responsiveness-related performance; OQRP - Operation quality related performance; OC-organisational culture; KS-knowledge sharing; IM-innovation management; SC-Social capital									
***Correlation is significant at the 0.001 level (3-tailed)									

Source: Author's own compilation

Table 6.25 presents the correlation matrix of all the constructs considered in the current study. It is indicated that all the paired individual constructs had positive correlations, which were found to be below the cut-off value of 1 ( $r=0.699$ ;  $p<0.01$  to  $r=0.314$ ;  $p<0.01$ ), which subsequently confirmed the presence of discriminant validity of the scale items, as recommended by Bagozzi and Yi (1988:74). After revising the original measurement models, three items were deleted, one from the knowledge sharing scale and two from the SCP sub-factors scale. Thus, people-centred KMSs were measured using four latent variables, namely, organisational culture, innovation management, CoP and social capital where organisational culture had four factors (OC1-OC4), innovation management had four factors (IM1-IM4) and CoP had three factors (CoP1-CoP3), and social capital had three factors (SC1-SC3). Similarly, knowledge sharing had three factors (KS1-KS3), TRP had three factors (TRP1-TRP3), CRP had two factors (CRP1-CRP2), RRP had three factors (RRP1-RRP3) and OQRP had two factors (OQRP1-OQRP2).

The subsequent covariance structure model was then developed following the confirmation of all the individual measurement models. The model resembles both the network-based approach to SCP indicated by direct relationships from predictor to outcome and the process-based approach to SCP with indirect relationships going through the mediating variable. Using SEM notation, the latent variables are presented using oval shapes, observed variables using rectangular shapes all with the variable names written inside. The error terms are represented using circles. The covariance relationships are represented using a double headed arc while straight line arrows show the relationship between latent and observed constructs and their corresponding error terms. The outcome from the CFA was supposed to confirm the directional relationships on the predictor, mediating and outcome variables as supported by the data. The results of the tests are shown in Figure 6.11.

The results from the CFA tests showed that the standardised estimates and factor correlations for indirect relationships between predictor and outcome had an adequate model fit for the nine-factor model as they all loaded above 0.6. The results therefore illustrate a strong relationship with each factor as suggested by Schreiber, Stage and King (2006: 323) and many other authors (De Paula, Albuquerque, Lage, Bicalho & Silva, 2016:235; Glen, 2016:2; Woods & Edwards, 2011:3; Field, 2005:664). The results also showed that the standardised estimates and factor correlations for all direct relationships from predictor to outcome variable (i.e. marked in red)

had poor loadings. This outcome therefore proved that evidence from the literature that had suggested the existence of a partial mediation effect of the predictor on the outcome variable (i.e. the network-based approach to SCP) was not supported by the data. Therefore, based on the above outcome, the mediating effect of knowledge sharing on people-centred KMSs and SCP was argued to be a full mediation and thus supported the proposed conceptual model in Figure 4.17. The results reveal an insightful outcome which suggests that the network-based approach to SCP may not be supported in knowledge-based supply chains.

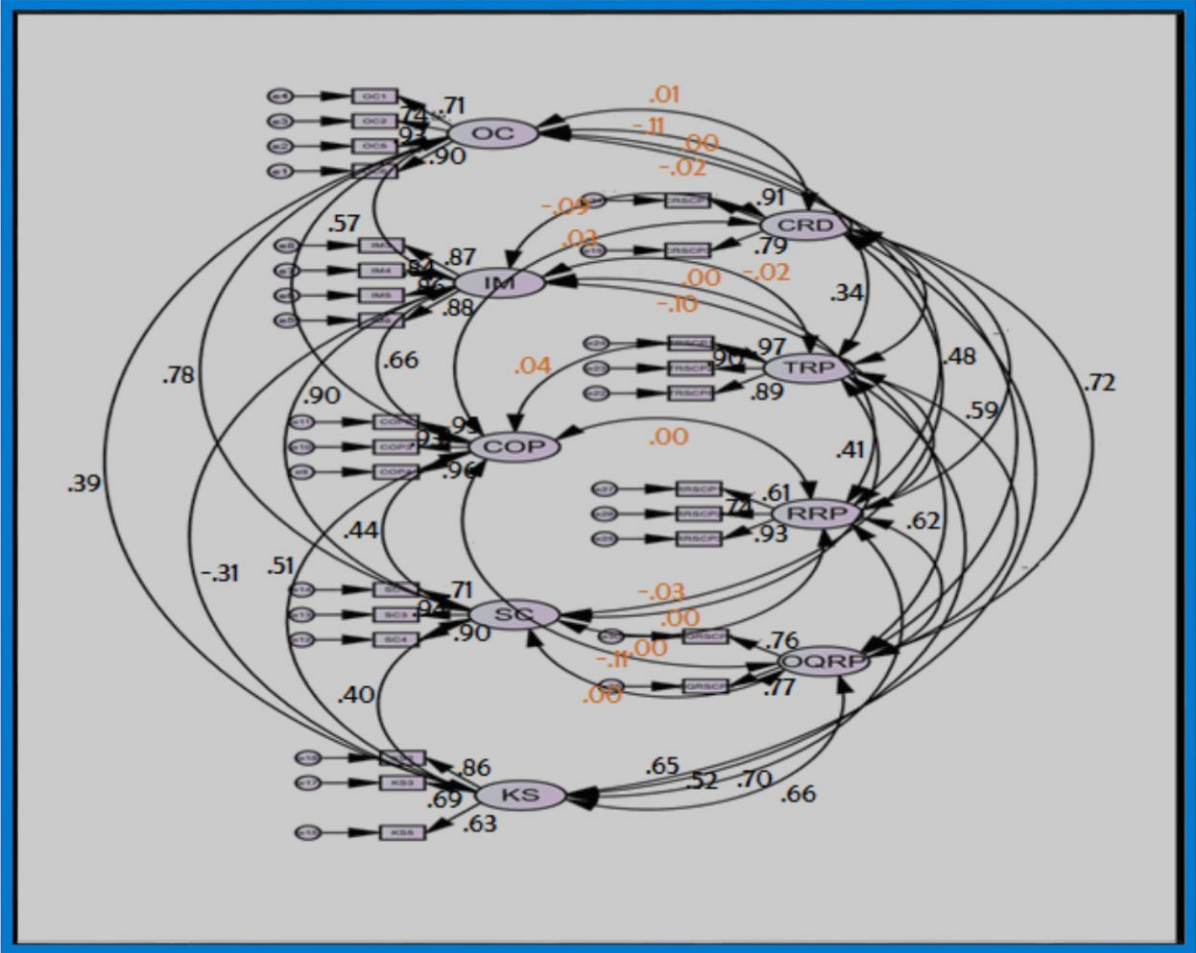
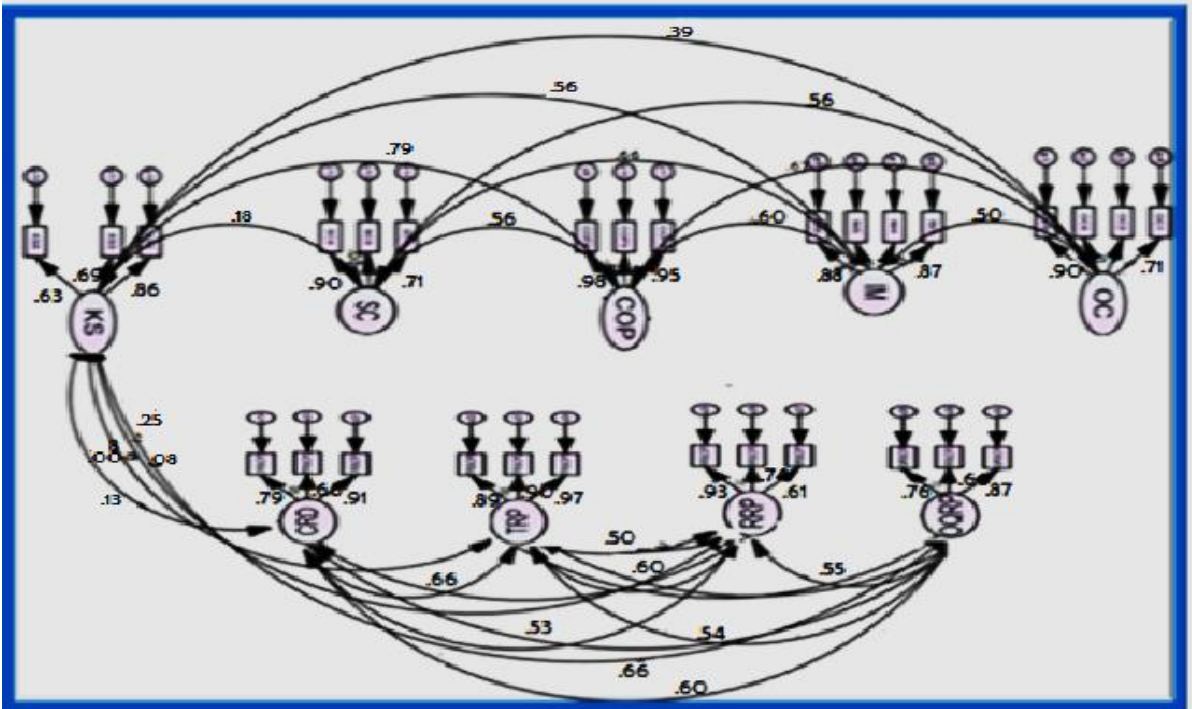


Figure 6.11: Covariance measurement structure model (Before revision)

Source: Extracted from AMOS 25.0

The validity and reliability of the model as revealed from the CFA above suggests that the model was correctly specified (Fan & Sivo, 2005:344) and also theoretically correct, thus meeting the assumptions of SEM. Therefore the model cannot be considered as a mis-specified model to warrant its discarding, as argued by Saris, Satorra, and van der Veld (2009:562) who

noted that either correctly specified or only slightly mis-specified models should be retained and interpreted otherwise the results will be misleading. Conclusively, the Cronbach's alpha, CR, AVE, chi-square, item-total correlations and communalities values outlined in Table 6.1, coupled with those in Table 6.24, indicated that the model met the minimum requirements for validity (i.e. discriminant, convergent, content) and reliability. The model was, however, revised based on model index suggestion supported by literature evidence and direct relationships from predictor to outcome variable were removed due to model fit discrepancies that inflated the chi-square. The final covariance structure model for the model fitness test is given in Figure 6.12.



**Figure 6.12: Final covariance measurement structure model after revision**

Source: Extracted from AMOS 25.0

Figure 6.12 indicates that after the model revision, all paths among variables were statistically significant at the significance level of 0.05, and thus the assessment of the model fitness for the covariance model structure was confirmed.



### 6.4.5.1.3 SEM Model fitness assessment for the covariance model structure

Based on the suggestion in Chapter Five, indices such as GFI and AGFI were not used considering the complexity of the model (Garson, 2015:96). Thus, three indices that have been argued to be less sensitive to complexity were considered namely the RMSEA, TLI, and CFI as well as the Chi-square value using a threshold of 4 and not 3 as suggested by Schermelleh *et al.* (2003:210). However, the other indices were not completely ignored, as such, the results from the model tests showed that GFI, AGFI, NFI, RMR, and IFI were insignificant with values below 0.400 as was expected. The outcome may also confirm the weakness of the indices in testing fitness for complex models (i.e. models that have latent variables) coupled with mixed Likert scales (for instances mixed seven-point and five-point items) as was the case in the current study and concurred with in SEM literature (Hooper, Coughlan & Mullen, 2008:54; Garson, 2015:96).

However, out of the three indices that were considered, RMSEA was significant with a value of 0.04 at a 95 percent confidence interval, TLI and CFI were not significant with values of 0.409 and 0.535, respectively (Browne & Cudeck, 1993:137). The Chi-square over degrees of freedom was significant having a value of 3.09 ( $\chi^2/df=8597.644/297$ ,  $p=001$ ) based on the complexity of the models as stated earlier and supported by Shi, DiStefano, McDaniel and Jiang (2018:453). The SRMR was also significant with a value of 0.05 (Hooper, Coughlan & Mullen, 2008:54). The foregoing results show that only the RMSEA, SRMR and the chi-square indices met the required thresholds. The results indicate that the model was significant against most of the absolute fit indices while all the incremental fit indices were insignificant a result which may require further inquiry concerning the sensitivity of incremental fit indices in complex models.

Results such as the chi-square value of 3.09 that is slightly above the usual 3.0 threshold but below 4.0, insignificant AGFI, GFI, GFI, NFI, RMR, and IFI values may confirm the complexity of the model (Hooper, Coughlan & Mullen, 2008:54; Shi & Maydeu-Olivares, 2018:18). The model complexity might explain the insignificance in some of the absolute indices and all the incremental fit indices since individual measurement models produced significant fitness as outlined earlier. The outcome gets support from SEM literature that posits that the above insignificant fit indices have high sensitivity to either sample sizes, mixed scale rating or model complexity (Kline, 2005:110; Fan & Sivo, 2007:511; Kenny, 2015:12; Shi &

Maydeu-Olivares, 2018:18). The simultaneous presence of all the three aforementioned conditions that are known to increase indices' sensitivity could have exacerbated the low accuracy of other absolute fit indices and all incremental fit indices. The results therefore suggest that when all the three SEM sensitivity conditions exist (i.e. large sample, mixed scale items, complex model), TLI and CFI become sensitive and their accuracy reduces; however, RMSEA, chi-square and SRMR remain stable.

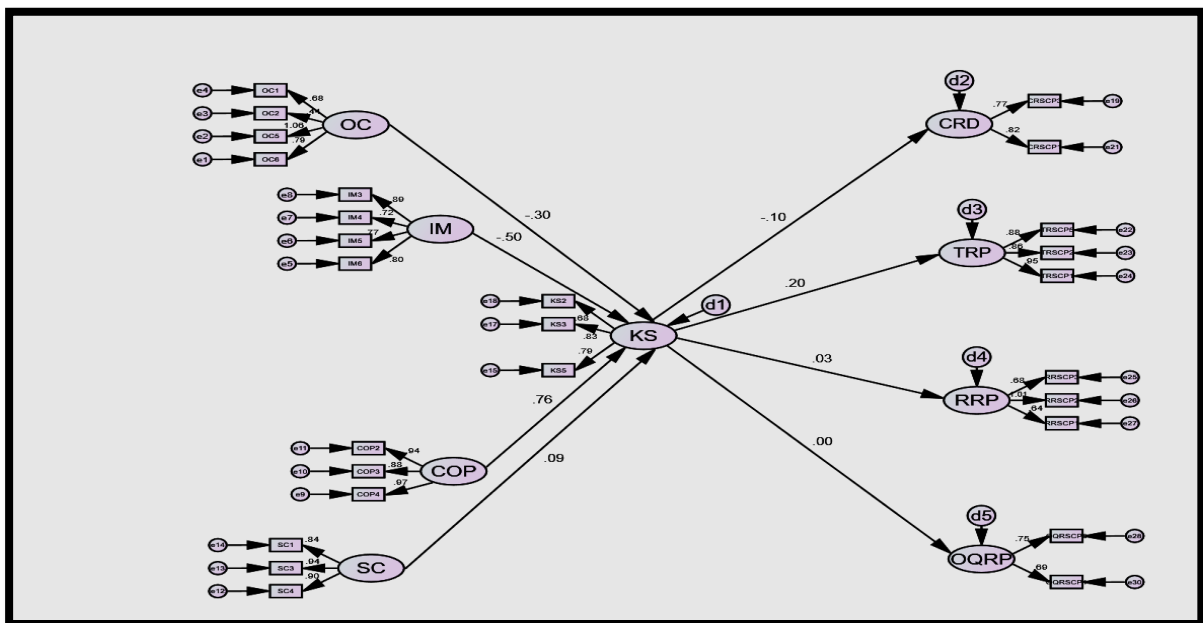
Nonetheless the significant indices could not be used to confidently conclude the fitness of the entire model due to lack of supporting literature evidence. One temptation in such scenarios would be considering the significant indices only and ignoring the insignificant ones, which would not be good research practice. Literature recommends that in order to conclude model fitness in SEM, the two-index presentation strategy by Hu and Bentler (1999:50), may be used as a guide or used as a combination of absolute and incremental indices and not just one category of indices. Therefore, the model was considered to be partially fitting the dataset, since it was supported by one category of fit indices. Based on the partial fitness conclusion (Saris, Satorra & van der Veld, 2009:562), a path analysis was then conducted.

Path analysis is a statistical analysis method used to evaluate models by examining the hypothesised dependencies or relationships between an independent variable and two or more dependant variables (Judea, 2018:6). Path analysis can be conducted using SEM or linear regression. The path coefficients below were determined using AMOS 25.0 and the results are presented in Figure 6.13. The path analysis results in Figure 6.13 show the direct relationships from predictor to mediator variable, first: organisational culture → knowledge sharing, innovation management → knowledge sharing, CoP → knowledge sharing, social capital → knowledge sharing, second: from mediator to outcome variable, i.e. knowledge sharing → CRP, knowledge sharing → RRP, knowledge sharing → TRP, knowledge sharing → OQRP.

There was also the fully mediated relationships first, organisational culture → knowledge sharing → CRP, innovation management → knowledge sharing → CRP, CoP → knowledge sharing → CRP, social capital → knowledge sharing → CRP; second, organisational culture → knowledge sharing → RRP, innovation management → knowledge sharing → RRP, CoP → knowledge sharing → RRP, social capital → knowledge sharing → RRP; third, organisational culture → knowledge sharing → TRP, innovation management → knowledge sharing → TRP, CoP → knowledge sharing → TRP, social capital → knowledge sharing → TRP, lastly,

organisational culture → knowledge sharing → OQRP, innovation management → knowledge sharing → OQRP, CoP → knowledge sharing → OQRP, social capital → knowledge sharing → OQRP.

The direct relationships (i.e. people-centred KMSs → knowledge sharing) results indicated that organisational culture had a weak negative and highly significant relationship with knowledge sharing ( $r=-0.30$ ,  $p=0.00$ ), innovation management had a moderate negative and significant relationship with knowledge sharing ( $r=-0.50$ ,  $p=0.04$ ) and CoPs had a strong positive and highly significant relationship with knowledge sharing ( $r=0.76$ ,  $p=0.00$ ). Social capital had a very weak positive and insignificant relationship with knowledge sharing ( $r=0.09$ ,  $p=0.15$ ). CRP had a weak negative and significant relationship with knowledge sharing ( $r=-0.10$ ,  $p=0.00$ ). TRP had a moderate positive and significant relationship with knowledge sharing ( $r=0.20$ ,  $p=0.00$ ). RRP also had a very weak positive but highly significant relationship with knowledge sharing ( $r=0.03$ ,  $p=0.00$ ). OQRP had no relationship with knowledge sharing and the result was significant ( $r=0.00$ ,  $p=0.00$ ). The weak relationships outcomes may have been caused by the complexity of the model and the partial fitness of the model.



**Figure 6.13: Path analysis results for the covariance structural model using SEM**

Source: Extracted from AMOS 25.0

The mediated relationships were computed by multiplying the two direct relationships; one from predictor to mediating variable and another from mediator to outcome variable and are shown in Table 6.26.

The reviewed literature suggested that when people-centred KMSs (CoP, innovation management, organisational culture, social capital) increase, knowledge sharing also increases (Lee, Suh & Lee, 2014:392; Peralta & Saldanha, 2014:546; Wu & Lee, 2016:525; Mandal & Korasiga, 2017:42). Evidence is also provided in literature that knowledge sharing positively influences CRP by increasing supply chain productivity and efficiency (Miri- Lavassani & Movahedi 2018:689); knowledge sharing positively influences RRP by increasing flexibility, resilience and agility (Li, Tarafdar & Rao, 2012:402); knowledge sharing negatively influences TRP by achieving the intended reduction of processing and delivery lead times as well as the cash-to-cash cycles (Song *et al.*, 2018:6); finally knowledge sharing positively influences OQRP by improving the perceived product quality (Haque & Islam, 2018:306).

**Table 6.26: Results of mediating effect of people-centred knowledge management systems on supply chain performance**

Mediated path	Mediation effect	Level of significance ( <i>p</i> -value)
OC→KS→CRP	0.03	0.000
IM→KS→CRP	0.05	0.000
CoP→KS→CRP	-0.076	0.000
SC→KS→CRP	-0.009	0.000
OC→KS→TRP	-0.06	0.000
IM→KS→TRP	-0.10	0.000
CoP→KS→TRP	0.152	0.000
SC→KS→TRP	0.018	0.000
OC→KS→RRP	-0.009	0.000
IM→KS→RRP	-.015	0.000
CoP→KS→RRP	0.023	0.000
SC→KS→RRP	0.003	0.000
OC→KS→OQRP	0.00	0.123
IM→KS→OQRP	0.00	0.100
CoP→KS→OQRP	0.00	0.110
SC→KS→OQRP	0.00	0.141
OC - organisational culture    IM – innovation management    SC – social capital		

**Source: Author's own compilation**

In view of the foregoing literature evidence, the mediating effect results in Table 6.26 coupled with the path coefficients in Figure 6.13 illustrate that as organisational culture and innovation management were increasing, knowledge sharing was reducing, as shown by the negative path coefficients. The reduction in knowledge sharing resulted in a positive mediation, which meant that CRP was increasing, which was the intended outcome. The results also showed that as CoPs and social capital were increasing, knowledge sharing was also increasing leading to a reduction in CRP, which was not the intended outcome. In relation to TRP, an increase in organisational culture and innovation management led to reduction in knowledge sharing. This resulted in a negative mediation which meant that TRP was reducing which was the intended outcome. The results also showed that as CoPs and social capital were increasing, knowledge sharing was also increasing leading to an increase in TRP, which was not the intended outcome. With reference to RRP, an increase in organisational culture and innovation management led to reduction in knowledge sharing, and led to a negative mediation, which was not the intended outcome. However, as CoP and social capital were leading to increased knowledge sharing, this resulted in a positive mediation, which meant that RRP was increasing, which was the intended outcome. Lastly, no mediating effect was realised with OQRP, suggesting that quality was not being considered as an important factor.

The results unveil new insights that indicate that for the SMEs to survive within turbulent supply chains, they were juggling amongst three key people-centred KMSs, namely, organisational culture, innovation management and CoP, and social capital was completely not considered. The results suggest the importance of these people-centred KMSs (organisational culture, innovation management, CoP) in surviving within uncertain supply chains. The results also reveal that in normal supply chains organisational culture and innovation management can be combined to achieve effective results while CoPs should be implemented independently. The results further suggest that adopting a negative organisational culture and innovation management approach to knowledge sharing leads to improved CRP and TRP while RRP is reduced. On the other hand, a positive CoP approach to knowledge sharing leads to reduced CRP and TRP and improved RRP. These results are new and contrary to extant literature since literature advances that increase in people-centred KMSs (organisational culture, innovation management, CoP, social capital) leads to increased knowledge sharing, which leads to increased SCP (CRP, TRP, RRP, OQRP). In fact, the outcomes seem to prove that the SMEs

that were still surviving were utilising organisational culture and innovation management to manage CRP and TRP while CoPs were being utilised to manage RRP activities.

The results in Table 6.26 also show that knowledge sharing had the highest full mediating effect on CoPs with values  $\beta=-0.076$  with CRP,  $\beta=0.152$  with TRP and  $\beta=0.023$  with RRP. It was followed by innovation management with values  $\beta=0.05$  with CRP,  $\beta=-0.10$  with TRP and  $\beta=-0.015$  with RRP. The least effect was realised on organisational culture with values  $\beta=-0.03$  with CRP,  $\beta=-0.06$  with TRP and  $\beta=-0.009$  with RRP. The results present an interesting outcome since literature has treated organisational culture as the factor that influences knowledge sharing ahead of innovation management, social capital and CoP (Thuan, 2020:7; Ganguly, Talukdar & Chatterjee, 2019:1111). Nevertheless, the current results show that CoPs were rated as the most influential factor that encourages knowledge sharing leading to improved SCP. The outcome may suggest that when organisations are operating in uncertain supply chains they tend to shun a knowledge sharing culture and do not share both their innovations and knowledge but rather rely more on CoPs in their area of specialty. The results further indicate that knowledge sharing had no mediating effect on people-centred KMSs and OQRP ( $\beta=0.00$ ) and the result was also not significant with all  $p$  values greater than 0.05. This outcome might have been greatly influenced by a poor economic environment. However, it also confirms the view by Alamgir (2015:106), that SMEs in developing countries usually do not consider product quality as a key factor to business success, hence their low export activities. The lack of relationship between OQRP and knowledge sharing is also in conformity with the results from the descriptive statistics that revealed that the respondents did not place much value in quality. The outcome finds supporting evidence in literature, for instance, Kin and Chai (2015:467) argue that in highly uncertain businesses, supply chains' product quality ceases to be important due to product scarcity. Based on the previously outlined SEM results, the decisions taken on the proposed hypotheses are presented in Table 6.27.

The results in Table 6.27 show that the hypotheses H<sub>1</sub>, H<sub>6</sub> and H<sub>10</sub> were accepted since they exerted a positive influence as initially suggested. The accepted hypotheses are also supported in existing literature where CoP was confirmed to support knowledge sharing (Bolisani & Scarso, 2014:366; Aljuwaiber, 2016:733). However, H<sub>2</sub>, H<sub>3</sub>, H<sub>4</sub>, H<sub>5</sub>, H<sub>7</sub>, H<sub>8</sub> and H<sub>9</sub> were mainly rejected for yielding either an opposite effect or no effect at all, which was contrary to the initially proposed effect. For instance, knowledge sharing was argued to lead to increased CRP and reduced TRP (Ramish & Aslam, 2016:716; Li *et al.*, 2017:1334; Wulf & Butel, 2017:1410;

Keszey, 2018:1061) but inverted outcomes were discovered. The SCP improvement on the one hand implies that when knowledge sharing increases, the time-related SCP activities reduce resulting in both shorter cash-to-cash cycles and lead times. On the other hand, when knowledge sharing increases, the process-based responsive factors (i.e. flexibility, agility and resilience) also increase. The negative outcome on H<sub>2</sub> and H<sub>3</sub> thus suggests an inverted effect, which might emanate from the external moderating influence of supply chain uncertainty. The uncertainty of the supply chain though present during the course of the study was not considered in the research conceptual framework. Thus, future studies may consider a similar model with supply chain uncertainty as a moderating construct to confirm the inverted effect under similar environments.

**Table 6.27: Summary of path analysis results for structural equation modelling**

Proposed path	Hypotheses	Path coefficient	Decision
CoP →KS	H <sub>1</sub>	0.76***	Accepted
IM →KS	H <sub>2</sub>	-0.50***	Rejected
OC →KS	H <sub>3</sub>	-0.30***	Rejected
SC →KS	H <sub>4</sub>	0.09	Rejected
KS→TRP	H <sub>5</sub>	0.020***	Rejected
KS→RRP	H <sub>6</sub>	0.03***	Accepted
KS→OQRP	H <sub>7</sub>	0.00	Rejected
KS→CRP	H <sub>8</sub>	-0.10***	Rejected
KS→SCP	H <sub>9</sub>	0.00	Rejected
People-centred KMS→KS→SCP	H <sub>10</sub>	0.210***	Accepted
OC – organisational culture; IM – innovation management; SC – social capital; KS – knowledge sharing Significance level <0.05; * significance level <0.01; *** significance level <0.001**			

**Source: Author's own compilation**

In relation to the rejection of H<sub>2</sub>, H<sub>3</sub> and H<sub>4</sub>, the results unveil insightful views, which show that in uncertain supply chains, innovation management negatively impacts on knowledge sharing probably because the innovations become sources of competitive advantage. The same effect cascades to influence a knowledge hoarding culture, hence reduced knowledge sharing particularly with external stakeholders. Thus, the value placed on knowledge sharing by the organisations becomes insignificant resulting in the non-significance of the social capital to knowledge sharing relationship. Similarly, in relation to the rejection of H<sub>5</sub>, H<sub>7</sub> and H<sub>8</sub>, the

sharing of knowledge seems to result in a positive impact on time. For instance, when more time is taken sharing knowledge, there will be an increase in lead times and cash-to-cash cycles since decisions will only be taken on completion of the knowledge sharing process. In furtherance to that, the scarcity associated with uncertain supply chains means that any product can be sold and thus product quality is not considered within SCP and emphasis is on satisfying the market demand.

Lastly the rejection of H<sub>9</sub> as also discussed earlier may indicate that the network-based approach to SCP was not supported by the data. The outcome brings about a two-pronged view, firstly, it could have been because of the existence of uncertainty within the supply chain and secondly, it could imply incompatibility between the network-based approach and knowledge-based supply chains. The outcome puts forward the view that process-based SCP is more suitable for predicting performance in uncertain knowledge-based supply chains. However, before concluding on the hypothesis a linear regression was conducted since the certainty of the SEM results accuracy was doubtful due to the partial fitness of the model. Thus, the test for predictability, mediation and causality using the proposed hypotheses were done using multiple linear regressions as discussed below.

#### **6.4.5.2 Hypotheses testing and model prediction with multiple linear regression**

The foregoing SEM results were considered not be quite conclusive, firstly, because there was a partial model fitness, and secondly, because SEM can only indicate fitness of the model, which may not necessarily imply prediction. Therefore, to validate the usability of the model in the SME sector as intended there was a need to also confirm if indeed the extracted factors could be used to predict the performance of Zimbabwean SMEs using multiple linear regressions. The data were only tested for heteroscedasticity which was the only missing linear regression assumption since other tests such as multicollinearity and normal distribution had been done during the SEM tests. The scatter plot and Breusch pagan tests were used and the scatter plots showed points that were fanning out along the horizontal plane while the chi-square value of 13.170, significant at  $p=0.0218$ , was produced from the Breusch pagan test. The results showed that all the residuals had a constant variance which fitted the data for the regression analysis.



The “stepwise” method was used instead of the “enter” method since it eliminates the statistically insignificant predictors as well as ranking the predictors into models. The model prediction was conducted using multiple linear regressions where each of the hypotheses was tested and either confirmed or unconfirmed based on the results. The mediating effect was tested using the three-step procedure where the first step tested the direct relationship from predictor variable (i.e. people-centred KMSs) to outcome variable (i.e. SCP). Step Two tested the relationship from the predictor variable (i.e. people-centred KMSs) to the mediating variable (i.e. knowledge sharing). Finally, Step Three tested the indirect or mediated relationship from predictor to outcome variable through the mediator variable. All the tests were conducted using multiple regressions in SPSS 25.0.

All of the multiple regression results from Step One were insignificant, thereby confirming that there was no direct relationship from predictor to outcome variable. The results also provide evidence that the data support a full mediating effect of knowledge sharing on people-centred KMSs and SCP as also shown in the SEM tests. Therefore, the remaining discussion will focus on the results of the full mediation effect as also proposed in the conceptual model.

#### **6.4.5.2.1 Knowledge sharing and its relationship with organisational culture, communities of practice, social capital and innovation management**

This section includes four hypotheses, which were intended to confirm whether people-centred KMSs predict knowledge sharing. In which H<sub>1</sub> examines whether CoP predicts knowledge sharing in Zimbabwean SMEs. H<sub>2</sub> examines whether innovation management predicts knowledge sharing in Zimbabwean SMEs. H<sub>3</sub> examines if organisational culture predicts knowledge sharing in Zimbabwean SMEs. H<sub>4</sub> examines if social capital predicts knowledge sharing in Zimbabwean SMEs. The results of the tests are presented in Table 6.28.

Table 6.28 illustrates that knowledge sharing is the dependent variable while organisational culture, innovation management and CoP are the predictor variables. Social capital was eliminated from the model which suggests that it was insignificant as also revealed from the SEM results. The results show that the model as a whole was statistically significant to predict knowledge sharing as shown in the ANOVA table results ( $F(24.694, 90.444) = 52.407, p = 0.00$ ). The adjusted R squared was 21.0 percent (which is of medium size effect) reported by the model; variations in knowledge sharing were accounted for by the linear combination of the

three people-centred KMSs, namely, organisational culture, innovation management and CoP. The results imply a good explanatory power of the model. The squared semi-partial coefficient ( $sr^2$ ) that estimated how much variance in knowledge sharing was uniquely predicted by the three predictor variables was CoP (0.357), innovation management (-0.317) organisational culture (-0.151). The results indicate that 35.7 percent, 31.7 percent and 15.1 percent of the variance in knowledge sharing is accounted for by CoP, innovation management and organisational culture, respectively when other factors are controlled.

**Table 6.28: The relationship between people-centred KMSs and knowledge sharing**

Model summary											
Model	R	R Square	Adjusted R Square		Std. Error of the Estimate						
1	.318	.101	.099		.42319						
2	.438	.192	.189		.40162						
3	.463	.214	.210		.39627						
ANOVA											
Model		Sum of Squares	df	Mean Square	F	Sig.					
1	Regression	11.625	1	11.625	64.910	.000					
	Residual	103.513	578	.179							
	Total	115.138	579								
2	Regression	22.070	2	11.035	68.416	.000					
	Residual	93.067	577	.161							
	Total	115.138	579			.000					
3	Regression	24.694	3	8.230	52.407						
	Residual	90.444	576	.157							
	Total	115.138	579								
Coefficients											
Model		Unstd Coefficients		Std Coefficient	t	Sig.	95.0% Conf. Interval for B		Correlations		
		B	Std. Err	Beta ( $\beta$ )			Lower Bound	Upper Bound	Zero-order	Partial	Part ( $Sr^2$ )
1	(Constant)	1.829	.064		28.779	.000	1.704	1.954			
	CoP	.110	.014	.318	8.057	.000	.083	.137	.318	.318	.318
2	(Constant)	2.154	.073		29.685	.000	2.011	2.296			
	CoP	.146	.014	.421	10.636	.000	.119	.173	.318	.405	.398
	IM	-.132	.016	-.318	-8.047	.000	-.164	-.099	-.182	-.318	-.301
3	(Constant)	2.350	.086		27.251	.000	2.180	2.519			

CoP	.222	.023	.639	9.656	.000	.177	.267	.318	.373	.357	
IM	-.139	.016	-.337	-8.578	.000	-.171	-.107	-.182	-.337	-.317	
OC	-.130	.032	-.261	-4.083	.000	-.068	-.068	.192	-.168	-.151	
a. Dependent Variable: KS COP					b. Predictors in the Model: (Constant), COP						
c. Predictors in the Model: (Constant), COP, IM					d. Predictors in the Model: (Constant), COP, IM, OC						

**Source: Author's own compilation**

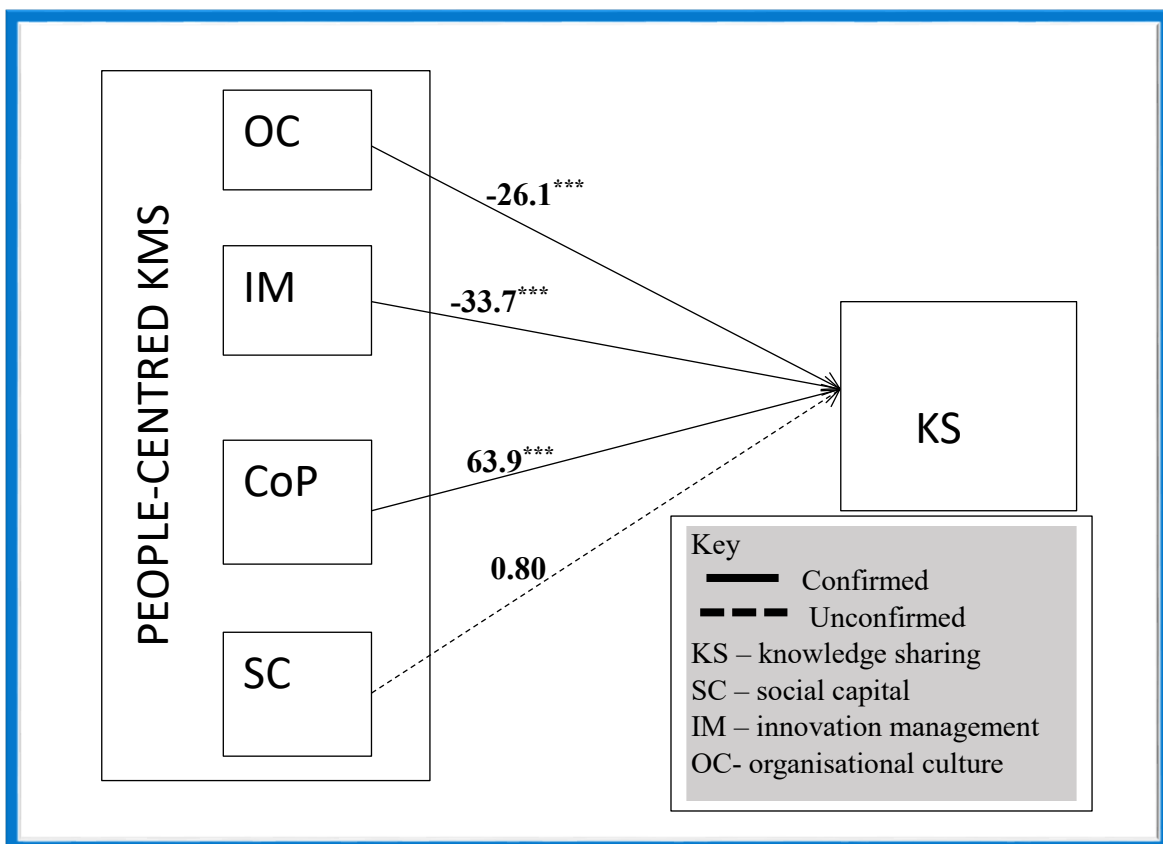
The positive slope for CoP (0.222) indicated that there was a 0.222 increase in knowledge sharing for each unit increase in CoP activities. Therefore, knowledge sharing increases as CoP activities increase. The negative slope for innovation management (-0.139) as predicted by knowledge sharing indicated that there was a 0.139 decrease in knowledge sharing for each one unit increase in innovation management. Thus, knowledge sharing tends to decrease as innovation management increases. Similarly, the negative slope for organisational culture (-0.130) as predicted by knowledge sharing indicated that there was a 0.130 decrease in knowledge sharing for each one unit increase in organisational culture. Thus, knowledge sharing tends to decrease as organisational culture increases. The outcome shows that CoP exerted more influence on knowledge sharing and the influence was positive while innovation management and organisational culture had a lesser influence, which was negative.

The results in Table 6.28 also helped to make decisions on the four hypotheses. The results show that in the final model, COP significantly predicts knowledge sharing, i.e. knowledge sharing is dependent on COPs ( $\beta = 0.639$ ,  $t = 9.656$ , significant at  $p = 0.000$ ), implying that the prediction is conclusive. A positive standardised beta coefficient ( $\beta = 0.639$ ) shows that CoP exerts a positive influence on knowledge sharing. The first hypothesis,  $H_1$  is therefore confirmed with a positive prediction.

The results from Table 6.28 show that in the final model, innovation management significantly predicts knowledge sharing, i.e. knowledge sharing is dependent on innovation management ( $\beta = -0.337$ ,  $t = -8.578$ , significant at  $p = 0.000$ ), implying that the prediction is conclusive, however, it was not positive as earlier suggested. A negative standardised beta coefficient ( $\beta =$

-0.337) shows that innovation management exerts a negative influence on knowledge sharing. The second hypothesis, H<sub>2</sub> is therefore confirmed with a negative prediction.

As illustrated in Table 6.28, the results show that in the final model, organisational culture significantly predicts knowledge sharing, i.e. knowledge sharing is dependent on organisational culture ( $\beta = -0.261$ ,  $t = -4.083$ , significant at  $p = 0.000$ ), implying that the prediction is conclusive although it reveals an inverse relationship, which is the opposite of the initial hypothesis. A negative standardised beta coefficient ( $\beta = -0.261$ ) shows that organisational culture exerts a negative influence on knowledge sharing. The third hypothesis H<sub>3</sub> is therefore confirmed with a negative prediction. Results from the excluded variables table in the linear regression indicate that social capital positively predicts knowledge sharing. However, although the hypothesis was supported, the relationship is not statistically significant ( $\beta = -0.076$ ,  $t = 0.177$ , significant at  $p = 0.859$ ). The fourth hypothesis, H<sub>4</sub> is therefore not confirmed on the basis of an insignificant outcome. The final model with regression coefficients is shown in Figure 6.14. The figure presents the confirmed and unconfirmed predictions between people-centred KMSs and knowledge sharing.



**Figure 6.14: Predictions for people-centred KMSs and knowledge sharing**

Source: Author's own compilation

The results in Figure 6.14 show that the first hypothesis (CoP predicts knowledge sharing) was confirmed and significant. The second hypothesis (innovation management predicts knowledge sharing) and the third hypothesis (organisational culture predicts knowledge sharing) gave inverted results that were significant, thus they were not confirmed as valid predictors of knowledge sharing that results in a negative relationship and not a positive relationship as initially suggested. The fourth hypothesis (social capital predicts knowledge sharing) was not confirmed due to insignificant results. Therefore, social capital was considered as an invalid predictor of knowledge sharing. The results present new evidence of the relationship that exists between people-centred KMSs in that they unveil the valid predictors of knowledge sharing for SME organisations. The predictors were extracted and selected as CoPs with a positive influence, innovation management and organisational culture both exerting a negative influence on knowledge sharing. Table 6.29 summarises the extracted factors and their relevant selected variables.

**Table 6.29: Extracted people-centred KMSs and factors and variables**

<b>People-centred KMS factors</b>	<b>Variables</b>	<b>Sig (<i>p</i> value)</b>
Communities of practice	Specialist support group, positive affect by group leaders, face-to-face meetings	0.000
Innovation management	New product development, environmental adaptation, process improvement, problem solving	0.000
Organisational culture	Trust, knowledge hoarding, positive affect	0.000

**Source: Author’s own compilation**

Table 6.29 illustrates that at a 95 percent confidence interval, CoPs, innovation management and organisational culture are valid predictors of knowledge sharing while social capital is not a predictor. The valid variables to predict CoPs include specialist support groups, positive affect by group leaders and face-to-face meetings; to predict innovation management the variables are new product development, environmental adaptation, process improvement and problem solving; to predict organisational culture the variables are trust, knowledge hoarding and positive affect.

#### **6.4.5.2.2 Knowledge sharing and its relationship with time related performance, cost related performance, response related performance and operation quality related performance**

This section includes four hypotheses, which were intended to confirm whether knowledge sharing predicts SCP using the process-based approach, which breaks down SCP into four sub-factors. In which H<sub>5</sub> examines if knowledge sharing predicts TRP in Zimbabwean SMEs. H<sub>6</sub> examines whether knowledge sharing predicts RRP in Zimbabwean SMEs. H<sub>7</sub> examines whether knowledge sharing predicts or exerts a positive influence on OQRP in Zimbabwean SMEs. H<sub>8</sub> examines if knowledge sharing exerts a positive influence on CRP in Zimbabwean SMEs. The network-based approach, which treats SCP as one integrated factor was also tested in which H<sub>9</sub> examines whether knowledge sharing predicts or exerts a positive influence on SCP in Zimbabwean SMEs. The tests were also conducted using multiple linear regressions.

Table 6.30 illustrates that TRP, RRP and CRP are the dependent variables while knowledge sharing is the predictor variable. OQRP was eliminated from the model, which suggests that it was insignificant as also revealed from the SEM results. The results show that the model as a whole was statistically significant to predict process-based SCP sub-factors from a knowledge-based perspective as shown in the ANOVA table results ( $F(5.338, 109.799)=9.335, p=0.00$ ). The adjusted R squared was 14.1 percent (which is of a small size effect) reported by the model; variations in knowledge sharing are accounted for by the linear combination of the three process-based SCP sub-factors, namely, TRP, RRP and CRP. The results imply a good explanatory power of the model considering that a very small change in the performance of the supply chain can have a great impact on the profitability or existence of the organisation. The squared semi-partial coefficient ( $sr^2$ ) that estimated how much variance in each of the three dependent constructs was uniquely predicted by, was TRP (0.192), RRP (-0.147), and CRP (-0.082). The results indicate that 19.2 percent, 14.7 percent and 8.2 percent of the variance in knowledge sharing is accounted for by TRP, RRP and CRP, respectively when other factors are controlled.

The positive slope for TRP (0.231) indicated that there was a 0.231 increase in TRP for each unit increase in knowledge sharing activities. Therefore, TRP increases as knowledge sharing activities increase. The negative slope for RRP (-0.177) as predicted by knowledge sharing

indicated that there was a 0.177 decrease in RRP for each one unit increase in knowledge sharing activities. Thus, RRP tends to decrease as knowledge sharing increases. Similarly, the negative slope for CRP (-0.082) as predicted by knowledge sharing indicated that there was a 0.082 decrease in CRP for each one unit increase in knowledge sharing. Thus, CRP tends to decrease as knowledge sharing increases. The outcome shows that knowledge sharing exerted more influence on TRP, and the influence was positive while RRP and CRP had a lesser influence, which was also negative. The results of the tests are presented in the table below.

**Table 6.30: The relationship between knowledge sharing and time-related performance, cost-related performance, response-related performance and operation quality-related performance**

<b>Model Summary</b>											
<b>Model</b>	<b>R</b>	<b>R Square</b>		<b>Adjusted R Square</b>		<b>Std. Error of the Estimate</b>					
1	.231	.117		.115		.44247					
2	.299	.140		.136		.43776					
3	.315	.146		.141		.43660					
<b>ANOVA</b>											
<b>Model</b>		<b>Sum of Squares</b>		<b>df</b>	<b>Mean Square</b>		<b>F</b>				
1	Regression	1.976		1	1.976		10.092				
	Residual	113.162		578	.196						
	Total	115.138		579							
2	Regression	4.564		2	2.282		11.909.000				
	Residual	110.573		577	.192						
	Total	115.138		579							
3	Regression	5.338		3	1.779		9.335				
	Residual	109.799		576	.191						
	Total	115.138		579							
<b>Model</b>											
		<b>Unstd Coefficient s</b>		<b>Std Coefficient s</b>	<b>t</b>	<b>Sig.</b>	<b>95.0% Conf. Interval for B</b>		<b>Correlations</b>		
		<b>B</b>	<b>Std. Err</b>	<b>Beta (β)</b>			<b>Lower Bound</b>	<b>Upper Bound</b>	<b>Zero-order</b>	<b>Partial</b>	<b>Part (Sr<sup>2</sup>)</b>
1	(Constant)	2.080	.078		26.572	.000	1.926	2.233			
	TRP	.058	.018	.131	3.177	.002	.022	.094	.131	.131	.131
2	(Constant)	2.449	.127		19.306	.000	2.200	2.698			
	TRP	.102	.022	.231	4.709	.000	.060	.145	.131	.192	.192
	RRP	-.123	.033	-.180	-3.675	.000	-.188	-.057	-.052	-.151	-.150

3	(Constant)	2.55 4	.137		18.67 2	.000	2.285	2.822									
	TRP	.102	.022	.231	4.717	.000	.060	.145	.131	.193	.192						
	RRP	- .120	.033	-.177	-3.621	.000	-.86	-.055	-.052	-.149	- .147						
	CRP	- .037	.018	-.082	-2.015	.044	-.073	-.001	-.084	-.084	- .082						
a. Predictor Variable: knowledge sharing (Constant), TRP						b. Dependent in the Model: c. Dependent in the Model: (Constant), TRP, RRP						d. Dependent in the Model: (Constant), TRP, RRP, CRP					

**Source: Author's own compilation**

The results in Table 6.30 also helped to make decisions on the next four hypotheses. The results show that in the final model, knowledge sharing significantly predicts TRP, i.e. TRP is dependent on knowledge sharing ( $\beta=0.231$ ,  $t=4.717$ , significant at  $p=0.000$ ), implying that the prediction is conclusive. A positive standardised beta coefficient ( $\beta=0.231$ ) shows that knowledge sharing exerts a negative influence on TRP and not the positive influence as proposed. The prediction for the fifth hypothesis,  $H_5$  is therefore confirmed with a negative prediction.

The results from Table 6.30 show that in the final model, knowledge sharing predicts RRP, i.e. RRP is dependent on knowledge sharing ( $\beta=-0.177$ ,  $t=-3.621$ , significant at  $p=0.000$ ), implying that the prediction is conclusive; however, it was not positive as earlier suggested. A negative standardised beta coefficient ( $\beta=-0.177$ ) shows that knowledge sharing exerts a negative influence on RRP. The sixth hypothesis  $H_6$  is therefore confirmed with a negative prediction.

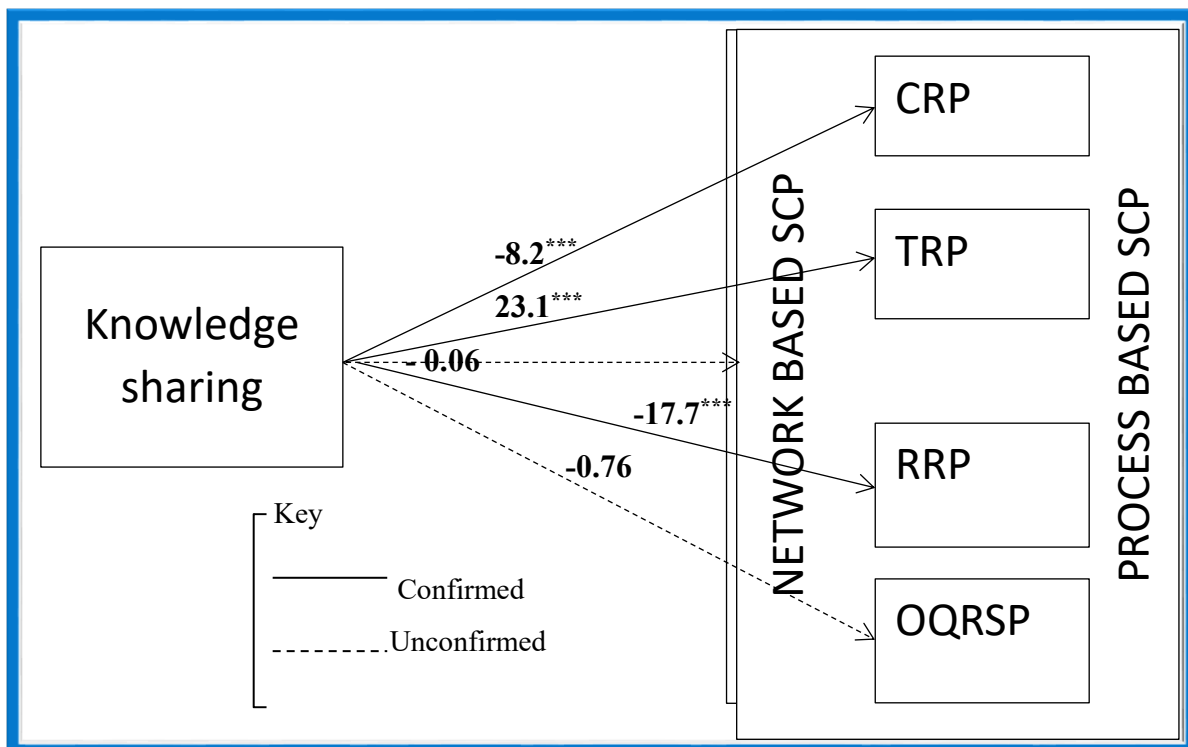
As illustrated in Table 6.30, the results show that in the final model, knowledge sharing significantly predicts CRP, i.e. CRP is dependent on knowledge sharing ( $\beta=-0.082$ ,  $t=-2.015$ , significant at  $p=0.044$ ), implying that the prediction is conclusive although it reveals an inverse relationship which is the opposite of the initial hypothesis. A negative standardised beta coefficient ( $\beta=-0.082$ ) shows that knowledge sharing exerts a negative influence on CRP. The eighth hypothesis,  $H_8$  is therefore confirmed with a negative prediction.

Results from the excluded variables table in the linear regression indicate that knowledge sharing negatively predicts OQRP. Thus, the hypothesis was not supported, and the relationship



is not statistically significant ( $\beta = -0.076$ ,  $t=0.049$ , significant at  $p=0.254$ ). The seventh hypothesis,  $H_7$  is therefore not confirmed on the basis of an insignificant outcome.

The results also showed an insignificant and negative result on knowledge sharing and SCP (which is the network-based approach to SCP). The revealed result ( $\beta=-0.006$ ,  $t=0.009$ , significant at  $p=0.754$ ), which suggests a highly inconsistent outcome, which may indicate that the data do not support this approach. Thus, the ninth hypothesis,  $H_9$  was not confirmed due to inconsistent linear regression results.



**Figure 6.15: Predictions for SCP sub-factors**

Source: Author's own compilation

The results in Figure 6.15 show that the fifth hypothesis (knowledge sharing predicts TRP); the sixth hypothesis (knowledge sharing predicts RRP) and the eighth hypothesis (knowledge sharing predicts CRP) gave significant predictions, thus the hypotheses were confirmed and the three constructs were considered as outcome variables of knowledge sharing. The seventh hypothesis (knowledge sharing predicts OQRSP) showed that there was an insignificant outcome, and the construct was considered to be independent from knowledge sharing activities. The ninth hypothesis (knowledge sharing predicts SCP) was also not significant. Therefore, the network-based approach to SCP was concluded to be an invalid approach in all

tests conducted. The results present new evidence of the relationship that exists between knowledge sharing and SCP in that knowledge-based supply chains are best predicted from a process-based approach and not a network-based approach to SCP. The process-based approach unveils the valid SCP outcome factors for SME organisations. The outcome factors were extracted and selected as TRP, RRP and CRP, all confirmed to be predicted by knowledge sharing. Table 6.31 summarises the extracted constructs and their relevant selected factors.

**Table 6.31: Extracted knowledge-based SCP factors and variables**

SCP sub-factors	Variables	Sig ( <i>p</i> value)
Time-related SCP	Processing lead time, delivery lead time, cash-to-cash cycle	0.000
Response-related SCP	Flexibility, resilience, agility	0.000
Cost related-SCP	Supply chain productivity, supply chain efficiency	0.044

**Source: Author’s own compilation**

Table 6.31 illustrates that at a 95 percent confidence interval, knowledge sharing can significantly predict time-related SCP; response-related SCP and cost-related SCP while operation quality-related SCP cannot be predicted by knowledge sharing. The valid variables to predict time-related SCP include processing lead time, delivery lead time and cash-to-cash cycle; to predict response-related SCP, the variables are flexibility, resilience and agility; to predict cost-related SCP, the variables are supply chain productivity and supply chain efficiency.

**6.4.6 The mediating effect of knowledge sharing on people-centred KMSs and SCP**

This section includes one hypothesis, which was intended to test the mediating role of knowledge sharing on SCP and people-centred KMSs using the process-based approach, which breaks down SCP into four sub-factors. In which H<sub>10</sub> examines if knowledge sharing mediates between people-centred KMSs and SCP. The results are presented in Table 6.32.

**Table 6.32: Mediating effect of knowledge sharing on people-centred KMSs and SCP sub-factors**

		Standardised regression coefficients (given if significant at 0.05 or less)			
Variable	Dependent variable				Interpretations
	Step 1 KS	Step 2 SCP sub-factors (indirect)		Step 3 SCP sub-factors (direct)	
CoP	0.639***	TRP	0.147***	ns	Full mediation
		RRP	-0.113***	ns	Full mediation
		CRP	-0.052***	ns	Full mediation
		OQRP	ns	ns	No mediation
IM	-0.336***	TRP	-0.077***	ns	Full mediation
		RRP	0.059***	ns	Full mediation
		CRP	0.027***	ns	Full mediation
		OQRP	ns	ns	No mediation
OC	-0.261***	TRP	-0.060***	ns	Full mediation
		RRP	0.046***	ns	Full mediation
		CRP	0.021***	ns	Full mediation
		OQRP	ns	ns	No mediation
SC	ns	TRP	ns	ns	Full mediation
		RRP	ns	ns	Full mediation
		CRP	ns	ns	Full mediation
		OQRP	ns	ns	No mediation

CoP: Communities of practice    IM: Innovation management    OC: Organisational culture  
 SC: Social capital    ns: Not significant    KS: Knowledge sharing

**Source: Author's own compilation**

The results in Table 6.32 indicate that partial mediation of knowledge sharing on all the people-centred KMSs and SCP did not exist. However, there was a full mediation on CoP, innovation management and organisational culture, which suggests the importance of knowledge sharing in knowledge-based supply chains. The results show that without implementing knowledge sharing within the supply chain it is likely to be difficult to survive the impact of an uncertain supply chain environment. No mediation was found on social capital and operation quality just as the SEM results had shown, which may indicate the lack of importance placed on these factors in uncertain supply chains.

### 6.4.6.1 Summary of confirmed predictions

The results of running the multiple regressions test using SPSS 25.0 are summarised in Table 6.33, which shows the confirmed and unconfirmed predictions.

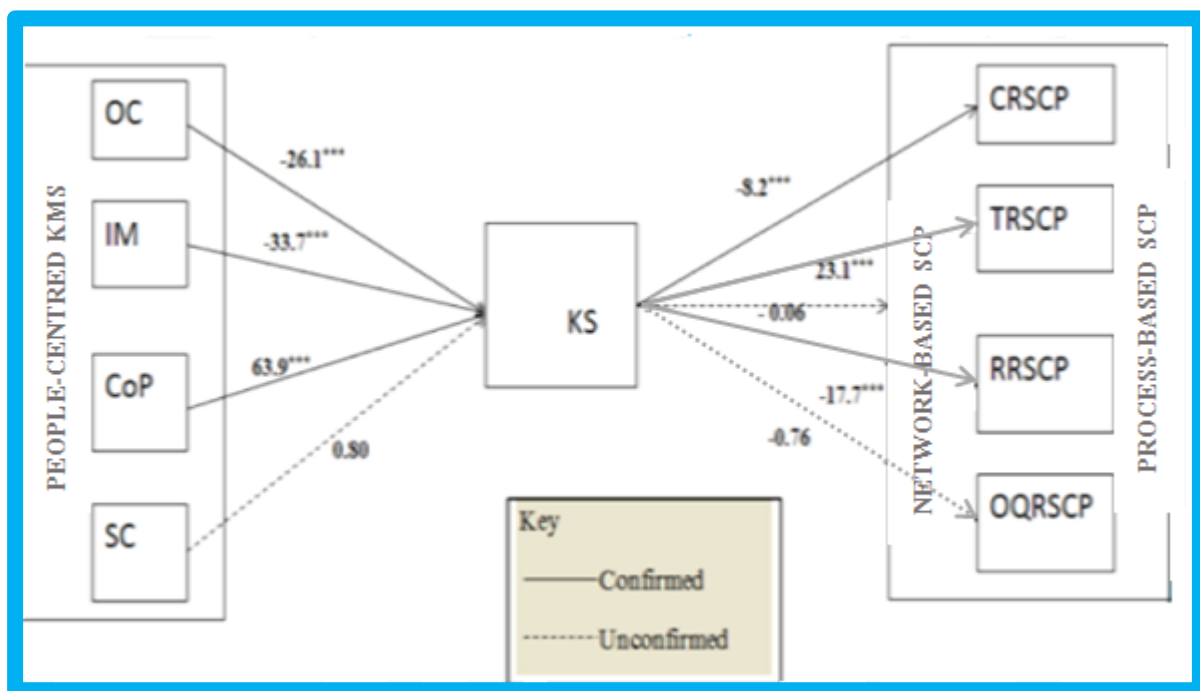
**Table 6.33: Summary of the hypotheses tests**

Hypothesis	Result
H <sub>1</sub> : Communities of practice predicts knowledge sharing in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>2</sub> : Innovation management predicts knowledge sharing in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>3</sub> : Organisational culture predicts knowledge sharing in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>4</sub> : Social capital predicts knowledge sharing in Zimbabwean SMEs.	<b>Unconfirmed</b>
H <sub>5</sub> : Knowledge sharing predicts TRP in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>6</sub> : Knowledge sharing predicts RRP in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>7</sub> : Knowledge sharing predicts OQRP in Zimbabwean SMEs.	<b>Unconfirmed</b>
H <sub>8</sub> : Knowledge sharing predicts CRP in Zimbabwean SMEs.	<b>Confirmed</b>
H <sub>9</sub> : Knowledge sharing predicts network-based supply chain performance in Zimbabwean SMEs.	<b>Unconfirmed</b>
H <sub>10</sub> : Knowledge sharing mediates between people-centred KMSs and SCP.	<b>Confirmed</b>

**Source: Author's own compilation**

It can be established from Table 6.33, that H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>5</sub>, H<sub>6</sub>, H<sub>8</sub>, H<sub>10</sub> were confirmed as valid predictions and that H<sub>4</sub>, H<sub>7</sub>, and H<sub>9</sub> were unconfirmed. The unconfirmed predictions show that social capital is not a predictor of knowledge sharing and also that knowledge sharing cannot predict OQRP or network-based SCP. This outcome concurs with the SEM results, which may justify the validity of the previous results under a partially fitting model condition. Thus, it can be confirmed that the SMEs had to strike a balance between the implementation of CoPs, innovation management and organisational culture to manage the knowledge sharing activities. The managing of knowledge sharing using different people-centred KMSs was intended to

manipulate the knowledge sharing process to produce the intended SCP outcome, which aided in sustaining the uncertainty within the supply chain. The confirmation of the predictions also proves the non-significance of both social capital and OQRP under network-based uncertain supply chains that were prevailing in the Zimbabwean environment. Figure 6.16 summarises the confirmed predictions.



**Figure 6.16: Confirmed and unconfirmed predictions**

Source: Author's own compilation

Figure 6.16 shows that organisational culture, innovation management and CoPs were confirmed as predictors of knowledge sharing and social capital was not confirmed. Knowledge sharing was also confirmed to predict CRP, TRP and RRP. However, knowledge sharing was not confirmed to be a predictor of OQRP. The next section discusses the results in detail.

## 6.5 DISCUSSION OF RESULTS

The research results from the study were presented in the previous section. This section emphasises the discussion of the results based on the presented empirical objectives, which were as follows:

- To establish the socio-demographic factors that can predict SME life span.

- To assess the perceptions of SME employees regarding implementation of knowledge management practices in their sector.
- To examine the perceptions of SME employees regarding the level of knowledge sharing in their sector.
- To establish the perceptions of SME employees regarding the level of SCP in their sector.
- To determine the influence of people-centred KMSs on knowledge sharing in the Zimbabwean SME sector.
- To determine how knowledge sharing influences SCP in the Zimbabwean SME sector.
- To determine the mediating effect of knowledge sharing on people-centred KMSs and SCP in the Zimbabwean SME sector.
- To develop a model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector.

### **6.5.1 Socio-demographic factors used in predicting the life span of an SME**

The continued emphasis in literature on the high failure rate within the SME sector has shown that survival of SMEs is fundamental to their effective economic contribution. This view motivated the need to establish possible socio-demographic factors that may be used to predict such failure and guide in decision making. The study used cross-tabulations that were confirmed using the Kendall's rank order correlation coefficient which must be greater than 0.7 to be significant and extract the relevant factors as suggested by Leech *et al.* (2005:49).

It emerged that SMEs being managed or owned by employees possessing appropriate work experience (i.e. above five years of work experience) had a high chance of surviving beyond the first five years. The outcome suggests that employee work experience is important for the survival of SMEs. The results also suggest that although qualifications were a key factor in determining SME survival, a diploma qualification was more important in ensuring that SMEs survive beyond the general failure range of three to five years as compared to other lower or higher qualifications. Similarly, the nationality of the SME employee particularly owner/managers, was also a significant factor in ascertaining extended SME survival. Lastly, the cross-tabulation results showed that the SME business sector also determined how long an SME will remain in existence with evidence showing that those in the manufacturing and agricultural sector were more likely to survive beyond five years.

The results imply that nationality has an influence on the number of years an SME will remain in operation. The results thus suggest that the indigenisation policy that promoted the formation of Zimbabwean organisations is a better policy when compared to the “Look east” policy that supported Asian-owned organisations. The results further imply that establishment of European and American-owned organisations increases SME survival rate. The cross-tabulations and correlation tests revealed that SME employee work experience, higher qualifications, and nationality, together with SME sector, are significant factors that can be used to predict the life span of an SME. The confirmed cross-tabulations may then be used to produce two-dimensional data visualisation using a data cube, which in turn helps to achieve knowledge discoveries in databases.

However, factors such as SME location, number of employees and annual turnover were not significant predictors of SME life span. The insignificant factors were however, the most used variables in classifying SMEs as small enterprises or medium enterprises in many countries (Kachlami & Yazdanfar, 2016:967) including Zimbabwe. The utilisation of such insignificant factors could be a major contributor to an inconsistent definition of an SME in Zimbabwe. Thus, a consideration of the significant factors in classifying the SME could help achieve the much-needed definitional standardisation. The insignificance realised on these other factors could have been affected by supply chain uncertainty factors such as poor decision making by policy makers and an unstable micro and macro-economic environment. The uncertainty led to high employee attrition within the entire sector and also forced the SMEs to move from location to location as directed by the city authorities or at times in search of cheaper premises.

Perhaps the identified socio-demographic factors may help eliminate the perennial challenge of SME survival as they may assist decision makers in the proper selection of SMEs for funding and granting of long-term tenders. Such strategic funding may lead to intended outcomes that yield economic growth and improved SCP. The factors may also help guide the SMEs in their recruitment process, for instance, they may target individuals with diplomas for technical duties while those who have degrees may be employed in administrative roles. Furthermore, the factors may be used together with modern software-based data mining predictive models to discover knowledge from SME data tombs that are lying idle in Zimbabwean institutions such as ZimStats and the Confederation of Zimbabwe Industries (CZI). The current study is the first

to establish socio-demographic factors that may be used to predict the existence of an SME in knowledge-based supply chains in developing countries such as Zimbabwe.

### **6.5.2 The perceptions of the SME employees on knowledge-based supply chains**

The study results showed that in relation to knowledge-based supply chain factors that adopt a people-centred KMS approach, four people-centred KMSs and four process-based SCP factors were extracted from extant literature based on emphasised importance and wide usage. The extraction process was further confirmed using the principal component analysis method and factors were extracted based on metrics, which included factor loadings, eigenvalues, total variance explained, communalities, correlations and Cronbach's alpha. The extracted factors were also visualised using the scree plot method. Four people-centred KMSs were extracted that had eigenvalues greater than one and Cronbach's alpha  $> 0.7$  as well as reasonable total variance explained. The extracted factors were: *CoPs*, *innovation management*, *organisational culture* and *social capital*. Similarly, four process-based SCP factors were extracted, namely, *time-related performance*, *responsiveness-related performance*, *cost-related performance* and *operation quality-related performance*. Each of the extracted factors had a multiple item scale in which the items were adapted from literature. The next subsections discuss the perceptions of the SME employees on the item scales that formed the measurement variables used to operationalise the extracted latent factors.

#### **6.5.2.1 The perceptions of SME employees regarding implementation of people-centred knowledge management systems practice in their sector**

This section focuses on the SME employees' perceptions of the implementation of people-centred KMSs. The perceptions were established by using the variables from each extracted factor. The selection of the valid variables for each of the factors was done using a multiple linear regression stepwise approach at a 95 percent confidence interval. The study selected significant variables for people-centred KMS factors: for CoPs it was specialist support group, positive affect by group leaders, and face-to-face meetings; for innovation management it was new product development, environmental adaptation, process improvement, and problem solving; for organisational culture it was trust, knowledge hoarding, and positive affect. Social capital was found to be insignificant and was discarded as an invalid factor hence no variables were selected. The selected CoP variables show that Zimbabwean SMEs generally valued



specialist support groups and face-to-face meetings as well as positive affect from leaders. The success of the CoPs is thus very dependent on a people-centred approach rather than an IT-centred approach probably due to low technological adoption within the sector coupled with prohibitive costs and unreliable IT infrastructure.

The emphasis of physical contact through face-to-face meetings implies the need for establishing trust within the sector. Similarly, innovation management was more focused towards strategies to cope with the supply chain environment as seen by the nature of the selected variables. This result also dovetails into the Zimbabwean environment in which manufacturing of products was very limited and most of the products were being imported. Thus, when the supply chain environment is uncertain, organisations that survive place their efforts towards managing the environment rather than the products, although this strategy has short term effects. Lastly, the organisations tend to value positive affect and knowledge hoarding and still value the influence of trust though not practicing it.

The results present ground-breaking evidence that provides the basis for the successful implementation of knowledge-based supply chains within the SME sector in developing countries. Successful knowledge management implementation using data mining techniques requires a positive identification of the data variables, which will help to convert the available information into knowledge. As such, the identified variables that adopt a people-centred KMS approach are key in helping the SMEs to convert their abundant tacit knowledge (Afrifa & Padachi, 2016:46) to explicit knowledge, which is also a prerequisite to the adoption of the inevitable IT-centred KMS as it emerged from the study. Furthermore, the recent ontology and case-based reasoning KMSs that utilise data mining models and algorithms require valid variables to be identified (Zvarevashe & Olugbara, 2018:3) before available data may be fully utilised to segment or classify markets and predict the performance of the Zimbabwean SME supply chain.

The identification of variables is also required to enable the mining of knowledge from data generated by the organisations so that benefits may be drawn from existing data repositories. The variables may also be used as dimension and measure attributes to test and train data mining models (Wang *et al.*, 2019:5334) as classifiers, predictors, recommenders or sentiment analysis systems to achieve knowledge discovery in databases. The current results will therefore provide new knowledge and assist SMEs intending to embrace knowledge-based

supply chains for the first time or those intending to migrate to modern IT-centred KMSs with more certainty and success. The successful implementation will reduce the failures they have been facing when they attempt to implement the existing IT-centred KMSs that are designed based on variables derived from large organisations. As such, the performance of the SMEs' supply chains is likely to be improved and they will be able to compete with the large organisations thereby increasing their life span and eliminating the challenge that has bedevilled the sector for centuries.

#### **6.5.2.2 The perceptions of SME employees regarding the level of knowledge sharing in their sector**

The selected variables for knowledge sharing were contextual SCK and up-to date SCK. Organisational capabilities and consistent technical terminology were insignificant knowledge sharing variables and were thus discarded. The results showed that although the SMEs valued knowledge sharing as an important factor in improving SCP but they were not fully practising it. They had adopted a selective approach to knowledge sharing in which contextual SCK was being kept up-to-date while innovation management knowledge that related to the supply chain was not being shared.

The failure to place value in sharing organisational capabilities and technical supply chain terminology could be emanating from the use of capabilities as a competitive advantage without a supply chain view. However, when a supply chain view is adopted, such knowledge will be shared as it helps to gain a business opportunity from other SMEs requiring such expertise. Perhaps by failing to share organisational capabilities, Zimbabwean SME employees were losing business to their counterparts in large organisations who freely share their innovation management knowledge. The results also confirm that when knowledge is not shared at a supply chain level, SMEs can only improve performance at an organisational level, which does not assure their continued survival.

### **6.5.2.3 The perceptions of SME employees regarding the level of supply chain performance in their sector**

This section discusses the perceptions of the SME employees regarding SCP within the Zimbabwean SME sector. Similarly, significant SCP factors adopting the process-based system and its respective variables were selected: for TRP, it was processing lead time, delivery lead time, and cash-to-cash cycle; for RRP it was flexibility, resilience, and agility; for cost related performance it was supply chain productivity and supply chain efficiency. OQRP was insignificant and was discarded therefore no variables were selected.

The variables selected for each of the supply chain factors further confirm the conditions established with the people-centred KMSs in that they also focus more on trying to manage environment-based activities. In this case, lead times for both processing and delivery as well as cash become fundamental since inflationary factors may lead to losses, hence the time taken on all activities becomes a critical performance factor. Similarly, responses begin to focus on agility, flexibility and resilience, which all ensure that the organisation survives the turbulent environment. The same is reflected in the cost-related activities, which also emphasise efficiency. All the selected variables thus suggest the importance of environmental scanning as a moderating factor for SMEs that survive longer in uncertain supply chains. Therefore, environmental knowledge is more important in this scenario and probably the most shared knowledge amongst organisations regardless of levels of trust. However, the results show that the approach does not improve performance at an industry/sector level but at an organisational level. Such improvement still impacts negatively on SCP, thus failing to produce the desired end state of improved performance at both micro and macro-economic levels.

### **6.5.3 People-centred knowledge management systems and prediction of knowledge sharing in Zimbabwean SMEs**

The objective of the study was also to establish the influence of the four people-centred KMSs on knowledge sharing in the Zimbabwean SME sector. Therefore, it was hypothesised that:

### 6.5.3.1 H<sub>1</sub>: CoPs have a positive influence on knowledge sharing in Zimbabwean SMEs

The study results from the structural equation modelling (SEM) analysis revealed that CoPs exert a positive and significant influence on knowledge sharing. The existence of a relationship between the two constructs was thus supported ( $r=0.76, p=0.00$ ). The results demonstrate that CoPs are key people-centred KMSs in achieving knowledge sharing within SMEs. The high and significant effect shown by the relationship implies that CoPs greatly increase knowledge sharing within the SME sector. In other words, as activities such as face-to-face meetings and specialist support groups increase, the level of knowledge sharing also increases significantly, which in turn gives a likelihood of improved SCP. The view echoed by Zulfadil, Hendriani and Machasin (2020:269), who argued that CoPs improve knowledge sharing, which in turn improves the overall performance of the organisation, supports the above results. The results also draw support from Meessen and Berton (2012:11) who argued that CoPs are an essential tool for sharing both explicit and tacit knowledge through people.

The capability to facilitate the sharing of both tacit and explicit knowledge makes CoPs a bridging KMS, which can support SMEs to effectively migrate from information-based systems to knowledge-based systems. Thus, making CoPs the most important people-centred KMSs for adoption within SMEs especially considering that most of the knowledge in this sector has been viewed as being more tacit than explicit (Maldonado Guzman *et al.*, 2016:831). CoPs require less capital to implement since they are mainly people-centred, requiring just the coming together of experts in groups or face-to-face meetings. Such cheap systems are easy to implement as knowledge sharing systems, which allow for easy mainstreaming within SMEs who usually lack resources as supported by Lee and Wong (2015:719). Therefore, CoPs have the potential of enabling SMEs particularly those in developing countries such as Zimbabwe to make headway in preparing to embrace the emerging and inevitable knowledge-based economies. CoPs provide a platform for organisations to codify their tacit knowledge (Zulfadil, Hendriani & Machasin, 2020:269), thus converting the knowledge to valid datasets that can be utilised with the IT-centred KMSs, which seem to be the *defacto* of the twenty first century economies characterised by artificial intelligence.

The results from the multiple linear regression analysis further showed that CoPs were a valid predictor of knowledge sharing. The outcome was confirmed by a significant positive prediction ( $\beta=0.639$ ,  $t=9.656$ , significant at  $p=0.000$ ). Using the 'step wise' method, CoPs were ranked first ahead of other factors such as innovation management, organisational culture and social capital. The outcome confirms that CoPs are a fundamental best practice for SMEs that effectively contribute to increased knowledge sharing as also endorsed by other authors (Peralta & Saldanha, 2014:546; Aljuwaiber, 2016:733; Ali, Musawir & Ali, 2018:458). However, the existing evidence as outlined in these studies only confirmed a positive influence in the presence of trust and stable supply chains, which was not the case in the current study. Lee, Suh and Lee (2014:392) found that when trust reduces or when there is a high attrition of CoP members, the effectiveness of the CoP in increasing knowledge sharing is greatly reduced. However, the current study found a contradicting outcome in which though there was a high attrition of CoP members and a lack of trust, the influence of CoPs remained high, positive and also significant. As such, the existence of high CoP member attrition and absence of trust has minimal impact on the effectiveness of CoPs in influencing knowledge sharing when operating in uncertain knowledge-based supply chains. The argument gets support from the fact that Zimbabwean SMEs were operating in a very uncertain supply chain environment characterised by lack of trust, but CoPs remained a very important means of sharing knowledge. Nevertheless, they had to support the CoP activities by combining them with innovation management or organisational culture or both. This strategy suggests that Zimbabwean SMEs managed the limited negative impact through maintaining a mix of people-centred KMSs to complement the CoPs with other KMSs and help maintain a knowledge sharing balance at any given time. The situation suggests that CoPs are essential in improving SCK sharing particularly in highly uncertain supply chains where there is frequent movement of CoP members and trust is lacking. Hence, implementation of CoPs as people-centred KMSs ensures survivability in uncertain supply chains.

Furthermore, Zimbabwean SMEs were implementing a mixture of people-centred KMSs with CoPs being mandatory in the different combinations with innovation management and organisational culture. This could mean that Zimbabwean SMEs that were surviving within the uncertain supply chain valued CoPs and maintained a mix of people-centred KMSs. The current study is thus a pioneer study to unveil the influence of CoPs on knowledge sharing in the absence of trust coupled with high CoP member attrition, as well as in improving knowledge

sharing through a mix of people-centred KMSs. The study thus extends the existing knowledge of the relationship between CoPs and knowledge sharing.

### **6.5.3.2 H<sub>2</sub>: Innovation management has a positive influence on knowledge sharing in Zimbabwean SMEs**

The results of the analysis from the SEM analysis revealed that innovation management exerts a negative and significant influence on knowledge sharing. The existence of a negative moderate relationship between the two constructs was thus supported ( $r=-0.50, p=0.04$ ) instead of the proposed positive relationship. The significant outcome demonstrates that innovation management is an essential people-centred KMS for SMEs, a view which has been supported in literature. For instance, Chatzoglou and Chatzoudes (2016:320) as well as Hyder and Lussier (2016:80) both note that SMEs thrive through innovation though their activities lack a strategic approach. The results also indicated that as innovation management increases it leads to a reduction in knowledge sharing activities within SMEs. Extant innovation management literature has argued that it is knowledge sharing that positively influences innovation management and not vice versa. The existing literature evidence thus suggests that knowledge sharing predicts innovation management and innovation management does not predict knowledge sharing probably due to lack of a strategic (i.e. knowledge-based) approach to innovation within SMEs studies. The results for the multiple linear regression analysis suggested otherwise and showed that when a knowledge-based approach to innovation is adopted, innovation management becomes a predictor of knowledge sharing as supported by ( $\beta =-0.337, t=-8.578, \text{significant at } p=0.000$ ). The results put forward a new perspective to the relationship between innovation management and knowledge sharing by suggesting leading evidence that innovation management leads to improved knowledge sharing as not described before in extant literature.

The view to continuously treat knowledge sharing as a predictor of innovation management could have been influenced by a self-centred perspective to innovation within SMEs, which viewed innovation as a sustainable competitive advantage that must never be shared (Guijarro, Lema & Van-Auken, 2016:100). In such conditions it implies that once the innovations are achieved, they are not shared, implying that the supply chain does not benefit, and the low supply chain innovators will impact negatively on the high innovators. Thus, instead of

innovations improving the performance of the entire supply chain they become an impediment, and this could help explain why SMEs have been innovating but failing to perpetuate their existence. However, the results show that when a strategic approach to innovation is adopted and innovation management is treated as a KMS, it is innovation management that predicts knowledge sharing in an organisation. In this view, SMEs come up with innovations first and these innovations are then shared as patented knowledge to improve both the originating SMEs and the entire supply chain. On the other hand, the negative effect of innovation management on knowledge sharing could mean that the SMEs were not coming up with innovations that benefit the entire supply chain but were doing so to out-compete each other. This approach could be viewed as a hindrance for innovation management success in SMEs since the current results are showing that as innovation management was increasing knowledge sharing was reducing. Thus, by strategically engaging in innovation management from a knowledge-based supply chain perspective SMEs would innovate to benefit the entire supply chain (Mehdikhani & Valmohammadi, 2019:778), hence improving trust amongst supply chain members, which results in increased knowledge sharing.

The fact that innovation management is viewed as a strategic competitive strategy for most SMEs in developing countries (Ishkandar *et al.*, 2017:70) can be argued as the driving factor to reduction in knowledge sharing in these countries as supported by the results. Nevertheless, the moderate negative relationship also suggests that to some extent SMEs still share SCK, hence the confirmation of the existence of a moderate negative relationship. The results are supported by the results that Zimbabwean SMEs were only sharing innovation management knowledge internally and not externally. It thus implies that if the sector continues to depend on shared knowledge to improve innovation management it would result in low innovation within the supply chain since innovation management knowledge will be rarely shared to benefit others. Therefore, for better performance, innovation management by supply chain members must trigger the need to improve the supply chain through sharing of the innovations to the entire supply chain members.

The current study is amongst the few to establish innovation management as a predictor of knowledge sharing since most studies as alluded to earlier have focused on knowledge sharing as a predictor of innovation management. The study showed that when innovation management activities within and outside the organisation are combined, they exert a moderate negative effect on knowledge sharing. The results indicate that innovation management can indeed

influence knowledge sharing and the negative effect on external sharing could be as a result of the lack of collaborative activities within the sector as SMEs treat each other as rivals regardless of belonging to the same supply chain. The outcome is also supported by the lack of trust that exists among firms, which suggests that restoration of trust may influence innovation management to increase knowledge sharing as was the case within an organisation.

The predominant perspective of viewing knowledge sharing as a predictor of innovation management can be argued as a misnomer amongst SMEs in developing countries as it leads to negative outcomes. For instance, Del Giudice, Bresciani and Meissner (2017:640) found that SMEs were still failing regardless of being known to be prominent in innovations. The results imply that the noted failure can be eradicated by ensuring a knowledge-based approach to innovation management in which innovation management is a people-centred KMS that predicts knowledge sharing thereby restoring trust among the SMEs which will in turn increase knowledge sharing.

### **6.5.3.3 H<sub>3</sub>: Organisational culture has a positive influence on knowledge sharing in Zimbabwean SMEs**

The structural equation modelling analysis revealed that organisational culture exerts a weak negative and significant influence on knowledge sharing as opposed to the proposed positive relationship. The existence of a relationship between the two constructs was thus supported ( $r=-0.30$ ,  $p=0.00$ ). The weak and significant effect shown by the relationship implies that organisational culture contributes to a lesser extent to a reduction in knowledge sharing within the SME sector. However, the low effect may cause a very significant effect on the performance of the supply chain, thus making the effect important. The results demonstrate that organisational culture remains a key people-centred KMS in achieving knowledge sharing within SMEs. Zimbabwean SMEs were confirmed to be practising a knowledge hoarding culture that was anchored on lack of trust probably due to the need to preserve and protect their innovation knowledge. The foregoing statement can be supported by the outcome from the reviewed literature and analysis which showed that most SMEs viewed knowledge sharing as a predictor of innovation management and they were also not sharing their innovation knowledge. Therefore, instead of engaging in innovation management with an aim to improve the entire supply chain, SMEs were adopting knowledge sharing to gather knowledge for use



in improving organisational innovation management as suggested. Such a culture, however, kills innovation management and retards SCP at sector/industry level as all SMEs in the supply chain lie in wait to gather each other's innovation management knowledge, which however, will be protected from external access.

On the contrary, if the culture promotes the use of innovation management to predict knowledge sharing and not the opposite this will result in effective knowledge sharing as confirmed by the multiple linear regression analysis ( $\beta=-0.261$ ,  $t=-4.083$ , significant at  $p=0.000$ ). The analysis also indicated that organisational culture predicts knowledge sharing with a weak negative effect, which could have been influenced by the fact that SMEs were expecting knowledge sharing to help them improve innovation management and achieve a competitive advantage, which was expected to increase performance. Therefore, the SMEs only managed to increase organisational performance sufficient to survive in the short term, but they could not improve the sector/industry SCP since their culture led to knowledge hoarding resulting in an unwanted reduction in knowledge sharing. The outcome indicates that existing literature (Lin, 2007:316; Lee, Park & Lee, 2015:895; Hussein, Singh, Farouk & Sohal, 2016:484) is misleading SMEs to utilise knowledge sharing to improve innovation management, hence their demise.

The results also show that SMEs were using organisational culture to manage their knowledge sharing activities so that they could selfishly preserve the organisational innovation knowledge within the internal CoPs. The use of organisational culture to manage knowledge sharing activities, was also highlighted by Li (2017:850), who argued that knowledge sharing levels were directly related to the culture of the employees in the organisations. Probably the strategy was meant to ensure survivability within the uncertain supply chain although this only led to short term survival as the organisational approach resulted in a low sector/industry SCP, which is likely to exert an indirect negative impact on the surviving SMEs. However, by utilising innovation management to improve knowledge sharing they will achieve an increase in knowledge sharing (Yao, Crupi, Di Minin & Zhang, 2020:30), which in turn exerts a positive influence on SCP (Haque & Islam, 2018:309) and increase survivability in the long term thereby extending the life of the SMEs. It is therefore necessary that SMEs adopt a supply chain view of their internal and external operations by adopting a knowledge-based culture that treats organisational culture as a people-centred KMS that promotes knowledge sharing to the entire supply chain.

The foregoing argument implies that the implementation of one specific people-centred KMS as a panacea to knowledge sharing challenges may not always achieve the intended SCP results as a change in organisational culture results in a change in KSB. There is therefore a need for organisations to maintain a mix of people-centred KMSs as a strategy to achieve effective knowledge sharing particularly in the absence of trust resulting from supply chain uncertainty. The foregoing result implies that maintaining a mix of people-centred KMSs is a key strategy in surviving within uncertain supply chains. The outcome is also supported by the study results, which revealed that Zimbabwean SMEs were utilising alternating people-centred KMSs, namely, CoPs, innovation management and organisational culture to achieve knowledge sharing outcomes that match the needs of the supply chain, hence the mixture of negative and positive influence on knowledge sharing. Overall, the results suggest that if the SMEs adopt a knowledge-based organisational culture approach they are likely to survive longer as compared to the current organisational and competition-based approach, which guarantees short term survival. This is because a knowledge-based approach is likely to promote a supply chain perspective to survival, which will motivate the SMEs to realise they need one another to survive longer thereby restoring sector/industry level trust and resultantly increase the much needed knowledge sharing. The results thus present further insight into strategies for ensuring SME long term survival in developing countries such as Zimbabwe.

#### **6.5.3.4 H4: Social capital has a positive influence on knowledge sharing in Zimbabwean SMEs**

The study results from the SEM analysis revealed that social capital exert a positive and insignificant influence on knowledge sharing. The non-existence of a relationship between the two constructs was thus supported ( $r=0.09$ ,  $p=0.15$ ). The results demonstrate that although social capital may impact positively on knowledge sharing, its effect is not significant. The outcome reveals that Zimbabwean SMEs did not view social capital as an essential people-centred KMS in achieving knowledge sharing within SMEs. The lack of significance of knowledge sharing, which however, has been noted in recent studies as important (Kim & Shin, 2017:2417; Ganguly, Talukdar & Chatterjee, 2019:1110) in improving knowledge sharing could have been necessitated by the uncertainty within the supply chain. The results were the first to establish the lack of importance of social capital in improving knowledge sharing that arises as result of an uncertain supply chain. The results were further confirmed by the multiple

linear regression analysis ( $\beta=-0.076$ ,  $t=0.177$ , significant at  $p=0.859$ ), which demonstrated that social capital is not a predictor of knowledge sharing.

The insignificance of social capital could indicate the influence of organisational culture on both knowledge sharing (Sedighi, Lukosch, Brazier, Hamed, & van Beers, 2018:1264) and other people-centred KMSs, in that if an organisational perspective is propagated, social capital ceases to be important and innovation management tends to reduce knowledge sharing at sector/industry level. The results also reveal that social capital and innovation management are sensitive to the prevailing organisational culture whilst CoPs are neutral to culture. However, literature continues to prove that social capital has remained a significant predictor of knowledge sharing within the SME sector, for instance, the recent study by Kim and Shin (2017:2417) on SMEs in the tourism industry, found that social capital positively influences knowledge sharing. The literature evidence suggests that social capital remains a key people-centred KMS, more so in knowledge-based supply chains, which were not being practised by Zimbabwean SMEs. The promotion of a knowledge-based culture is therefore likely to stimulate a supply chain perspective that in turn reduces the organisational approach among the Zimbabwean SMEs and hence restores the significance of social capital at sector/industry level. It is therefore not conclusive to discard social capital on the basis of the study results since the SMEs had ignored this important people-centred KMS and could also not achieve long term survival. Thus, the valuing of social capital by these SMEs is likely to ensure that they can perpetuate their existence by gaining support through the supply chain and by thus discarding this specific KMS, the SMEs were losing out. Nevertheless, it may be necessary to test the foregoing assumption in an environment where a knowledge-based approach to SCP has been fully adopted.

#### **6.5.4 Knowledge sharing and prediction of supply chain performance in Zimbabwean SMEs**

The objective of the study was to establish the relationship between knowledge sharing and SCP in the Zimbabwean SME sector. The following hypotheses were made on the four sub-factors of SCP.

#### **6.5.4.1 H5: Knowledge sharing exerts a negative influence on time-related performance in Zimbabwean SMEs**

The structural equation modelling analysis revealed that TRP exerts a positive and significant influence on knowledge sharing. The existence of a relationship between the two constructs was thus supported ( $r=0.20$ ,  $p=0.00$ ). The results demonstrate that knowledge sharing is essential in achieving TRP within SMEs as also supported by Grant and Preston (2018:1) who cited knowledge sharing as a prerequisite to TRP. The moderate and significant effect shown by the relationship implies that knowledge sharing improves TRP within the SME sector. The results agree with the study by Wulf and Butel (2017:1410) who postulate that knowledge sharing has been known to shorten some supply chain activities such as innovation cycle, new product development life cycle and supply chain lead time resulting in improved SCP. Another study by Song *et al.* (2018:6) on the SME sector provides further evidence and highlights that the sharing of SCK improves the time taken to attain end-to-end delivery of products. The multiple linear regression analysis showed that knowledge sharing positively predicts TRP ( $\beta=0.231$ ,  $t=4.717$ , significant at  $p=0.000$ ). The results suggest that TRP prediction is affected by alternation in knowledge sharing activities since the outcome remained positive regardless of other knowledge sharing influences emanating from innovation management and organisational culture.

The results imply that based on the supply chain environment, knowledge sharing may exert a positive influence on TRP in other ways; environmental factors must be considered if successful TRP is to be achieved. However, time remains a fundamental factor in predicting SCP. The study by Anand and Grover (2015:155) that was based on a ten-year review of SCP literature echoed similar views and revealed that time was a key antecedent for SCP. The same opinion finds support from Miri-Lavassani and Movahedi (2018:677) who adopted the more recent process-based perspective to SCP using a multiple industry sample and concluded that time was mandatory in attaining successful SCP. Such outcomes assist SMEs to understanding the importance of time in achieving effective adaptation to an uncertain supply chain environment. The positive influence from the results may help explain the continued failure of the SMEs as it indicates that there were longer lead times, which means reduced profitability. Therefore, Zimbabwean SMEs should implement knowledge sharing, adopting the KBV to reduce the time taken from the start to the end of the supply chain as this would improve SCP.

The importance placed on TRP could have been motivated by the need to preserve the value of the profits considering the hyperinflationary environment that the SMEs were operating in. The results thus confirm existing literature evidence from a Zimbabwean perspective, which to date, lacks literature support.

#### **6.5.4.2 H<sub>6</sub>: Knowledge sharing exerts a positive influence on responsiveness-related performance in Zimbabwean SMEs**

The results from the SEM analysis revealed that knowledge sharing exerts a negative and significant influence on RRP. The existence of a relationship between the two constructs was thus supported ( $r=0.03$ ,  $p=0.00$ ). The results demonstrate that knowledge sharing is important in achieving RRP within SMEs. The results are supported by Wu, Lee and Tsai (2012:67), who argue that organisations must possess and share the relevant environmental knowledge in order to effectively respond to disruption in both the internal and external supply chain environment. In furtherance to that Li, Tarafdar, and Rao (2012:402) reinforce the same idea when they concluded that knowledge sharing by the source organisation improves supply chain responsiveness and partner relationships.

The conclusion by Wu, Lee and Tsai (2012:67) suggests selective knowledge sharing, which implies that SMEs within the same supply chain may not share all their SCK. The foregoing perspective, however, advocates a competitive perspective, which negatively affects the SCP by only improving the performance of some organisations while others suffer. However, the study results reveal that in knowledge-based supply chains open sharing of SCK is critical as it will help improve responsiveness within the entire supply chain. The outcome is supported by the multiple linear regression results, which indicated that knowledge sharing is a significant predictor of RRP ( $\beta=-0.177$ ,  $t=-3.621$ , significant at  $p=0.000$ ). The current results show that sharing SCK exerts a negative influence on RRP, thus, as knowledge sharing increases RRP is reduced. Thus, by implementing selective knowledge sharing the Zimbabwean SMEs were disadvantaging themselves as they failed to be resilient, flexible and agile so as to maintain a going concern. The results contradict the existing view of selective knowledge sharing and thus presents new insights on the implementation of knowledge sharing to improve RRP throughout the supply chain by advocating for full SCK sharing.

#### **6.5.4.3 H7: Knowledge sharing exerts a positive influence on operation quality-related performance in Zimbabwean SMEs**

The SEM results revealed that knowledge sharing exerts no influence on OQRP. The non-existence of a relationship between the two constructs was thus indicated by the results ( $r=0.00$ ,  $p=0.00$ ), contrary to the proposed positive relationship. The results demonstrate that knowledge sharing was not necessary in achieving OQRP within Zimbabwean SMEs. The lack of relationship implies that no knowledge that related to operational quality was being shared within the SME sector. The linear regression analysis also showed an insignificant prediction ( $\beta=-0.076$ ,  $t=0.049$ , significant at  $p=0.254$ ) further confirming that OQRP was not predicted by knowledge sharing.

The results contradict the results by Haque and Islam (2018:306) who conducted a study in the drug manufacturing industry and found that sharing SCK had a positive impact on the operational quality. The study did not, however, take a holistic supply chain perspective since it emphasised organisational competitive advantage and was also conducted within a normal supply chain. Therefore, the contradiction may be substantiated by differences in supply chain environments which have also been argued to influence OQRP. The Zimbabwean environment was marred by supply chain uncertainty coupled with low manufacturing activities, high inflation and commodity scarcity, which meant that all products on the market could be sold regardless of quality. Thus, the supply chain was concentrating on meeting demand and in the process quality was compromised. The situation could help explain the lack of importance placed on OQRP by the Zimbabwean SMEs but that does not necessarily ascertain the low importance of OQRP since it is a very unusual environment. However, it also reveals that OQRP knowledge is sensitive to the environment and is only shared in competitive supply chains that have a plethora of products, otherwise the need to invest in OQRP is not justifiable.

The foregoing results imply that the Zimbabwean SMEs completely ignored OQRP and no such knowledge was being shared within the supply chain. This failure to recognise OQRP as an important supply chain factor may explain the low export performance by the Zimbabwean SMEs. This view gets support from Anur and Yusuff (2011:328) who highlighted that in the modern world, competition has increased and focus is no longer on high production but also on the quality of the product and the extent to which the product meets the customer expectations.

Alamgir (2015:106) also noted that SME products from developing countries are less competitive on the global markets compared to their international counterparts who usually produce high quality products. Another study by Hasnan, Aziz, Zulkifil and Taip (2014:331) attributed the low-quality products from SMEs to their failure to professionally train their manpower on OQRP since they view all quality-related activities as an unwarranted expenditure.

The result therefore suggests that perhaps the Zimbabwean SMEs were not investing in professionally training their employees in OQRP because they undermined both its influence and effectiveness in improving SCP. More so considering that they were not able to satisfy the market demand from their production activities. Nevertheless, to compete globally the SMEs still need to take OQRP seriously by adopting a knowledge-based supply chain perspective in all their activities. The general perspective on OQRP in SME literature that advances that OQRP is usually considered as an after-thought (Hasnan *et al.*, 2014:331), is thus confirmed by the current results.

#### **6.5.4.4 H<sub>8</sub>: Knowledge sharing exerts a positive influence on cost-related performance in Zimbabwean SMEs**

The study results from the SEM analysis revealed that knowledge sharing exerts a weak negative and significant influence on CRP. The existence of a relationship between the two constructs was thus supported ( $r=-0.10$ ,  $p=0.00$ ). The results indicate that knowledge sharing is important in achieving CRP within SMEs. The weak and significant effect shown by the relationship indicates that CRP is reduced by knowledge sharing, which suggests the practising of a network-based approach that views cost as an expense and not as a process enhancing strategy. The network-based approach views the sharing of CRP knowledge as a risk (Asrar ul Haq & Anwar, 2016:7) and promotes the zero sharing of such knowledge with outsiders with an aim to gain a competitive advantage through pricing models (Myers, 2015:5; Li *et al.*, 2017:1334). The results show that in knowledge-based supply chains when CRP knowledge is not shared, cost is not considered as a process, and knowledge sharing in the supply chain is negated leading to poor SCP. However, when cost is viewed as a process, the sharing of CRP knowledge yields a positive influence, which increases SCP.

Thus, the negative outcome may help show that Zimbabwean SMEs are utilising a network-based perspective to SCP when dealing with CRP, which perhaps leads to an over-emphasis on total expenditure and not the entire supply chain process (Miri-Lavassani & Movahedi, 2018:679). Such behaviour may stimulate inflation as businesses focus more on sourcing and delivering activities while ignoring other important activities such as manufacturing and planning.

The study therefore confirms that successful supply chains must adopt a knowledge-based process approach that views cost as a process, which is strategically managed throughout the supply chain. The study by Song, Lu, Yu and Qian (2018:2) supports the preceding results and highlights that when SMEs share supply chain financing knowledge as a strategy for managing their costs they will, in turn, improve their SCP. Similar sentiments have been reverberated by Wu and Lee (2017:475) who argued that people-centred knowledge sharing theories such as the social exchange theory emphasise that organisations make decisions based on the benefits-to-cost ratio that is derived after considering all the supply chain activities. The above results suggest that knowledge-based supply chains can be argued to improve SCP, which in turn improves SMEs' existence and may also stabilise supply chain uncertainty. The results were the first attempt to address both the short life span challenge of an SME and the uncertainty of the supply chain through the implementation of knowledge-based supply chains anchored on people-centred KMSs.

#### **6.5.4.5 H<sub>9</sub>: Knowledge sharing exerts a positive influence on supply chain performance in Zimbabwean SMEs**

The study results from both the SEM and linear regression analysis revealed that the network-based approach to SCP is not supported in knowledge-based supply chains. The non-existence of a relationship in the initial data analysis stages, which was later confirmed in the statistical tests, led to the absolute rejection of the hypothesis. The results demonstrate that the network-based approach cannot be implemented together with knowledge-based concepts such as people-centred KMSs and knowledge sharing within the SME sector.

The results imply that perhaps network-based approaches have a limited effect on influencing successful SCP in knowledge-based environments. Furthermore, the network-based approach



may only improve individual organisational performance by exploiting resources within the supply chain while exerting a negative impact on the entire supply chain due to selfish operations. In so doing, SMEs will be indirectly reducing their life span since the selfish operations end up affecting some SMEs, which form part of their supply chain and the closures lead to the failure of seemingly successful SMEs. Therefore, in this environment, the failure of one SME may have ripple effects on the entire supply chain. A typical situation from the results was realised amongst SMEs operating in the steel and fabrication sub-sector, in which Harare based SMEs dealing in fabrication were thriving at the expense of Midlands-based SMEs dealing in steel. By not adopting a knowledge-based supply chain, the Harare based SMEs did not share their knowledge with their supply chain counterparts in the Midlands province and viewed such sharing as a risk (Asrar ul Haq & Anwar, 2016:7). In the short-run, the Harare based SMEs enjoyed low steel prices and profited while the Midlands based SMEs were running at a loss and finally closed down leading to the closure of nearly all the Harare based SMEs. It is thus prudent that developing countries embrace the knowledge-based supply chain concept if they are to survive and effectively compete in the emerging knowledge economies. The current study is providing ground-breaking results from a developing country perspective and more so in Zimbabwe.

#### **6.5.5 The mediating effect of knowledge sharing on people-centred knowledge management systems and supply chain performance**

The objective of the study was to establish the mediating effect of knowledge sharing on people-centred KMSs and SCP in the Zimbabwean SME sector. The following hypothesis was made:

##### **6.5.5.1 H<sub>10</sub>: Knowledge sharing mediates the effect of people-centred knowledge management systems on supply chain performance in Zimbabwean SMEs**

The results from both the SEM and multiple linear regression analysis showed that knowledge sharing fully mediates between people-centred KMSs and SCP since all direct relationships were insignificant as shown in Table 6.30 and Table 6.32, respectively. The outcome indicates that knowledge sharing is mandatory for the success of knowledge-based supply chains that are moored on people-centred KMSs. The results further establish knowledge sharing as primarily

a people-centred concept as opposed to being an IT-centred concept as propagated in most of the knowledge management literature (Witherspoon, Bergner, Cockrell & Stone, 2013:256; Martini, 2016:81; Ragsdell & An, 2018:482). Thus, successful knowledge sharing should place value on the role played by the people more than that of the technological components such as computers and data communication platforms.

In the modern world of big data, IT-centred KMSs are primary systems in the effective creation of knowledge and the importance of implementing such systems cannot be over emphasised. However, it is important to also note that knowledge creation does not necessarily imply that the created knowledge will be shared to the entire supply chain. The decision to establish electronic data interchange through intranets and extranets that facilitate the automated sharing of the created knowledge still depend on the people, hence their importance. The views by Hussein, Singh, Farouk and Sohal (2016:488) are in support of the aforementioned statements and they conclude that the success of organisational knowledge sharing is highly dependent on top management support. It is the top management who decide when, how and what to share and their decision is mostly final as also indicated in the study results that the SMEs were deliberately not sharing innovation management knowledge. Thus, regardless of the level of automation within a knowledge-based supply chain, people remain relevant players denoting that the full mediation role of knowledge sharing is necessary for success to be achieved.

The results imply that SMEs must adopt knowledge sharing strategies to share their SCK to all members of the supply chain. Furthermore, these organisations must not view knowledge sharing as a risk since it emerged that this view discourages knowledge sharing and in the absence of knowledge sharing, knowledge-based supply chains are bound to fail. The failure will imply that SMEs will continue to operate as silos of knowledge within the supply chain, which will only ensure their short-term survival as has been the prevailing trend within the sector. Yet the knowledge that the successful SMEs did not share was important for the survival of other supply chain members whose closure then led to indirect effects on the performance of the surviving SMEs. This could mean that knowledge sharing plays a fundamental full mediatory role in knowledge-based supply chains within SMEs that are anchored on people-centred KMSs. These are the first results suggesting a full mediation of knowledge sharing on people-centred KMSs and process-based SCP within SMEs in developing countries.

### **6.5.6 Development of a knowledge-based supply chain performance model for maximising people-centred KMSs, knowledge sharing and SCP in SMEs**

The objective of the study was to develop a model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector. The establishment of a model is necessary to help SMEs better understand the requirements for implementing knowledge-based supply chains, which have been suggested based on the study results as a permanent solution to perpetuate the existence of such organisations. The model will advise SMEs on the necessary processes that are required for change management as the SMEs migrate from both manual and management information systems to knowledge-based systems. The model will also guide software developers in the development of SME specific IT-centred KMSs and help these organisations to effectively utilise knowledge-based systems. Furthermore, business intelligence experts and government ministries who may want to engage in classification or predictive analysis of SME performance using data mining techniques will utilise the identified variables to extract knowledge from data repositories. Such activities will thus ensure that the data in most of the data tombs maintained by governments in developing countries will be helpful in future decision making for supporting the SME sector.

## **6.6 THE LINK BETWEEN THE KNOWLEDGE-BASED VIEW THEORY AND THE RESULTS OF THE STUDY**

This section attempts to discuss both the relationship and contribution that can be drawn between the study results and the selected guiding theory, which is the knowledge-based view (KBV) theory. Literature has often acknowledged that the KBV is an off-shoot of the RBV (Nonaka, 1994:101; Grant, 1996:15; Cepeda-Carrion, Martelo-Landeroguez & Leal-Rodriguez, 2017:2), which is most appropriate for the emerging knowledge economies (Torabi, Kyani & Falakinia, 2016:472). As mentioned in Chapter Three, the KBV emphasises that organisations exist to create, transfer and transform knowledge to survive in a highly competitive and turbulent environment (Kogut & Zander, 1992:384; Merlo, 2016:16). The study results showed that in knowledge-based supply chains, knowledge sharing had a full mediation on people-centred KMSs and SCP. The results indicated that if organisational knowledge is shared, SMEs can survive in uncertain supply chains and also could be able to extend their existence. These results are in harmony with the KBV views by Merlo (2016:16),

who suggested that knowledge creation, transfer and transforming are important for the survival of organisations in turbulent environments.

The study also found that the network-based approach to SCP is not a valid approach to knowledge-based supply chains since it emphasises reliance on resources rather than knowledge. Similarly, the results were echoed by Castro, Lopez-Saez and Delgado-Verde (2011:871) who noted that sustainability in the modern economy is no longer dependant on the abundance of physical resources but on knowledge superiority. The study further revealed that SMEs were to utilise and share both internal and external knowledge for better performance and not operate as knowledge silos. The co-opetition concept coined by McGee and Thomas (2007:544), which is a sub-concept of the KBV, supports the aforementioned results and notes that organisations need to utilise and share internal and external knowledge.

The study results also showed that SMEs were not performing well because they were treating knowledge sharing as a competitive advantage, as such they did not share the knowledge they possessed, to their own disadvantage. Desai and Rai (2016:1022) also argue that the KBV advances that when knowledge is considered as a sustainable competitive advantage, the owner is more than likely not prepared to share that knowledge. While Leal, Cunha and Couto (2017:1000) posit that the KBV advocates that when knowledge is shared and made public, organisations derive more benefits from their knowledge resources. When both views are combined, it can be established that the KBV advances that lack of knowledge sharing leads to poor performance, which is then similar to the study results.

In view of the above discourse on the link between the study results and the KBV, it can be established that the results are in conformity with the KBV theory. The results thus add to the existing body of knowledge on the application of the KBV theory within SMEs in developing countries such as Zimbabwe. The study results support knowledge sharing also known as the knowledge transfer phase as an important stage in the success of knowledge-based systems. As shown by the results, knowledge sharing must provide full mediation on people-centred KMSs and SCP for effective and sustainable performance of the entire supply chain. This therefore suggests that perpetual SME existence and performance in knowledge-based supply chains, depends heavily on their knowledge sharing activities and strategies.

## 6.7 CHAPTER SUMMARY

The current chapter implemented the analysis of all elements of the study methodology as outlined and explained in Chapter Five. The chapter emphasised data preparation, data cleaning, data validation and data analysis, presentation and interpretation. Data preparation was conducted by capturing the source data from questionnaires into Microsoft Excel to create a dataset. The Excel data were then exported into SPSS 25.0 and AMOS 25.0 for further analysis. Data cleaning was done through checking for missing values and outliers using SPSS 25.0. The validation was achieved by checking for reliability, validity, normal distribution, collinearity and heteroscedasticity through EFA, CFA and structural equation modelling (SEM). Metrics such as the Cronbach's alpha test, the composite reliability test, total-item correlations, eigenvalues, and beta coefficient, among others, were used to validate the data. The knowledge-based supply chain factors were then extracted and visualised using the scree plot method. The determination of the model fit was ascertained through indicators such as chi-square value over degrees of freedom ( $\chi^2/df$ ); incremental fit index (IFI); Tucker-Lewis Index (TLI); the normed fit index (NFI); root mean square residual (RMR); and the root mean square error of approximation (RMSEA), which were known to be insensitive to large sample sizes. Due to the assumed impact of the large sample size coupled with mixed scales on the accuracy of the SEM results, a multiple linear regression was also conducted to affirm the results from the SEM analysis. The SEM results showed that the data partially fitted the research model for both CFA and SEM. The linear regression results showed that people-centred KMSs predicted knowledge sharing and knowledge sharing predicted SCP. The results further indicated that knowledge sharing fully mediates between people centred KMSs and process-based SCP while no mediation was found with network-based SCP. The chapter concludes with the testing of the hypotheses of the study, which was done using SEM and multiple linear regressions. The SEM analysis which tested the hypotheses for the existence of relationships showed that three hypotheses ( $H_1$ ,  $H_6$ ,  $H_{10}$ ) were accepted to proving the initial proposition at  $p < 0.01$ , with seven hypotheses ( $H_2$ ,  $H_3$ ,  $H_4$ ,  $H_5$ ,  $H_7$ ,  $H_8$ ,  $H_9$ ) being rejected for either inverting the initial proposition or presenting at  $p > 0.5$ . The multiple linear regression analysis, which tested the hypotheses for prediction showed that three hypotheses ( $H_4$ ,  $H_7$ ,  $H_9$ ) were not confirmed as predictors at  $p > 0.5$ , with the seven hypotheses ( $H_1$ ,  $H_2$ ,  $H_3$ ,  $H_5$ ,  $H_6$ ,  $H_8$ ,  $H_{10}$ ) being confirmed as valid predictors with  $p < 0.01$ . The next chapter offers the salient points that are drawn from the results as well as the recommendations made to various stakeholders, which are designed to improve both the performance of SMEs in developing countries and future studies.

## **CHAPTER SEVEN**

### **CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH**

#### **7.1 INTRODUCTION**

This final chapter discusses the salient issues arising from the theoretical and empirical results with an aim to make recommendations to various stakeholders on the benefits that may be drawn from the results. The chapter first provides conclusions derived from both the theoretical and empirical objectives that were outlined in Chapter One. In addition, the chapter provides practical recommendations on how SME performance may be improved through knowledge-based SCP. The recommendations are provided in relation to the research objectives. The chapter then concludes by putting forward the implications as well as some of the limitations of the current study and then presents suggestions for other future researchers in the field of KMSs and SCP.

#### **7.2 REVIEW OF THESIS CHAPTERS**

The main aim of this study was to investigate the relationships between people-centred KMSs, knowledge sharing and SCP within the Zimbabwean SME sector. The effort was targeted at finding possible solutions to improve the SCP of the Zimbabwean SME sector as well as increasing the life span of SME organisations in developing countries. The entire thesis was composed of seven chapters in which Chapter One was the point of departure highlighting the genesis and background of the study, which then led to the elucidation of the problem that motivated the necessity of undertaking the study. In a bid to explicate the identified problem, the chapter went further to outline the research problem, the theoretical and empirical objectives and also present a brief summary of the methodology and literature review to justify the possibility of conducting the research to completion.

The succeeding three chapters, namely, Chapters Two, Three and Four, constituted the literature review as guided by the research context and the main study constructs, which were presented in the proposed conceptual framework. Thus, Chapter Two was entitled “developments in small and medium enterprises” and formed the first chapter of the literature review. The chapter gave

an exposition of the research context, which was the Zimbabwean SME sector. The review in this chapter first took a global analysis of SMEs and analysed definitional inconsistency as one of the issues that has hindered cross country studies of SMEs. The chapter also expounded on the evidence provided in the background to the study by reviewing literature on the global SME environment, challenges, capabilities and performance. Also covered in the chapter are some of the recommended best business practices within the SME sector, such as knowledge management and SCP. The chapter, likewise, identified the different socio-demographic variables that have been used to classify and define SMEs. Finally, the chapter gave a brief review of the Zimbabwean SMEs' structure and business environment before summarising the major issues that were discussed therein.

The second literature review chapter was Chapter Three with the title, "A theoretical review of knowledge management systems" that directed emphasis towards conceptualising KMSs. The chapter looked at the underlying KMS concepts such as knowledge categorisation, knowledge management and the knowledge management process. The review went further to discuss people-centred KMSs and IT-centred KMSs as well as the challenges and limitations associated with the adoption of such systems within the SME sector. The main people-centred KMSs discussed in the chapter included CoPs, innovation management, organisational culture and social capital, which were also used in developing the hypotheses.

The final literature review chapter had the title, "A literature review of knowledge sharing and supply chain performance". The chapter first presented a background review of both knowledge sharing and SCP. The role, antecedents, drivers, limitations, practices and methods of knowledge sharing were reviewed from an SME perspective. The chapter further reviewed the utilisation of knowledge sharing practices in supply chain management before identifying selected factors for measuring SCP both from a network-based standpoint and process-based approach. The process-based SCP factors discussed in detail were TRP, CRP, RRP and OQRP, which were again used in developing the hypotheses of the study.

After reviewing the literature, Chapter Five, which was entitled "research methodology and design" focused on discussing the entire research methodology that was used in analysing, presenting and interpreting the data. The chapter focused on key research concepts such as research philosophy, research methodology and research methods that were adopted for the study. Issues of validity, reliability and ethical consideration were also discussed. Chapter Six

entitled “data presentation, data analysis results and interpretation” implemented the proposed methodology to analyse, present and interpret the data. The chapter analysed the respondent socio-demographic factors, the empirical objectives and the hypotheses using both descriptive and inferential statistical techniques, which were conducted using SPSS 25.0 and AMOS 25.0. The current chapter, which is the final chapter gives an overall summary as outlined in the introduction section.

### **7.3 CONCLUSIONS RELATED TO THE THEORETICAL OBJECTIVES**

The primary objective of the study was split into secondary objectives comprising theoretical and empirical objectives. The theoretical objectives of the study were as follows:

- i. To review literature on SMEs developments.
- ii. To conceptualise people-centred KMSs, namely, CoPs, innovation management, organisational culture and social capital from literature.
- iii. To conceptualise knowledge sharing from literature.
- iv. To conceptualise SCP and its sub-factors, namely, TRP, RRP, CRP and OQRP from literature.
- v. To examine literature on the KBV theory.

#### **7.3.1 Conclusions based on the SMEs’ developments**

The first theoretical objective concentrated on the review of literature on SMEs globally, but focus was directed towards SMEs in Zimbabwe and was addressed in the second chapter of the study. The chapter took a global analysis of SMEs where it emerged that definitional inconsistency and short-term survival have remained key challenges in SME studies. The challenges were cited as hindrances, which limited cross country research on SMEs and most authors recommended the need for standardisation of the definition and adoption of modern business practices as solutions. Evidence spanning over decades of research also confirmed that SMEs globally were more likely to fail within the first five years and were also faced with multiple operational and strategic challenges regardless of their high innovative capabilities. Modern business practices such as knowledge management, knowledge sharing, and SCP, though recommended in literature, were rarely being practiced within these SMEs, more so in



Zimbabwe. Unlike other business environments elsewhere, the Zimbabwean SME environment was highly uncertain and characterised by an unstable currency, inconsistent policies, difficulty in the doing business procedures and high tax rates, among others. There were high aspirations by the Zimbabwean government to rebuild the economy through the SME sector.

It also emerged that the Zimbabwean government had provided several support structures such as funding, training and supporting legal frameworks to improve SME sector survival and performance but with minimum success. Major problems emanating from the review showed that high failure rate resulted in SMEs being viewed by funding institutions as high-risk organisations, and there was a lack of standardisation of the SME definition due to utilisation of varying variables. The study, however, acknowledges that the attainment of a standardised SME definition and improved survival is important in ensuring that the SME sector fulfils its mandate of driving economic growth. The study therefore concludes that although governments in developing countries such as Zimbabwe are fully aware of the potential of SMEs in improving economic growth they have hitherto been recycling archaic business practices thereby failing to exploit the capability of the SME sector.

### **7.3.2 Conclusions related to literature on people-centred knowledge management systems**

The second theoretical objective placed emphasis on reviewing literature pertaining to people-centred KMSs and was attained in Chapter Three of the study. It emerged from the reviewed literature that KMSs are becoming key systems particularly in the advent of knowledge-based economies. It was established that information management is not necessarily knowledge management but rather information management precedes knowledge management. In light of conceptualising people-centred KMSs, most studies introduced the concept from either an organisational or generalised approach. The organisational perspective categorises knowledge as tacit and explicit, with these two branches exerting a direct influence on how knowledge sharing will be conducted within organisations. Tacit knowledge was confirmed as being more people oriented and thus the entry level of knowledge management adoption since it cannot be easily managed through an IT-based system. Explicit knowledge, on the other hand, is well codified and can be better managed using IT-based systems. Thus, it emerged that failure to strategically blend the two KMSs may lead to limitations in fully managing organisational

knowledge for better performance. IT-centred KMSs based on artificial intelligence, machine learning, fuzzy logic, data mining, case-based reasoning and knowledge discovery were highlighted as efforts meant to do away with people-centred KMSs but to no avail due to the importance of people in managing organisational knowledge.

SMEs were presented as possessing more tacit knowledge and less explicit knowledge. Most SMEs that had adopted a KMS were leap frogging from information systems to IT-centred KMSs without first adopting people-centred KMSs. Their efforts to embrace KMSs were failing because of the stated approach and also they did not consider blending the two KMSs for better performance. The adoption approach further left the SMEs with limited capability to utilise the complex technologies in the KMS, therefore poor results ensued. Additionally, nearly all the existing IT-centred KMSs were said to have been developed for large organisational environments and thus they could not fully address primary SME knowledge management prerequisites.

Literature indicated that people-centred KMSs were less costly to implement and were associated with skills that most SMEs already possessed. An understanding of people-centred KMSs was also cited as a skill that organisations should attain before migrating to IT-centred KMSs. As such, people-centred KMSs could be used by the SMEs as a springboard for the adoption of IT-centred KMSs since the SMEs lack the skills and experience required in the implementation and utilisation of most IT-centred KMSs. The most commonly adopted people-centred KMS within the SME sector in developing countries, though not explicitly stated, were CoPs, innovation management, organisational culture and social capital. All the foregoing people-centred KMSs were suggested as predictors of knowledge sharing in an organisation (Bolisani & Scarso, 2014:366; Aljuwaiber, 2016:733; Chatzoglou & Chatzoudes, 2016:320; Hyder & Lussier, 2016:80). The conclusions on each of the identified people-centred KMSs and their influence on knowledge sharing are discussed in detail in the succeeding subsections.

### **7.3.2.1 Conclusions on literature related to communities of practice**

The review in this section was based on CoPs as a people-centred KMS. The literature review revealed that CoPs were being implemented as both people-centred and IT-centred KMSs

within SMEs depending on the level of technological development. In developed countries, virtual CoPs were being utilised while developing countries relied more on face-to-face approaches due to technological limitations. CoPs emerged in literature as one of the most adopted people-centred KMSs in SME organisations. The study also revealed that face-to-face meetings, trust, and positive affect were some of the important factors that when they exist among members within CoPs, will improve the level of knowledge sharing.

Literature singled out trust as a prerequisite for attaining successful CoPs. The review also showed that organisations were implementing CoPs to increase their knowledge sharing activities and, in some instances, to manage an uncertain supply chain. The review cited lack of trust, high employees' attrition and employee behaviour as some key challenges that limit the effectiveness of CoPs in influencing knowledge sharing in developing countries. Nevertheless, the study recognises that CoPs were used as a key tool in unifying people, knowledge and experiences in order to improve knowledge sharing within the SME sector. Thus, the study concludes that the collaboration of supply chain members within CoPs as people-centred KMSs, helps improve knowledge sharing within the SME sector in developing countries.

### **7.3.2.2 Conclusions on literature related to innovation management**

The review here was focused on innovation management as a people-centred KMS. The literature review indicated that SMEs were specialised innovators, but they lacked strategic management skills in their innovation practices, as such, they placed less value on innovation management. It emerged that the greater number of SMEs lacked strategic direction and thus viewed knowledge sharing as a method of improving innovation practices. A few studies revealed that SMEs that adopted strategic innovation were contrary to the foregoing common view and held that innovation was a tool for improving knowledge sharing. The results from the later studies indicated that if SMEs adopt innovation management, they can effectively utilise their innovation strength to improve knowledge sharing and resultantly SCP.

The study recognises that a non-strategic approach to innovation is the major cause of knowledge hoarding since innovation will be viewed as a competitive advantage that should be protected. The study also acknowledges that to improve knowledge sharing, SMEs must

strategically manage innovation and by so doing they improve SCP. The study therefore concludes that SMEs in developing countries can sufficiently increase their knowledge sharing activities through utilising innovation management as a people-centred knowledge management system.

### **7.3.2.3 Conclusions on literature related to organisational culture**

The section conducted a review of literature on organisational culture as a people-centred KMS. It emerged that organisational culture impacts on knowledge sharing within SMEs in developing countries. Organisational culture was depicted as collected or individual values, beliefs and artifacts, which place the concept as more oriented to people than technology. The literature revealed that organisational culture can determine technological acceptance thereby making people-centred knowledge management more influential than IT-centred KMSs in enhancing knowledge sharing.

The review recognises that organisational culture, such as members' value, protection of one's position, technological background and discrimination influences the level of knowledge sharing within an organisation. It was revealed that SMEs that have an innovation culture are more likely to share knowledge than those that do not practice such a culture. However, the study acknowledges that studies that focus on knowledge-based organisational culture are still limited within SMEs particularly those studies that adopt a process-based perspective. The study also accepts that a knowledge-centred culture that is anchored on trust improves knowledge sharing within SMEs in developing countries. Therefore, this study concludes that nurturing of effective organisational cultures as part of people-centred KMSs can improve knowledge sharing within the SME sector in developing countries.

### **7.3.2.4 Conclusions on literature related to social capital**

The last people-centred KMS to be reviewed was social capital. The study acknowledged the necessity of implementing social capital as a people-centred knowledge management system in the SME sector. It emerged that social capital dimensions such as structural, relational and cognitive, influence the level of knowledge sharing in an organisation. The literature revealed that social capital creates a conducive environment for the sharing of knowledge, which then

improves organisational performance. The study accepts that the utilisation of social capital as a people-centred KMS improves knowledge sharing, though this assumption has not been empirically proven as true in the SME sector within developing countries. The study therefore concludes that effective knowledge sharing within the SME sector can be attained through the adoption of social capital as a people-centred knowledge management system.

### **7.3.3 Conclusions on literature related to knowledge sharing**

The objective to conceptualise knowledge sharing as outlined in extant literature was addressed in Chapter Four of the study. In the review on knowledge sharing, it emerged that there were various definitions of knowledge sharing, hence a definition was derived and used for the study. Trust was identified as the primary antecedent in promoting knowledge sharing regardless of whether the KMS used was people-centred or IT-centred. It was also unearthed that over and above facilitating tacit-explicit knowledge conversion, knowledge sharing amongst employees is always the most important knowledge management phase compared to other, less important phases such as knowledge creation, capturing and storage.

Conclusively, the discourse presented knowledge sharing as a people-centred activity, which can never be absolutely implemented using technology thereby proving the importance of people in influencing knowledge sharing activities within an SME organisation. Consequently, discussions on the SME context revealed that knowledge sharing was a new concept in the sector, was highly unstructured, based on manual interaction and knowledge was mainly tacit. The review accepts that through knowledge sharing, SMEs can improve their SCP, however, such success can best be achieved when the process-based approach to SCP is adopted. It is therefore concluded that knowledge sharing, if implemented in knowledge-based supply chains, using the process-based approach, will improve the SCP of the SME sector.

### **7.3.4 Conclusions on literature related to supply chain performance**

The fourth theoretical objective focused on carrying out a literature review on SCP with emphasis on the SME sector. Literature revealed that partner collaboration was the best approach to successful SCM, thus linking supply chains to knowledge sharing. It was also indicated that SCP had been defined and measured in various ways, but the process-based

approach which integrates KMSs in supply chains was lacking in extant literature. Also, SCP studies had focused more on the network-based approach, which had reached maturity, but the process-based approach was in its infancy and had limited literature support. It is thus concluded that the network-based approach to SCP is losing validity in the modern knowledge-based economies. Regarding SCP constructs that adopted the process-based approach, those identified were CRP, TRP, RRP and OQRP as discussed forthwith. The study therefore draws the following conclusions:

#### **7.3.4.1 Conclusions on literature associated with time-related performance**

The review in this section was aimed at conceptualising TRP. The study acknowledges the importance of sharing TRP knowledge from a process-based supply chain perspective. The study revealed that knowledge sharing improves the efficiency of the supply chain as it helps reduce the lead time and delivery time. The study therefore concurs that by using knowledge sharing, SMEs can improve their TRP. The study concludes that SMEs that share TRP knowledge through people-centred KMSs are likely to experience an improvement in their SCP.

#### **7.3.4.2 Conclusions on literature associated with cost-related performance**

The review conducted focused on conceptualising CRP. The study recognises that the sharing of CRP knowledge from a process-based dimension is essential in the SME sector in developing countries. The study revealed that the sharing of cost-related SCK allows the SMEs to conduct effective cost benefit analysis, which leads to better supply chain decisions and reduced risks. The study accepts that if SMEs have better CRP knowledge, they will improve SCP. The study thus concludes that sharing of CRP knowledge through people-centred KMSs is likely to improve SCP in the SME sector in developing countries.

#### **7.3.4.3 Conclusions on literature associated with responsiveness-related performance**

The review was aimed at conceptualising RRP. The review accepts the importance of RRP particularly in uncertain supply chains. The literature revealed that by sharing RRP knowledge, SMEs are able to respond effectively to disruption in both the external and internal business environment. The study accepts that SMEs that share RRP knowledge are more likely to attain

improved SCP. It is therefore concluded that when SMEs in developing countries share RRP knowledge they will increase their SCP.

#### **7.3.4.4 Conclusions on literature associated with operation quality-related performance**

The section reviewed literature on OQRP. The review revealed that OQRP was important in improving the global competitiveness of SME products. However, it emerged that most SMEs in developing countries were not considering OQRP as an important concept. The review revealed that SMEs in developing countries were not worried about quality because they lacked modern production machinery coupled with demand and supply factors in which they could not meet the market demand. It also emerged that the SME products were not competitive globally because of poor quality. The study recognises that by sharing OQRP knowledge, SMEs in developing countries are more likely to improve on SCP. Accordingly, it is concluded that the sharing of OQRP knowledge about the supply chain using people-centred KMSs can improve SCP.

#### **7.3.4 Conclusions on literature associated with the knowledge-based view theory**

The fifth and last theoretical objective directed emphasis towards reviewing literature pertaining to the KBV theory, which was the underlying theory of the study. Hitherto, the knowledge-based theory has been acknowledged as an off-shoot of the RBV, which has been more appropriate for emerging knowledge economies. It surfaced that the knowledge-based theory emphasises that organisations exist to create, transfer and transform knowledge to survive in a highly competitive and turbulent environment. Regarding the utilisation of the KBV theory in knowledge-based supply chains, the study recognises that the network-based approach to SCP has been extensively researched. However, though mature, the network-based approach lacked support and the process-based approach is still in its infancy. The review indicated that when organisational knowledge is shared, SMEs can survive in uncertain supply chains and are also able to extend their existence.

It emerged that sustainability in the modern economy is no longer dependant on the abundance of physical resources but on knowledge superiority. It was also shown that the major difference between the RBV and the KBV theories was that the earlier treats knowledge as a resource that

must be protected while the later advocates for the open sharing of knowledge. The study advances that knowledge sharing is important for the improvement of SCP within SMEs in developing countries thereby making the KBV theory very appropriate for the study. The study accepts that knowledge sharing, or knowledge transfer is a key phase in the management of SCK. The review revealed a mediatory role of knowledge sharing on the two study constructs, namely, people-centred KMSs and SCP. The study therefore concludes that the KBV theory was in conformity with the study and thus relevant to be adopted as the main theory guiding the study.

#### **7.4 CONCLUSIONS RELATED TO THE EMPIRICAL OBJECTIVES**

Similar to the previous section on conclusions related to theoretical objectives, the following section provides conclusions based on the empirical objectives, which were set out as follows:

- i. To establish the socio-demographic factors that can predict SME life span.
- ii. To assess the perceptions of SME employees regarding implementation of knowledge management practices in their sector.
- iii. To examine the perceptions of SME employees regarding the level of knowledge sharing in their sector.
- iv. To establish the perceptions of SME employees regarding the level of SCP in their sector.
- v. To determine the influence of people-centred KMSs on knowledge sharing in the Zimbabwean SME sector.
- vi. To determine how knowledge sharing influences SCP in the Zimbabwean SME sector.
- vii. To determine the mediating effect of knowledge sharing on people-centred KMSs and SCP in the Zimbabwean SME sector.
- viii. To develop a model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector.

##### **7.4.1 Conclusions regarding the establishment of the socio-demographic factors that can predict SME life span**

The first empirical objective was concerned with establishing the socio-demographic factors that can predict SME life span. SME studies have continued to report SMEs as organisations



that do not survive for long periods compared to large organisations. There has been limited effort that has been directed towards proffering solutions to the long-standing challenge of short life span. However, the study accepts that the understanding of such factors can help business professionals on the best approaches to perpetuate SME existence. In order to address this objective, the socio-demographic responses from SME employees were used to compute cross tabulations and correlations on work experience and years in existence; qualification and years in existence; nationality and years in existence. Similarly, computations related to the business profile were on number of employees and years in existence, and nature of business and years in existence. The Kendall's rank order correlation coefficient (Kendall's tau) was used to ascertain the reliability of results.

The obtained results revealed that SME employee work experience, highest qualification, and nationality together with SME business sector are significant factors that can be used to predict the life span of an SME. The results also revealed that factors such as location, number of employees and annual turnover were not significant predictors of SME business life span due to their instability arising from the uncertainty in the supply chain. The outcome accepts that SMEs being managed or owned by employees possessing good work experience, a diploma qualification or better and being of indigenous nationality had a high chance of running SMEs that survive beyond the first five years. The results also showed that the SME sector determines the survival period with the manufacturing sector being dominant. The results led to the conclusion that SME survival in Zimbabwe can be predicted using both SME employee and business profile factors considered in this study, thereby allowing for more relevant support structures being availed to the SME sector.

#### **7.4.2 Conclusions regarding the perceptions of SME employees in the implementation of knowledge management practices in their sector**

The second empirical objective was aimed at understanding the perceptions of the SME employees of the implementation of knowledge management practices in their sector. The objective focused on the respondent perceptions of the four people-centred KMSs, namely, CoPs, innovation management, organisational culture and social capital, knowledge sharing and the four SCP sub-factors, namely, TRP, RRP, CRP and OQRP. To achieve the objective,

descriptive statistics such as mean scores and standard deviations for each research construct were analysed using SPSS 25.0.

#### **7.4.2.1 Perceptions regarding people-centred knowledge management systems**

The Zimbabwean SME employees perceived CoPs, innovation management and organisational culture as usable people-centred KMSs to achieve knowledge sharing. However, social capital was not perceived as a usable people-centred knowledge management system. The Zimbabwean SMEs perceived themselves as possessing the capacity and capability to adopt and implement people-centred KMS

and were not as equipped for IT-centred KMSs, most likely due to technology-related challenges. This leads to the conclusion that CoPs, innovation management and organisational culture are valid people-centred KMSs that can be adopted within the Zimbabwean SME sector. The perceptions on each of the predictor sub-constructs are discussed below.

##### **7.4.2.1.1 Perception regarding communities of practice**

The SME employees confirmed that CoPs have remained one of the primary methods of knowledge sharing within the Zimbabwean SME sector. As such, Zimbabwean SME employees perceived CoPs as an important vehicle for sharing organisational knowledge through methods such as specialist support groups, positive affect by group leaders, and face-to-face meetings. They also showed that specialist support groups and face-to-face meetings were fundamental in the success of CoPs as a knowledge sharing tool. They further indicated that positive affect from leaders was not being employed to encourage knowledge sharing. Also, over and above IT-centred approaches being greatly hindered by non-availability of relevant technology infrastructure, they were viewed as causing knowledge leakage to competitors. Furthermore, the results show that there are differences in the way the Zimbabwean SME sector approaches CoPs. Unlike other SME sectors that are driving towards an IT-centred approach, the sector prefers a more people-centred approach.

The results further show the need for trust as indicated by the emphasis on physical contact through face-to-face meetings. The SME employees perceived knowledge as a resource that must not be shared with other organisations indicating that the sector was still utilising a RBV

theory. The KBV theory, however, advocates for the separating of organisational knowledge from SCK of which an open sharing of such knowledge must be practiced while organisational knowledge is protected. It can be concluded that formalised CoPs that adopt a KBV theory are effective people-centred KMSs that the Zimbabwean SME sector can adopt to improve the sharing of SCK. However, such CoPs are lacking in the Zimbabwean SME sector, which limits the effectiveness of these people-centred KMSs in improving knowledge sharing and resultant SCP.

#### **7.4.2.1.2 Perception regarding innovation management**

The Zimbabwean SME employees perceived innovation as a necessary strategy to cope with the supply chain environment. However, the SME employees showed that there was no strategic approach to innovation practices that were being conducted in the Zimbabwean SME sector. The strategic dimension of innovation was not being practiced in Zimbabwe most likely because SMEs as noted earlier still adopted a resource-based view theory approach which does not separate SCK from organisational knowledge. The SMEs perceived the sector as lacking necessary structures and policies that protect organisational innovations. As such, sharing of innovation management knowledge was perceived as a risk to organisational survival. The SME employees as a consequence, lacked the capability to categorise their innovation knowledge into supply chain innovation knowledge and organisational innovation knowledge. It is therefore concluded that the Zimbabwean SME employees lack the required experience to effectively implement innovation management while the entire sector has no clearly defined policies for innovation management. Such a situation presents a limitation in the implementation of innovation management as a people-centred KMS that improves both knowledge sharing and SCP.

#### **7.4.2.1.3 Perception regarding organisational culture**

The Zimbabwean SME employees perceived that organisational culture was important in influencing knowledge sharing in the SME sector. The Zimbabwean SME sector was practicing a knowledge hoarding culture, in which employees that hoard knowledge were being commended. The culture still confirms a RBV ideology although knowledge sharing as promoted in the KBV theory is the better approach in knowledge-based supply chains. SME

employees were discouraging knowledge sharing particularly with other organisations thereby affecting the efficiency and effectiveness of the supply chain.

The SME employees exuded people-centred KMSs, knowledge sharing and SCP as independent activities in their culture, which ended up impacting negatively on the entire SCP. Consequently, it is concluded that the SME employees in Zimbabwe lack the cultural knowhow on the KBV theory and how it can be adopted to integrate the three concepts to achieve improved SCP. As such, the culture they are practicing promotes organisational performance which assures short term existence while destroying SCP, which assures long term existence.

#### **7.4.2.1.4 Perception regarding social capital**

The SME employees in Zimbabwe perceived that social capital was not being considered as a means for sharing knowledge in the SME sector. Although the SME employees realised the importance of social capital they perceived it as of less value. The SME employees did not see the value in social capital since they were only sharing organisational knowledge and SCK was not being shared. However, by sharing SCK, the SME employees will realise social capital from knowledge sharing activities. It is therefore concluded that by engaging in a knowledge hoarding culture, Zimbabwean SMEs were failing to value social capital as a people-centred KMS. Therefore, the SME employees are failing to grasp the need for knowledge sharing since they do not associate any value with the activity.

#### **7.4.2.2 Conclusions regarding the perceptions of SME employees on the level of knowledge sharing in their sector**

The Zimbabwean SME employees perceived that knowledge sharing was necessary in achieving SCP in the SME sector. The sector was only sharing knowledge internally and external knowledge sharing was being discouraged. The sharing of knowledge remained a threat that would compromise the SMEs' competitiveness. Knowledge sharing was considered by the SME employees as an inevitable process in the improvement of the entire supply chain but with limited understanding of the kind of knowledge to be shared. However, the SME employees viewed knowledge sharing as a tool to improve innovation, CoPs and organisational culture. It is therefore concluded that the SME employees wrongly adopted knowledge sharing

as a predictor of people-centred KMSs and yet SCP is improved when people-centred KMSs predict knowledge sharing. The SME employees perceived knowledge sharing as a means to understand the costs in the business environment and not the SCK. It is further concluded that the approach impacts negatively on the effectiveness of people-centred KMSs within knowledge-based supply chains.

### **7.4.2.3 Conclusions regarding the perceptions of SME employees regarding the level of supply chain performance in their sector**

The Zimbabwean SME employees perceived TRP, RRP and CRP as sub-factors of SCP. However, OQRP was not perceived as a SCP sub-factor. This leads to the conclusion that TRP, RRP and CRP are valid SCP sub-factors that can be adopted within the Zimbabwean SME sector. The perceptions on each of the outcome sub-constructs are discussed next.

#### **7.4.2.3.1 Perception regarding time-related performance**

The Zimbabwean SME employees perceived that TRP was an important sub-factor that can determine the SCP of the SME sector in Zimbabwe. The sector perceived that time-related factors such as processing lead time, delivery lead time and cash-to-cash cycle were critical in attaining TRP. The SME employees were concerned with adjusting to the uncertainty in the environment more than adopting strategic knowledge-based supply chains that emphasise sharing critical process-based SCK.

The SME employees lack a supply chain-oriented approach as shown by their increased focus on time-related factors that guarantee organisational level performance while ignoring factors that ensure sustainable performance of the entire supply chain. Knowledge sharing was hence reduced to sharing quicker ways of value adding to finished goods than supporting supply chain activities, which were perceived to lead to losses due to increased lead times. Such knowledge, however, when shared does not support SCP activities as it showed that sharing was being done selfishly to benefit from the uncertainty in the supply chain even without production. Thus, it is concluded that the SME employees in Zimbabwe lacked basic knowledge of the time-related supply chain practices that improve supply chain level time-related knowledge. As such, the

time-related knowledge they are sharing does not help them improve their SCP as they failed to share other critical time-related supply chain factors such as production lead time.

#### **7.4.2.3.2 Perception regarding responsiveness-related performance**

The Zimbabwean SME employees perceived that RRP was an important SCP sub-factor in the Zimbabwean SME sector. The Zimbabwean SME employees also perceived that flexibility, resilience and agility were key factors in achieving RRP within the sector. There was a visible supply chain uncertainty management dimension thereby deviating focus from the primary SCP activities. Accordingly, environmental scanning can be viewed as a moderating factor in knowledge-based supply chains operating under an uncertain environment. Environmental knowledge sharing is also shown as not being dependent on the existence of trust since this knowledge was being shared with other organisations without restriction. The SME employees were only responding to environmental uncertainty while failing to respond to supply chain activities, therefore they were only improving at organisation level but failing at supply chain level. Such a condition results in successful SMEs being indirectly affected when downstream or upstream supply chain members close down due to non-availability of SCK. Therefore, it is concluded that the SME employees in Zimbabwe did not respond to activities that impact negatively on the entire supply chain but only to those that directly affected them, hence their demise as the lack of SCK impacts negatively on key partners.

#### **7.4.2.3.3 Perception regarding cost-related performance**

The Zimbabwean SME employees perceived that CRP was neutral and did not exert visible influence on SCP although they concurred it was significant. The Zimbabwean SME sector perceived that supply chain productivity and supply chain efficiency were important to them, and supply chain efficiency was more important since they were concentrating on finished products. Factors such as return on investment and profitability were lowly rated by the Zimbabwean SMEs. The SME employees were not effectively sharing CRP knowledge and consequently cost was not supportive of the entire supply chain since some SMEs were intending to benefit from low charges from members of the supply chain. Therefore, non-availability of relevant cost-related SCK impacted negatively on the survivability of SMEs. It

is therefore concluded that the SME employees in the Zimbabwean SME sector do not value cost-related SCK, which presents survival challenges to the sector that results from poor SCP.

#### **7.4.2.3.4 Perception regarding operation quality-related performance**

The SME employees in Zimbabwe perceived that OQRP was not considered as a SCP sub-factor in the SME sector. The SME employees confirmed the importance of OQRP although they perceived it as of less value in their supply chain activities. The SME employees did not recognise the importance of sharing OQRP since they were mostly dealing with imported finished products. However, by failing to share operation quality-related SCK, the SME employees were selling poor quality products that affected their brands indirectly. It is, however, noteworthy that provision of quality products ensures survivability of the organisation and the entire supply chain. It is therefore concluded that by failing to recognise OQRP as a significant SCP sub-factor, Zimbabwean SMEs will fail to compete locally and globally thereby shortening their existence.

#### **7.4.5 Conclusions regarding the influence of people-centred knowledge management systems on knowledge sharing in the Zimbabwean SME sector**

The fifth empirical objective focused on the influence of people-centred KMSs on knowledge sharing in the Zimbabwean SME sector. To address this objective, a structured questionnaire consisting of mixed five-point and seven-point scales adapted from literature was used to elicit data from selected SME employees who understood knowledge management, ICT and supply chain in the Zimbabwean SME sector. The data were then subjected to a structural equation modelling (SEM) procedure followed subsequently by a multiple linear regression analysis to test and confirm the hypothesised relationships between the four people-centred KMSs (CoPs, innovation management, organisational culture and social capital) and knowledge sharing. The nature of the model was considered complex and it was therefore expected that SEM model fit indices would be sensitive to this factor as outlined in literature, hence the complimentary testing using multiple linear regression.

The results of the study indicate that CoPs exert a significant and strong positive influence on knowledge sharing. Also, amongst all the people-centred KMSs considered in the study, CoPs exerted the largest influence as a predictor of knowledge sharing. The results further showed that the CoP factors were face-to-face meetings, specialist groups and positive affect, showing that activities were more people-centred and less IT-centred as seen by the non-utilisation of virtual CoPs. The SMEs seemed to start by sharing internal knowledge in informal face-to-face environments composed of specialists in their area and the level of sharing would increase if positive affect was practiced. It is therefore concluded that the implementation of CoPs as people-centred KMSs by the Zimbabwean SMEs increases the level of internal knowledge sharing and so presents a challenge in terms of SCK sharing.

The results of the study also show that innovation management exerts a significant and moderate negative influence on knowledge sharing. The results further indicate that innovation management factors include environmental adaptation, process improvement, problem solving and new product development practices and these influenced a decrease in knowledge sharing. The SMEs seemed to first focus on innovation management practices that enabled them to adapt to the environment and if they succeeded they then moved to process improvement practices, suggesting they relied on the process-based approach to SCP versus a network-based approach. Problem solving and new product development were treated as peripheral activities, suggesting a minor focus on manufacturing and a stronger focus on importation or buying of finished products. The results also showed that innovation management was the second most important predictor of knowledge sharing after CoPs. This leads to the conclusion that innovation management within Zimbabwean SME organisations, though important, leads to a reduction in knowledge sharing. The reduction was most likely due to failure to adopt a strategic approach to innovation, which advocates for sharing of supply chain-related innovation knowledge. A more desirable environment would be one that promotes innovation management where SCK is shared to improve the performance of the entire supply chain.

The results additionally show that organisational culture exerts a significant and weak negative influence on knowledge sharing. Hence, the organisational culture activities within the Zimbabwean SME sector led to a reduction in the sharing of SCK. The SMEs seemed to have limited ability to separate organisational knowledge (which must be protected) from SCK (which must be shared). The results also show that organisational culture factors include trust and knowledge hoarding. There seemed to be a lack of trust amongst SME supply chain



members and this led to hoarding of knowledge, which influenced unofficial methods of knowledge sharing. It was also shown that organisational culture is the third most important predictor of knowledge sharing, which when based on lack of trust motivates knowledge hoarding and hence presents a negative influence on knowledge sharing. This leads to the conclusion that in knowledge-based supply chains, an organisational culture that promotes lack of trust and knowledge hoarding leads to a reduction in knowledge sharing levels. However, the most appropriate culture would be one that is anchored on trust and sharing of SCK amongst supply chain members.

Additionally, the results showed that social capital, although identified as a people-centred knowledge management system, exerted an insignificant and positive influence on knowledge sharing in the SME sector. The knowledge sharing activities in the Zimbabwean SME sector were independent of social capital; as such, social capital cannot predict the level of knowledge sharing amongst the SMEs. In line with this result, this study concludes that implementing social capital as a people-centred KMS does not yield reliable results in knowledge-based supply chains and this outcome was probably influenced by other factors that were not considered in this study, mainly the uncertainty of the supply chain.

Regarding people-centred KMSs, the study concludes that Zimbabwean SMEs perceived these systems as a possible solution to SCP challenges. The SMEs also showed the necessary capabilities to adopt and implement people-centred KMSs. Additionally, CoPs still continue to achieve a positive influence on knowledge sharing regardless of the supply chain environment. However, innovation management and organisational culture exerted an inverted influence on knowledge sharing, most likely in response to the supply chain environment. In view of the results that the SMEs were sharing knowledge internally and not externally, it can be concluded that the SMEs implemented CoPs to share internal knowledge while organisational culture and innovation management were used to restrict external knowledge sharing. Therefore, this eclectic approach to people-centred KMSs was being practiced to achieve the desired knowledge sharing outcomes that were believed to manage the uncertainty in the supply chain. The Zimbabwean SMEs, by so doing, therefore showed limited understanding of how the sharing of SCK to other supply chain members would improve their performance and perpetuate their existence. For that reason, a more desirable scenario would be a strategic approach that utilises all the identified people-centred KMSs in influencing an improvement in the sharing of SCK.

#### **7.4.6 Conclusions regarding the influence of knowledge sharing on supply chain performance in the Zimbabwean SME sector**

The sixth empirical objective focused on the influence of knowledge sharing on SCP. Based on literature evidence, the network-based approach and the process-based approach to SCP were considered. The same testing methods outlined in Section 7.4.5 were used to establish the hypothesised relationships on the constructs. The results of the study indicate that knowledge sharing exerts a significant and moderate positive influence on TRP. The results imply that as SMEs engaged in knowledge sharing, TRP was increasing instead of reducing. Also, amongst all the process-based SCP sub-factors considered in the study knowledge sharing exerted the largest influence on TRP. The results further showed that the time-related activities factor included processing lead time, delivery lead time, and cash-to-cash cycle. Therefore, the SMEs' knowledge sharing activities seemed to be aimed at influencing reduction in processing lead time followed by delivery lead time to achieve the desirable cash-to-cash cycle; instead the lead times increased with the knowledge shared. The outcome is suggesting that the SMEs were most likely not sharing relevant SCK as shown by an increase in lead times instead of a decrease. It is therefore concluded that the knowledge that was being shared by the SMEs led to an increase in TRP, most probably because the knowledge did not relate to the supply chain. However, the most suitable situation will be to have the knowledge sharing activities reducing the TRP factors.

The results of the study also show that knowledge sharing exerts a significant and weak negative influence on RRP. The results indicate that RRP factors include flexibility, agility and resilience. The knowledge sharing activities by the SMEs seemed to reduce supply chain flexibility making the SMEs less agile and fail to be resilient to the supply chain environment, most probably for lack of SCK. The results also showed that RRP was the second most important process-based SCP outcome predicted by knowledge sharing after TRP. This leads to the conclusion that the knowledge sharing activities by the SMEs did not conform to knowledge-based supply chain principles since they led to a reduction in RRP activities within the Zimbabwean SME sector and most likely also reduced the existence of the SMEs. Nevertheless, knowledge sharing activities that conform to knowledge-based supply chains

support the sharing of SCK instead of organisational knowledge, which, in turn, increases RRP factors.

The results further show that knowledge sharing exerts a significant and weak negative influence on CRP. The results indicate two CRP factors, which include supply chain productivity and supply chain efficiency. The knowledge sharing practices by the SMEs seemed to reduce supply chain productivity and efficiency probably because such SCK was not being shared at all. It was also shown that CRP is the third most important process-based SCP outcome predicted by knowledge sharing. This leads to the conclusion that the Zimbabwean SMEs shared organisational knowledge that did not promote supply chain productivity and efficiency, as such, these cost-related factors were reducing. However, sharing of SCK should lead to the desired increase in CRP factors.

Additionally, the results showed that OQRP, although identified as a process-based SCP sub-factor, was not in any way being predicted by knowledge sharing. Consequently, this study concludes that knowledge sharing does not influence OQRP in uncertain knowledge-based supply chains. The Zimbabwean SMEs seem to have less interest in manufacturing of products and most probably this could have influenced the results in which knowledge sharing was not viewed as a predictor of OQRP. Regarding knowledge sharing and SCP, the study concludes that the influence of knowledge sharing is realised when adopting the process-based SCP with alternating effects, most probably due to the unconsidered influence of supply chain uncertainty. However, a more desirable situation would be to consider supply chain uncertainty as a moderating factor and achieve consistent positive influence, which leads to improved supply chain-wide performance.

#### **7.4.7 Conclusions regarding the mediating effect of knowledge sharing on people-centred knowledge management systems and supply chain performance in the Zimbabwean SME sector**

The seventh empirical objective directs emphasis towards establishing the mediating effect of knowledge sharing on people-centred KMSs and SCP. The network-based approach and the process-based approach to SCP were considered. The tests used to achieve this objective included the path analysis and multiple linear regressions in which direct and indirect

relationships were tested for significance. The results of the study showed that the network-based approach to SCP just as in previous tests was insignificant for both direct and indirect relationships. The results also indicated that when adopting the process-based approach to SCP, all the direct relationships were insignificant, and significance was realised on all indirect relationships except one.

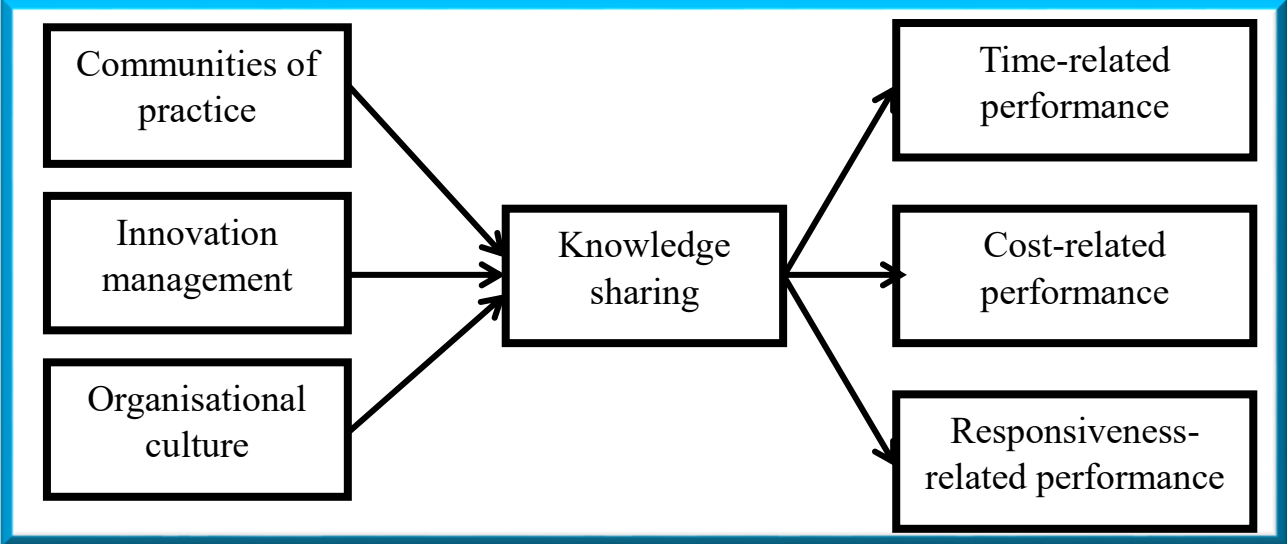
Additionally, in terms of people-centred KMSs, the results showed that CoPs can be used independently to give a positive mediation effect while innovation management and organisational culture are combined to achieve a negative mediation. This triggers firstly, the conclusion that a network-based approach to SCP is not supported in knowledge-based supply chains and also that in process-based SCP, knowledge sharing provides a full mediation effect on people-centred KMSs. Secondly, CoPs can be implemented independently as people-centred KMSs to promote a positive full mediation of knowledge sharing on SCP while innovation management and organisational culture can be utilised to achieve a negative full mediation of knowledge sharing on SCP.

#### **7.4.8 Conclusions regarding the development of a model for the maximisation of people-centred KMSs, knowledge sharing and supply chain performance in the Zimbabwean SME sector**

The eighth empirical objective focused on reaching conclusions on the usability of the conceptual model for the maximisation of people-centred KMSs, knowledge sharing and SCP in the Zimbabwean SME sector. The ten proposed hypotheses were used to reach this conclusion based on the outcomes from the inferential statistical tests. The results obtained from the results and interpretation provide sufficient evidence for most of the hypotheses, namely, H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>5</sub>, H<sub>6</sub>, H<sub>7</sub>, H<sub>8</sub> and H<sub>10</sub> as presenting valid predictions although some of them provided inverted outcomes and this was attributed to the uncertainty in supply chains which was not considered in the study.

The results as discussed above provided enough evidence that CoPs, innovation management and organisational culture are predictors of knowledge sharing. The results also sufficiently showed that knowledge sharing is firstly, a valid predictor of TRP, CRP and RRP and secondly, provides full mediation on people-centred KMSs and SCP. The factor structure for each of the

study constructs was established and confirmed. It is therefore concluded that the confirmed predictions can constitute the knowledge-based supply chain model for adoption in the Zimbabwean SME sector as shown in Figure 7.1.



**Figure 7.1: Knowledge based supply chain model for SMEs in Zimbabwe**

Source: Research results

The model can be truly relevant to the Zimbabwean SME sector, which is still grappling to fully adopt information technology-based systems to be able to participate in the knowledge economy. The identified people-centred KMSs may be adopted into the SME sector with minimum technological requirements. CoPs may be set up at ministerial level and sector level to put relevant structures in place that support positive knowledge sharing. The CoPs that would have been established will then conduct training and seminars to inculcate a knowledge-based organisational culture and innovation management. The activities will increase the availability of SCK, which supply chain members will utilise to improve time-related performance, cost-related performance and responsiveness-related performance as detailed in the recommendations subsection.

**7.5 RECOMMENDATIONS**

The study results give sufficient evidence to suggest that implementation of people-centred KMSs in the Zimbabwean SME sector results in improved sharing of SCK, which in turn leads to increased SCP. It is therefore necessary to proffer recommendations that could guide SMEs

that intend to improve SCP through adopting knowledge-based supply chains that are anchored on people-centred KMSs.

### **7.5.1 Recommendations based on the socio-demographic factors that can predict SME life span**

The results of the study showed that SME employee factors such as work experience, qualifications and nationality as well as one SME business factor, namely, SME sector can be used to predict SME existence. The factors were extracted using data from all the country's ten provinces and the major recognised SME sectors, which suggests their universal application. The results also showed that quantitative factors, such as annual turnover and number of employees were losing meaning because of the inconsistency in the local currency and downsizing of employees by large companies. It is therefore recommended that the factors that were extracted be used as follows:

i. **Elimination of definitional inconsistencies.** Since there is no commonly agreed definition or categorisation of an SME in Zimbabwe with each sector using its own factors probably due to lack of universally applicable factors. The extracted factors have universal application and when combined together are likely to give a universally acceptable definition or categorisation that matches reality in the Zimbabwean SME sector.

ii. **Build confidence in funding institutions and support government strategic planning.** By using the extracted factors to predict SME life span, funding institutions may positively classify risk and non-risk SMEs. Similarly, government may be able to plan in terms of SME license allocation since SME employee nationality is a key factor and also in policy formulation. This may be achieved by the utilisation of the SME data tombs (idle and not effectively used data) in SME associations, government parastatals and ministries together with open source data mining software such as Weka, Rapid miner or Orange that can analyse the patterns in the data using the extracted factors and predict future performance or provide recommendations by classifying distressed SMEs that need support. The Business Skills Development directorate in the ministry of SMEs will be able to retrieve useful information from the SME data in their database. This will also be achieved by using the aforementioned data mining applications guided by the extracted factors to visualise SMEs SCP and plan for

funding and training that is relevant to the SME needs and so ensure their long term survival. In turn, financing institutions will gain confidence in providing financial support to the sector thereby increasing the sustainability of these SMEs. The ministry of SMEs will be able to direct resources where they really matter, thus the government support efforts will have an incremental performance effect on the SMEs, and so extend their existence.

### **7.5.2 Recommendations based on the relationship between people-centred knowledge management systems and knowledge sharing in the SME sector**

The results of the study also provided sufficient evidence to suggest that people-centred KMSs that include CoPs, innovation management and organisational culture can predict the level of knowledge sharing in the Zimbabwean SMEs supply chain. There was also evidence that social capital does not predict SCK sharing in the Zimbabwean SME sector. Furthermore, the Zimbabwean SMEs had system-to-system integration challenges in adopting supply chain-wide IT-centred KMSs. However, they were equipped to adopt and implement people-centred KMSs as a strategy to enhance knowledge sharing and resultantly SCP. People-centred KMSs were identified as the entry point for organisations that intend to adopt KMSs for the first time. Therefore, a full implementation of people-centred KMSs was considered in the theoretical review as necessary before migrating to IT-centred KMSs. Therefore, the following recommendations are put forward for each of the people-centred KMSs:

#### **7.5.2.1 Recommendations regarding communities of practice**

The results of the study indicate that CoPs are the most important predictor of knowledge sharing within Zimbabwean SMEs. CoPs were used to share organisational knowledge and not SCK. The extracted CoP factors were face-to-face meetings, specialist groups and positive affect while all computer-based CoP factors were insignificant. It is therefore recommended that:

- i. **SMEs intending to implement knowledge-based supply chains must prioritise people-centred communities of practice.** SMEs may not have the capability to roll out many people-centred KMSs at once, in such cases they must begin with CoPs since they were ranked as the most important systems. The SMEs may formally register their CoPs internally

as organisations and provide official face-to-face platforms for the sharing of SCK. They also need to consider utilising positive affect as a means to motivate their employees to openly share SCK. This approach will facilitate knowledge codification and also equip SMEs with the necessary framework for implementing other people-centred KMSs and even to easily migrate to IT-centred KMSs when the need arises.

ii. **Communities of practice be instituted at sector level to formalise knowledge sharing processes within the sector.** As it emerged that CoPs in the Zimbabwean SME sector were focused on organisational knowledge sharing, suggesting an informal approach which leads to negative SCP. The formulation of an SME supply chain management board under the Business Development directorate of the ministry of SMEs to oversee all CoPs will help formalise processes. Such formalisation of CoPs is most certainly going to eradicate fear, thus facilitating trust and resultantly increase the level of confidence among supply chain members. Once fear is removed and trust restored it is also going to improve knowledge sharing with other organisations to achieve the desired end state of improved SCP.

#### **7.5.2.2 Recommendations regarding innovation management**

The results of the study also show that innovation management is the second most important predictor of knowledge sharing. The results indicate that innovation management processes that were being practised by the Zimbabwean SMEs led to a reduction in knowledge sharing within the supply chain. Innovation management factors were identified as environmental adaptation, process improvement, problem solving practices and new product development in their order of importance. However, it was also clear that downplaying new product development hinders manufacturing efforts, which are necessary for the long-term survival of the SMEs. It is therefore recommended:

i. **Only SMEs that would have successfully implemented communities of practice should consider implementing innovation management.** SMEs that are adopting a phased approach to knowledge-based supply chain implementation should always ensure that they have first succeeded in implementing CoPs before considering innovation management. This way it will be easier to channel the innovation management knowledge through the existing CoPs and get better returns from knowledge sharing activities.



ii. **SMEs should prioritise innovations that support new product development.** The results from the extraction of factors showed that manufacturing was important in ensuring SME long term survival. Consequently, innovation management should be used to improve collaboration within the supply chain by promoting sharing of innovation knowledge, which will eventually mean the SMEs will achieve the nirvana of manufacturing gurus, i.e. the “sell one/make one” supply chain. SMEs should also consider prioritising new product development because the other factors such as environmental adaption and process improvement, which they considered as important, only ensures short term survival. Therefore, by focusing on new product development they will improve manufacturing, which is an important factor for long term survival.

ii. **SMEs receive training on knowledge-based supply chains.** SMEs need training on knowledge-based supply chains to enable them to distinguish SCK from organisational knowledge. This training may be achieved through the utilisation of existing structures such as SME associations and business skills development officers under the ministry of SMEs and coordinated by the supply chain management board. Once the SMEs are equipped with the ability to separate knowledge and understand the benefits of sharing SCK, they will freely share such knowledge, and this will increase SCP. This approach ensures that all the supply chain members will benefit from each other’s innovations thereby extending their existence.

iii. **An intellectual property policy be formulated and implemented.** The innovations by the SMEs will need to be protected and a model of how benefits may be derived after sharing innovation knowledge should be clearly outlined in such policies. This can be achieved by implementing effective intellectual property policies that will explain how the owner benefits if their innovations are utilised by other members of the supply chain. The supply chain management board would be mandated to register all innovations after which knowledge is shared to allow downstream benefits within the supply chain while the innovators get royalties from their knowledge. By so doing innovations will be converted to money-generating solutions and not competitive advantage and this will improve the sharing of such knowledge within the supply chain. The promulgation of such policies that outline how benefits may be gained from innovations will bring transparency into the innovation management processes and supply chain activities thereby increasing the sharing of SCK to improve performance.

### 7.5.2.3 Recommendations regarding organisational culture

The results additionally show that organisational culture is the third most important predictor of knowledge sharing, which exerts a negative influence as implemented by the Zimbabwean SMEs. The results indicate that organisational culture factors include knowledge hoarding and trust, but trust emerged in a negative context implying that there was no trust among supply chain members. A negative influence results in decreased knowledge sharing activities, which also negatively affects SCP. Therefore, it is recommended that:

- i. **Training on knowledge behaviour be conducted in all sectors.** SME employees need to be trained through seminars and workshops on the importance of maintaining a positive organisational culture, which promotes the sharing of SCK. The training would also discourage informal knowledge sharing methods and promote formal knowledge sharing, which benefits not only an individual organisation but all members of the supply chain. Such understanding will also discourage a knowledge hoarding culture and improve trust, which is a key factor for promoting knowledge sharing that, in turn, benefits the entire supply chain.
- ii. **Organisational culture should be implemented after communities of practice and innovation management.** The level of importance derived from the results shows that organisational culture as a people-centred knowledge management system must be implemented when both CoPs and innovation management are in existence. The extraction of knowledge hoarding and lack of trust as factors indicates some lack of understanding of knowledge-based supply chains. Hence, the establishment of the policies and structures that govern CoPs and innovation management will be the basis for eradicating knowledge sharing and building trust. Accordingly, organisational culture needs to come after CoPs and innovation management has been established as a people-centred KMS. The existence of the two people-centred KMSs will eliminate lack of trust, which then establishes the necessary environment for also doing away with knowledge hoarding.
- iii. **Practising a process-based knowledge sharing culture that emphasises knowledge capturing and storage.** The SME must practice a knowledge capturing and storage culture where meticulous recording of all the CoPs and innovation management activities are maintained in formal records. Storage of knowledge is important in people-centred KMSs as it helps preserve the supply chain and organisational knowledge. Usually the failure to handle knowledge through simple computer-based systems is then a benchmark for the need to migrate

to IT-centred KMSs. Such a culture ensures that the SMEs strategically adopt KMSs and reduce the failure rates associated with implementing KMSs within the sector.

#### **7.5.2.4 Recommendations regarding social capital**

Additionally, the results showed that social capital, although identified as a people-centred knowledge management system in literature, did not predict knowledge sharing in the SME sector. Nevertheless, the importance of this people-centred knowledge management system cannot be ignored. The existence of other unconsidered factors such as supply chain uncertainty could have affected the significance of this factor. Influence of supply chain uncertainty can be seen from inverted outcomes in the previously discussed people-centred KMSs and this could have cascaded to nullify the significance of social capital. Therefore, it is recommended that SMEs operating in stable supply chains should consider social capital as the fourth most important people-centred KMS. Once SMEs have successfully implemented CoPs, innovation management and organisational culture, they need to use evaluation methods to derive the value gained from the people-centred KMSs otherwise the process remains incomplete. The consideration of social capital will thus improve the SME employees understanding of the value they draw from sharing SCK thereby increasing the knowledge sharing levels, which is the ideal environment for improved SCP.

#### **7.5.3 Recommendations based on the relationship between knowledge sharing and supply chain performance in the SME sector**

The results of the study provided sufficient evidence to suggest that knowledge sharing that is anchored on people-centred KMSs influences process-based SCP sub-factors that include TRP, RRP and CRP in the Zimbabwean SME sector. There was also evidence that knowledge sharing does not influence OQRP in the Zimbabwean SME sector. Furthermore, the network-based SCP approach is not supported in knowledge-based supply chains. Knowledge-based supply chains that are built on people-centred KMSs can best be applied in the Zimbabwean SME sector to support supply chain-wide business-to-business transactions without challenges. However, the results for all the tests from the data showed inverted influences suggesting that there may be other factors that influenced such outcomes. The Zimbabwean SMEs could have lacked expertise and knowhow on knowledge-based supply chains, hence their failure to reap

supply chain benefits from the identified people-centred KMSs. Therefore, the following recommendations are put forward for each of the process-based SCP sub-factors:

#### **7.5.3.1 Recommendations regarding time-related performance**

The results of the study indicate that knowledge sharing predicts TRP and exerts a significant and moderate positive influence. The positive influence resulted in increased lead time which may have contributed to the high rate of failure within the sector. Amongst all the process-based SCP sub-factors considered in the study TRP exerted the largest influence. The results further showed that the TRP factors included processing lead time, delivery lead time, cash-to-cash cycle. It is recommended that:

- i. **SMEs adopt time-related performance to achieve the process-based approach to supply chain performance.** A process-based supply chain view by the SMEs will ensure that the knowledge sharing activities arising from the people-centred KMSs are well coordinated through formal structures. The positive influence here suggests a gap between the network-based approach and process-based approach, which influences organisational knowledge sharing and SCK sharing. Hence, by utilising people-centred knowledge management to achieve integrated collaboration of knowledge sharing throughout the supply chain from a process-based approach, negative factors such as knowledge hoarding will be eliminated thereby reducing the lead times.
- ii. **SMEs need to consider and utilise the extracted time-related performance factors.** Time related performance is a key factor in achieving improved SCP when implemented in knowledge-based supply chains that adopt a process-based perspective to SCP. The infusion of the KBV with TRP will enforce emphasis on the sharing of SCK, which in turn improves decision making processes. Once the relevant SCK is timeously supplied, the SMEs will manage to reduce the various lead times, which will improve their SCP and enhance both profitability and survival.

#### **7.5.3.2 Recommendations regarding responsiveness-related performance**

The results of the study also show that knowledge sharing predicts RRP and exerts a significant and weak negative influence. The results imply that although knowledge sharing could

significantly predict RRP in the current environment, it was yielding unwanted results, thus explaining the challenge in the Zimbabwean SME sector. The results indicate that RRP factors included flexibility, which is a key factor in the knowledge value chain, resilience and agility. The negative influence of knowledge sharing on flexibility meant that SMEs were losing out and not gaining any value from knowledge sharing, which also explains the insignificance of social capital as stated above. The results also showed that RRP was the second most important process-based SCP sub-factor after TRP. Considering the importance of RRP in the knowledge value chain it is recommended that:

- i. **SMEs adopt responsiveness-related performance as a means of achieving the process-based approach to supply chain performance.** The SMEs need to adopt RRP by adopting the process-based approach to SCP, which in turn improves supply chain responsiveness, which is necessary for realising value from the supply chain.
- ii. **The SMEs utilise the extracted factors, namely, flexibility, resilience and agility to strategically implement responsiveness.** This can be achieved by effective utilisation of people-centred KMSs to promote the sharing of SCK with all supply chain members instead of limiting knowledge sharing to members of the same organisation. By sharing SCK all members of the supply chain will have detailed knowledge of the supply chain environments allowing for flexibility, resilience and agility to the entire supply chain not just an individual organisation.

### **7.5.3.3 Recommendations regarding cost-related performance**

The results show that knowledge sharing predicts CRP and exerts a significant and weak negative influence. The negative influence implies that instead of knowledge sharing activities improving the CRP processes it was reducing them. The results also indicate that CRP factors include supply chain productivity, which is also a key factor in the knowledge value chain that promotes new product development as well as supply chain efficiency. It was also shown that CRP is the third most important process-based SCP sub-factor. It is recommended that:

- i. **SMEs adopt cost-related performance as a means of achieving the process-based approach to supply chain performance.** The SMEs need to implement CRP as the third most important factor after TRP and RRP. By prioritising CRP without strategic TRP and RRP

measures, SMEs' performance-related efforts were failing. Therefore, by observing the order of importance of the SCP factors, SMEs will yield realistic supply chain benefits instead of organisational benefits, which have indirect survival disadvantages resulting from struggling supply chain members.

ii. **SMEs direct their knowledge sharing efforts towards improving supply chain productivity and efficiency.** The improvement of these factors will ensure a sustainable SCP that eventually increases the existence of the SMEs. Such efforts can be achieved by ensuring that people-centred KMSs such as innovation management adhere to the process-based approach and encourages the sharing of innovation knowledge. The sharing of such knowledge entails that the entire supply chain benefits from innovations from members of the supply chain thereby building trust amongst the members and improving process quality.

#### **7.5.3.4 Recommendations regarding operation quality-related performance**

Additionally, the results showed that OQRP, although identified as a process-based SCP sub-factor, was not in any way being influenced by knowledge sharing. A number of reasons as discussed above could explain the foregoing outcome. It emerged from the RRP that the SMEs were realising negative value from the knowledge value chain, which certainly led to poor performance and probably invalidated the importance of quality. However, OQRP is a key factor that cannot be ignored in the global business environment. Regardless of the results, the following strategies may still ensure SMEs benefit from OQRP:

i. **SMEs adopt operation quality-related performance for improving supply chain processes quality.** Such a measure can be achieved by engaging in knowledge sharing activities that promote quality management at supply chain level in terms of product quality, forecasting accuracy and knowledge accuracy. This effort will improve the quality of the supply chain processes, which may increase manufacturing capability of the SMEs and also increase their export performance which is the intended outcome by major stakeholders such as government.

#### **7.5.4 Recommendations based on the mediating effect of knowledge sharing on people-centred knowledge management systems and supply chain performance.**

The results indicated that when adopting the process-based approach to SCP all the direct relationships were insignificant, and significance was realised on all indirect relationships except one. Thus, the result provides sufficient evidence for a full mediation of knowledge sharing on people-centred KMSs and SCP. The results showed that the full mediation effect of knowledge sharing on CoPs led to an increase in all process-based SCP factors. While the same mediation effect on innovation management and organisational culture led to a reduction on all supply chain factors. No mediation effect was realised when adopting the network-based approach to SCP. It is recommended that:

- i. **All SMEs intending to adopt knowledge-based supply chains should strategically implement knowledge sharing.** Knowledge sharing must be treated as a prerequisite to achieving effective knowledge-based supply chains. This can be achieved by setting up the knowledge sharing processes and support structures in the form of people-centred KMSs at organisational and supply chain levels. Such strategies will ensure that the knowledge sharing process is formalised making it more acceptable by supply chain members and resultantly increasing the much-needed trust.
- ii. **Training on knowledge sharing behaviour to be conducted.** SMEs need to conduct training on effective people-centred knowledge sharing behaviour, such as employee roles in CoPs. The training will produce the required balance on the people-centred KMSs, which will ascertain the required positive mediation of knowledge sharing on the extracted SCP process-based factors.
- iii. **SMEs may utilise the combination of communities of practice, innovation management and organisational culture for short term survival.** The SMEs that are operating in highly uncertain supply chains may adopt the combination of the three people-centred KMSs as a short-term survival measure. Consequently, in the event of averting a serious challenge in the short term while working on long term survival, SMEs may first implement CoPs to achieve effective RRP and CRP. This strategy should be supported by implementing innovation management and organisational culture, which work together to reduce TRP. However, this strategy may not assure long term survival due to lack of a supply chain-wide perspective.

## **7.6 STRENGTHS AND LIMITATIONS OF THE STUDY**

The current study provides sufficient evidence to address the proposed theoretical and empirical objectives. The results of the study present positive methodological strengths in that the sample was large and representative enough, consisting of 580 respondents drawn from all the country's ten provinces and the five major recognised SME sectors. Therefore, the results present a nearly accurate position of the SME environment at a countrywide level.

The study also had some limitations, which were, however, mitigated to avoid their influence on the results. The constructs and context of the study, namely, people-centred KMSs and SCP as well as small to medium enterprises are factors associated with definitional challenges and multiple factors. Thus, the study derived definitions from reviewed literature, which may narrow the scope of the terms although such measures were necessary to delimit the constructs. The study was conducted in a highly uncertain environment and this factor was not considered, as such it could have influenced the study results although the effect was minimised by the sample used. In furtherance to that, the measurement instrument used comprised multiple scale items, which could have impacted on the structural equation modelling results; however, the complimentary linear regression analysis was used to verify the results. The study also implemented a cross-pollination of statistical methods where structural equation modelling results were further confirmed with a multiple regression analysis which verified relationships and predictions between the factors under consideration.

The study implemented a fully quantitative design, which may inhibit some of the salient qualitative issues and a mixed method approach could have bridged this gap. Nevertheless, efforts were made to include comprehensive measurement scales in the questionnaire guided by an extensive literature review and expert guidance from two universities, which ensured that key issues had not been omitted. Although KMSs are mostly known to be founded on computer-based platforms, the current study put less emphasis on that dimension, which might be necessary when considering the impact of an IT-centred KMS in the modern business environment. A better approach would have been utilising a socio-technical approach, which fully considers both people-centred KMSs and IT-centred KMSs. However, an understanding of a people-centred KMS was considered more appropriate for paving the way and building structures for the adoption of knowledge economies in less technological environments than Zimbabwe.



## **7.7 IMPLICATIONS FOR FURTHER RESEARCH**

In view of the abovementioned limitations, there are some implications that can be put forward for further research. There is a need for future studies to provide standardised or universally agreed-upon definitions for SMEs, SCP and people-centred KMSs. This standardisation will help benchmark studies in these areas and support multiple-country studies. The conceptual framework could be modified to include the moderating effect of SCP, which was not considered in the current study but seemed to present significant influence. The inclusion of that factor would help explain its influence within knowledge-based supply chains. Similarly, a mixed method approach, which also considers a socio-technical approach to KMSs might be necessary. Such a study will provide more information by adding the salient views that cannot be expressed quantitatively and also technological solutions that support modern global trends that are driven by computer-based systems.

Since the study used only one country, a cross country study could be conducted, which would provide a platform for a broader view and understanding of knowledge-based supply chains. Design science researchers, such as software developers for KMSs could be guided by the model factors to design and develop IT-centred KMSs with features that fit SME knowledge-based supply chains. Researchers in data mining could utilise the extracted SME features to identify data mining algorithms that better predict SME SCP and survival. Such information will help in the management of SMEs by either government or other stakeholders such as financing institutions and SME associations.

## **7.8 THEORETICAL AND PRACTICAL CONTRIBUTIONS OF THE STUDY**

The study contributed to the existing body of knowledge by providing theoretical contributions and practical contributions as discussed in the ensuing subsections.

### **7.8.1 Theoretical contributions**

The study presented SME factors that may help achieve a standardised SME definition and classification, which builds a good foundation for cross country SME studies, which are also

very necessary in proffering a global understanding of knowledge-based supply chains. The standardisation of an SME definition has been cited as a hindrance in SME studies (Salikin, Wahab & Muhammad, 2013:335; Abiodun, Harry & Busra, 2015:3; Massaro, Handley, Bagnoli & Dumay, 2016:274) and the current study is an effort towards minimising this effect. Extant literature presents very few people-centred KMS and process-based SCP studies due to the infancy of the concepts and the current study adds to the few, and to the knowledge of the researcher is the pioneer study in this field, from a developing country perspective. The current study therefore extends people-centred KMSs and process-based SCP literature from a developing country perspective and more specifically in Zimbabwe. Lastly, the study utilised both traditional and modern data collection methods in which drop and collect as well as email were used to collect the data. The combination of data collection methods helped prove that there is no significant difference in the two data collection methods, hence future researchers may be guided when selecting data collection methods in studies conducted within Zimbabwean SMEs.

Generally, the exponential growth of studies in SCP provides evidence on its positive role in organisational performance. The current study contributes to this pool of studies by identifying the ways in which knowledge-based supply chains built on people-centred KMSs can lead to improved SCP from a process-based perspective. The study also presents measurement scales for process-based knowledge supply chains, which can be adopted or adapted for further understanding of knowledge-based SCP. The study helps explain the relationship between people-centred KMSs, knowledge sharing and SCP, which is the first such study from a developing country perspective. It presents knowledge sharing as having a full mediation on people-centred KMS thereby giving insights into the importance of knowledge sharing in knowledge-based supply chains. The results contribute also to further confirming that most SEM model fit indices (i.e. AGFI, GFI, NFI, RMR and IFI) are sensitive to mixed scales and model complexity. Absolute fit indices that include RMSEA and SRMR were confirmed as less sensitive while incremental fit indices such as TLI and CFI were extremely sensitive to model complexity. This contribution is important in aiding the selection of SME model fit indices when testing complex models with mixed measurement scales.

## **7.8.2 Practical contributions**

The practical contributions of the study will be outlined in terms of different stakeholders, namely, supply chain professionals, SME employees and the Zimbabwean government.

### **7.8.2.1 Supply chain practitioners**

Experts in the field of SCP will gain more insight into how they may achieve process-based SCP built on people-centred knowledge management systems within the SME sector. With the emerging knowledge-based economies, all organisations have to embrace KMSs and SMEs are not spared. The results present a good starting point by availing the constructs and factors to be considered and the confirmed model helps to conceptualise the relationships that improve SCP. The model suggests that more efforts should be directed towards effective knowledge sharing, which practitioners must seriously consider. In terms of people-centred KMSs, the model advises the importance of CoPs and TRP, which are critical in attaining SCP. The practitioners will also benefit in knowing which process-based factors to consider to avoid losing out by utilising the outdated network-based approach to SCP, which has proven not to work with knowledge-based supply chains. By using the identified people-centred KMS factors, supply chain practitioners may be able to implement processes and structures in their organisations that help in implementing SME-specific IT-centred KMSs without a significant challenge.

### **7.8.2.2 SME employees**

The results could help the SME employees in understanding the negative effects of organisational knowledge sharing and the positive effects of SCK sharing. The employees will therefore be informed on the need to avoid cultures, such as the lack of trust within the supply chain, knowledge hoarding and focus on cost while ignoring time and responsiveness to the supply chain. The employees will also be guided in the required characteristics for effective SCP as informed by the socio-demographic factors, which will help them in recruiting and training their employees. The ranked order of importance of the identified constructs will increase knowledge on the phased implementation of process-based supply chains built on people-centred KMSs.

### **7.8.2.1 Zimbabwean government**

The Zimbabwean government will be able to use the identified factors to understand SME performance and achieve effective management of the SMEs by utilising available SME datasets in ministries, financial institutions, research centres and parastatals. The SME factors may also assist in deriving a common classification of SMEs and eliminate the use of different categories, which confuses overall sector performance analysis. The government may also be guided in the policies and structures required to set up effective knowledge-based supply chains as they prepare to embrace the emerging economy of intangibles. This involves the setting up of intellectual property policies and supply chain management policies that promote SCK sharing as well as awarding SME licences to individuals who possess the required characteristics.

## **7.9 CONCLUSION**

There has been an increase in studies focusing on KMSs and SCP as important concepts in the modern business environment. It is also evident that the emerging concept of knowledge economies is driving the KBV of the firm as opposed to the RBV. Developing countries, such as Zimbabwe that are technologically behind though mandated to match the prevailing global trends by embracing knowledge-based economies, are facing challenges due to the over-emphasis of technology on KMSs. These limitations are more profound within the SME sector which usually faces a plethora of challenges including poor funding, limited skills and poor technology infrastructure. KMSs have been generally viewed as comprised of two categories, namely, people-centred KMSs and IT-centred KMSs. Similarly, SCP has been viewed from two perspectives: the network-based perspective and the process-based perspective.

There is limited literature on people-centred KMSs and process-based SCP. This empirical study adds to the previous studies on the measurement of people-centred KMSs, knowledge sharing and SCP from a process-based perspective. As the first study of its kind on the relationships between people-centred KMSs, knowledge sharing and SCP, this study provides a benchmark in the KMS and SCP fields for the development of process-specific measurement models in knowledge-based supply chain operations within the SME sector.

The study presents the importance of the process-based SCP in achieving effective knowledge sharing in supply chains that are supported by people-centred KMSs. Hence, the network-based approach to SCP is not supported in knowledge-based supply chains and thus, it must not be adopted due to its lack of support on the KBV theory concepts. The study found that knowledge sharing provides a full mediation on people-centred KMSs and SCP. Therefore, knowledge sharing is a prerequisite when implementing process-based SCP supported by people-centred KMSs. Furthermore, supply chain uncertainty presents some suggested moderating effects when utilising people-centred KMSs to improve knowledge sharing and resultantly improve process-based SCP. People-centred KMSs such as CoPs, innovation management, and organisational culture are predictors of knowledge sharing. Also, knowledge sharing can predict TRP, CRP and RRP. The importance of these results is worth noting as they are pioneer results from a developing country perspective and thus add new insights to the existing body of knowledge.

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## APPENDIX 1

### RESEARCH QUESTIONNAIRE



Date: 27 February 2019

Dear participant,

I am a postgraduate student at the Vaal University of Technology studying towards a Doctoris Technologiae: Business degree. The title of my research project is: **PEOPLE-CENTRED KNOWLEDGE MANAGEMENT SYSTEMS AND SUPPLY CHAIN PERFORMANCE: THE CASE OF SMALL AND MEDIUM ENTERPRISES IN ZIMBABWE**

You are invited to participate in this research study by completing the attached survey questionnaire. This questionnaire consists of seven sections. Before you complete the enclosed questionnaire, I wish to confirm that:

- Your organisation has given me permission for this research to be conducted.
- Your participation in this study is voluntary and you are free to withdraw at any time.
- Your anonymity will be maintained, and no comments will be ascribed to you by name in any written document or verbal presentation. Nor will any data be used from the questionnaire that might identify you to a third party. Thus, you are not required to write your name anywhere on the questionnaire.
- Once completed a copy of the research report will be made available to you upon request.
- Completion of the questionnaire will take less than 15 minutes.
- Please click Yes/No to respond to the question at the bottom of the page before proceeding to answer the questionnaire.

If you have any query concerning the nature of this research or should you have any question/s please feel free to contact me at [tarambiwae@gmail.com](mailto:tarambiwae@gmail.com) +263 775 915 326/ +263 775 040 190.

Your response and time are greatly appreciated. Thank you!

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Tarambiwae', is written over a horizontal line.

**Mr E. Tarambiwa**

Private Bag X021 ~ Vanderbijlpark ~1900  
 Andries Potgieter Boulevard ~ South Africa  
 Tel: +27 16 950 9000 ~ www.vut.ac.za

**Survey Questionnaire**

Please click to place a cross (☒) in the appropriate block and forward answered questionnaire to tarambiwae@gmail.com.

**Section A: Demographic Information**

**In this section we would like to find out a little more about you.**

<b>A1</b>	<b>Your gender</b>	Male <input type="checkbox"/>			Female <input type="checkbox"/>			
<b>A2</b>	<b>Your age group (years)</b>	18-25 <input type="checkbox"/>	26-33 <input type="checkbox"/>	34-41 <input type="checkbox"/>	42-49 <input type="checkbox"/>	Above 50 <input type="checkbox"/>		
<b>A3</b>	<b>Highest qualifications</b>	Ordinary Level <input type="checkbox"/>	Advanced Level <input type="checkbox"/>	Diploma <input type="checkbox"/>	First Degree <input type="checkbox"/>	Masters <input type="checkbox"/>	Doctorate <input type="checkbox"/>	Other.....
<b>A4</b>	<b>Nationality</b>							
	Zimbabwean <input type="checkbox"/>	African <input type="checkbox"/>	Asian <input type="checkbox"/>	European/American <input type="checkbox"/>		Other (Specify).....		
<b>A5</b>	<b>Work experience</b>	Less than 1 year <input type="checkbox"/>	Between 1 to 5yrs <input type="checkbox"/>	Between 5 to 10yrs <input type="checkbox"/>	Between 10 to 15yrs <input type="checkbox"/>	15 yrs and over <input type="checkbox"/>		

**Section B: Profile of the Business**

**In this section, we would like to find out a little more about the profile of your company.**

<b>A6</b>	<b>Number of employees in this SME</b>	Less than 50 <input type="checkbox"/>	51 to 100 <input type="checkbox"/>	101 to 150 <input type="checkbox"/>	151 to 200 <input type="checkbox"/>
<b>A7</b>	<b>Type of industry you operate in</b>				
	Manufacturing <input type="checkbox"/>	Retail <input type="checkbox"/>	Mining <input type="checkbox"/>	Hospitality and Tourism <input type="checkbox"/>	Agriculture <input type="checkbox"/>
	<b>Province where business is headquartered</b>				

<b>A 8</b>	Hre <input type="checkbox"/>	Byo <input type="checkbox"/>	Manicaland <input type="checkbox"/>	Mas h East <input type="checkbox"/>	Midland s <input type="checkbox"/>	Mas h West <input type="checkbox"/>	Mas h Cent <input type="checkbox"/>	Masvingo <input type="checkbox"/>	Mat North <input type="checkbox"/>	Mat South <input type="checkbox"/>	
<b>A 9</b>	<b>Years in Existence</b>										
	Less than 1 year <input type="checkbox"/>	Between 1-5 years <input type="checkbox"/>	Between 5-10 years <input type="checkbox"/>	Between 10-15 years <input type="checkbox"/>	15 years and over <input type="checkbox"/>						

### Section C: Organisational Culture

We would like to find out a little more about how the culture in your organisation can enhance knowledge sharing. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 7 (Strongly agree). A rating of 4 points towards moderate acceptance of the statement.

OC 1	Our culture promotes the trust that is needed to encourage knowledge sharing among employees.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
OC 2	Our organisation has a knowledge-sharing rather than a knowledge-hoarding culture.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
OC 3	Our culture emphasises that knowledge-sharing activities earn praise that indicates people are doing their jobs well if they share knowledge.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
OC 4	Our culture emphasises that knowledge-sharing activities earn praise that indicates what a good employee should do.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree

### Section D: Innovation Management

We would like to find out a little more about your perceptions of how your firm is embracing innovation management as a knowledge management tool that promotes knowledge sharing. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 7 (Strongly agree). A rating of 4, points towards moderate acceptance of the statement.

IM1	Our organisation promotes knowledge sharing so that we are quicker in new product development than most of our key competitors.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
IM2	Our organisation relies on knowledge sharing to be quicker in environmental adaptation.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree



IM3	Our organisation is quicker in improving processes than most of our key competitors because of the value we place in knowledge sharing.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
IM4	Our organisation is quicker in problem-solving than most of our key competitors because employees are encouraged to share knowledge.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree

### Section E: Communities of Practice

We would like to find out a little more about your perception of how Communities of Practice have helped achieve knowledge sharing in your firm. Please indicate whether you agree with the statements by encircling the corresponding number between 1 (Strongly disagree) and 7 (Strongly agree). A value of 4 points towards moderate acceptance of the statement.

CoP1	I participate in the group to get specialist support from members.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
CoP2	Management speaks positively to others about participation and involvement in groups.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree
CoP3	I often share knowledge with others through face-to-face meetings in groups.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Strongly agree

### Section F: Social Capital

We would like to find out a little more about your perceptions on how knowledge sharing has improved social capital in your firm. Please indicate the frequency at which you carry out the activity given in the statements by encircling the corresponding number between 1 (Never) and 7 (Always). A value of 4, points towards a moderate frequency of the activity given in the statement.

SC1	I can rely on my colleagues when I need support in anything concerning my work.	Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Always
SC2	I tell someone what I know, and I can count on it that they will also tell me what they know.	Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Always
SC3	I view this organisation as a group to which I belong.	Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Always

### Section G: Knowledge sharing

We would like to find out a little more about your perceptions regarding how knowledge sharing can be used as a tool for improving supply chain performance in your firm. Please indicate the frequency at which you carry out the activity given in the statements by encircling the corresponding number between 1 (Never) and 7 (Always). A value of 4, points towards the moderate frequency of the activity given in the statement.

KS1	My firm has exchanged many ideas with the partners about how to improve each other's capabilities in manufacturing, research, Logistics, services, etc.	Never	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	Always
KS2	The supply chain knowledge provided through knowledge sharing is up-to-date.	Never	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	Always
KS3	The supply chain words and phrases provided from the knowledge sharing processes are consistent.	Never	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	Always
KS4	Knowledge sharing processes provide contextual supply chain knowledge so that we can truly understand how to accurately carry out forecasts.	Never	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	Always

### Section H: Supply chain performance

We would like to find out a little more about your perceptions on how knowledge sharing can enhance the performance of the supply chain in your firm both from a network and process-based approach. Please indicate whether you agree with the statements by encircling the corresponding number between 1 (Significantly worse) and 5 (Significantly better). A value of 3, points towards moderate acceptance of the statement.

Supply chain performance: Network Approach								
SCP1	Supply chain productivity (e.g. ratio of production to asset/staff)	Significantly worse	1	2	3	4	5	Significantly better
SCP2	Supply chain efficiency (e.g. ratio of output to input)	Significantly worse	1	2	3	4	5	Significantly better
SCP3	Profit margin (e.g. return on investment)	Significantly worse	1	2	3	4	5	Significantly better
SCP4	Manufacturing or service processing lead time (i.e. time taken to make a product)	Significantly worse	1	2	3	4	5	Significantly better
SCP5	Delivery lead time (i.e. time taken to make a delivery)	Significantly worse	1	2	3	4	5	Significantly better
SCP6	Cash-to-Cash cycle (i.e. time taken to convert cash to cash)	Significantly worse	1	2	3	4	5	Significantly better
SCP7	<b>Flexibility:</b> ability to handle small disruptions	Significantly worse	1	2	3	4	5	Significantly better
SCP8	<b>Resilience:</b> ability to handle large disruptions	Significantly worse	1	2	3	4	5	Significantly better
SCP9	<b>Agility:</b> ability to recover from short-term changes	Significantly worse	1	2	3	4	5	Significantly better
SCP10	Perceived quality of products or services (by customers)	Significantly worse	1	2	3	4	5	Significantly better

SCP11	Knowledge accuracy (by your organisation and its suppliers)	Significantly worse	1	2	3	4	5	Significantly better
SCP12	Current or real-time knowledge	Significantly worse	1	2	3	4	5	Significantly better
<b>Supply chain performance: Process-based approach</b>								
<b>Cost-related performance</b>								
CRP1	Supply chain productivity (e.g. ratio of production to asset/staff)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
CRP2	Supply chain efficiency (e.g. ratio of output to input)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
CRP3	Profit margin (e.g. return on investment)	Significantly worse	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
<b>Time-related performance</b>								
TRP1	Manufacturing or service processing lead time (i.e. time taken to make a product)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
TRP2	Delivery lead time (i.e. time taken to make a delivery)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
TRP3	Cash-to-Cash cycle (i.e. time taken to convert cash to cash)	Significantly worse	<input checked="" type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
<b>Responsiveness-related performance</b>								
RRP1	<b>Flexibility:</b> ability to handle small disruptions	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
RRP2	<b>Resilience:</b> ability to handle large disruptions	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
RRP3	<b>Agility:</b> ability to recover from short-term changes	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
<b>Operation quality-related performance</b>								
OQRP1	Perceived quality of products or services (by customers)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better
OQRP2	Knowledge accuracy (by your organisation and its suppliers)	Significantly worse	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	Significantly better

OQRP3	Current or real-time knowledge	Significantly worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Significantly better
			1	2	3	4	5	

**Thank you for taking the time to complete this questionnaire. Your views are much appreciated.**

## APPENDIX 2

### LETTER FOR AUTHORISATION OF DATA COLLECTION



SME Association of Zimbabwe  
6<sup>th</sup> Floor Batanai Gardens, Jason Moyo Avenue, Harare  
08644 098517, +263 772 901 080, +263 778 055 076  
enquiries@smeaz.org.zw  
www.smeaz.org.zw

Edmore Tarambiwa  
Manyame Airbase Married Quarters  
P.O Box 7722 Causeway  
Harare

Tuesday 14 February 2017

**RE: REQUEST FOR AUTHORITY TO COLLECT DATA FROM COMPANIES**

This letter serves to confirm that we received your letter dated 10 February 2017, concerning the reference stated above. The letter furthermore seeks to confirm the meeting I had with you on the same date and the acceptance that has been awarded you by the Association to use its database as a resource for your research including site visits of SMEAZ Members in all regions of Zimbabwe.

We also expect to receive a copy of your end product from the research.

Regards

Josiah Munaki  
Head Member Consultant

A handwritten signature in blue ink, appearing to read 'J. Munaki', is written over a horizontal line.



*"How can we help you?"*