THE INFLUENCE OF ICT COMPETENCES, KNOWLEDGE MANAGEMENT AND OPERATIONAL EFFICIENCY ON COMPETITIVENESS OF RETAIL SMMES IN THE MANGAUNG METROPOLITAN AREA (MMA), FREE STATE

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DECLARATION

I, Mokgadi Petros Mantje, student number: _____ hereby declare that this research report submitted to the Central University of Technology, Free State for the degree M Tech: Business Administration is my own work and has not previously been submitted by me at another university. I further cede the copyright of the dissertation in favour of the Central University of Technology, Free State.

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<u>30 July 2021</u>

DATE

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DEDICATION

I dedicate this thesis to my wife, Mmakarabelo and child, Karabelo Mantje.

ABSTRACT

Despite the increasing prominence of information and communication technologies (ICTs) in the operations of small firms, there is still a need to understand fully how small, medium and micro enterprise (SMME) owners and managers appropriate ICT competences to support the management of business knowledge and improve their firms' operational efficiency. There also exists wide acknowledgement on the contribution of SMMEs to economic growth, profitability and creation of employment opportunities, and yet there still exists limited knowledge on enterprises' capacity to manage the knowledge of their business operations, operate efficiently, and on the way the possession of ICT competences affects these variables to improve the competitiveness of such firms. The under-exploration of these relationships in entrepreneurship literature stems from SMMEs' limited appreciation and mastery of innovative strategies such as ICT competences, knowledge management and operational efficiency, which are variables deemed to drive competitiveness of firms. The main argument of this study is that business competitiveness is not necessarily an automatic or inevitable event for any small business but rather depends on the capacity of SMMEs to harness their ICT competences, knowledge management and operational efficiencies skilfully and strategically.

Drawing on a positivist epistemology and an explorative quantitative design, the study investigated the effects of ICT competences, knowledge management and operational efficiency on the competitiveness of SMMEs in the Mangaung Metropolitan Area of the Free State Province of South Africa. A cross-sectional survey was conducted on 343 retail SMMEs in this province and a corresponding number of questionnaires (i.e., 343) was distributed to them. A total of 300 questionnaires were successfully completed and returned, representing a response rate of 87.5 percent. Descriptive statistics, especially graphs and frequency tables, inferential statistics such as correlation and regression analytics were also employed for the analysis of the data.

The major empirical findings were that there is a strong positive relationship between ICT competences and knowledge management (KM), between ICT competences and operational efficiency, as well as between ICT competences and firm competitiveness.

Moreover, the findings also reveal a positive, statistically significant relationship between knowledge management and operational efficiency, and operational efficiency and firm competitiveness. Most importantly, the study exhibits a positive correlation between all these variable and firm's competitiveness. Finally, the study recommends that government agencies employ more direct approaches, such as the use of incubation structures and provision of mentoring to owners and managers of SMMEs to promote ICT competence appropriation and knowledge management implementation. These efforts can contribute to increased knowledge sharing and transfer, which enhance the operational efficiency and improve the overall competitiveness of SMMEs in South Africa.

Therefore, the study which builds on mainstream literature and the validation of empirical findings, contributes a conceptual model on firm competitiveness that integrates ICT-based competences, knowledge management and operational efficiency in one investigation. The study also contributes to the development of theoretical and practical knowledge on the joint impact of ICT competences, knowledge management and operational efficiency on the competitiveness of SMMEs. For instance, the study demonstrates how knowledge management recognition and implementation lead to better firm operations and communication.

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LIST OF ACRONYMS AND ABBREVIATIONS

CUT — Central University of Technology, Free State

DTI — Department of Trade and Industry

EU — European Union

FC — Firm competitiveness

FDC — Free State Development Corporation

FRIC — Faculty Research Innovation Committee

GDP — Gross Domestic Product

GEM — Global Entrepreneurship Monitor

ICT — Information and Communication Technology

IDC — Industrial Development Corporation

KM — Knowledge Management

MMA — Mangaung Metropolitan Area

NYDA — National Youth Development Agency

OE — Operational efficiency

OECD — Organisation for Economic Cooperation and Development

SEDA — Small Enterprise Development Agency

SMMEs — Small, Medium and Micro Enterprises

SPSS — Statistical Package for the Social Sciences

StatsSA — Statistics South Africa

SAMAF — South African Microfinance Apex Fund

W&RSETA — Wholesale and Retail Sector Training Authority

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Definition of key terms

Information and communication technology (ICT)

ICT is a set of diverse technological resources and tools used to create, disseminate, communicate, manage and store information (Laronde, 2010).

Competences

Competences refer to capabilities that an organisation knows how to excel in (Le, 2017). They are areas of special technical expertise, skills and abilities used to gather resources and to exploit opportunities (Siudek & Zawojska, 2014).

Knowledge management (KM)

Knowledge management is the management practice used to leverage knowledge on how to add value to an organisation's advantage (Bennet et al., 2015).

Operational efficiency (OE)

Operational efficiency is the proficiency of a firm to curtail the unwelcome and maximise resource capabilities in order to deliver quality products and services to customers in a cost-effective way and without sacrificing quality (Ndolo, 2015).

Firm competitiveness (FC)

The concept of firm competitiveness refers to the ability, skill or strategy of firm to out manoeuvre its competitors (Ramorena, 2016).

Small, medium and micro enterprises (SMMEs)

There is no universally accepted definition for small business or SMME. Definitions of a small business vary from one industry to another (South Africa, National Small Business Amendment Act, No 26 of 2003). Nonetheless, small businesses are small, medium and micro enterprises that operate in a specific geographical area of a country that are comparable in size across the international community (Katz & Green, 2011). They are generally characterised as relatively small enterprises, which often emerge as outcomes of entrepreneurial activity (Agbobli, 2013).

Intelligence generation (IG)

Intelligence generation involves the gathering and analysis of information such as customer's current and future needs and monitoring and analysing exogenous factors such as competition, government technology and other environmental forces (Mokoena, 2019).

CHAPTER 1

ORIENTATION TO THE STUDY
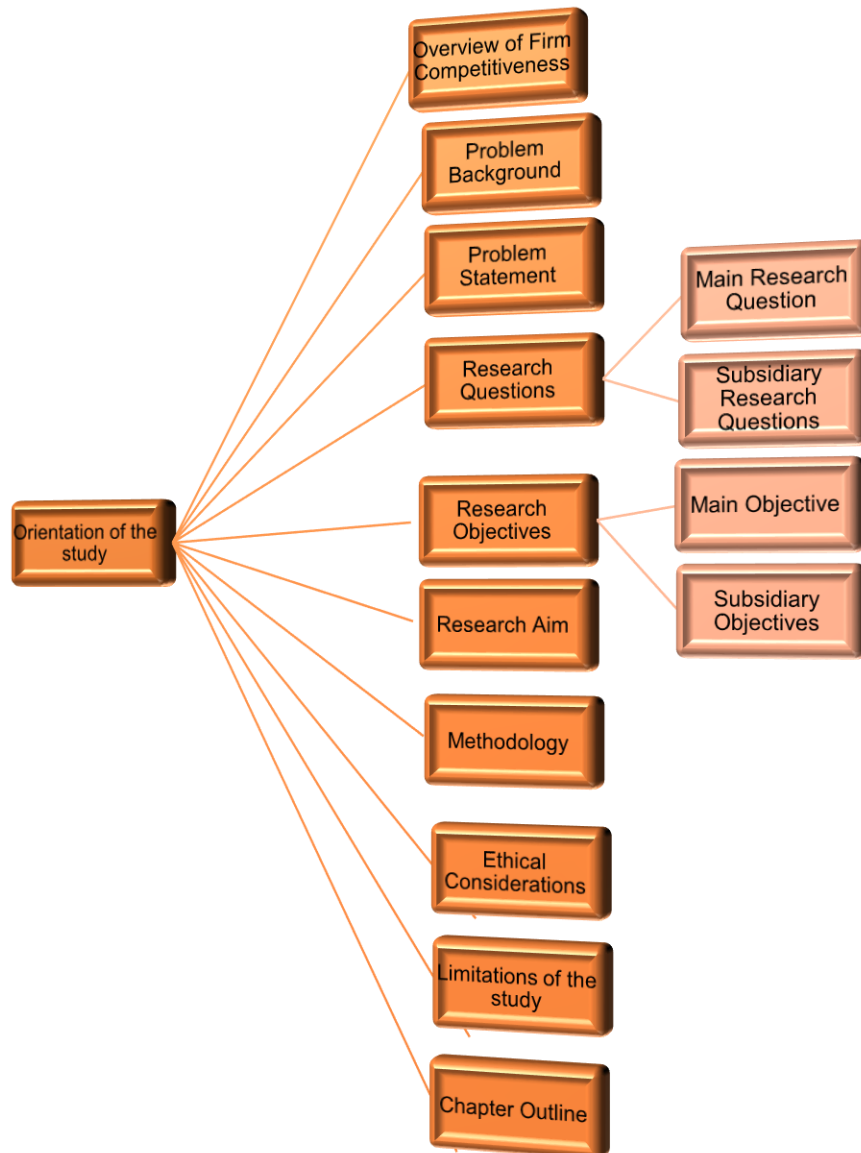
1.1. Introduction

This study investigates how small, medium and micro enterprises (SMMEs) in the Free State harness Information and Communication Technology (ICT) competences, knowledge management and operational efficiency as part of their strategy for improving their competitiveness. For this study, ICTs are information technologies, telecommunication technologies and networking technologies (Mpofu, Milne & Waltkins-Mathys, 2013) that facilitate the transfer and sharing of information among individuals and businesses through digital means (Zuppo, 2012).

The global economy has introduced a change in the way firms compete in a marketplace. This change has also been precipitated by the deluge of ICTs that are improving the pace of knowledge creation and facilitating the maturation of the knowledge economy (Modimogale, 2013). It is evident that ICT adoption has potential to drive firm competitiveness and the economic growth of companies and organisations that can exploit them (Higon, 2011; Ollo-Lopez & Aramendia-Muneta, 2012; Steinfield, LaRose & Chew, 2012). However, extant literature does not explicitly state which forms of ICTs SMMEs must use and how. In contrast to SMMEs that are not fully exploiting the potential of ICTs (Ollo-Lopez & Aramendia-Muneta, 2012), large firms are generally able to withstand competition because they are ICT-driven and deploy knowledge management as part of their competitive strategy (Yusuf, 2013). This creates an impetus to explore the nexus between ICT competences, knowledge management and firm competitiveness with reference to SMMEs.

There is evidence to suggest that SMMEs in developing economies, which do not adopt ICTs would underperform due to inefficient supply of goods and services. This suggests that firms can no longer afford to bypass ICT and its associate competences. For instance, without the appropriation of ICTs, there would be delays in supplying goods and longer lead times after an order has been placed (Ali, 2015). To the contrary, the use of modern ICT systems enables "perfect orders", which means that the delivery of the desired assortment to the right location on time, damage-free and correctly invoiced (Bowersox, Close & Cooper, 2007). For instance, Amazon, the biggest and most successful online retailer in the world (Zhu & Liu, 2016) prides itself

in effective and efficient use of ICTs for online sales and merchandise measured by its economies of scale and unrivalled competitiveness (Thakur & Muralidharan, 2019). This demonstrates that the use of ICTs and sophisticated ICT competences can contribute to the success of online businesses without brick-and-mortar success formulae.

The successful adoption of ICTs and possession of ICT competences by the firms, and integration of ICT in business has also revolutionised relationships within organisations and those between and among organisations and individuals. The use of ICTs in business has indeed enhanced productivity, encouraged greater customer participation, enabled mass customisation, and contributed to the reduction of operational costs (Yusuf, 2013). Firms which embrace ICT evolution gain a competitive edge (Habib, 2011) due to increased accessibility to local and global markets, improved access to market information, and the provision of information for better and more competitive prices (Yusuf, 2013). This points to the need to explore the link between ICT competences and firm competitiveness with specific reference to emerging economies as the claims made about these relations in the Western world might not be transposed to emerging economies due to the difference in situated conditions of firms in these locations.

Various studies on SMMEs' adoption of ICTs (Higon, 2011; Ollo-Lopez & Aramendia-Muneta, 2012; Steinfield, LaRose & Chew, 2012), knowledge management & integration (Yusuf, 2013; Almajali et al., 2016) and operational efficiency (Geuens, 2010; Eze, 2013) have been conducted in isolation. What is yet to be determined is the effect of the combination of ICT competences, knowledge management and operations efficiency on competitiveness of small firms. This exception in literature is surprising since business competitiveness stems from a combination of these selected factors rather than just from their individual capacities.

1.2. Overview of firm competitiveness as it relates to other variables

1.2.1. Relationship between ICT Competencies and Firm Competitiveness

Studies (Higon, 2011; Consoli, 2012; Ollo-Lopez & Aramendia-Muneta, 2012; Steinfield, LaRose & Chew, 2012) argue that the adoption and use of ICT represent fundamentals of competitiveness and economic growth for companies, organisations and countries that are able to exploit them. Increasing attention has been given recently to the impact of ICT on company's performance. For instance, Consoli (2012) summarised various indicators and suggested that ICT effects on competitiveness could be structured and analysed using indicators such as competitiveness, innovative business and intangible benefits. Furthermore, ICT affects the flexibility of organisations and companies. For example, Ollo-Lopez and Aramendia-Muneta (2012) maintain that companies that adopt ICT tend to perform better in markets and enjoy easier differentiation of their products and services. These researchers also believe that ICT adoption seems to have a positive effect on productivity, directly as well as indirectly, depending on the sectors and have great potential to support a sustainable development.

However, some scholars, such as Ghobakhloo et al. (2012) and Chube (2015), do not agree that information technology alone can yield sustainable competitive advantage for a firm. A firm's ownership of the most sophisticated information technology facilities that which are impossible for the competitors to imitate or substitute, will not generate any value to the organisation if there are no knowledgeable personnel in the organisation, or the knowledgeable personnel in the organisation is not willing to utilise these facilities (Ong & Ismail, 2008). Hence, knowledge, skill and willingness to use ICT are all critical for ICT to yield a competitive advantage.

1.2.2. Knowledge management and Firm Competitiveness

ICT and e-business applications provide various benefits across a wide range of intra- and inter-firm business processes and transactions. These E-commerce and information management applications (e.g., enterprise resource planning (ERP) and customer relations management [CRM]) improve information and knowledge management inside the firm for both business-to-business (B2B) and business-to-

consumer (B2C) transactions (Almajali, Mansour & Maqableh, 2016). In this way the applications increase the competitiveness of firms.

The application of knowledge management to a firm is critical to firm competitiveness but it relies on the capacity of the firm to capture customer operations and supplier data on regular basis. This will give rise to new customer-driven and other metrics designed to improve shoppers' journey and point-of-purchase experience (PriceWaterhouseCoopers, 2015). This data will need continuous update and be combined with recent ones so that accurate predictions can be made with regard to demands and the competitor's price information. The utilisation of ICT applications to efficiently manipulate stored data will allow real-time information sharing for all value chains to deliver products that meet customer needs as and when appropriate (Narumitsu et al., 2015) while enable organisations to keep abreast with sales patterns and customer trends across gender, race, age and cultural values, sustaining a competitive advantage for the firms. What existing literature omitted is the types of knowledge management tools that SMMEs must harness and how to incorporate them into daily operations to effect better firm competitiveness.

1.2.3. Operational Efficiency and Firm Competitiveness

The tremendous power and abilities associated with ICT is viewed as having dramatically changed the way firms innovate, organise and create value (Narumitsu et al., 2015). As new ICT emerges, organisations have to devise new directions and strategies to make use of these applications to reach out to their business partners, customers and suppliers (Eze, 2013:16). For example, a modern advanced planning system will, at the push of a button, find the overall cheapest solution based on a mathematical model that takes into account all constraints or make demand forecasts for different products (Geuens, 2010; Narumitsu et al.,2015) and this has a bearing on the capacity of firms to outcompete their rivals. To this extent, Mathew (2011) maintains that reality that ICT are technologies enable society to communicate, collect, consolidate, create, manage and process information in various digital formats and multimedia for different purposes means that they can be appropriated in the search for new markets, development of new networks, promotion of value added exports and

in improving a firm's efficiency (Guzman et al., 2016). One can infer that all these advantages serve as an impetus for improving the competitive edge of firms over their rivals. Small firms can use ICT (devices, processes and techniques) to transform long distance communication channels and patterns, increase their capacity to augment transactional commercial activities, trigger export potential, and increase the internal dynamic capacities contributing to the increased competitive edge for organisations (Mathew, 2011).

1.3. Problem background

Despite an increase in the number of small firms and government support and intervention (Maye, 2014), the failure of small firms at a rate of 60%- 80% is still prevalent (Bushe, 2019) especially by the fifth year of operation (Edoun, Mbohwa & Bhila, 2019). This coheres with Makhoali's (2016) assertion that up to 80 percent of SMME establishments fold within five years. Furthermore, the World Economic Forum (2016) attributed the high failure of retail SMMEs to high competition from established chain stores that necessitates retail SMMEs to develop innovative and creative strategies to overcome competition. The innovative strategies seeking to improve small firm competitiveness include developing their ICT competences (Kholopane, 2016), improving their knowledge management capabilities (Masic et al., 2017), and upgrading their operational efficiency (Jokanovic et al., 2020).

Despite the postulated benefits of developing ICT competences, improving knowledge management and operational efficiency of small firms through better customer satisfaction, shareholder value and sustained competitive edge (Okwang'a et al., 2015; Kramer et al., 2017), SMMEs' failure to implement knowledge management and operational efficiency may undermine their competitiveness. Yusuf (2013) asserts that regardless of the business environment, the biggest challenge most SMME managers face is on how to transform their brick-and-mortar companies into click and mortar company to increase competitiveness in the digital economy. Reference to click and mortar company signal the importance of ICT adoption and competences to make firm competitiveness a reality. As such, the South African government held awareness campaigns and set up Non-Profit Organisations (NPOs) to help SMMEs obtain

necessary ICT resources and advice on ICT matters (Modimogale & Kroeze, 2011). This emphasises the central role that ICT competences can play in the realisation of competitiveness of firms.

Numerous studies have investigated the relationships between ICT competences and competitiveness of SMMEs (Naido, 2016; Ndolo, 2015; Modimogalet, 2013). Despite government interventions to enable ICT affordability by SMMEs, studies indicate that SMMEs are still reluctant to fully engage (Chube, 2015). In other words, there is limited evidence to suggest that SMMEs have sufficiently exploited ICT infrastructure to better understand the linkages among ICT competency, knowledge management, operational efficiency and firm competitiveness (Ong & Ismail, 2008). Given the limited integration of SMMEs in the national ICT infrastructure to facilitate increased firm competitiveness, it is not surprising that the interface of SMMEs' ICT competences, knowledge management and the operational efficiency of SMMEs remain a grey area, hence this study.

Notwithstanding the aforementioned challenges, SMMEs are continuously challenged to adopt ICT strategies to enable them to function effectively in a fiercely competitive and dynamic business environment. Thus, the South African government, as the major driving force behind small businesses is fostering an ICT-driven competitive environment by encouraging and enabling small firms to deploy ICTs to improve their competitiveness (Modimogale, 2013). However, despite the government's intervention, it remains unclear how ICT competences, knowledge management, and operational efficiency interact to influence firm competitiveness, hence this study.

1.4. Problem Statement

While the relationships between ICT diffusion and SMME performance (Habib, 2011), ICTs' impact on emerging African SMMEs (Yusuf, 2013) and the effects of ICT adoption on company performance (Ollo-Lopez & Aramendia-Muneta, 2012) have been explored, there is limited knowledge on the compendium of ICT competences knowledge management, and operational efficiency employed by small firms and

especially those in the small retail sector. For instance, Kramer et al. (2017) argue that the body of literature covering the availability of knowledge management (KM) tools focusing on SMMEs is relatively sparse. In fact, small retail firms are reluctant to employ modern technological techniques and lack the requisite capacity to manage knowledge to effectively use such ICTs (Consoli, 2012) even though such technologies may be the decisive factor on whether SMMEs succeed or fold their businesses (Mulligan & Gurguc, 2015). This observation mirrors the study by World Economic Forum (2016) that the stagnation in small firms' adoption and usage of ICT globally suggests their limited capability to keep pace with the technological trends and thus depriving themselves of the inter-firm linkages and data interchange opportunities associated with ICTs. This highlights the maturity gap between SMMEs in developed countries and ones in developing countries. One can infer that SMMEs lack the ICT competences to effectively realise their competitiveness. This study, therefore, zooms into the mechanisms through which SMMEs can strengthen their ICT competences, manage knowledge and improve their operational processes.

One of the most disruptive forces for retailers in various developed markets has been the aggressive growth of online shops in both food and non-food businesses (PriceWaterhouseCoopers, 2015). For small firms, the convenience of online shopping and the use of ICT for advertising, the buying and selling of products and/or services fuels competition which the SMMEs must continually battle with. As a developing country, South Africa's e-commerce market remains relatively niche. The ICT evolution and growth of internet access, which has long been a constraint in South Africa, is now speeding up and leading to a rise in firm competitiveness. However, only higher-end retailers are giving e-commerce much attention (PriceWaterhouseCoopers, 2012) than small retail firms are. This provides impetus for exploring how ICT competencies could be affecting the operational efficiencies of small retail firms that are only beginning to integrate ICTs into their operations. Overall, studies that explicitly explore the influence of ICT competence, knowledge management, and operational efficiency on small retail firm's competitiveness are yet to receive much deserved attention in literature (Al Qubaisi, Ajmal & Khan, 2018). Therefore, this study examines ICT competences, knowledge management and

operational efficiency dimensions of small firms with a view to improve their competitiveness.

1.5. Research questions
1.5.1. Main research question

What is the impact of ICT-based competences, knowledge management, and operational efficiency on the competitiveness of small retail firms in the Mangaung Metropolitan Area in the Free State Province?

1.5.2. Subsidiary research questions

In order to address the main research question, the following subsidiary questions will be answered:

1. Which ICT competences enable the appropriate adoption of ICT by small firms?
2. To what extent does ICT competence account for the variance in the competitiveness of small retail firms?
3. To what extent does knowledge management account for the variance in the retail SMMEs' competitiveness?
4. How does knowledge management account for the variance in the operational efficiency of small retail firms?
5. In what way does small firm's operational efficiency predict firm competitiveness?

1.6. Research objectives
1.6.1. Main objective

The study's main objective seeks to interrogate the impact of harnessing ICT competences, knowledge management, and operational efficiency on the competitiveness of small retail firms in the Metropolitan Area in the Free State Province.

1.6.2. Subsidiary objectives

To complement the main objective of the study, the following subsidiary objectives are provided:

1. To establish the set of ICT competences that are needed to support appropriate adoption of ICT by small firms.
2. To determine the extent to which ICT competences account for the variance in the competitiveness of small retail firms.
3. To establish how knowledge management account for the variance in the retail SMMEs' competitiveness.
4. To establish how knowledge management account for variance in the operational efficiency of small retail firms.
5. To determine how small firm's operational efficiency predict firm competitiveness.

1.7.   Research aim

The aim of this study is to develop broad theoretical and empirical knowledge on the joint impact of ICT competences, knowledge management and operational efficiency on small firm competitiveness to inform SMME and entrepreneurship policies and programmes as well as enhance their competitive position in the market.

1.8.   Methodology

The current research adopts a positivist epistemology to enable the researcher to determine and predict the impact of ICT – competences, knowledge management and operational efficiency on competitiveness of small retail firms. This epistemology is considered appropriate when researchers seek to establish relations of associations between concepts and constructs using a predetermined conceptual model (Leedy & Ormrod, 2010). To avoid unnecessary repetition, the details of the research methodology are presented in Chapter 3.

1.9.   Ethical considerations

Scientific research work, as all human activities, is governed by moral and ethical standards. Research ethics involve the protection of dignity of subjects and the publication of the appropriate information in the research (Fouka & Mantzorou, 2011). They also require the researchers to put into consideration the moral implications of their research to mitigate negative risks, prejudices and undesirable consequences on subjects that may arise from the conduct of their research (Sikes, 2004:16). A detailed discussion on ethical considerations is presented in Chapter 3.

1.10.   Chapter outline

Chapter 1: This chapter introduces the study. It also presents the problem background, problem statement, research questions, objectives and the research aim. It also discusses research methodology and ethical considerations.

Chapter 2: This chapter reviews the literature on ICT competences, knowledge management and operational efficiency's influence on SMME competitiveness. It discusses perspectives, theories, interrelationships between concepts and the interventions to improve the concepts studied in this research.

Chapter 3: This chapter delves into the research methodology, approach and design adopted for the study as well as the population and sampling. The study also discusses questionnaire design, data collection and analysis. It finally presents data validity and reliability, ethical considerations and the limitations of the study.

Chapter 4: This chapter presents participants' response rate, reliability analysis and biographical data. It also interprets and discusses the findings of the study.

Chapter 5: This is the final chapter that presents the conclusion of the study and the recommendations. It also discusses the limitations of the study and the implications for further research.

CHAPTER 2

ICT COMPETENCES, KNOWLEDGE MANAGEMENT AND OPERATIONAL EFFICIENCY's INFLUENCE ON SMMES' COMPETITIVENESS.

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                        Introduction
                            |
   +----------------+---------------+----------------+
   |                |               |                |
   ICT          Knowledge      Operational         Firm
Competences     Management     Efficiency      Competitiveness
                   (KM)           (OE)              (FC)

Perspectives on  Perpectives on  Perpectives on  Perpectives on
     ICT             KM              OE              FC
  competences

Theories of ICT  Theories of KM  Parallel studies Theories of FC
  competences                       on OE

ICT C & FC        KM & FC         OE & FC         Measuring FC
 relationship    relationship    relationship

Interventions to Interventions to Interventions to Interventions to
 improve ICT C    improve KM       improve OE       improve FC
```

2.1. Introduction

This chapter reviews literature on ICT competences, knowledge management, operational efficiency and their influence on the competitiveness of SMMEs. The chapter considers literature and *theorises* ICT competences, knowledge management, operational efficiency and studies on the *interventions* by government institutions to improve the *challenges* SMMEs face.

2.2. ICT competences

The general aspects of ICT competences, which comprise of computers, telecommunication networks, mobile devices, internet, intranet and employee ICT literacy, are discussed under various sections covering the constitution of application and challenges concerning ICT competences. According to Tobon (2013), a competence is defined as the integrated actions performed by a person to carry out activities and solve problems, based on certain eligibility criteria, continuous improvement and ethics. In this regard, ICT competences refer to the abilities and skills one possesses to efficiently utilise ICT infrastructure, resources and digital means (Ainley, Schulz & Fraillon, 2016). For this study, ICT competences most relevant to SMMEs include ICT education and capacity evaluation (Ainley, Schulz & Fraillon, 2016), ICT skills and expertise (Binkley et al., 2011), and digital competence, knowledge management, creation and sharing (Ferrari, 2013). These competences are deemed relevant as they propel SMMEs to reach a wider market and improve their competitiveness on a global scale (Miraz & habib, 2016).

2.2.1. Constitution of ICT competences

ICT competences are deemed to comprise ICT literacy and skills, application competences and ethical competences (Gastelu, Kiss & Dominguez, 2015). *ICT literacy*, often used interchangeably with digital literacy, is the ability of a firm, its manager/owner, or the employee to utilize digital tools in achieving the goals of the business. Ainley, Schulz and Frailon (2016) refer to ICT literacy as using digital technologies, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society.

Application competences relate to the application of skills and knowledge to create, execute and manage complex projects, collaborate work and solve problems. *Ethical competences* encompass the ethical, legal and responsible use of ICTs (Gastelu & Kiss, 2016). They are knowledge sets, skills, attitudes and abilities that enable a person to adequately deal with moral challenges involving ICTs (Heres & Lasthuizen, 2013). Ethical competences were omitted from this study because SMMEs often venture into ICTs without necessarily having sufficient ICT knowledge and literacy due to lack of training.

2.2.2. ICT adoption

SMMEs need to adopt ICT as part of a strategic plan in order for them to pursue profits and gain a competitive edge. ICT adoption refers to the application of knowledge, skills to perform complex tasks, reach a decision and network collaboratively using ICTs. The adoption of ICT among SMMEs comprises tasks such as collaborative teamwork, effective decision making and communicating with suppliers and customers, and conducting sales. This coincides with Mbuyisa and Leonard's (2016) assertion that ICT usage can also help SMMEs by connecting them to markets. These authors also argues that ICT adoption offers opportunities for SMMEs by making knowledge and information available, and improving business related communication, decision making, responsiveness and overall efficiency. The level of expertise required to use these ICTs effectively, however, is not articulated in previous studies.

Literature suggests that there are motivation factors that drive SMMEs' desires and decision to adopt ICT. Ongori (2010) argues that ICT usage augments the firms' efficiency by reducing costs and widening the market base for suppliers and customers. Consequently, these factors translate into positive results in the form of revenue generation and competitiveness. Moreover, findings by Kiveu and Ofafa (2013) indicate that opportunities exist for SMMEs to apply ICT to facilitate communication. According to Mbuyisa (2017), this also enables the firms to become more visible and to form closer ties with suppliers and customers. Mbuyisa (2017) further maintains that ICT bridges the time and distance gap by conducting

transactions online. ICT opens an international market with trade being performed online and, in that way, eliminating the transport and time costs. To this end, Kiveu and Ofafa (2013), who explored the opportunities offered by ICT in enhancing market access for Kenyan SMMEs, point out that market expansion is a major benefit for SMMEs that use ICTs. South Africa's transformation into a knowledge economy calls for the need for more digital markets to be explored. Mbuyisa (2017) concurs with the aforementioned researchers in that adoption of ICTs offer SMMEs the ability to identify and attract local and international markets. Literature, however, does not demonstrate which ICTs are most suitable for small firms and how they can be blended into operations to ensure the increase competitiveness of these firms.

2.2.3. Perspectives on ICT competences
2.2.3.1.   *Educational perspective*

The concepts of ICT competences can be approached from an educational perspective. In the educational context, the competences that students have for using technological tools productively and ethically in the search and organisation of information in problem solving and collaborative work, as well as in improving their communication process, are vital for efficient responses to the demands that arise in the contexts that require significant integration of ICTs (Tobon, 2013). Moreover, Caluza et al. (2017) posit that educators have recognised that there is a need to equip learners with the necessary skills and experiences that will enable them to become contributing members of the global community. One could argue that the same obtains for SMMEs in the retail sector. This is indicative of the importance of introducing entrepreneurial education and skills at school level (Gamede & Uleanya, 2017). Borrowing from this perspective, it is generally believed that ICTs can empower entrepreneurs with twenty-first century skills such as digital skills and ICT literacy relevant to the effective and efficient running of their businesses. Such skills could include web-supported finance management skills, crowd funding skills via social networking sites and Microsoft skills relevant to effective communication with their customer and suppliers.

2.2.3.2. *Human empowerment perspective*

South Africa's political parties and the government acknowledge that there is a skills shortage in diverse sectors of the economy and in the SMME sector, which highlights the need for a human empowerment perspective that to conceives a broad spectrum of ICT skills seeking to increase the participation of marginalised groups in businesses and the mainstream economy. The human empowerment perspective can be harnessed as a strategy for narrowing the digital divide in the SMME sector and mainstreaming vulnerable groups, such as women, youth, and the unemployed, into the productive sectors of the economy and for job creation through venture creation (Mokgosi, 2017). The Broad Based Black Economic Empowerment (BBBEE) also seems to borrow from this perspective as it seeks to harness germane resources such as ICT infrastructure, digital literacy and other financial resources to increase the active participation of the historically marginalised groups into the productive sectors of the economy such as SMME development sector. From a global viewpoint, ICT is radically transforming the way we live and impacting on our work, study and personal lives (Caluza et al., 2017). To this effect, Ainley, Schulz and Fraillon (2016) declare digital and ICT literacy as an important competence for full participation in the knowledge economy and information society. Consequently, interest has emerged at national and international level seeking to explore the best ways to measure the extent to which, and how equitable, competences in this area are being achieved.

2.2.4. Theories of ICT competences

There are various theories that can be applied to the development of ICT competences, however, the most relevant for this study are the Technology Acceptance Model (TAM) (Davis, 1986), Unified Theory of Technology Acceptance and Use (UTAUT) (Venkatesh et al. 2003) and the Diffusion of Innovation Theory (Rogers, 2002). Each of these theories and its application to the subject of inquiry of this study is discussed below. The subsequent section discusses the Technology Acceptance Model with reference to ICT competence and firm competitiveness.

2.2.4.1. Technology acceptance model (TAM)

This model pays special emphasis on user's acceptance of information systems or technologies. It is rooted in the understanding of user acceptance processes and expounds new theoretical knowledge into the successful design and implementation of information systems (Davis, 1986). This theory is relevant to ICT competence development, and firm competitiveness especially for SMMEs as they often buy into new technologies without any feasibility study nor due diligence to establish the acceptance of different technologies by different stakeholders. These stakeholders include customers, distributors, regulators and clients. The model permits SMMEs to evaluate proposed new systems prior to their implementation by assessing their acceptance and the implications thereof for the competitiveness of SMMEs. This study aims to extend on this model to account for the context of SMMEs in emerging economies.

2.2.4.2. Unified theory of acceptance and use of technology (UTAUT)

According to Venkatesh et al. (2003), the Unified Theory of Acceptance and Use of Technology (UTAUT) is predominantly concerned with technology acceptance and use of technology. The empirical studies on the UTAUT model suggest that it outperforms other models such as the TAM, Motivational model, by far (Lescevica, Ginters & Mazza, 2013). The authors further discuss four constructs within this model as explained below:

Performance expectancy, which is the degree that an individual believes using the system will help him or her to attain gains in job performance.

Effort expectancy, focusing on the degree of ease associated with the use of the system.

Social influence, which refers to the degree that an individual perceives the importance of others believing that they should use the new system.

Facilitating conditions, related to the degree to which an individual believes that organisational and technical infrastructure exists to support use of the system.

Hence, the UTAUT model is most relevant to ICT competence development and firm competitiveness because its constructs play a significant role as they directly determine user acceptance and usage behaviour. This is particularly the case in the retail sector where the purchase, sale, distribution and marketing of products and services is largely dependent on users' acceptance and behavioural commitment to use technology for these activities. The study, therefore, extends this theory by seeking to establish how SMMEs orient themselves towards greater acceptance and productive use of technology in their operations.

2.2.5. Relationship between ICT competences and knowledge management

It is critical to examine the relationship between concepts examined in this study to fully appreciate how the conceptual model was developed. First, the relationship between ICT competences and knowledge management is examined. ICT competences are deemed to bridge the barriers of managing knowledge (Taghipour, Mahboobi & Gharagoslou, 2016) by drawing on new technologies to locate, manage and effectively appropriate knowledge. For instance, the different competencies (e.g communication, online collaboration, and e-marketing) enabled by technologies particularly e-business, e-commerce, enterprise resource planning (ERP) and customer relations management (CRM) applications are known to influence knowledge management processes. Thus, Almajali, Mansour and Maqableh (2016) maintain that information management applications (e.g., ERP, CRM) activate competencies such as communication competencies, social competencies and e-marketing which are deemed to improve the management of knowledge by increasing transaction speed and reliability. This concurs with Narumitsu et al's (2015) view that the use of ICT competences by organisations to generate, process, store and reproduce data will enable real time information interchange, which enabled effective management of knowledge. However, this body of literature does not demonstrate the actual methodology applied to ensure ICT competences are used positively, who are

the change agents and whether ICT adoption is a once off exercise or an ongoing process.

2.2.6. Relationship between ICT competences and operational efficiency

The concept of ICT competences has been associated with engagements in firm operations. Literature highlights that ICT competences exert a positive impact on operational efficiency (Tarute & Gatautis, 2014). Similarly, Loya et al. (2017) assert that ICT competences have become an integral part of organisations because they help improve operational efficiency by improving the speed and reliability of product and service delivery while reducing transaction costs, including those related to communications and transportation (Almajali, Mansour and Maqableh, 2016). Moreover, these competences increase the operational efficiency which is deemed to improve the overall performance of the organisations (Diaz et al., 2015). Tsolakis et al. (2014) posit that some of the well documented benefits of ICT competences are that they facilitate quicker and joint decision-making processes where all members of the organisations can get involved in the process in ways that improve the speed and efficiency of operations and decision making.

2.2.7. Relationship between ICT competences and firm competitiveness

Haider (2011) argues that ICT should be seen as a dynamic social-technical entity, which exists and interacts within an organisational context. Literature suggests that ICT competence encourages and stimulates innovation that plays an important role in developing internal operations, production capacity and capabilities, and enables swift response to market pressures. Tarutė and Gatautis (2014) asset that the implication of new technology in business include the reduction in production and operational cost, and sustainable expansion of potential target markets, which create the much-needed avenue for competitive advantage. Likewise, Erasmus et al (2013) declare that a business that does not keep abreast with technological changes may not survive competition in the business world. Hence, Mbuyisa's (2017) assertion that SMMEs in developing countries are faced with the difficult task of surviving competition in a global market.

This study stresses the important role ICT plays in organisational competitiveness and highlights the shortfalls exhibited by SMME owners and managers in terms of ICT adoption and use. Moreover, in consensus with literature, the study interrogates SMME owners and managers and employee's level of ICT competence and functional use of ICT to attain competitive edge. This is pivotal especially for SMMEs in emerging economies that are technology dependent for their increased competitiveness.

2.2.8. Interventions to improve ICT competences

In a study on ICT usage by SMMEs, Mbuyisa (2017) declares that studies conducted in developing countries have paid limited attention to ICT use in relation micro-enterprises. Moreover, the National Planning Commission (2011) maintains that less developed countries demonstrate a lack of skilled labour and thus use technology inefficiently. This could explain the need for governments and businesses to intervene to improve ICT competence in small firms. Thus, telecentres are used as information or knowledge centres in some developing countries, such as India, to provide access to details on products and services and possible selling prices (Mbuyisa, 2017). Furthermore, various stakeholders such as private (i.e., vendors) and public sectors (i.e., SEDA) provide training opportunities to bridge knowledge and skills gap in SMMEs (Ghobakhloo et al., 2012).

In the case of developed countries, a study by Ghobakhloo et al (2012) maintains that the ICT competence of SMMEs has improved significantly through government policies and initiatives designed to aid IT adoption and e-readiness within Iranian SMMEs. Similarly, Malaysian government agencies have offered and provided financial support and various training programs for SMMEs through the Malaysian Technology Development Corporation (MTDC) and Small and Medium Scale Industries Development Corporation (SMIDEC) (Ghobakhloo et al., 2012).

2.3. Knowledge management (KM)

Traditionally, the production factors were the only known determinants of organisational success. However, the twenty first century's modern economic classes

and conditions compelled organisations to realize that their ultimate success is now dependent on their general ability to influence, generate, cultivate and manage a precious resource called knowledge. The task of developing knowledge management has become even more important for organisations, more especially the small firms (SMME's) because competitors are less known, rules are more rigid, customer loyalty is more dynamic, trading conditions are unpredictable and economic fluctuations are more frequent. The subsequent sections discuss the knowledge management concept.

2.3.1. Knowledge management dimensions

For this study that focuses on SMMEs, knowledge recognition and knowledge implementation were deemed most important dimensions of KM. Knowledge recognition encompasses the awareness, recognition and comprehension of the knowledge management spectrum for small and medium enterprises in a globalised world (Baporikar, 2014) and revolves around business opportunity recognition (Guo et al. 2017). The KM recognition dimension is relevant for SMMEs in the retail sector because it is indispensable for successful goal attainment and sustainable business development in a contemporary complex economy (Baporikar, 2014). It is critical because it requires SMMEs to locate and recognise knowledge that increase the productive capacity of the business and improve its chances of improving competitiveness.

It should also be noted that knowledge implementation is concerned with the adoption and setup of knowledge management practices (Robertson, 2016) that can facilitate the creation, sharing and leveraging of knowledge (Zieba et al., 2016). This dimension is most relevant for SMMEs in the retail sector because it will directly affect both the internal and external operations of an organisation through knowledge application. Furthermore, knowledge implementation, as noted by Anand and Singh (2011), is brings with it tremendous organisational, structural, cultural and technological changes within firms.

2.3.2. Perspectives on knowledge management
2.3.2.1.   *Knowledge management as a business strategy.*

Strategy is the actual plan an organisation puts in place to drive operational efficiency by regulating inputs to produce maximum outputs (Gavril e al., 2016). With this strategy, knowledge is seen as a product with significant and direct impact on the profitability and viability of the enterprise – a valuable (Naicker et al., 2017) and practical tool for any organisation (Anand & Singh, 2011). The knowledge owned by an organisation is now used as a key resource in this competitive market and whoever has the best knowledge leads the way in the competition, as a result, firms are forced to adopt knowledge management in their business strategy (Ishan, 2019). Firms around the world have indeed recognised the significance of knowledge management and use it to facilitate the creation, sharing and leveraging of knowledge (Zieba et al., 2016).

2.3.2.2.   *Knowledge transfer as a business process*

Knowledge transfer has always been an existing concept in one form or another through on-the-job discussions, apprenticeship, organisational libraries, training and mentoring programs (Van Schadewijk, 2014) and the creation of and interacting with databases. This concept has a tremendous intuitive appeal and face validity, and also leads to a rapid success of the business. The focus is on systematic approaches to knowledge reuse, and transfer for best practices and knowledge to where organisations use them in order to improve operations or include them in products and operations. To this end, JARI (2011) argues that SMME owners and managers need to place emphasis on knowledge transfer capabilities to increase their competitiveness. These authors further posit that the nature of knowledge, end-user engagement level and contextualisation of knowledge compels for a consideration of the related costs of knowledge transfer during the designing of knowledge transfer activities and policies.

2.3.2.3. Knowledge management as customer orientation

This emphasizes the importance of capturing knowledge about customers, their needs and preferences and increasing sales by bringing the knowledge of the organisation to bear on customer problems. This process pertains to the knowledge about customers, knowledge for customers and knowledge from customers (Vasireddy, 2016). Al-Shammari (2009) and Vasireddy (2016) declare that knowledge that resides with customers has the potential to provide innovative ideas and new insights that can create sustainable competitive advantage for the firms. This perspective is based on the knowledge about customers, knowledge for customers and knowledge from customer as their knowledge is conceived as an external resource for improved competitiveness. As such, various methodologies that include customer knowledge management (CKM) (Vasireddy, 2016) and customer relations management (CRM) (Schierholz & Kolbe, 2004) have been adopted to facilitate customer-oriented knowledge management - as should be the case with SMMEs.

2.3.2.4. Knowledge management as management of intellectual assets

This encompasses enterprise-level management of specific intellectual assets such as patents, technologies, operational and management practices, customer relations, organisational arrangement, and other structural knowledge assets. Brooking (1997) concurs and adds that intellectual assets include corporate culture, structure, ICT, employees, knowledge and networks that give an organisation internal strength. Baskerville and Dulipovici (2006), who define intellectual capital as the difference between company book value in comparison to the amount offered to purchase it, assert that knowledge management is a field that embodies practical intellectual strength with emphasis on the value of knowledge within the organisation. This author maintains further that knowledge is a fundamental part of an organisation's intellectual capital and human assets.

2.3.3. Theories of knowledge management

Various researchers have theorized knowledge management over the past years. Some of the prominent theories given much focus in this study are knowledge creation and knowledge enhancement.

2.3.3.1. *Knowledge creation theory*

The knowledge creation theory is premised on two types of knowledge: the knowledge that is subjective, experience based and cannot be expressed with words (tacit knowledge) and objective knowledge that h is rational and can be expressed with words (explicit knowledge) (Nonaka & Takeuchi, 1995). These authors focus on the interaction and distinctions between both types of knowledge. Nonaka and Takeuchi's (1995) knowledge creation theory draws distinctions on two dimensions namely:

Epistemological dimension – which draws distinction between tacit and explicit knowledge. Here, Guia (1999) advises that the distinctions should not be regarded as separate types of knowledge, but as two possible states of knowledge.

Ontological dimension – this acknowledges different fields of knowledge and classifies knowledge as individual and social (Nonaka, 1994). Nonaka and Takeuchi (1995) posit that individual knowledge is entrenched in a person and as such, is necessary and available for creation. Social (collective) knowledge on the contrary, is shared by members of an organisation and does not reside in any individual.

2.3.3.2. *Knowledge environment enhancement theory*

According to Davenport, De Long and Beers (1998), the knowledge environment enhancement theory focuses on the creation of an environment that is conducive to effective knowledge creation, transfer and use. Hence, organisations are trying to change their behaviour towards knowledge and improve knowledge management process. Moreover, Davenport et al (1998) posit that several companies have engaged in high-level initiatives to change their organisational norms and values related to

knowledge. Finally, this theory involves the knowledge support infrastructure and designs for knowledge enhancement and further development (Baskerville & Dulipovici, 2006). The implications of this theory are in line with the SMME environment and infrastructure, particularly the need to enhance the quality of knowledge development for utilisation in an organisation, hence this study.

2.3.4. Relationship between knowledge management and operational efficiency

A general consensus among studies (Okwang'a et al., 2012; Kuppusamy & Ramanigopal, 2017) is that knowledge management has a positive influence on the operational efficiency of a business. When effectively implemented in an organisation, knowledge management can result in maximum efficiency for the firm (Al-Qubaisi & Ajmal's, 2018). Because knowledge management increases the firm's capacity to utilise resources at their disposal, it is considered a strategic resource that drives the performance of an organisation (Omotayo, 2015). Omotayo (2015) further postulates that for organisations perfect their operations, to increase their chances of survival generate maximise profits and stay in competition, they often rely on knowledge management. This coincides with the view that knowledge management efforts directly translate to improved efficiency in task planning and execution (Hegazy & Ghorab's (2015). In short, one could argue that knowledge management exerts a positive influence on the operational efficiency of firms.

2.3.5. Relationship between knowledge management and firm competitiveness

Knowledge management is an important tool towards attempts by various firms across the globe to secure their overall sustainability. Proper creation and management of knowledge inside a firm should pave a way for the better execution of operations. One of the facets of knowledge management is that of knowledge sharing, better understood as the dissemination of knowledge, which in turn leads to the creation of solutions and problem solving within a firm (Naicker et al., 2017). Furthermore, Wang et al. (2016) and Robertson (2016) attest to the importance of KM in the firm as they state that the manner in which KM is implemented in a firm influences its overall effectiveness (the extent to which a business' objectives are achieved (Business

Dictionary, 2017a), efficiency (the time taken to complete tasks; the less time it takes to complete tasks, the more efficient a firm is perceived to be (Business Dictionary, 2017b), competitiveness and overall sustainability. Therefore, a concisely and properly implemented KM is the driver for operational effectiveness and the maintenance of competitive advantage (Pais, 2014) for an organisation.

The knowledge economy is built on information technology and the sharing of knowledge and intellectual capital. In such a knowledge-based environment, competitive advantage rests with those enterprises that have the capacity to deliver fast and have innovative forms of processes that raise productivity (Alawneh, Abuali, & Almarabeh, 2010). Torabi and El-Den's (2017) study on the impact of knowledge management on organisational productivity highlight that the organisational management's main aim is to ensure effective use of its diverse resources in their quest to achieve competitiveness. In line with this view, Chawla and Joshi (2011) assert that knowledge management by organisations is one of the most important assets that helps them in attaining competitive advantage. Moreover, global statistics indicate that as firms invest in knowledge management, they improve the ability leveraging their operations for better performance (Murumba, 2016). Alawneh et al. (2010) concur with this view and further declare that knowledge is increasingly claimed to be a key critical source of competitive advantage.

2.3.6. Interventions to improve knowledge management

Various studies posit that knowledge management is the catalyst for organisations to compete in the global marketplace (Palte et al., 2011; Omotayo, 2015; Sefollahi, 2018). It is for this reason that the South African government has made various interventions to facilitate knowledge management within SMMEs. The South African government established the Small Enterprise Development Agency (SEDA) that is delegated by the National Small Business Act (NSBA) to design and implement development support programmes for small businesses that target the management of knowledge in small business (Rankhumise & Masilo, 2017). A local study (Malefane, 2019) declares that the South African government has shown political and legislative

commitment through policy and strategy to ensure that SMMEs adopt knowledge management.

An international study on SMME support by Rankhumise and Masilo (2017) maintains that Chinese government initiatives tend to focus on productivity development centres, which provide business support to SMMEs and facilitate the development of knowledge among SMMEs. This view is extended by Muriithi (2018) who argues that some foreign governments integrated SMME agendas in their national and social development strategic planning leading to the development of numerous legislations and policies meant to promote and boost SMME growth, manage their knowledge management, entrepreneurial education and start-up business innovations (OECD, 2016).

2.4.   Operational efficiency (OE)

From an economic perspective, Sharma, Vashisth, and Sharma (2014) define operational efficiency as a ratio of actual output against maximum output and behaves like financial advantage. It identifies wasteful processes and resources that undermine the realisation of organisational profits and suggest the designing of new work processes that improve quality and productivity. Improving operational efficiency has a direct impact on a company's bottom line (profit maximisation). Operational efficiency and lean manufacturing both target waste-elimination related to time, money, people, effort and other un-productive resources. The results are measurable, immediate and sustainable. OE is reflected in the organisation's turnover as a high turnover is associated with better performance of firms. Lee and Johnson (2015) define operational efficiency as the quality of products and services including the systematic and proficient manner with which the organisation carries out its tasks to achieve its goals. It is the proficiency of a corporation to curtail the unwelcome and maximize resource capabilities to deliver quality products and services to customers (Ndolo, 2015) cost effectively. For SMMEs, this would be a major confidence booster to confront economic and political uncertainties that negatively affect global competitiveness.

An organisational operational efficiency depends on factors such as skilful and proficient workers, proper technological progression, proper procurement carried out, return to scale of the businesses, and supply chain control. In addition, Mills and Schumann (1985) consider operational efficiency as the capability of a business to deliver quality commodities to customers in the most cost-effective manner possible. The operating efficiency of a business in relation to the efficient utilisation of the assets is reflected in net profit margin. Although a high return margin reflects better performance, a lower margin does not automatically indicate a lower rate of return on assets turnover. According to Heikal et al. (2014), return on earning does not necessarily go in parallel with return on assets – it sometimes happens that while the return on assets is higher, the growth of profits may decrease. Relatively, firms that are more efficient tend to maintain more stability levels in terms of output and operating performance in comparison to the other industry peers.

2.4.1. Dimensions of operational efficiency

This study on SMMEs focalises proactiveness and intelligence generation as central to the achievement of operational efficiency. Proactive behaviour at work is about making things happen. Bindl and Parker (2010) argue that it involves self-initiated, anticipatory action aimed at changing either the situation or oneself. Examples include taking charge to improve work methods, proactive problem solving, using personal initiative, making deals, and a proactive search for feedback. Proactiveness is a relevant dimension in this study because SMME owners and managers should be proactive on the job if they are to resolve anticipated problems and take advantage of opportunities.

Intelligence generation involves the gathering and analysis of information such as customer's current and future needs and monitoring and analysing exogenous factors such as competition, government technology and other environmental forces (Mokoena, 2019). In essence, intelligence generation involves the collection, analysis and interpretation of data to give meaning or forms that better informs key strategic decision-making.

2.4.2. Perspectives on operational efficiency

The perspectives on OE are largely focused on measuring a firm's operational efficiency. In order to stay in the market, companies have to constantly measure their level of operation efficiency and strive for new ways to improve. The measuring of operational efficiency can be a complicated and daunting task for all organisations large or small. Lee and Johnson (2015) outline two theories under which operational efficiency is measured:

2.4.2.1.   *Absolute operational efficiency (AOE)*

Ideal benchmarks to measure efficiency are usually developed in a design laboratory under perfect operating conditions. However, it is not easy to identify the sources of efficiency loss between ideal performance and the best-observed performance. For instance, in a manufacturing process operating in perfect conditions, one machine's ideal throughput is 100 units per hour, yet the actual throughput is 80 units per hour due to operator's skill, scheduling, etc (Lee & Johnson, 2015).

2.4.2.2.   *Relative operational efficiency (ROE)*

Relative operational efficiency (ROE) is the ratio of actual throughput (the end product or output) in comparison with the best observed throughput. Relative benchmarks are often used to measure efficiency because similar comparable machine, process, firm, etc. are often easily identifiable (Lee & Johnson,2015). In relation to SMMEs, Okwang'a et al. (2015) identify several other efficiency indicators that they believe are imperative measures of a firms' relative operational efficiency. These measures include inter alia *price/costs, quality products, service/time, increased sales/profits*. Alternatively, other measures of OE that can be used are the a) fixed asset turnover ratio, b) total asset turnover ratio, and c) Equity turnover (Ndolo, 2015).

2.4.3. Relationship between operational efficiency and firm competitiveness

Kholopane (2016) posits that competitive advantage based on operations is not a new phenomenon. This implies that operational efficiency has always been part of organisation's competitive mix (Mkala et al., 2018). Mutunga, Minja and Gachanja (2014) conducted a study to test the effects of innovative adaptation and operational efficiency on sustainable competitive advantage. The study results showed a positive relationship between operational efficiency and sustainable competitive advantage, which further supports the view that in Kenya firms regard innovative adaptation and operational efficiency as critical to business operations. Omondi and Muturi (2013) also conducted a study to investigate factors affecting the financial performance of listed companies on the Nairobi Securities Exchange in Kenya. Again, the study provided evidence that operational efficiency plays an important role in improving a company's financial performance.

It is for these reasons that SMMEs often express ambitious plans to expand their revenues in both domestic and international markets. The argument is that forecasting improved revenue leads to profitability, which when properly managed can contribute to improvements in operating efficiency (Oxford Economics, 2017). Some organisations turn to exports as a focus for growth and to accomplish the operational efficiency firm-competitiveness relationship. Moreover, SMMEs boost export sales by investing in digital platforms, developing marketing intelligence in overseas markets, and collaborating with established multinationals. Literature suggests that firm competitiveness has improved substantially due to operational efficiency (i.e., offering superior customer service, improving quality of products and service delivery, maintaining good relations with local and international agents) (Kholopane, 2016).

2.4.4. Proposed conceptual framework
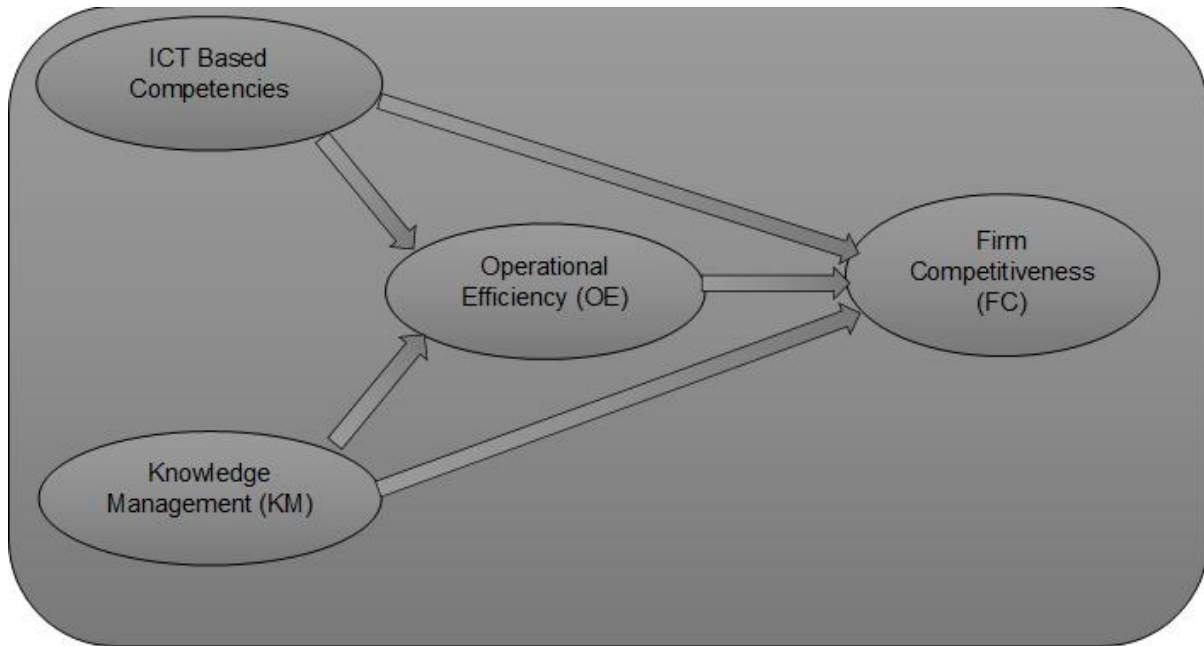
Figure 2.1 Proposed Conceptual Framework

The above presented framework suggests, on one hand that, possession and effective application of ICT competence, just as the implementation of knowledge management by small retail firms, can directly and independently influence firm competitiveness. On the other hand, the framework also depicts operational efficiency's mediation role in all the relationships between ICT competence, knowledge management and firm competitiveness.

2.4.5. Interventions to improve operational efficiency

SMMEs respond to market uncertainties by developing effective strategies that will yield them the competitive edge. Literature suggests that most SMMEs adopt new strategies to expand into new domestic and global markets. These SMMEs have prioritized four areas critical to their success (Oxford Economics, 2017):

2.4.5.1. Applying technology

Information has become a commodity in the global market. The effective use of technology is an imperative aspect for success within the SMME sector. This is even more possible as technology is becoming more affordable. However, those that shy away from technology and the digital agenda will have serious problems.

2.4.5.2. Agility and Accelerated innovation

In a period of rapid disruption, where customers are increasingly demanding new, bespoke products and services delivered nearly instantly, companies must adjust course and scale operations quickly. Large incumbents with outdated, complex IT systems, established bureaucracies and standardised regimes for managing planning, budgeting, and performance management naturally find it difficult to change course easily.

Moreover, the speed and urgency to respond to market demand can be an advantage for SMMEs. This is interpreted as accelerated innovation. The fact that SMMEs are generally small in nature is an added advantage because they find it easier to innovate at an accelerated pace than larger firms. Therefore, the size and newness of SMME to their industry and areas of operation may facilitate innovation through software design, which is dependent on smaller teams' use of agile methodologies for their development and fostering of supportive corporate culture. All this can be easier for SMMEs to provide due to their size of operations.

2.4.5.3. Attracting and retaining talent

Talent is the single most important thing in SMMEs since literature suggests that SMMEs heavily rely on tacit knowledge. SMMEs should be able to construct attractive packages to attract and retain top talent, which is difficult to get because top talent is often attracted by high paying jobs from already established businesses.

2.5.   Firm competitiveness (FC)

The term competitiveness is one of the most used terms in the business arena. However, there is no generally accepted definition to the term as it means different things to different researchers and in different settings. Siudek and Zawojska (2014) maintain that the term competitiveness emerged from the Latin word "petere", meaning to seek, attack, aim at, desire and the Latin prefix "con", meaning together. Furthermore, Arslan and Tathdil (2012) simply view it as the firm's ability to make production at lower costs and higher quality. Firm level competitiveness can be defined as the ability of a firm to design, produce and or market products superior to those offered by competitors, considering the price and non-price qualities (D'Cruz, 1992). Hence, Chao-Hung and Li-Chang (2010) pair competitiveness with a firm. These authors define firm competitiveness as its economic strength against its rivals in the global marketplace where products, services, people and innovations move freely despite the geographical boundaries. This is the preferred definition for this study because it captures the competitive capacity of firms. In terms of its dimensions, competitiveness includes enjoying a better market share, creating shareholder value and increasing gross sales.

2.5.1. Perspectives on firm competitiveness

Different perspectives have emerged regarding the competitiveness of firms. Some of them include the competency approach (Doz and Prahalad, 1987; Bartlett & Ghoshal, 1989; Hamel & Prahalad, 1989, 1990) and competition approach (Banerjee, Farooq & Upadhyaya, 2018).

2.5.1.1.   *Competency approach*

Under the competency approach, scholars such as, Doz and Prahalad (1987); Hamel and Prahalad (1989, 1990); Bartlett and Ghoshal (1989), emphasize the role of factors internal to the firms that include a firm' strategy, structures, competencies, capabilities to innovate, and other tangible and intangible resources for their competitive success.

2.5.1.2. Competition approach

Banerjee, Farooq and Upadhyaya (2018) maintain that organisations around the world regularly review their performance against ever-changing economic situations. As competition intensifies, firms strive to survive by trying to expand to newer geographies and markets, developing and marketing new products, offering attractive prices, enhancing customer satisfaction and experiences. Each one of these considerations are competencies that firms must have.

2.5.2. Theories on firm competitiveness
2.5.2.1. Theory of competitive advantage

The competitive advantage theory, as postulated by Ricardo (2015), does not consider the cost of production in money terms but rather in between real costs (i.e., labour time) of different commodities. This view is in line with Buchanan and Yoon's (2002) assertion that competitive advantage is primarily based on two or more competitors, there is a perfect competitive environment, and the cost of production is measured in labour terms. A better explanation of competitive advantage is found in Wang's (2014) theory where he maintains that competitive advantage is obtained when an organisation develops or acquires a set of attributes that allow it to outperform its competitors as is the case of using comparatively cheaper labour costs. This theory is most relevant for the current study because each SMMEs owner manager ventures into business with the sole purpose of outperforming the competition.

2.5.2.2. Marginal utility theory

Earlier researchers (Jevons, 1957; Wieser, 1989) maintain that marginal utility measures the extra benefits that a consumer enjoys from an extra unit of a good. This view is slightly different from Ricardo's (1951) assertions in his explanation of the relative value of commodities in the market in relation to the quantity of labour necessary to produce them. A more vivid definition of the theory is that of Levin and Milgrom (2004) that considers marginal utility as the change in utility associated with an insignificant change for one of the goods consumed when keeping the quantity of

the other good fixed. This theory is most relevant for the current study because SMMEs owner managers must deal with the economic paradox of having to allocate limited resources to achieve a higher output while at the same time seeking better understanding or benefit from increased consumer behaviour such as purchases and re-purchases.

2.5.3. Measurement of competitiveness

Often a challenging task in the study of competitiveness is its empirical measurement – how well a firm does compared to its rivals in the same industry or from an external environment. In light of evidence that the competitiveness concept lacks a universally accepted definition (Siudek & Zawojska, 2014; SMME Competitiveness Outlook, 2015), there are three main competitive measures the study drew on:

2.5.3.1. *Competitive potential*

This measure of competitiveness refers to the resources used to generate superior performance and centres on present operations of firms and their efficiency in terms of cost, time, quality and quantity (SMME Competitiveness Outlook, 2015). This concept also extends to the immediate business and national environment. European Commission Report (2018) highlights that competitive potential as a process encompassing internal factors (i.e., product innovation, productivity, cost efficiency) that may determine the firm's current and future performance.

2.5.3.2. *Competitive process*

This competitiveness measure refers to the management and administration of the company. This measure centres on the capacity of a firm to execute change in response to, or in anticipation of, dynamic market forces and to innovate through investments in human and financial capital (SMME Competitiveness Outlook, 2015). It is possible to perceive that this method of measurement is qualitative in nature

because in looks at how are the internal processes are carried out and also focuses on translating competitive potential into competitive performance.

2.5.3.3. *Competitive performance*

This is the performance outcome relative to that of competitors and centers on gathering and exploiting information and knowledge about the market and competitors. This method of measurement focuses on formulating strategy and translating it into actionable tasks (Teeratansirikool, Badir & Charoenngam, 2013). Hence Kimani et al. (2013) posit that competitive performance is all about the firm's ability to sustain trade against the competitors in the market.

2.5.4. Interventions to improve firm competitiveness

In a globalised economy, firms no longer just rely on mortar and tangible assets as the only form of competitive advantage as they now consider how they can manage knowledge effectively since an effective management of knowledge is effectively managed (i.e., created, shared, leveraged), is highly likely to result in innovation (Dube & Ngulube, 2012) and the firm can become more sustainable (Du Plessis, 2011). Moreover, Krajnovic, Covo and Jasic (2012) propose innovation and competence upgrading as the two major factors for organisations to compete intensively in the market. Krajnovic, Covo and Jasic (2012) maintain that those organisations should focus on innovation and developing their competence intensively to differentiate themselves from their counterparts. This can be achieved through effective knowledge management and integration of existing knowledge as well as exploitation of new information and communication technologies to form new knowledge that is unique and specific to organisational needs.

CHAPTER 3

RESEARCH METHODOLOGY
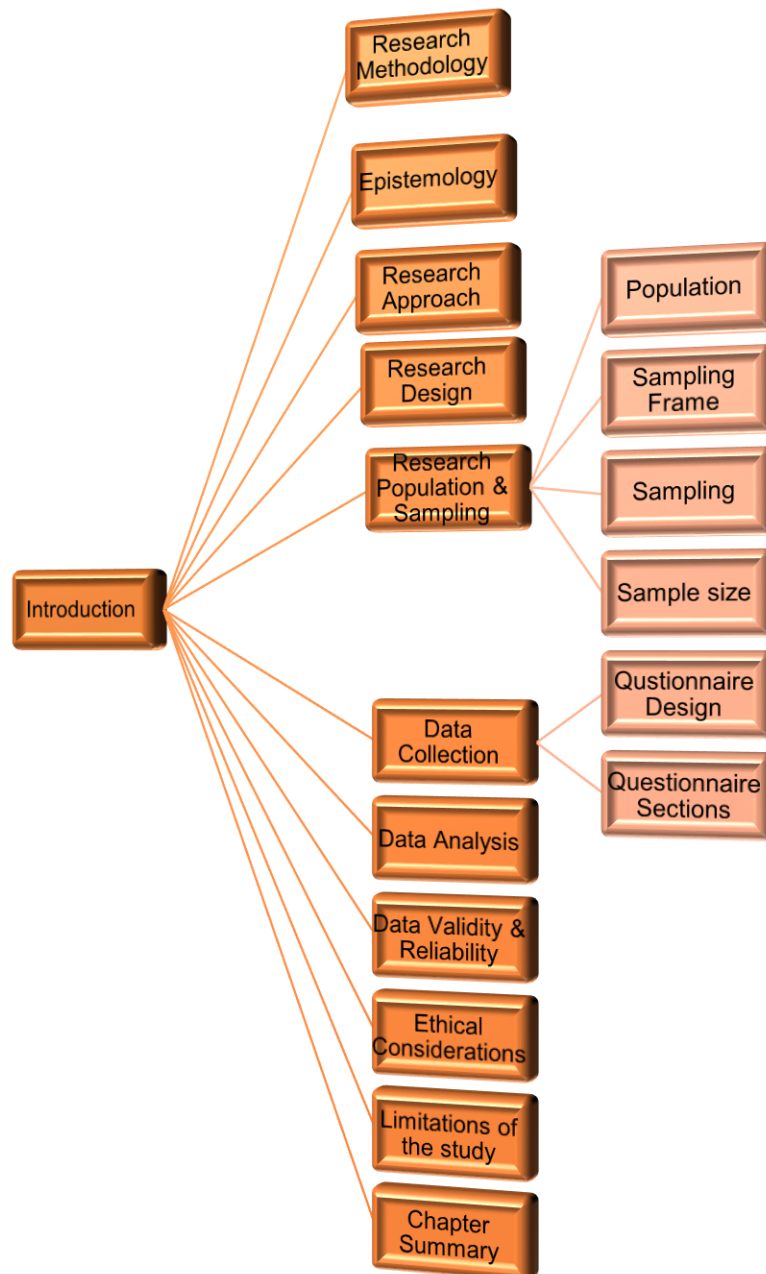
3.1. Introduction

The previous chapter reviewed the literature related to the study. Special attention was devoted to a discussion of concepts, their constitution, perspectives and theories underpinning them, their measurements, interventions to address these variables, and challenges around realising them. The chapter concluded with a conceptual model that summarises the relationships between variables and the sequence of these relationships. This chapter outlines the methodology employed in the study and presents the epistemological position, research approach, research design, target population, sampling strategy, data collection instruments and process, data gathering and analysis, and validity and reliability.

3.2. Research methodology

This study follows a strict methodology to arrive at the targeted research outcome. A research methodology is the general strategy that outlines the way in which a research project is undertaken and among other things, identifies the methods used in the study (Igwenagu, 2016). The research methodology constitutes the overall strategy to achieve the aim of the study and employs research methods as tool tools for addressing the research questions (Ramorena, 2016).

The diversity of research methodologies compels the researcher to cautiously consider the nature of the research problem and the data to be collected before employing a methodology. With methodology viewed as the overall strategy, or a plan of action, or a process of adopting a particular method and linking the choice of methods to the preferred outcome (Tight, 2013), there is need to align the process of data collection to the phenomenon under investigation and the constitution of the research outcome. For the purpose of this study, the methodology comprises all the detailed data collection processes and procedures and their justifications used to realise the desired research outcomes and address the research questions for this study.

3.3.   Epistemology

Epistemology refers to the philosophical orientation of the researcher in executing a research project (Agbobli, 2013). It is the study of knowing, dealing with the questions of how what is known is known, and the theory of knowledge and how it ought to be validated (Sutrisna, 2010). Epistemology is important because, it helps the researcher to establish the facts and truths from the data. It affects how the researcher goes about uncovering knowledge in the social context that s/he investigates (Kivunja & Kuyini, 2017).

Often, the word epistemology is used interchangeably with paradigm in research even through some differences are drawn between both terms. Epistemology defines how researchers know what they know while paradigm involves the assumptions and perspectives that drive and inform the research process (Mokgosi, 2017). Furthermore, Chilisa and Kawullich (2012) argue that paradigm embodies ontology – that is, what is believed about the nature of reality, while epistemology deals with how researchers know what they know, and axiology- that is, what is believed to be true. Together, these paradigmatic aspects help shape the researcher's view of a research problem, how he/she goes about investigating it, and the methods or techniques employed to answer the research questions.

This study leans on a positivist epistemological philosophy mainly because quantitative oriented calculations and analyses will be conducted to establish the relationships among ICT- based competence, knowledge management, operational efficiency and firm competitiveness.

3.4.   Research approach

Creswell (2014) defines research approach as the plans and procedures for research that span the broad assumptions, and steps detailing the methods of data collection, analysis and interpretation. There exist three main research approaches as outlined by Creswell (2014):

I.   Qualitative – this approach is used to explore the meaning individuals or groups ascribe to a social or human problem.

II.   Quantitative - is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured using instruments with the numerical data analysed using statistical procedures. Hence, Sulaiman and Kura (2012) maintain that quantitative research involves the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect.

III.   Mixed methods – this approach resides in the middle because it incorporates elements of both the qualitative and quantitative approaches.

Given the objective and nature of this research project, the quantitative approach was used to explore the impact and relational aspects of the variables. A quantitative approach was used in the study because the researcher wanted numerical data that was manipulated to make observations about relationships. Moreover, statistical analysis was used to establish and test co-relational and predictive relations. Theories were also tested to ascertain the relationships between concepts.

3.5. Research design

To conduct credible research, the researcher must select the appropriate research approach, and select the appropriate research design. Creswell (2014) maintains that research designs are types of inquires within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures, whereas others refer to them simply as strategies of inquiry (Denzin & Lincoln, 2011). Hence, the research design encompasses the tools, processes and specific tasks required for data collection (Mokgosi, 2017). In accordance with the selected quantitative approach, a survey design was adopted for this study. According to Arevik (2014), a cross sectional survey is a systematic method for gathering information from (a sample of) entities for constructing quantitative descriptors of the attributes of the larger population of which the entities are members. This author further posits that surveys

are conducted to gather information that reflects a population's attitudes, behaviours, opinions and beliefs that cannot be observed directly.

The quantitative design was adopted various reasons. They include the reality that the constructs measured are abstract and cannot be observed empirically (Techo, 2016), and that the design is appropriate for determining the nature and complexity of perspectives of SMME owner/managers regarding the variables examined at a particular time (Daniel, 2016). Moreover, the numerical data was generated was amenable to measurements and statistics could be employed to establish relationships between the variables (Fischer, Boone & Neumann, 2014; Apuke, 2017).

3.6. Research population and sampling

Following the selection of the research design phase is the establishment of the study population. Ideally, a research study is intended to cover the entire population, a task which is usually impossible due to time and cost constraints. Hence, a sample is drawn as a representative of the entire population on which a study is to be conducted. The subsequent sub-sections discuss the population, sampling frame and the sample.

3.6.1. Population

Agbobli (2013) states that a population is the total collection of elements from which the sample is to be drawn and the researcher wishes to make some inferences about the general population. Babbie (2014) considers the population as constituted by a group of elements or cases, whether individuals, objects or events, connected to a specific standard and to which the researcher intends to generalise the results of the study. The population for this study comprised SMME owners and managers from the retail sector in the Mangaung Metropolitan Area. Records from W&RSETA together with Small Enterprise Development Agency (SEDA) indicate that there are 3165 SMMEs over the whole of Free State province. Using a Raosoft online sample size calculator set at 95% confidence level, margin of error of 50% and response distribution of 50%, a population of 3165 SMMEs generates a sample of 343. The justification for selecting SMME owners and managers as the unit of analysis is that

such individuals would ideally have sufficient knowledge of the variables studied as they relate to entire business operations.

3.6.2. Sampling frame

A sampling frame is the list of all units in the population from which the sample is selected (Bryman & Bell, 2011; Cooper & Schindler, 2011). The sampling frame, also called the working population because these units will eventually provide units involved in the analysis, is often derived from an existing database (Zikmund et al., 2013:388). The sampling frame for the current study was established from the Small Enterprise Development Agency (SEDA), through the Department of Trade and Industry, (DTI), which hosts a database of active SMMEs that is updated continuously and thus, accurate.

3.6.3. Sampling

According to Tischler (2014), sampling is a technique that permits investigators to study a controllable number of people, referred to as the sample, chosen from a larger population or group. Generally, researchers have at their disposal two main categories of sampling techniques, which are probability and non-probability sampling (Leedy & Ormrod, 2014). Based on this categorisation, Stangor (2015) posits that with probability-sampling method, each population element is given an equal chance of being selected and becoming part of the sample. Contrary to this, non-probability sampling is a method in which respondents are not randomly selected. Therefore, not all respondents have a fair chance of being selected and included in the sample. Thus, Zikmund et al. (2013) suggest that non-probability sampling is somewhat a subjective selection (based on personal judgment) method where each element does not have a known chance of being selected.

Moreover, Ary, Jacob, Sorensen and Walker (2014), claim that the most important characteristic of a sample is its representability and not necessarily its size. Two attributes of a good sample are accuracy and precision (Cooper & Schindler, 2011:367). Accuracy denotes the degree to which a sample is devoid of bias, while precision demonstrates how closely the sample represents the population.

3.6.4. Sample size

One of the most difficult tasks in research relates to the determination of the correct sample size. How large a sample should be in probability sampling is a function of the variation in the population parameters (measurable characteristic) being investigated and the desired level of precision (Cooper & Schindler, 2011). Wanger, Kawulich and Garner (2012) state that an increase in the population size decreases the statistical accuracy required of the sample size. This implies that the sample size will depend on the population size. Wanger et al. (2012) further argue that the required sample size for a small population is approximately 30% of the population, while the required sample size for a large population is 10% of the population.

The Wholesale and retail Sector Training Authority database suggests that there were 31 65 SMME owner /managers in the whole of Free State. This study, however, covers only the Mangaung Metropolitan Area due to time and financial limitations. Using Raosoft online sample size calculator set at 95% confidence level, margin of error of 50% and response distribution of 50%, a population of 3165 SMMEs generated a sample of 343 which is fairly representative of the population. Drawing from this sample, all owners and managers were issued with questionnaires either by email or hand delivery by the researcher and two assistants. The unit of analysis was the owners and managers as they were the most knowledgeable about their businesses and were deemed to provide accurate information about all variables considered in the study. A total of 300 questionnaires were successfully completed and returned. As such, the response rate was 87.5% even though a threshold of 50% response is deemed sufficient for a detailed analysis (Baker, 2012). This positive response rate can be attributed the researcher's follow-ups on the respondents and the help of researcher assistants in distributing and collecting questionnaires.

3.6.5. Data collection

The researcher employed quantitative data collection methods in line with the positivist epistemology. To answer the research questions, and to gain the SMME's owner/manager's views and perspectives on the impact of ICT based competences, knowledge management and operational efficiency on competitiveness of retail SMMEs, a structured questionnaire consisting of closed-ended questions was used. Moreover, the study harboured the widely used Five-point Likert scale questions in asking research subjects about the extent to which they agree with the provided statements (Maree & Pietersen, 2016). This approach is in line with Stangor's (2015) assertion that quantitative data needs to be collected using systematic methods and that the same data is analysed through statistical techniques.

3.6.6. Questionnaire design

A questionnaire was adopted in this investigation because the researcher, along with other theorists such McMillan and Schumacher (2010), is of the view that a questionnaire is relatively economical because the questions are standard across all subjects and can ensure anonymity.

The questionnaire for this study comprised structured questions and 55 items on a Likert scale format. To achieve the study objectives, the questionnaire covered concepts discussed in literature and covered research questions highlighted in the research proposal. The questions were divided into five sections briefly discussed below.

Section A: This section sought to collect personal demographic data. As a result, the questions requested information about the SMME owner/managers' gender, age, race, highest academic education, roles in their businesses and the nature of business ownership.

Section B: This section collected data on the SMME's level of ICT competency, and the adoption of ICT based competences.

Section C: This section collected data on SMME's knowledge management dimensions namely knowledge implementation and recognition.

Section D: This section collected data on SMME's operational efficiency dimensions namely pro-activeness and intelligence generation.

Section E: This section collected data on SMME's knowledge management effect on operational efficiency.

Section F: This section collected data on SMME's competitiveness.

3.7. Data analysis

Data analysis is a process of organising large and complicated data so that comparisons can be made, and conclusions drawn (Tischler, 2014). The analysis phase also included the numerical coding of the collected data. Numerical coding involves the entering and sorting of data using suitable software package. Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 23. The analysis involved descriptive data analysis, correlational and regression analysis, and exploratory factor analysis.

3.8. Data validity and reliability

For survey results to be meaningful, one must ensure that the employed measurement procedures and instruments fulfil the two characteristics - validity and reliability. Each characteristic is outlined below.

Validity refers to the extent to which the measured variable actually measures the conceptual variable (that is, the construct) that it is designed to measure (Stangor, 2011). Furthermore, Jackson (2012) and Babbie (2014) refer to validity as an extent to which an empirical measure adequately reflects the meaning of the concept under consideration. Hence, the questionnaire was developed based on the empirical literature relating to the study concepts. The research instrument was sent to the supervisor and the statistician (whose comments were incorporated into the design of the final research instrument) to test for completeness and relevance as a measure to ensure validity.

The reliability of a measure refers to the extent to which the instrument is free from random error (Stangor, 2011: 91). It is reliable if it can be used for a number of times on the sample with similar characteristics and produce the same results (Ray, 2012: 341). The measures of reliability of each of the Likert scaled constructs were calculated to determine their level of consistency. The Cronbach's alpha coefficient was also used as an indicator of how the questions that form a construct measure the same variable. A Cronbach's alpha coefficient of at least 0.700 indicates adequate internal consistency and hence reliability.

3.9.   Ethical considerations

It is imperative that a researcher always abides by the ethical standards of research. At the beginning, the researcher sought the necessary research clearance from the Faculty Research and Innovation Committee (FRIC) before the conduct of this study. Furthermore, the researcher sought consent from every participant that was issued with the questionnaire. The cover page of the questionnaire sought consent from respondents to participate in the study voluntarily and to withdraw from the study without any sanctions. It also clearly states the purpose of the study and the rights of the respondents not to participate if they wished to.

The following ethical issues were also adhered to:

- The researcher got the consent of the individuals to participate and made it clear that the respondents were able to withdraw from the study at any time without any sanctions.
- Scientific misconduct or dishonesty: the researcher avoided plagiarism, fabrication and falsification of data by, citing sources and correct reporting, respectively.
- Confidentiality and privacy issues: respecting and upholding the confidentiality and privacy of the participant is a key factor in research. The researcher respected respondent's confidentiality and assured them that under no circumstances will this report be presented in such a way that others become aware of how a particular respondent has responded or behaved (Leedy &

Ormrod, 2014). In keeping with this confidentiality, the results were reported in aggregated format to protect the respondent's identities.

- The researcher did not have any conflict of interest at all stages in the design and execution of this study

- Recruitment of participants: the researcher refrained from deceptive recruitment of the participants and relied on their willing and ability to respond to the questions.

3.10. Limitations of the study

The researcher was restrained to draw the sample from SMMEs in the Mangaung Metropolitan Area. Ideally, the inclusion of employees into the sample of employers (supervisors) and foreign nationals would have substantially increased the sample size. However, the inclusion of employees was deemed inconsequential for SMMEs since supervisors may not have sufficient knowledge of competition and operational issues which are often practiced by managers and owners. The participation of foreigners was omitted in the sample as they cited privacy and confidentiality reasons and declined to participate in the study.

3.11. Chapter summary

This chapter presented the research methodology used in this study. The research methodology leaned towards a positivist epistemology. The chapter also outlined the research approach and design, population, sample size, techniques, data collection, data analysis, data validity and reliability and ethical considerations. The limitations of the study were also discussed.

The next chapter discusses the empirical findings of the study.

CHAPTER 4

FINDINGS AND DISCUSSIONS

```
Response Rate

Reliability Analysis

Biographical ──┬── Gender
Profiles        ├── Age
                ├── Race
                ├── Highest Qualification
                ├── Role in the business
                ├── Type of Business
                └── Age of Business

ICT Competence & Adpotion

ICT Competences affecting ICT Adoption

Knowledge ──┬── Recognition
Management  └── Implementation

Introduction

Operational ──┬── Proactiveness
Efficiency (OE) └── Intelligence Generation (IG)

KM affecting OE

Competitiveness

Effects of ICT Competence on KM and OE

Effects of KM on OE

Effects of OE on FC

Conceptual Framework

SEM of CF
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4.1. Introduction

The preceding chapter outlined the methodology employed in this study. The current chapter presents and discusses the findings of the empirical study drawing on the literature. This chapter first presents the results from an analysis of the response rate, the demographics of the sample and the owner/managers perspectives on the impact of ICT competences and adoption, knowledge management and implementation and operational efficiency on SMME competitiveness. Also discussed are the detailed statistical techniques such as correlation and regression analysis, applied to illuminate understanding of the impact of ICT competences, knowledge management and operational efficiency on retail SMME's competitiveness. The chapter concludes with a broader structural model depicting the overall relationship between concepts.

4.2. Response rate

The Small Business Development Agency (SEDA) and the Wholesale and retail Sector Training Authority (W&RSETA) database were considered. The SEDA database was smaller and covered 343 SMMEs while the W&RSETA one was larger (3165) and covered the whole of Free State province. The study considered the larger database – using a Raosoft online sample size calculator set at 95% confidence level, margin of error of 50% and response distribution of 50%, a population of 3165 SMMEs generates a sample of 343. However, the breadth of the province meant that, the research could not cover it all due to time and financial constraints, hence only the Mangaung Metropolitan Area of the Free State Province of South Africa was selected. According to Bryman and Bell (2011), a response rate of 50% or more is acceptable for data analysis. Therefore, the 87.5% response rate achieved for this study was deemed more than adequate.

The researcher distributed 343 questionnaires to small retail owner/managers located in the Mangaung Metropolitan Area. The choice of retail owner/managers in this research area was influence by the lack of innovation and competitive capacity (Antlova, Propelinsky & Tandler, 2011) in the area. Of the 343 distributed questionnaires, 300 were correctly completed and returned/collected. This represents

87.5% response rate, which exceeds the 50% minimum acceptable percentage for data analysis. The research strategy in which the researcher self-administered all questionnaires and collected them immediately after administration explains this overwhelmingly high response rate.

4.3.   Reliability analysis

This section focuses on the measures of reliability of each of the constructs in the Linkert scale as they were calculated to determine the level of internal consistency of the data. The Cronbach's alpha coefficient is applied to determine whether the questions that form a construct measure the same variable. If a Cronbach's Alpha statistic is greater or equal to 0.700, then it is an indication of adequate internal consistency and reliability. The reliability statistics are presented in Table 4.1 below.

Table 4.1: Reliability statistics

Construct	Number of Items	Cronbach's Alpha	Comment
ICT Competency and Adoption			
ICT Competency *Questions 8-12*	5	0.929	High internal consistency
ICT Adoption *Questions 13-22*	10	0.947	High internal consistency
KM Recognition			
Recognition of KM as critical in operations and sales *Questions 23-24*	2	0.670	Moderate internal consistency
Employees KM training and roles *Questions 25-27*	3	0.800	High internal consistency
Implementation of Knowledge Management			
Resources and personnel for KM implementation *Questions 28-31*	4	0.934	High internal consistency
Encouragement of knowledge sharing and transfer *Questions 32-33*	2	0.756	High internal consistency
Operational Efficiency			
Pro-activeness *Questions 34-39*	6	0.832	High internal consistency
Intelligence generation *Questions 40-44*	5	0.850	
Operational efficiency *Questions 45-49*	5	0.883	High internal consistency
Competitiveness *Questions 50-55*	6	0.865	High internal consistency

Overall questionnaire All Likert Scaled Questions	48	0.974	High internal consistency

The reliability statistics presented in Table 4.1 show that all constructs in the questionnaire had a very high internal consistency except for one, "Recognition of KM as critical in operations and sales" which, with a Cronbach's Alpha statistic of 0.670, as an acceptable internal consistency. This demonstrates that all the items actually measure what they intended to (Taber, 2017). The questionnaire had a very high internal consistency with the Cronbach's alpha statistic = 0.974, hence it was deemed very reliable.

4.4.   Biographical profile of the study sample

This section summarises the demographic characteristics of the sample of owner/managers of small retail firms. This demographic data ranges from gender, age, race, education, role in the business, type of business and the number of years the business has been in existence.

Table 4.2: Biographical information of respondents

Variable	Category	Frequency	Percentage
Q1: Gender	Male	180	60.0%
	Female	120	40.0%
Q2. Age	18-35 years	127	42.3%
	36-55 years	140	46.7%
	56 ++ years	33	11.0%
Q3. Race	Black	147	49.0%
	White	30	10.0%
	Coloured	83	27.7%
	Asian	40	13.3%
	Other	0	0.0%
Q4. Highest qualification	No formal education	6	2.0%

	Primary school	15	5.0%
	High school	106	35.3%
	Tertiary	83	27.7%
	Postgraduate	90	30.0%
Q5. Role in the business	Owner	62	20.7%
	Manager	36	12.0%
	Owner/Manager	142	47.3%
	Other	60	20.0%
Q6. Type of business	Supermarket	55	18.3%
	Butchery	14	4.7%
	Cosmetics	16	5.3%
	Internet café	11	3.7%
	Spaza shop	28	9.3%
	Restaurant	37	12.3%
	Bakery	43	14.3%
	Fast foods	37	12.3%
	ICT	34	11.3%
	Other	25	8.3%
Q7. Business existence	<5 years	117	39.0%
	6-10 years	126	42.0%
	11-15 years	36	11.7%
	21 ++ years	21	7.3

4.4.1. Gender

Table 4.2 demonstrate a male retail SMME owner/managers dominated (60%) sample as their female counterparts who accounted for 40% of the respondents. Although not equal to male representation, a sizeable number of females involved in retailing sector suggests an increased penetration of female entrepreneurs in a male dominated the business environment. Although men still constitute the majority of SMME ownership in South Africa (Brijal et al., 2013; Bhora et al., 2018), Chinomona and Maziriri (2015)

state that women have come to the realisation that they are just as equally competent and sufficiently empowered to participate in various occupational categories that were originally dominated by men and may perform better than them in some business endeavours. This explains a dramatic increase in the number of women entrepreneurs involved in this study.

4.4.2. Age

Well over nine tenths (89%) of the respondents were young and middle-aged individuals in the age group 18-55 years. These statistics demonstrate that a mixed representation of youthful (18-35 years) and matured population (36-55 years) is more involved in the SMME ownership/management in comparison with the aging population (55 years and older). This finding partly validates SEDA's (2019) finding that most active business owners are generally aged between 20 and 44 years old. This statistic suggests that entrepreneurial activities are continuing strongly up to the age of 55 years. This is in line with SEDA's (2018) report that the growth in SMME owners has been most prominent among those aged between 45 and 60 years.

4.4.3. Race

In terms of racial representation, the sample revealed that blacks were the most represented racial group (49.0), with coloureds coming second (27.7%). Whites and Asians were almost evenly matched at 10% and 13.3% respectively. The racial domination of black respondents comes as no surprise given the national population statistics, which indicate that that the black African population is at 80.7% (StatsSA, 2014; StatsSA, 2019). This then explains the higher black population representation in this study.

4.4.4. Highest qualification

Table 4.2 illustrates that 35.3% of the SMME owner/managers had a matric qualification while 27.7% of the respondents held a tertiary qualification and 30.0%

were postgraduates. The demographics show that a sizeable number (57.7%) of retail SMME owner/managers had a tertiary qualification or had graduated. These findings partly cohere with SEDA's (2016) revelation that most SMME owners had secondary education and a substantial number had a tertiary education. The fact that most retail SMME owner/managers had some educational attainment resonates with Steenkamp and Bhorat's (2016) claim that formal education is critical to the effective management of SMMEs and that higher levels of education are associated with increased competitiveness (Fatoki, 2014; Lazenby, 2014). The reality that most entrepreneurs attained some formal education supports the view by Civelek et al. (2016) that education tends to improve an entrepreneur's creativity and flexibility.

4.4.5. Role in the business

Table 4.2 shows that most respondents (47.3%) professed that they were owner/managers of SMMEs with 20.7% being owners, 12.0% outright managers and 20% being lower-level employees. These statistics suggest that the roles of ownership and management are often infused into one and are not clear-cut in SMMEs. These findings seem to support the view by Bhorat et al. (2018) that, the largest group of SMME owners are own-account workers (businesses with no employees), constituting about 63% of the self-employed. The integration of management and ownership roles can be attributed to several factors such as the firm's size and resources, and the low income that SMMEs generate (GEM, 2014). This infusion of management and ownership roles coheres with the claim by Elbeltagi et al. (2013) claim that SMMEs owner/managers have full control of all operations of the organisation.

4.4.6. Type of business

Supermarkets had the highest percentage (18.3%) representation in the study sample. However, there is an even representation across different business types with internet cafes having the least representation (3.7%). This demonstrates that the majority of the chosen SMMEs were from the retail sector, which is consistent with the study focus. This interpretation coheres with the SEDA (2016) view that of the 2.2 million

SMMEs in South Africa, most (944.5 thousand) operate in the domestic trade (wholesale and retail).

4.4.7. Age of business

The statistics illustrate that less than half (39%) of SMMEs represented in the study sample were young, which could mean that youth are generally inexperienced and often lack the necessary capital to take the risk of starting a new business (SEDA, 2019). However, a sizeable majority (42%) of SMMEs indicated that they have been in business for more than five years while 19% of these businesses were well older than ten years. These statistics show relatively dissatisfactory results on longevity among SMMEs. It can be inferred that most SMMEs are not performing satisfactorily beyond their first five years of inception as few businesses had survived their first five years of existence. Moreover, the number of SMMEs also begins to decline beyond year ten. This reflects high rate of failure among SMMEs and corroborates the GEM's (2014) report that the survival rate for local start-up businesses in South Africa is low compared to global standards.

4.5. ICT competence and adoption

This section presents a summary of the statistics on questions relating to the ICT competency and adoption. These are summarised in Table 4.3 and 4.4 below.

Table 4.3: ICT competences

ICT Competency		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
B8. Majority of employees have at least basic computer education.	Count	171	45	84	2.51	1.12	0.658
	%	57%	15%	**28%**			
B9. The company reserves a budget for ICT knowledge and equipment acquisition.	Count	191	48	61	2.29	1.15	0.945
	%	63.7%	16.0%	**20.3%**			
B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	Count	155	47	98	2.63	1.30	0.946
	%	51.7%	15.7%	**32.7%**			
B11. The company has the necessary competences to enable appropriate adoption of ICT.	Count	170	35	95	2.58	1.40	0.944
	%	56.7%	11.7%	**31.7%**			
B12. The company exposes employees to ICT related training/courses.	Count	175	62	63	2.45	1.24	0.905
	%	58.3%	20.7%	**21.0%**			
Cronbach's Alpha						0.929	

4.5.1. Employees' basic computer education

A significant percentage (57%) of respondents indicated that most employees lacked basic computer education while 28% affirmed that they had computer education. These statistics demonstrate the necessity of training SMMEs in computer skills to increase their ICT skills. The findings somewhat confirm the observation by Bhorat et a (2018) that there may be more low skilled workers in SMMEs than in large firms judging from their knowledge of computers.

More than half (57.0%) of the respondents that do not have the basic computer education corroborate the higher percentage (58.3%) of employees who claim that the company does not expose employees to ICT- related training/courses. This supports Steenkamp and Bhorat's (2018) argument that ideally, most SMMEs operate in low skill industries and occupations.

4.5.2. Internal ICT capacity, knowledge and skills

Table 4.3 shows that slightly more than half (51.7%) of the respondents disagree that the company regularly evaluates its internal ICT capacity and skills. Only 32.7%

confirm that the company evaluates ICT capacity and skills. These statistics indicate that most SMMEs are behind on investing time and effort to accomplish ICT competences for their employees. The lack of investment in evaluating and developing internal ICT capacity and skills can be attributed to the company's financial constraints. This lack of investment is confirmed by the substantial number (63.7%) of respondents who indicated that the company did not reserve a budget for ICT knowledge and equipment acquisition. This finding corroborates Ismail, Jeffery and Van Bell's (2011) assertion that not all SMME owner/managers have taken up ICT nor do they intend on doing so in the near future. This observation again explains the low percentage (21%) of respondents who stated that the company exposes employees to ICT related training/courses.

4.5.3. Competences enabling appropriate ICT adoption

More than half (56.7%) of the respondents disagree with the view that their company had the necessary ICT competences to enable appropriate adoption of ICT while 31.7% agreed. These statistics underline the SMMEs' limited ICT adoption readiness. The low level of ICT competency may signify low ICT competency in the Free State Province, which might also explain why technology supported innovations adoptions have been low in the province. This observation is in line with the Ismail et al. (2011) view that SMMEs are often reluctant to embrace technological change and rather rely on more traditional approaches and means of conducting business and operations.

Table 4.4: ICT adoption

ICT Adoption		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
B13. The company utilize's internet/ intranet in most of its operations.	Count	177	46	77	2.58	1.45	0.676
	%	59.0%	15.3%	**25.7%**			
B14. The use of ICTs has increased the productivity of the business.	Count	78	121	101	3.27	1.24	0.911
	%	26.0%	40.3%	**33.7%**			
B15. The business frequently uses ICTs for conducting market research.	Count	119	56	125	3.05	1.36	0.865
	%	39.7%	18.7%	**41.7%**			
B16. The use of ICTs has increased the competitiveness of the business.	Count	27	146	127	3.57	1.07	0.870
	%	9.0%	48.7%	**42.3%**			
B17. The use of ICTs has improved the sales of the business.	Count	46	159	95	3.32	1.12	0.859
	%	15.3%	53.0%	**31.7%**			
B18. The use of ICTs has increased the level of satisfaction of customers.	Count	27	164	109	3.40	0.86	0.851
	%	9.0%	54.7%	**36.3%**			
B19. The use of ICTs has eased capturing of information.	Count	34	124	142	3.61	1.02	0.847
	%	11.3%	41.3%	**47.3%**			
B20. The use of ICTs has eased sharing of information.	Count	39	120	141	3.60	1.04	0.850
	%	13.0%	40.0%	**47.0%**			
B21. The business frequently uses ICTs for determining its monthly sales volume.	Count	140	38	122	2.93	1.46	0.853
	%	46.7%	12.7%	**40.7%**			
B22. The business frequently uses ICTs for determining its suppliers.	Count	143	60	97	2.70	1.07	0.769
	%	47.7%	20.0%	**32.3%**			
Cronbach's Alpha					0.947		

4.5.4. ICT for information capturing and sharing

Slightly less than half of the respondents indicated that most ICT adoption emphasised use of ICTs for capturing (47.3%) and sharing (47%) of information with the utilization of intranet/internet standing at a low 25.7%. This shows that generally, SMMEs are still lacking behind in ICT adoption. These low levels of ICT adoption may be attributed to numerous barriers and obstacles that complicate the adoption of ICT by SMMEs (Ismail et al., 2011), one being that SMMEs' lack an awareness of the benefits of ICT adoption and use. This observation coheres with Mbuyisa's (2017) claim that a sizeable number of SMMEs in developing countries have not been able to realise the benefits of ICT.

4.5.5. ICT usage for conducting market research

A substantial percentage (41.7%) of respondents agreed that SMMEs used ICT for conducting market research, which is a fact noted by Tarafdar, Anekal and Singh (2012) in their concurring view that ICTs enable SMMEs to find potential clients and increase consumers' awareness of available products. With the correct selection and use of ICTs, SMMEs stand a better chance at increasing their competitiveness by increasing their share of the market. Only 42.3% of respondents indicated that the adoption of ICT has led to an increased competitiveness. This can be interpreted to mean that SMMEs are not optimizing their adoption of ICTs or are simply selecting the wrong ICT tools. This assessment mirrors the claim that SMMEs are slow in adopting ICT into their businesses to attain competitive edge (Chube, 2015) or the costs associated with ICT adoption and set up are just too high (Ismail, Jeffery & Van Bell, 2011).

4.6. ICT competences affecting ICT adoption

This section addresses the first research objective that reads:

Which set of ICT competences enable the appropriate adoption of ICT by small firms.

The ICT competency variables were measured based on Linkert scaled questions. These variables are summarised in Tables 4.5. The effects of these constructs on ICT adoption are assessed using correlation analysis as presented in Table 4.5 below.

Table 4.5: Correlations between items of ICT competences and ICT Adoption.

Correlations		B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	Overall ICT Adoption
		ICT Adoption										
B8.	Corr	0.320**	0.533**	0.640**	0.447**	0.479**	0.389**	0.418**	0.471**	0.605**	0.489**	**0.582****
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
	N	300	300	300	300	300	300	300	300	300	300	**300**
B9	Corr	0.691**	0.733**	0.671**	0.693**	0.654**	0.723**	0.595**	0.638**	0.608**	0.639**	**0.797****
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
	N	300	300	300	300	300	300	300	300	300	300	**300**
B10	Corr	0.647**	0.807**	0.773**	0.701**	0.740**	0.751**	0.713**	0.687**	0.712**	0.668**	**0.863****
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
	N	300	300	300	300	300	300	300	300	300	300	**300**
B11	Corr	0.622**	0.716**	0.756**	0.721**	0.613**	0.689**	0.639**	0.661**	0.723**	0.693**	**0.822****
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
	N	300	300	300	300	300	300	300	300	300	300	**300**
B12	Corr	0.718**	0.704**	0.712**	0.656**	0.573**	0.686**	0.589**	0.608**	0.689**	0.648**	**0.795****
	p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**<0.001**
	N	300	300	300	300	300	300	300	300	300	300	**300**

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

B8. Majority of employees have at least basic computer education.
B9. Reserves a budget for ICT knowledge and equipment acquisition.
B10. Regularly evaluate its internal ICT capacity, knowledge and skills.
B11. Has the necessary competences to enable appropriate adoption
B12. Exposes employees to ICT related training/courses.
B13. Utilize internet/ intranet in most of its operations.
B14. ICTs has increased the productivity of the business
B15. The business frequently uses ICTs for conducting market research

B16. ICTs have increased the competitiveness of the business
B17. ICTs have improved the sales of the business.
B18. ICTs have increased the level of satisfaction of customers.
B19. ICTs have eased the capturing of information.
B20. ICTs have eased the sharing of information.
B21. Frequently uses ICTs for determining its monthly sales
B22. The business frequently uses ICTs for determining its suppliers.

The results in Table 4.5 illustrate that all ICT based competences are significantly correlated to all the items of ICT adoption and the overall measure of ICT adoption (all p-values<0.001). This means that ICT competences play a very important role in SMMEs' decision regarding ICT adoption. Majola (2015) supports this claim by acknowledging that SMME owners and employees with limited ICT competences will be incapable of harnessing ICT into their business processes and strategies. These findings also resonate with Ghobakhloo et al. (2012) claim that IT users' traits, such

as IT knowledge, attitudes and intentions towards IT, as well as training, participation and improvement in adoption process could affect IT adoption process.

The ranking by levels of importance of ICT competences that drive adoption is shown in Figure 4.1. This is based on the correlations between competences and the overall measure of adoption.
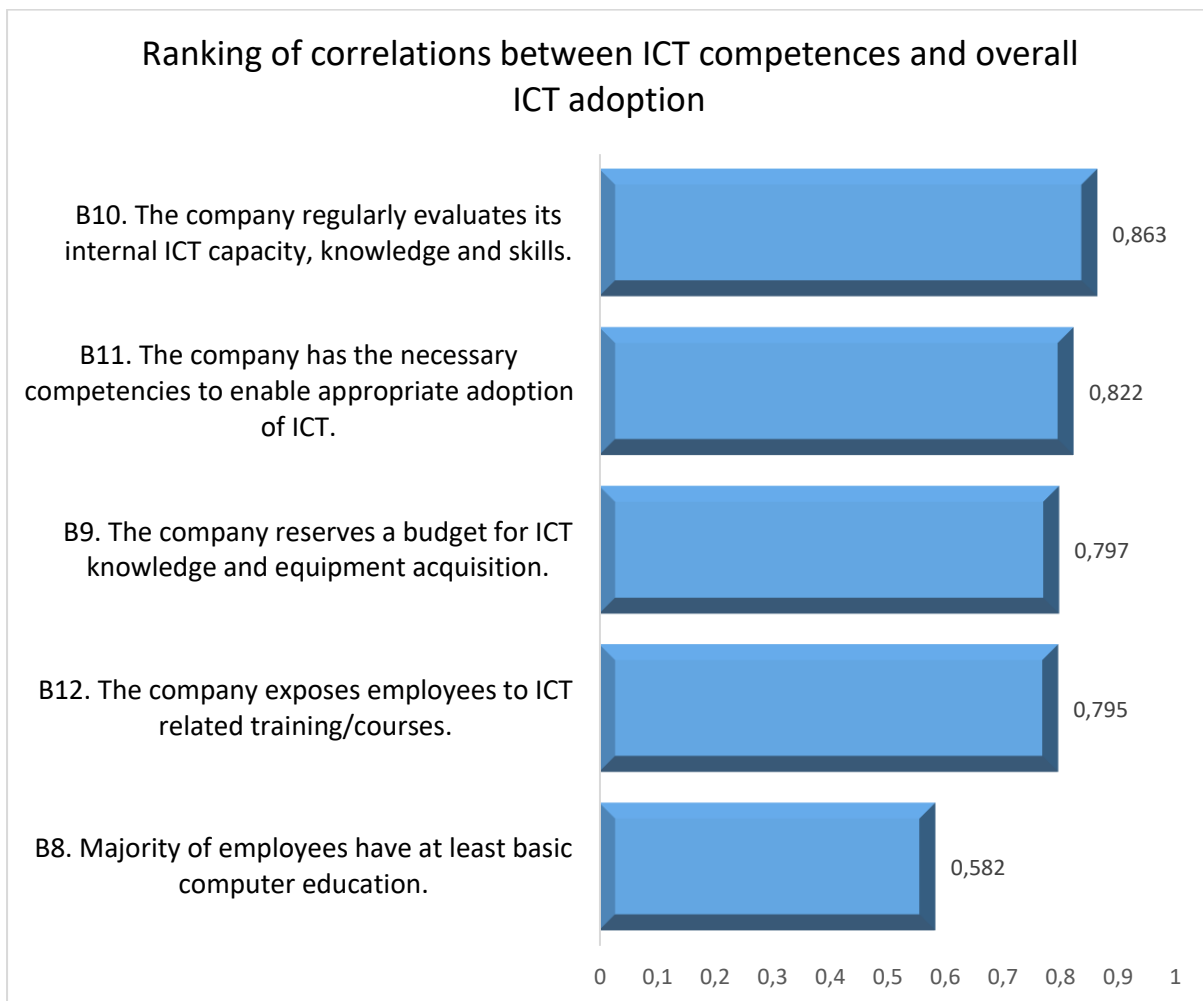
Figure 4.1. Ranking of correlations between ICT competences and overall ICT adoption.

The results in Figure 4.1 show that regular evaluations of internal ICT capacity, knowledge and skills (B10) by companies is the most important driver of adoption (Correlation=0.863). Mbuyisa (2017) shares the same view that as one of the driving forces of globalization, ICT may offer several opportunities for SMMEs by making

knowledge and information available, as well as improving quality of decision-making, responsiveness and efficiency. Moreover, human resource functions such as the evaluation of employee ICT skills and providing training and development are very pivotal for organisations to grow (Victor & Kathaluwage, 2019). The second most important driver of adoption is having the necessary competences to enable appropriate adoption of ICT (B11) (Correlation=0.822). The viewed low adoption rate is in line with Harindranath, Dyerson and Barnes's (2009) assertion that SMMEs are more likely to have limited resources and in particular ICT expertise, which explains their unwillingness to engage with ICT matters. The third most important driver is reserving a budget for ICT knowledge and equipment acquisition (B9) (Correlation=0.797) with exposing employees to ICT related training/courses (B12) (Correlation=0.795) coming fourth. The top statistics indicate that SMMEs the evaluation of their ICT capacity, knowledge and skills as well as possess appropriate competences to permit ICT adoption in high regard. This is even though most SMMEs attempts at ICT adoption are constrained by lack of financial resources and ICT skills (Ongori & Mingiro, 2010; Ismail et al., 2011).

Although the possession of computer education by employees (B8) is positively and significantly correlated (correlation = 0.582) with all items of ICT adoption, the results reveal that it is the least important competence in ICT adoption. This could be interpreted to mean that although employees who possess the necessary basic computer education significantly drive ICT adoption, the most important drivers may come from the company itself rather than the employees.

A regression model, using forward selection, was also employed to establish how ICT competences affect ICT adoption. This model differs from correlation analysis in that, while correlation analysis examines the effect of each predictor on the response individually, regression analysis looks at the joint effect of all the predictors at the same time. Regression analysis first selects the most important ICT competences that affect adoption and then checks if the others add more value to the response. If no additional predictors add value to the response, then they are disregarded. Regression analysis is presented in Table 4.6 below.

Table 4.6: Regression of ICT Adoption on ICT competences.

Dependent Variable: ICT Adoption		Unstandardized Coefficients		Standardized Coefficients	t	p-value	R^2
		B	Std. Error	Beta			
Model 1	(Constant)	1.503	0.064		23.408	<0.001	0.746
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.647	0.022	0.863	29.551	<0.001	
Model 2	(Constant)	1.422	0.063		22.450	<0.001	0.767
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.486	0.037	0.648	13.119	<0.001	
	B12. The company exposes employees to ICT related training/courses.	0.206	0.039	0.261	5.290	<0.001	
Model 3: Final Model	(Constant)	1.234	0.072		17.251	<0.001	0.786
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.392	0.040	0.523	9.754	<0.001	
	B12. The company exposes employees to ICT related training/courses.	0.235	0.038	0.298	6.206	<0.001	
	B8. Majority of employees have at least basic computer education.	0.144	0.029	0.166	5.011	<0.001	

The results in Table 4.6 indicate that with all five predictor variables considered, B10 (The company regularly evaluates its internal ICT capacity, knowledge and skills) is the most important predictor of ICT adoption (Model 1: Coefficient=0.647, t=29.551, p-value<0.001), followed by B12 (The company exposes employees to ICT related training/courses). Both predictors (B10 and B12) account for 76.7% (Model 2: R^2=0.767). One would expect SMMEs' investment in their ICT capacity to directly contribute to the development of employee's competences to supplement what individual employees bring to the organisation in terms of knowledge and skills in their individual capacities. This view is in line with the European Commission's (2014) assertion that the use of ICTs tends to increase the differentiation of competence levels among employees and enables them to carry out more work tasks independently. Nonetheless, the study did not provide conclusive evidence on the extent to which investment in ICTs directly influences ICT competences such as ICT

knowledge and skills. The third and last most important contributor to the variation in ICT adoption is B8 (Majority of employees have at least basic computer education), makes the overall account for the three predictors (B10, B12 and B8) to 78.6% (Model 3: R^2=0.786).

These results from the regression analysis indicate that the most important ICT competences are whether the company regularly evaluates its internal ICT capacity (B10), knowledge and skills; or whether the company exposes employees to ICT related training/courses (B12). To this end, Modimogale and Kroeze (2011) warn that constant learning and updating of technologies would be needed since the ICT environment is ever changing.

4.7. Knowledge management: recognition and implementation

Since all knowledge management variables were measured on a Likert scale, this question is addressed using principal components based on the exploratory factor analysis.

The construct of knowledge management recognition was, in this analysis, divided into two sub-constructs, namely "Recognition of KM as critical in operations and sales" and "Employees KM training and roles" while the construct of knowledge management implementation was divided into "Resources/personnel for KM implementation" and "Encouragement of Knowledge sharing/transfer". This is depicted in Tables 4.7 and 4.8 below.

Table 4.7: Exploratory factor analysis for KM recognition.

KM Recognition	Latent Factors	
	1	2
C23. The business considers knowledge management as critical to its routine operations.	0.785	
C24. The business recognises that knowledge management is critical to increasing its sale volumes.	0.896	
C25. KM initiatives have improved the operational efficiency of the business.		0.625
C26. The business provides employees with continuous training and development in building their knowledge capacity.		0.899
C27. The business clearly specifies employee's roles and responsibilities on knowledge management.		0.906
Suggested Construct name	Recognition of KM as critical in operations and sales	Employees KM training and roles
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		

Table 4.8: Exploratory factor analysis for KM implementation

KM Implementation	Latent Factors	
	1	2
C28. My business has sufficient resources to support knowledge management initiatives.	0.902	
C29. My business hires employees to fill knowledge management gaps.	0.941	
C30. My business appoints personnel to lead knowledge management initiatives.	0.905	
C31. My business appoints personnel to lead knowledge management teams.	0.879	
C32. My business encourages knowledge sharing to improve efficiency of operations.		0.908
C33. My business encourages knowledge transfer to improve efficiency of operations.		0.864
Suggested Sub-Construct name	Resources/personnel for KM implementation	Encouragement of Knowledge sharing/transfer
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		

4.7.1. Knowledge management recognition

The two sub-constructs of KM recognition are summarised in the subsections below.

4.7.1.1. Recognition of KM as critical in business operations and sales

This section provides statistics on knowledge management as a critical factor in business operations and sales. This is illustrated in Table 4.9 below.

Table 4.9: Recognition of KM as critical in business operations and sales.

Recognition of KM as critical in operations and sales		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
C23. The business considers knowledge management as critical to its routine operations.	Count	22	74	204	3.73	0.85	0.867
	%	7.3%	24.7%	**68.0%**			
C24. The business recognises that knowledge management is critical to increasing its sale volumes.	Count	27	52	221	3.83	0.84	0.867
	%	9.0%	17.3%	**73.7%**			
Cronbach's Alpha						0.670	

4.7.1.1.1. Knowledge management as a critical to increasing sales

A substantial number of respondents (73.7%) indicated that they agreed that their businesses recognised that knowledge management is critical to increasing sales volumes. These statistics which underline the importance of knowledge management in increasing sales are consistent with Krajnovic, Covo and Jasic's (2012) claim that businesses no longer rely just on tangible assets and natural resources as measures to gain competitive advantage, but heavily rely on knowledge management. The current researcher's view is that "knowledge is power" and as such Le (2017) argues that those firms that possess this power and are able to harness it will be able to translate it into a competitive advantage through higher levels of customer satisfaction.

4.7.1.1.2. Knowledge management as critical to business routines

As shown in Table 4.9, most respondents (68.0%) concurred that knowledge management is highly critical in their businesses' routine operations. This is evidenced

by the fact that both larger and smaller firms are aware of the value of knowledge (Guzman et al., 2016) and attempting to set up KM systems and practices to effectively use knowledge to fortify their overall sustainability, efficiency and effectiveness (Islam et al., 2015; Robertson, 2016). In addition, Edvardsson and Durst (2013) validate this view in their observation that knowledge management is a critical core competence that contributes to SMME success.

4.7.1.2. *Business support of Employees KM training and specification of roles*

This section presents statistics on retail SMMEs' support of their employee training in knowledge management and specification of roles. These are summarised in Table 4.10.

Table 4.10: Business support of Employees KM training and specification of roles.

Employees KM training and roles		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
C25. KM initiatives have improved the operational efficiency of the business.	Count	17	130	153	3.52	0.80	0.764
	%	5.7%	43.3%	**51.0%**			
C26. The business provides employees with continuous training and development to build their knowledge capacity.	Count	141	63	96	2.81	1.03	0.911
	%	47.0%	21.0%	**32.0%**			
C27. The business clearly specifies employees' roles and responsibilities on knowledge management.	Count	109	123	68	2.91	0.98	0.856
	%	36.3%	41.0%	**22.7%**			
Cronbach's Alpha					0.800		

4.7.1.2.1. Knowledge management initiatives improves operational efficiency

Just above half (51%) of the respondents agreed that KM initiatives have improved the operational efficiency of the business. The statistics could mean that there is a positive relationship between knowledge management initiatives and operational efficiency, thus corroborating Hegazy and Ghorab's (2015) claim that knowledge

management initiatives enable organisations to achieve their goals through a well-designed decision support system that guides decision makers in their efforts towards achieving their objectives. This could explain SMMEs low drive at employing KM to leverage operational efficiency.

4.7.1.2.2. Provision of continuous training and development

A low percentage (32.0%) of respondents professed that their retail businesses provided employees with continuous training and development to build their knowledge capacity. These findings are in conjunction with OECD's (2012) observation that smaller firms are less likely than larger enterprises to provide external training to all grades of workers especially front-line workers. In the same breath, the findings contradict Abduli and Arifi's (2017) view that SMMEs' are starting to acknowledge the importance of HRM in their daily functioning and especially the training of the staff because they perceive the results of the training in short periods of time. Only 22.7% of the respondents agreed that the business clearly specifies employee roles and responsibilities. These statistics clearly indicate the internal flaws within SMMEs, a shortcoming that contributes to the poor performance of SMMEs. However, the percentage in supports the view held by Khairi et al. (2018) that providing employees with knowledge management training and equipping them with the necessary and appropriate information offers the organisation a better competitive advantage over its competitors.

4.7.2. Knowledge management implementation

The two sub-constructs of KM implementation are summarised in the subsections below.

4.7.2.1.   Deployment of resources and personnel for KM implementation

This section provides statistics on the implementation of knowledge management through allocation of resources and personnel within the organisation. These are summarised in Table 4.11 below.

Table 4.11: Level of deployment of resources and personnel for KM implementation.

Resources and personnel for KM implementation		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
C28. My business has sufficient resources to support knowledge management initiatives.	Count	182	41	77	2.42	1.24	0.911
	%	60.7%	13.7%	25.7%			
C29. My business hires employees to fill knowledge management gaps.	Count	201	59	40	2.26	1.03	0.931
	%	67.0%	19.7%	13.3%			
C30. My business appoints personnel to lead knowledge management initiatives.	Count	178	75	47	2.35	0.98	0.936
	%	59.3%	25.0%	15.7%			
C31. My business appoints personnel to lead knowledge management teams.	Count	161	78	61	2.44	1.05	0.893
	%	53.7%	26.0%	20.3%			
Cronbach's Alpha					0.934		

4.7.2.1.1. Resources to support knowledge management initiatives

Only 25.7% of the respondents were of the view that their business had sufficient resources to support knowledge management initiatives. This statistic indicates a minimal deployment of personnel and resources for the implementation of knowledge management and as such, the study results contradict Muciek and Zinczuk's (2014) view that many enterprises have decided to implement the concept of knowledge management, as this cannot be supported with reference to SMMEs in South Africa. Perhaps the acute resource shortages in SMMEs explain their limited capacity to implement and guide knowledge management activities. Gourova (2010) supports this observation when he claims that knowledge management practical implementation in SMMEs is a tough and challenging task. Moreover, since SMMEs are already deploying little resources towards training and development to support their employees' core knowledge, one would be expected to believe that they would be over-stretched if they were to expand their limited resource base to support technology. This explains their limited capacity to deploy knowledge management in organisational process.

4.7.2.1.2. Appointment of personnel to fill knowledge management gaps

Thirty-six percent (36%) of the respondents agreed that their businesses appointed personnel to lead knowledge management teams and initiatives while only 13.3% affirmed that they hired employees to fill knowledge management gaps. These statistics demonstrate the shortage of skilled personnel to fill and to lead knowledge management initiatives and teams in retail SMMEs. This observation coheres with Gourova's (2010) notion that often SMMEs do not possess the necessary in-house human resources for implementing knowledge management initiatives and often rely on external expertise to fulfil such roles.

4.7.2.2. Business encouragement of knowledge sharing and transfer

This section provides statistics on the implementation of knowledge management through business encouragement of knowledge sharing and transfer. These statistics relating to this knowledge management dimension are summarised in Table 4.12 below.

Table 4.12: Level of implementation KM through knowledge sharing and transfer.

Encouragement of knowledge sharing and transfer		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
C32. My business encourages knowledge sharing to improve efficiency of operations.	Count	47	66	187	3.59	1.07	0.897
	%	15.7%	22.0%	**62.3%**			
C33. My business encourages knowledge transfer to improve efficiency of operations.	Count	24	68	208	3.84	1.02	0.897
	%	8.0%	22.7%	**69.3%**			
Cronbach's Alpha					0.756		

Many respondents (62.3%) indicated that their businesses encourage knowledge sharing and knowledge transfer (69.3%) to improve the efficiency of their operations. These statistics contrast results about resource allocation, which indicated that businesses are not allocating adequate resources and personnel to the implementation of KM. This might indicate that businesses are just paying lip service to knowledge management by encouraging it and yet not supporting it in terms of

actual provision of resources. Consistent with this interpretation, Naicker et al., (2017) assert that despite all the advantages of knowledge management it appears that SMMEs in South Africa do not make use of sound knowledge sharing initiatives as they have one of the worst sustainability rates in the world.

4.8. Operational efficiency

Operational Efficiency was measured by two constructs, namely, Pro-activeness and Intelligence generation. Both constructs are discussed below.

4.8.1. Operational efficiency through pro-activeness

This section provides statistics on operational efficiency through pro-activeness. These are summarised in Table 4.13 below.

Table 4.13: Operational efficiency through pro-activeness

Operational efficiency through pro-activeness		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
D34. The firm leverages technology to improve operational efficiency.	Count	128	78	94	2.70	1.25	0.763
	%	42.7%	26.0%	**31.3%**			
D35. The firm takes measures to enhance employee's efficiency in performing their duties.	Count	41	107	152	3.52	1.05	0.841
	%	13.7%	35.7%	**50.7%**			
D36. The firm puts effort to effectively manage operational risks.	Count	22	76	202	3.62	0.66	0.669
	%	7.3%	25.3%	**67.3%**			
D37. The firm puts effort to effectively deliver product/service to the customer.	Count	17	66	217	3.81	0.75	0.654
	%	5.7%	22.0%	**72.3%**			
D38. The firm conducts sufficient training and business management skills to support operational efficiency.	Count	114	113	73	2.82	0.89	0.706
	%	38.0%	37.7%	**24.3%**			
D39. The firm continually assesses its efficiency against that of competitors.	Count	51	102	147	3.33	0.89	0.822
	%	17.0%	34.0%	**49.0%**			
Cronbach's Alpha					0.832		

4.8.1.1. Technology and Business training to support operational efficiency

The above statistics indicate that the research participants had mixed feelings with regards to the measurement of operational efficiency through pro-activeness. Only 31.3% of the respondents held the view that their businesses leveraged technology to improve operational efficiency while 24.3% indicated that their businesses conducted sufficient training and business management skills to support operational efficiency. These statistics support Naidoo and Urban's (2010) view that one of the reasons 50% of SMMEs fail in South Africa is that there is a deficit in managerial skills, particularly operations skills that support efficient business operations.

4.8.1.2. Effective business operations

On a positive note, 72.3% of the respondents indicated that their businesses made concerted efforts to deliver products or services to the customers effectively while 67.3% said that businesses put effort to effectively manage operational risks. The respondents' views on taking measures to enhance employee's efficiency in performing their duties show a balance between those who indicated in the affirmative (50.7%) and those who disagreed, and the findings are similar with regard to those who indicated that their firms continually assessed their efficiency against that of competitors (49.0%). This shows the complexity of promoting efficient operations and concurs with Hulthen, Naslund and Norrman's (2017) claim that organisations are confronted with the challenges related to measuring corporate effectiveness.

The results show that the majority of respondents believed in effective delivery of products and services to customers, and in effectively managing operational risk. In addition, the statistics show that respondents neither leverage technology nor conducted sufficient training to support operational efficiency, a finding that validates the observation by Okwang'a et al. (2015) that all firms value operational efficiency even though few excel at designing, communicating and managing performance-improvement initiatives.

4.8.2. Operational efficiency through intelligence generation

This section presents the statistical result on operational efficiency through intelligence generation. These are summarised in Table 4.14 below.

Table 4.14: Operational efficiency through Intelligence generation

Operational efficiency through Intelligence generation		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
D40. The business gathers and assesses competitor information (e.g. products, price, and quality).	Count	73	116	111	3.22	1.07	0.784
	%	24.3%	38.7%	**37.0%**			
D41. The business gathers and assesses customer information (e.g. needs, preferences, buying trends)	Count	49	108	143	3.42	0.96	0.872
	%	16.3%	36.0%	**47.7%**			
D42. The business regularly discusses customer and competitor information with employees.	Count	33	154	111	3.37	0.91	0.789
	%	11.1%	51.7%	**37.2%**			
D43. The business regularly discusses business with suppliers.	Count	25	79	196	3.71	0.81	0.748
	%	8.3%	26.3%	**65.3%**			
D44. The business maintains corporate relationships with other companies.	Count	32	105	163	3.53	0.88	0.766
	%	10.7%	35.0%	**54.3%**			
Cronbach's Alpha					0.850		

4.8.2.1. *Maintaining relations with suppliers and other companies*

Statistics reveal that regular discussions with suppliers are the most positively practiced measure (65.3%) carried out to enhance operational efficiency while the maintenance of corporate relationships with other companies came second at 54.3%. The interpretation may be that businesses apply an external stakeholder approach in which they value the importance of keeping positive relations with their suppliers. This observation is supported by PricewaterhouseCoopers's (2013) claim that maintaining good relations with suppliers informs the understanding of sustainable businesses around supplier relations management (SRM). Moreover, Prihadyanti (2013) complements these findings in the assertion that interaction with suppliers and other businesses often becomes the source of innovative ideas and mutual trust, which

leads to inter-reliance. The focus on improving supply chains becomes an indication of the importance of interaction with suppliers and other partners in order to continually improve business performance (Prihadyanti, 2013).

4.8.2.2. *Disseminating customer and competitor information to employees*

The study results indicate very low statistics for businesses that gathered and assessed competitor information (37.0%) and regularly discussed customer and competitor information with employees (37.2%). The context of increased competition and the nature of the business environment forces firms to stay ahead of their competitors and its surprising that retail SMMEs seem to ignore this important area. Laakso (2017) claims that by being competitively intelligent enables firms to do performance comparisons, gather actionable information about their competitors and the overall competitive environment, and then apply this information to their planning processes and decision making in order to improve the firm's performance. These disappointing statistics suggest that SMMEs are lagging behind in terms of competitive intelligence and the need to improve on this significantly.

4.9.   Knowledge management affecting operational efficiency

This section considers the statistical findings on knowledge management that improved operational efficiency. These findings are summarised in Table 4.15 below.

Table 4.15: Effects of Knowledge management on operational efficiency.

Effects of knowledge management on operational efficiency		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
E45. Knowledge retention has improved employee work ethics.	Count	22	73	205	3.68	0.72	0.814
	%	7.3%	24.3%	**68.3%**			
E46. Knowledge circulation has increased integrated work processes.	Count	17	65	218	3.89	0.81	0.827
	%	5.7%	21.7%	**72.7%**			
E47. Knowledge generation has increased work performance.	Count	14	62	224	3.99	0.87	0.796
	%	4.7%	20.8%	**75.2%**			
E48. Internal knowledge transfer has improved operations.	Count	9	49	239	3.99	0.71	0.843
	%	3.0%	16.5%	**80.5%**			
E49. Knowledge circulation has increased streamlined work processes.	Count	6	51	243	3.93	0.62	0.876
	%	2.0%	17.0%	**81.0%**			
Cronbach's Alpha					0.883		

Most respondents (75.2%) believed that knowledge generation had increased work performance while 68.3% contended that knowledge retention improved employee work ethics. Furthermore, a considerable percentage of respondents (80.5%) held the view that knowledge transfer had improved operations (while a further (72.7%) thought that knowledge circulation increased integrated and 81.0% believed that it streamlined work processes. These statistics contradict Gourova's (2010) opinion that SMMEs often fail to retain knowledge acquired and lessons learned in the past and that SMME owner/managers do not perceive knowledge management as a critical business function that has fundamental implications for the business operations. The statistics can be interpreted to generally mean that, knowledge management affects operational efficiency in a positive way.

4.10. Competitiveness

This section presents the statistics on the competitiveness of SMMEs as presented below in Table 4.16.

Table 4.16: Competitiveness

Competitiveness		Disagree/ Strongly Disagree	Neutral	Agree/ Strongly agree	Mean	Std Dev	Latent Factor Coefficient
F50. The firm forecasts better return on investment.	Count	12	75	213	3.90	0.80	0.827
	%	4.0%	25.0%	**71%**			
F51. The company enjoys better market share.	Count	33	129	138	3.45	0.88	0.830
	%	11.0%	43.0%	**46%**			
F52. The firm has increased its gross sales in the last three years.	Count	23	173	104	3.31	0.68	0.859
	%	7.7%	58.1%	**34.9%**			
F53. The firm has increased its customers in the last three years.	Count	9	143	148	3.48	0.59	0.813
	%	3.0%	47.7%	**49.3%**			
F54. The firm has retained customers in the last three years.	Count	18	67	215	3.73	0.68	0.764
	%	6.0%	22.3%	**71.7%**			
F55. The business can attract talented employees.	Count	80	111	109	3.02	0.96	0.634
	%	26.7%	37.0%	**36.3%**			
Cronbach's Alpha					0.865		

4.10.1. The firm forecasts better return on investment

A majority of the SMMEs were doing well in terms of competition. This is evidenced by the greater percentage (71.0%) of respondents that agreed that the firm had forecasts on return on investment, which is a clear indication that they managed competition from rivals well. Surprisingly enough, this is percentage is contradicted by 46.0% of the respondents who claimed that their companies enjoyed better market share. These statistics suggest a state of mixed feelings with respondents claiming better return on investment on one the one hand while their companies' shares of the market were deemed to be low, on the other hand. This observation contrasts with

Frohberg and Hartmann's (2016) suggestion that both aspects of competitiveness often complement each other and are joint indicators of competitiveness.

4.10.2.   Retention and increasing customer base

The study reports an increased customer base – a measure of successful rate of competitiveness. A substantial percentage (71.7%) of the respondents indicated that they agreed that their firms had retained existing customers. This is an indication of a good competitive stance as Chen (2015) notes that a loyal customer is regarded as a competitive asset of any organisation. However, the low percentages of respondents claiming increased gross sales (34.9%) and increased customers (49.3%) over the last three years somewhat undermine the integrity of the claimed improved competitiveness of the business. This is especially so because an increase in customer numbers leads to a superior competition (Adekiya, 2016).

4.10.3.   The business is able to attract talented employees

The responses to whether the business attracted talented employees show that only 36.3% of the respondents agreed that the business had attracted talented employees while 26.7% of the respondents disagreed that their businesses were able to attract talent. The percentage that has agreed with this position support Almacik, Almacik, Erat and Akcin's (2014) view that attracting and retaining highly talented employees and consolidating competitive advantage are important issues for companies in all scales around the world. The other respondents that disagreed with this position cohere with Shikongo's (2011) view that attracting talented staff to organisations has become a challenge to most, if not all organisations, due to different factors which include: weak recruitment strategies, complex working conditions, challenges with company branding and employer branding (Almacik et al., 2014). Figure 4.2 below shows the ranking of the six items of competitiveness.
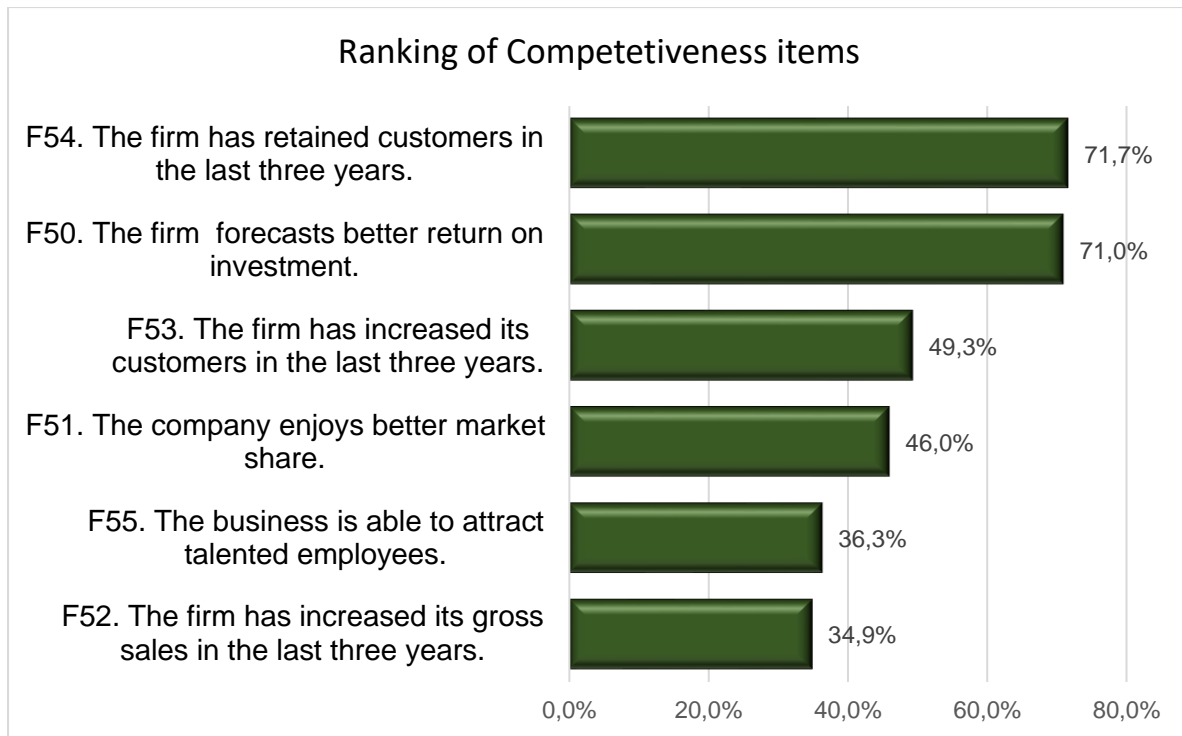
Figure 4.2. Ranking of items of competitiveness

The rankings above lead to the conclusion that the positive aspects of competitiveness are that if a company retained its customers and return on investment is projected to improve.

4.11. Effects of ICT competence and knowledge management on the competitiveness of small retail firms

This section discusses the effects of both ICT competences and knowledge management on the competitiveness of small retail firms respectively.

4.11.1. Effects of ICT competence on the competitiveness of small retail firms

This section addresses the second research objective that reads:

> *To determine the extent to which ICT competence account for the variance in the competitiveness of small retail firms.*

A regression analysis was used to evaluate the contribution of each ICT competence item to the competitiveness of small retail firms. The item with a higher coefficient will

be considered as having a greater contribution to competitiveness than those with lower regression coefficients.

The results from a statistical evaluation of with respondents' views on business competitiveness are presented in Table 4.17.

Table 4.17: Regression of competitiveness on ICT competence

		Unstandardized Coefficients		Standardized Coefficients	t	p-value	R^2
Dependent Variable: Competitiveness		B	Std. Error	Beta			
Model 1	(Constant)	2.800	0.065		43.370	<0.001	0.319
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.260	0.022	0.564	11.803	<0.001	
Model 2	(Constant)	2.699	0.074		36.400	<0.001	0.335
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.219	0.026	0.477	8.283	<0.001	
	B8. Majority of employees have at least basic computer education.	0.083	0.031	0.155	2.688	0.008	
Model 3	(Constant)	2.692	0.074		36.553	<0.001	0.347
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.133	0.045	0.290	2.932	0.004	
	B8. Majority of employees have at least basic computer education.	0.079	0.031	0.147	2.576	0.010	
	B11. The company has the necessary competences to enable appropriate adoption of ICT.	0.094	0.041	0.220	2.313	0.021	
Model 4: Final Model	(Constant)	2.764	0.077		35.943	<0.001	0.364
	B10. The company regularly evaluates its internal ICT capacity, knowledge and skills.	0.175	0.047	0.381	3.712	<0.001	
	B8. Majority of employees have at least basic computer education.	0.058	0.031	0.109	1.874	0.062	
	B11. The company has the necessary competences to enable appropriate adoption of ICT.	0.181	0.050	0.424	3.605	<0.001	
	B12. The company exposes employees to ICT related training/courses.	-0.145	0.050	-0.299	-2.880	0.004	

The results in Table 4.17 show that with all variables considered, the most important determinant and contributor of competitiveness is the company's regular evaluation of its internal ICT capacity, knowledge and skills (Model 1: coefficient=0.260, t=11.803, p-value<0.001). The second most important predictor is the majority of employees having basic computer education (Model 2: coefficient=0.083, t=2.688), followed by the company having necessary competences to enable appropriate adoption of ICT (Model 3). Antlova et al. (2011) concur with the above findings that ICT competences are instrumental in leveraging the competitiveness of small businesses. However, a surprising result is that a company exposing employees to ICT related training/courses has a negative coefficient on competitiveness (coefficient=-0.145). This might mean that initial investment in IT training may be costly to small firms as it strains their cash flows in the short term, even though the long-term gains may come at a later stage.

The results also show that the company reserving a budget for ICT knowledge and equipment acquisition prospect has no significant effect on competitiveness, as it is not entered into the final model (Model 4). It is also observed that the same prospect has no effect on ICT adoption (Table 4.6).

4.11.2.   Effects of knowledge management on the retail SMMEs' competitiveness

This section addresses the third research objective that reads:

To establish how knowledge management account for the variance in the retail SMMEs' competitiveness.

The constructs of knowledge management were outlined in Section 4.7 and sub-constructs obtained using exploratory factor analysis. Table 4.18 below shows the most important predictors of competitiveness under knowledge management using regression analysis with forward selection.

Table 4.18: Regression of competitiveness on knowledge management

Dependent Variable: Competitiveness		Unstandardized Coefficients		Standardized Coefficients	T	p-value	R²
		B	Std. Error	Beta			
Model 1	(Constant)	1.448	0.137		10.532	<0.001	0.433
	KM-Recognition: KM as critical in operations and sales	0.538	0.036	0.658	15.072	<0.001	
Model 2	(Constant)	0.946	0.129		7.328	<0.001	0.576
	KM-Recognition: KM as critical in operations and sales	0.423	0.033	0.516	12.812	<0.001	
	KM-Recognition: Employees KM training and roles	0.305	0.030	0.405	10.037	<0.001	
Model 3: Final model	(Constant)	0.899	0.123		7.302	<0.001	0.618
	KM-Recognition: KM as critical in operations and sales	0.325	0.036	0.397	9.079	<0.001	
	KM-Recognition: Employees KM training and roles	0.231	0.032	0.307	7.296	<0.001	
	KM-Implementation: Encouragement of Knowledge sharing/transfer	0.173	0.031	0.271	5.659	<0.001	

The results in Table 4.18 indicate that, with all variables considered, the most important predictor of competitiveness under knowledge management is the knowledge recognition construct as critical in operations and sales (Model 1: coefficient=0.538, t=15.072, p-value<0.001). It is imperative that for every organisation view knowledge management as central to its operations in order to generate favourable returns from operations and sales, (Saqib, Udin & Baluch, 2017). These researchers argue further that the sustainable competitiveness of contemporary organisations operating within a knowledge economy is dependent on knowledge-intensive activities and hence the importance of effectively managing knowledge.

The second most important contributor is the recognition of the importance of employees' knowledge management training and roles (Module 2: coefficient=0.305, t=10.037) followed by the construct of knowledge management implementation (Encouragement of Knowledge sharing/transfer). Together, these three variables have a total contribution of 61% (R2=0.618). The surprising revelation is that the deployment of resources and personnel for knowledge management implementation is not a significant contributor in the phase of predictors (Model 3).

From the results, we can conclude that recognition is more important than implementation as the recognition construct fits into the model first and contributes a higher percentage to the variation in competitiveness.

4.12. Effects of knowledge management on the operational efficiency of small retail firms

This section addresses the fourth research objective data reads:

To establish how knowledge management accounts for variance in the operational efficiency of small retail firms.

Operational efficiency was measured using two constructs based on Likert scaled questions, namely, pro-activeness and intelligence generation (summarised in Section 4.8.). The two regression analysis models were used, one to find the effects of the four knowledge management sub-constructs on pro-activeness, and the other to find how the same sub-constructs affect intelligence generation. The findings are discussed in the subsequent sections below.

4.12.1. Effects of knowledge management on operational efficiency: Pro-activeness

The results in Table 4.19 present the questions that dealt with respondents' views on knowledge management's effect on pro-activeness.

Table 4.19: Regression of pro-activeness on knowledge management

Dependent Variable: Operational efficiency through pro-activeness		Unstandardized Coefficients		Standardized Coefficients	t	p-value	R²
		B	Std. Error	Beta			
Model 1	(Constant)	1.114	0.091		12.177	<0.001	0.672
	KM-Recognition: Employees KM training and roles	0.710	0.029	0.820	24.688	<0.001	
Model 2	(Constant)	0.430	0.118		3.642	<0.001	0.731
	KM-Recognition: Employees KM training and roles	0.631	0.028	0.729	22.693	<0.001	
	KM-Recognition: KM as critical in operations and sales	0.245	0.030	0.260	8.109	<0.001	
Model 3: Final model	(Constant)	0.521	0.113		4.613	<0.001	0.760
	KM-Recognition: Employees KM training and roles	0.446	0.041	0.515	10.924	<0.001	
	KM-Recognition: KM as critical in operations and sales	0.254	0.029	0.270	8.855	<0.001	
	KM-Implementation: Resources/personnel for KM implementation	0.188	0.032	0.270	5.921	<0.001	

The results in Table 4.19 indicate that the most important predictor of pro-activeness among the four knowledge management constructs is the recognition of employee knowledge management training and roles (Model 1: coefficient=0.710, t=24.688, p-value<0.001). Victor and Kathaluwage (2019) advocate for the harnessing of people's skills and ideas as well as their commitments and motivations. In addition, Lendzion (2015) stresses that people are the basis of knowledge management because they are the ones who run processes connected with identification, creation, obtaining, purifying and transferring the knowledge. The second most important predictor of pro-activeness is the recognition of knowledge management as critical in operations and sales. Thus, Abusweilem and Abualous (2019) maintain that an organisation's knowledge management is considered a critical factor in performance levels while Obeidat et al. (2016) state that knowledge management has gained traction as one of the most strategically important resources due to its impact on the innovation and competitive advantage that leads the organisations to superior performance. The results indicate that these two knowledge management constructs are dominant in the contribution to the variation in pro-activeness while the third construct of allocation of

resources and personnel for knowledge management implementation (Model 3: coefficient=0.188, t=5.921, p-value<0.001) is not a significant contributor to the variation in pro-activeness.

4.12.2. Effects of knowledge management on operational efficiency: Intelligence generation

The results in Table 4.20 present the questions that dealt with the respondents' views on knowledge management's effect on intelligence generation.

Table 4.20: Regression of Intelligence generation on knowledge management

Dependent Variable: Operational efficiency through Intelligence generation	Unstandardized Coefficients		Standardized Coefficients	t	p-value	R^2
	B	Std. Error	Beta			
Model 1 (Constant)	1.637	0.132		12.417	<0.001	0.404
KM-Recognition: Employees KM training and roles	0.588	0.042	0.635	14.159	<0.001	
Model 2 (Constant)	1.081	0.138		7.821	<0.001	0.510
KM-Recognition: Employees KM training and roles	0.409	0.044	0.442	9.337	<0.001	
KM-implementation: Encouragement of Knowledge sharing and transfer	0.298	0.037	0.379	8.015	<0.001	
Model 3: Final (Constant)	0.650	0.166		3.926	<0.001	0.541
KM-Recognition: Employees KM training and roles	0.393	0.043	0.425	9.222	<0.001	
KM-implementation: Encouragement of Knowledge sharing and transfer	0.210	0.041	0.267	5.092	<0.001	
KM-Recognition: Recognition of KM as critical in operations and sales	0.214	0.048	0.214	4.435	<0.001	

The results in Table 4.20 indicate that the most important predictor of intelligence generation among the four knowledge management constructs is recognition of employee knowledge management training and roles (Model 1: coefficient=0.588, t=14.159, p-value<0.001). This finding resonates with Muciek and Zinczuk's (2014) claim that an organisation and its workers are expected to continue learning in order to catch up with the latest trends and that a successful learning organisation (through effective knowledge management) will provide a good community to help employees develop their professional skills within the organisations. According to Alrawi and

Alrawi (2011), top and middle level management is expected to be leading the knowledge management process. The second most important predictor is the encouragement of knowledge sharing and transfer (KM-Implementation). Fernandez and Sabherwal (2010) attest to the importance encouragement of knowledge sharing as organisations are reliant on the knowledge that is shared among employees to reap possible benefits and become innovative and competitive (Brcic & Mihelic, 2015). The last and third most important contributor of intelligence generation is the recognition of knowledge management as critical in operations and sales (KM-Recognition) respectively. This view is supported by Muciek and Zinczuk's (2014) who are of the view f that if fully recognized, knowledge management improves operational indicators such as productivity, decision making, customer satisfaction, innovation and competitiveness. In addition, Anand and Walsh (2019) argue that knowledge management improves SMME performance and that employee disinterest in knowledge management could endanger the organisation's progress and success. Finally, there is no equal contribution and yet the results suggest that all three variables are important predictors of intelligence generation.

4.13. Effects of operational efficiency on the competitiveness of small retail firms

This section addresses the fifth research objective that reads:

> *To determine how small firm's operational efficiency predict firm competitiveness.*

There was only one construct for competitiveness and two for operational efficiency. As a result, a multiple linear regression model was used to assess the joint effect of the two operational efficiency constructs on competitiveness. The findings are presented in Table 4.21 below.

Table 4.21: Regression of Competitiveness on Operational efficiency

Dependent Variable: Competitiveness		Unstandardized Coefficients		Standardized Coefficients	t	p-value	R²
		B	Std. Error	Beta			
Model 1	(Constant)	1.502	0.116		13.000	<0.001	0.507
	Operational efficiency through Intelligence generation	0.572	0.033	0.712	17.437	<0.001	
Model 2: final	(Constant)	1.306	0.121		10.829	<0.001	0.538
	Operational efficiency through Intelligence generation	0.406	0.049	0.505	8.245	<0.001	
	Operational efficiency through pro-activeness	0.234	0.053	0.271	4.434	<0.001	

The results in Table 4.21 show that both intelligence generation (Model 2: coefficient=0.406, t=8.2445, p-value<0.001) and pro-activeness (Model 2: coefficient=0.234, t=4.434, p-value<0.001) had a significant impact on competitiveness. While Ponelis (2018) argues that for businesses to be successful (e.g., creating competitiveness) there must be operational systems in place to gather the right type of information, Madonsela, Sobiyi and Twala (2017) argue that most organisations rely on intelligence for better decision making and that from a business perspective, generating intelligence has become an asset for competitive advantage. These statistics seems to concur with the declaration by Boschet al. (2011: 594) that business owners should be proactive in their decision making and management of the daily operations of the business as this could make a difference between success and failure (Waters, 2011). Moreover, Wambugu (2015) complements these findings in the postulation that proactiveness leads to greater firm performance that ultimately yields a competitive advantage.

4.14. A structural equation modelling summary of the conceptual framework

Figure 4.3 below depicts the overall relationships between variables of the fitted models. Only significant relationships are shown with arrows. The results show that the implementation of knowledge management (KM-Implement) does not significantly impact on Operational efficiency through intelligence generation (OPEF-IntGen) and

neither does it impact on pro-activeness (OPEF-Proact), hence the arrows were left out in the final SEM model.

The test statistics of the SEM model are shown in Table 4.22, and they show the significant relationships (p-values<0.001). It is important to note that the sub-constructs obtained through exploratory factor analysis are left out in the SEM model to avoid cluttering. Thus, the SEM model has less detail, and its use is for the overall picture of the relationships between the major variables.
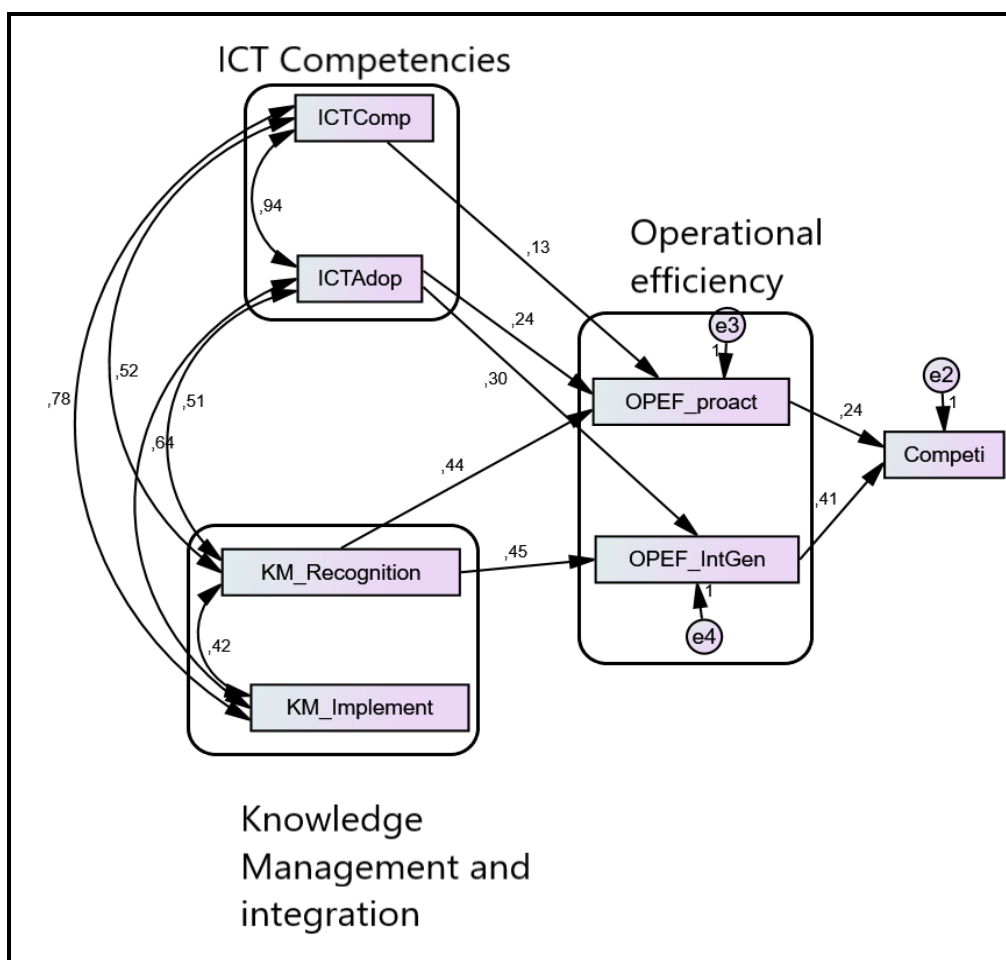

Figure 4.3. Structural Equations Modelling (SEM) diagram of the broader conceptual framework.

Table 4.22: SEM Regression estimates for the main constructs

Predictor Variable	Response variable	Regression parameter estimate	S.E.	C.R.	P-value
ICTComp	OPEF_proact	0.131	0.033	30.978	<0.001
ICTAdop	OPEF_proact	0.244	0.043	50.650	<0.001
KM_Recognition	OPEF_IntGen	0.447	0.078	50.749	<0.001
KM_Recognition	OPEF_proact	0.437	0.047	90.255	<0.001
ICTAdop	OPEF_IntGen	0.297	0.051	50.805	<0.001
OPEF_IntGen	Competi	0.409	0.042	90.642	<0.001
OPEF_proact	Competi	0.241	0.046	50.284	<0.001

4.15. Summary of the chapter

This chapter focused on the presentation and discussion of the results obtained from the data analysis. The results were presented in the form of tables, figures and percentages. Both correlation and regression analysis were employed to establish and predict the nature of the relationships between variables and/or constructs.

The next chapter presents the conclusion and provide some recommendations based on the results outlined in this chapter.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS
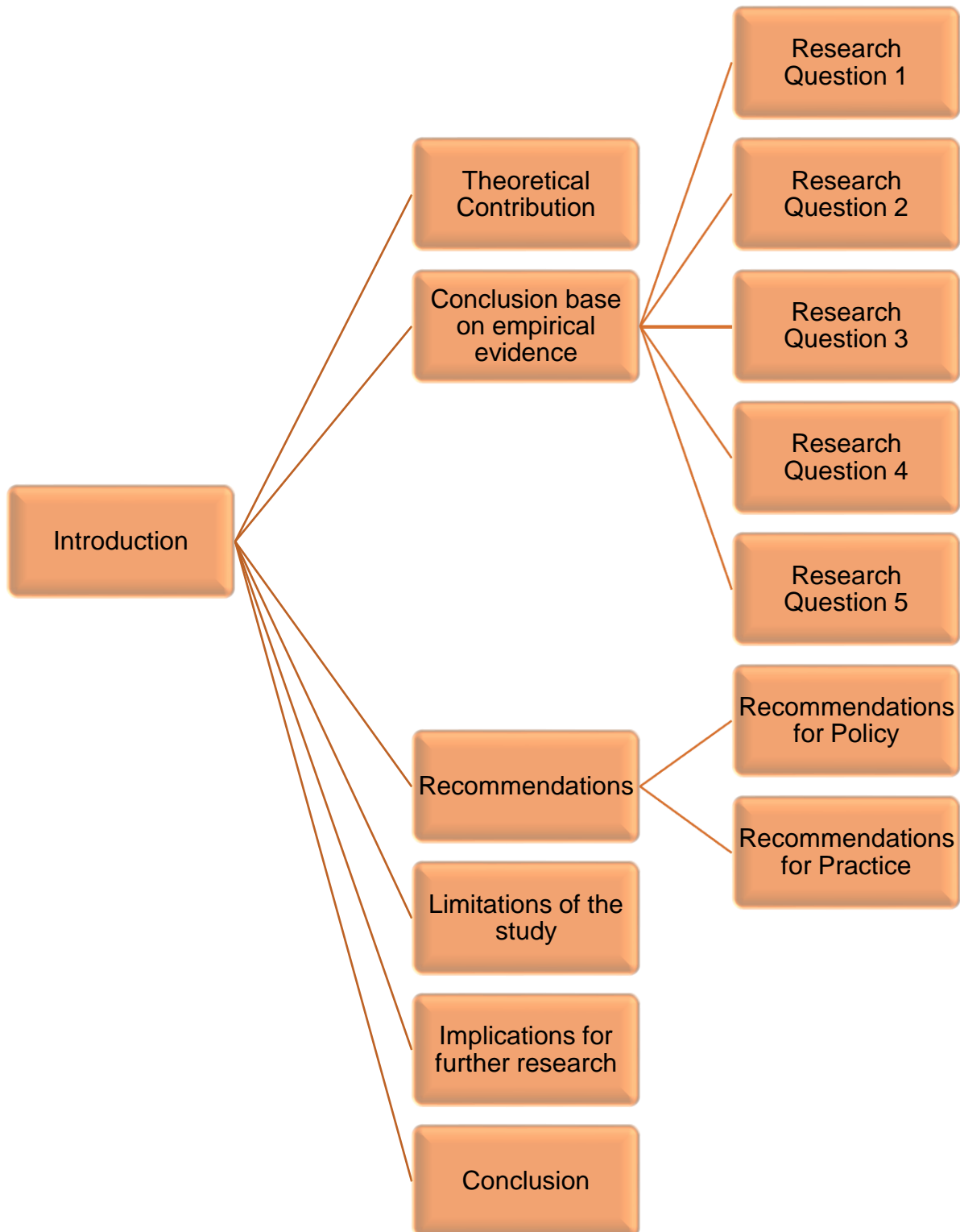
5.1. Introduction

The previous chapter focused on the research findings on the influence of ICT competences, knowledge management and operational efficiency on the competitiveness of SMMEs in the Mangaung Metropolitan Area (MMA). The study targeted this area because the MMA, unlike other outlying areas in the province, has a fairly developed ICT infrastructure even though such endowments may not translate into high ICT competences and hence the need to establish such competences. In addition, one can expect locations with fairly developed ICT infrastructure to be fully capacitated to take advantage of the knowledge that needs to be managed to improve their operational efficiencies (Mahlatse, 2011) and firm's competitiveness, hence this study.

The current chapter is divided into various sections. First, the chapter presents a conclusion based on literature and demonstrates the theoretical contribution of the study. The second part presents a conclusion based on empirical evidence. Here, the focus is devoted to recapping the questions of this study and their responses based on the analysis, presentation and discussion of findings. Third, the focus is the recommendations for theory and practice. The limitation of the study is presented in the fourth part while the fifth discusses the implications for future research. The study conclusion is presented in the sixth and final part of the chapter.

5.2. Theoretical contribution

The study draws on the unified technology acceptance and use model (UTAUT) and knowledge creation theories (KCT) to better understand the concepts explored the study. The UTAUT Model focuses on acceptance and use of technology, performance and organisation and thus, it allowed the researcher to explore the embedded relationships between an individual (i.e., owner/manager) competences, the firm (i.e., operational efficiency) and the expected performance outcomes (i.e., firm competitiveness), and enabled a multi-level analysis of predictors of firm competitiveness. Moreover, the adopted knowledge creation theory also aided in understanding how information generation and sharing flows within an organisation

and ways that improve the operational efficiency of firms in areas such as access to customers and new markets.

From a conceptual perspective, the study sets out to explore the interface between ICT competencies, knowledge management and the operational efficiency of SMMEs to improve their business competitiveness. The study argued that despite the exploration of the monological relationships between ICT competencies and business competitiveness on the one hand, and knowledge management-business competitiveness relationship on the other hand, the study postulated that these parallel studies do not offer a complete picture of how firm competitiveness is attained if a firm's operational efficiency were to be ignored. The study argued and tested the additional effects of operational efficiency on firm competitiveness.

The study contributes to the theoretical knowledge by proposing a conceptual model (Figure 5.1) that depicts the harmonious relationship between ICT competences, knowledge management and operational efficiency and the effects of these variables on competitiveness of SMMEs. The revised model, in contrast to the proposed model (Figure 2.1), demonstrates direct contribution of each variable towards firm competitiveness, where there are no interdependencies and mediation among the antecedent variables. The model also eliminates interrelations amongst variables themselves.
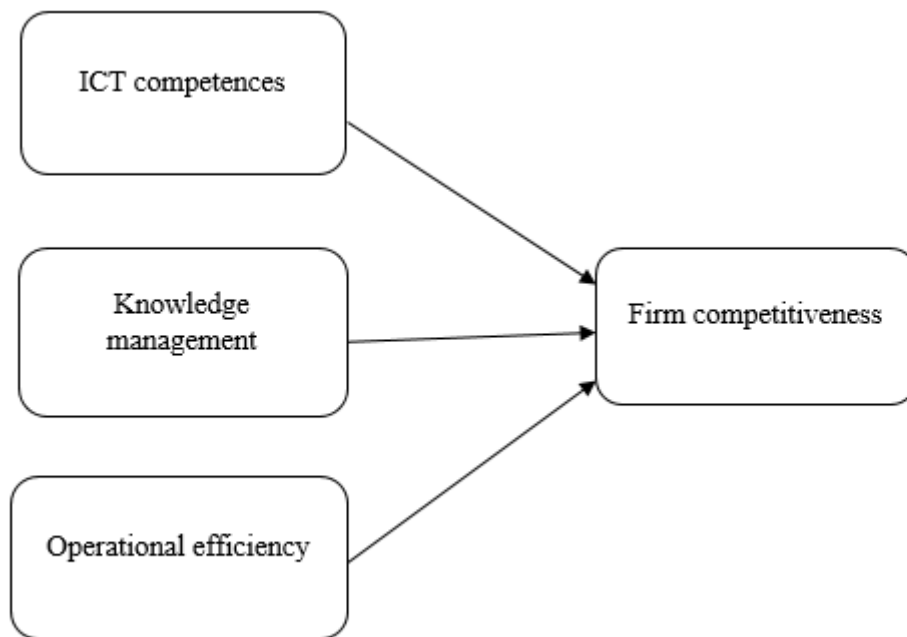
Figure 5.1. Revised conceptual model

5.3. CONCLUSION BASED ON EMPIRICAL EVIDENCE

This investigation also sought to render a solid conclusion based on the empirical findings. This conclusion is based on a recapping of the research questions, the responses to each question and informed by empirical findings. Consequently, the following sections draw on the research questions, their responses and the conclusion on each response.

5.3.1. Research question 1

Which set of ICT competences enable the appropriate adoption of ICT by small firms? The results in Table 4.2 demonstrate a severe lack of ICT adoption among research participants with only 28% agreeing that the majority of employees have basic computer education and 63% reporting that the company does not have a budget for increasing ICT knowledge and equipment. Figure 4.1, however, shows that regular evaluation of internal ICT capacity and developing the ICT knowledge and skills of employees are the most important driver of adoption. This is emphasised in Mbuyisa's (2017) study that maintains that ICT competences, as driver of ICT adoption, offer

several opportunities for SMMEs by making knowledge available and in that way improving the quality of decision making, responsiveness and efficiency. However, reserving a budget for ICT knowledge and equipment acquisition and exposing employees to ICT related training/courses were the least important drivers.

Furthermore, the results shown in Table 4.5 indicate that the least important competency in ICT adoption is employees having basic computer education. This can be attributed to the fact that appropriate ICT skills and knowledge acquisition is informed by the overall ICT strategy of the organisation and an intensive personnel policy. As such, computer education should firstly be embedded in organisational culture (OECD, 2012), something that could be lacking among SMMEs. As revealed by the study in Table 4.6, the firm's regular evaluation of its internal ICT capacity and exposing employees to ICT related training/courses are the most important predictor of ICT adoption as confirmed by 76% of the respondents (Model 2) (Pham, 2010). Most importantly, Table 4.5 also depicts that the companies that reserving budget for the development of ICT knowledge and acquisition of equipment have no significant effect on ICT adoption.

Therefore, it is concluded that regular evaluation of internal ICT capacity, developing the ICT knowledge and skills, and reserving a budget for ICT acquisition are competences that most affect ICT adoption by SMMEs. However, in terms of predicting ICT adoption, a firm's regular evaluation of its internal ICT capacity and exposure of employees to ICT related training/courses are the most important predictor of ICT adoption jointly predicting 76% of variations in adoption of ICT.

5.3.2. Research question 2

To what extent does ICT competence account for the variance in the competitiveness of small retail firms?

The results, as indicated by Table 4.16, show that companies' competitiveness is mostly affected by their regular evaluation of its internal ICT capacity, knowledge and skills (coefficient=0.260, t=11.803, p-value<0.001). This finding is also supported by

contemporary literature on SMMEs (SEDA, 2012; Mbuyisa, 2017). This finding is seconded by most employees having basic computer education (Model 2: coefficient=0.083, t=2.688). The findings also revealed that the company employees' possession of basic computer education is at the forefront of driving firm competitiveness (Antlova et al., 2011). This finding is supported by the Oxford Economics (2017) finding that an SMME that does not embrace technology and the digital agenda will have serious competitiveness problems.

Therefore, it is concluded that combined ICT competence accounts for the variation in the competitiveness of small retail firms by 33.5%.

5.3.3. Research question 3

To what extent does knowledge management account for the variance in the retail SMMEs' competitiveness?

The results as indicated by Table 4.17, show that the most important predictor of competitiveness under the knowledge management concept is the recognition of knowledge management, which is critical in operations and sales (Model 1: coefficient=0.538, t=15.072, p-value<0.001). This finding is corroborated by literature (Nazari et al., 2016; Donate et al., 2017) The second most important predictor being recognition of the importance of employees' knowledge management training and roles (Naicker et al., 2017). Both constructs account for 57.6% variation in competitiveness (R^2=0.576). To this effect, Naicker et al. (2017) maintains that knowledge management, embedded in a firm's culture, facilitates firm operations and the extent to which responsibilities, roles and power are delegated. Knowledge management implementation comes third with a contribution of 4.3%.

Therefore, it is concluded that knowledge management accounts for the variance in the retail SMME's competitiveness by 61.9 percent.

5.3.4. Research question 4

To what extent does knowledge management account for the variance in the operational efficiency of small retail firms?

Two constructs were used to address this question, which sought to measure operational efficiency. The question sought to find the effects of KM sub-constructs on *pro-activeness*, and how the very same KM sub-constructs affect *intelligence generation*. Therefore, the answer to this question is twofold in its focus on KM's effect on the first dimension of OE (pro-activeness) and KM's effect on the second dimensions of OE (intelligence generation).

The results in Table 4.18, show that the recognition of an employee's knowledge management training and roles is the most important predictor of pro-activeness (Model 1: coefficient=0.710, t=24.688, p-value<0.001), accounting for 67.2%.
The results again reveal that the second most important predictor for pro-activeness is the construct of recognition of KM as critical in operations and sales (R^2: 0.731-0.672), accounting for 5.9%, with KM implementation coming last at 2.9%. Overall, the effect KM on proactiveness, a dimension of operational efficiency, accounts for 76% (R^2=0.760)

The same construct of recognition of employee knowledge management training and roles is again the most important predictor of intelligence generation as shown in Table 4.19 (Model 1: coefficient=0.588, t=14.159, p-value<0.001), accounting for 51% when constructs are considered. The second and third most important predictors of knowledge generation are encouragement of knowledge sharing and transfer (KM-implementation) and recognition of KM as critical in operations and sales (KM-Recognition). The results show KM affects Intelligence generation and a dimension of operational efficiency with 54.1%. (R^2=0.541)

It can, therefore, be concluded that knowledge management (all dimensions considered) predicted changes in operational efficiency of small retail firms by 76% percent (see Table 4.18).

5.3.5. Research question 5

To what extent does a small firm's operational efficiency predict firm competitiveness?

This question was addressed by taking only one construct for competitiveness and two for operational efficiency (i.e., proactiveness and intelligence generation). After using the multiple linear regression model to assess the joint effect of the two operational efficiency constructs, the results, as indicated in Table 4.20, show that both intelligence generation and pro-activeness have a significant impact on competitiveness (Model 2: coefficient=0.406, t=8.2445, p-value<0.001). However, intelligence generation shows a higher coefficient, and as such, influences competitiveness more than pro-activeness.

It can, therefore, be concluded that operational efficiency exerts a positive, moderate but significant effect on firm competitiveness. It accounts for 40.6%.

5.4. Recommendations

The study revealed that most SMMEs do not possess necessary ICT competences (i.e., basic computer education and literacy) that effect knowledge management, operational efficiency and ultimately, their competitiveness. This section outlines the key recommendations, proposed for policy and practice, based on the research objectives and the findings of the study.

5.4.1. Recommendations for policy

The following aspects can be regarded as the recommendations for policy: Encouraging SMME ICT usage; Strengthening SMME ownership across different races; and the creation of a cohesive intelligence generation strategies for SMMEs.

5.4.1.1. Encouraging SMMEs' ICT usage

There is overwhelming evidence in the study that affirms ICT as the backbone of SMME sustainability and competitiveness. However, it is alarming that descriptive statistics of the study revealed a lack of ICT adoption among SMMEs. Given the central role ICTs play all facets of organisational operations (e.g. stakeholder management, cash management, budgeting, scenario planning and forecasting), the low rate of ICT adoption is quite concerning and may contribute to these SMMEs lagging in the digital economy. Government institutions such the Small Enterprise Development Agency (SEDA) and National Youth Development Agency (NYDA) should develop policies that specifically aim to encourage and facilitate ICT adoption. Such support systems can take different forms ranging from providing funding for procurement of ICTs, facilitating ICT and software procurement and training in effective ICT usage among SMME owner managers and effective integration of ICTs into SMME's routine operations.

While the attending of ICT seminars could be good corrective measure, one must be conscious of the busy schedule of SMME owners and managers as much of their activities and operations revolve around them. As such, instead of physical attendance that involves travelling to conference venues, the running of ICT webinars via online platforms such as Zoom, Microsoft Teams, and Skype could be better alternatives for supporting ICT adoption. The hope here is that the key ICT adoption strategies disseminated at these conferences and seminars will be implemented in their organisations. However, since Zoom, Microsoft Teams and Skype meeting are data intensive activities, the Department of Small Business Development may need to provide zero rated data to SMMEs in order to increase their active participation in ICT adoption conferences and workshops in the wake of high data costs.

5.4.1.2. Strengthening SMME ownership among previously disadvantaged racial groups

Despite black Africans constituting the racial majority in the Free State where this study was conducted, it was disappointing that only 49% of them participated in this

study. The limited participation may be pointing to their under representation in the retail business sector. In view of this limited participation of this historically marginalised group, it is recommended that race-based and social status based (as social status in South Africa is a good but non perfect proxy for race) intervention policies and programmes must be developed by government institutions such as the Industrial Development Corporation (IDC), Small Enterprise Development Agency (SEDA) and National Youth Development Agency (NYDA) to specifically target other racial groups. Such programmes could take different forms such as direct cash injections into black-owned business at low interest rates, black business focused training that targets the mechanics of those in retail and related businesses and providing business mentors and coaches (of various racial backgrounds) who provide continual feedback, monitoring and evaluation of performance of black-owned business throughout their life cycle.

5.4.1.3. *Creation of cohesive SMME intelligence generation strategies*

The demonstrated positive interrelationships between ICT competences, knowledge management, operational efficiency and SMME competitiveness is an insight worth giving attention. Intelligence generation was deemed the most impactful dimension of operational efficiency, and as such, government institutions must facilitate and improve intelligence generation among SMMEs to ensure their sustained competitiveness. Improving intelligence generation can take different forms and these include gathering and analysing competitor and customer information to improve firm competitiveness.

5.4.2. Recommendations for practice

The aspects, Acquisition of ICT competences, knowledge and skills by SMMEs, SMME intelligence generation and the development of SMME Knowledge management hubs, are regarded as recommendations for practice.

5.4.2.1. *Acquisition of ICT competences, knowledge and skills*

The study reported that a small number of SMMEs actually engage in the use of ICT and thus, it is recommended that SMMEs reserve a larger budget for resource acquisition specially for the fostering of ICT competences, knowledge and skills. There is a challenge with obtaining finance from institutions such as Industrial Development Corporation (IDC) and SA Micro-finance Apex Fund (SAMAF) that are mandated to fund SMMEs. However, there also exists a significant opportunity for financial providers to facilitate the growth of SMMEs by promoting their acquisition of resources to build ICT competences of their staff (Afolayan, 2014). Although the government serves as a funding bridge for SMMEs who fail to access loans from commercial banks due to lack of collateral, the provision of government guarantees (at reasonable lending rates) for loans that commercial banks extend to SMME owner/managers (The banking association of South Africa, 2018) could help overcome challenges of collateral which prevent SMMEs from receiving loans to support the development of their competences.

While the building of ICT competences, knowledge and skills remains central to SMME competitiveness, the innovativeness of SMMEs in pooling resources and establishing new ways of funding beyond traditional bank lending would be required to better meet these firms' needs for flexible and cost-effective finance to support ICT competence development. Such sources could be in the form of rotating group saving schemes (*stokvels*) or crowd funding using online platforms (Achemfuor & Dzansi, 2012; Cichy & Gradon, 2016) which also fit the purpose of ICTs for competence development as such funding do not bear any interest.

5.4.2.2.   SMME Intelligence Generation

The literature and empirical findings indicated the fundamental importance of intelligence generation to firm competitiveness, which is one of the dimensions of operational efficiency. This finding gels well with the essence of developing knowledge-based firms to overcome challenges on competitiveness in the market. This coheres with Omerzel's (2011) view that organisational knowledge has a positive effect on the market value of firms by increasing their profitability and overall

competitiveness. Since SMMEs were found wanting in ordinary activities, such as promoting regular communications with suppliers/customers, gathering information on competitors and sharing information with employees, the development of knowledge-based firms must target these areas of internal and external relationship management to improve their competitiveness. In short, SMME intelligence generation must focus precisely on those activities that SMMEs have downplayed or find difficult to effectively execute on their own. As such, more effort is needed in terms of gathering, processing and disseminating such stakeholder related information for critical decision making in SMMEs. Therefore, it is recommended that SMMEs should continually improve their intelligence generation strategies in order to realise the reported benefits.

5.4.2.3. *SMME knowledge management hubs*

The observation that knowledge management is an integral component of SMMEs that accounts for variance in operational efficiency (65%) and competitiveness (61.9%), it can be recommended that knowledge management hubs that specifically target SMMEs be established by government organisations such as the Small Enterprise Development Agency (SEDA). These hubs could specifically target those activities that SMMEs are struggling to effectively and efficiently conduct such as sourcing funds to support their ICT competences, training and development of employees, leverage technology to improve operational efficiency and encourage knowledge sharing. Although not the focus of this study, literature suggests that firms that make knowledge management part of their organisational culture tend to perform better than those that do not (Naicker et al., 2017). Consistent with this thinking, one could recommend that firms must embed knowledge management (especially knowledge sharing) into their organisational culture. While there is no one best way of doing this, making knowledge management a routine activity and embedded in conversations about improving operational efficiency and competitiveness could be some of the ways of entrenching knowledge management in the organisational culture of SMMEs.

5.5. Limitations of the study

The study was constrained by the following limitations:

Given the full-time employment status of the researcher, and the financial shortfalls, the researcher was unable to cover the whole of the Free State Province, which could have increased the sample size. Therefore, the area of investigation was constrained to Mangaung Metropolitan Area. However, the analysis conducted was not too sophisticated, and therefore, the sample covered was deemed sufficient for the analysis conducted and for addressing the research questions. Literature suggests that the important issue is the absolute size of the sample selected relative to the complexity of the population, the aims of the researcher and the statistical manipulation used in data analysis (Taherdoost, 2016), and not the proportion of the research population that gets sampled. Nevertheless, the findings of this study may not be generalised to other provinces as the study did not cover the entire province due to resource constraints.

The research used a mixed study approach that aimed at conducting interviews, which would complement the questionnaire data, especially in providing explanations for why some variables and relationships responded and behaved the way they did respectively. However, the researcher was unable to conduct interviews due to the unwillingness of SMME owners and failure of managers to cooperate owing to work commitments and lack of time. In spite of all these constraints, the data collected, and the analysis conducted was deemed sufficient to address all research questions posed by the researcher and could produce enough data to answer the research questions (Lopez & Whitehead, 2013).

Ideally, the inclusion of employees into a sample of employers (owners and managers) would have painted a broader picture of SMMEs' operational efficiencies and the extent of ICT competences of SMMEs. However, since most operational, supervisory, management and ownership roles are often infused in one person (owner/manager), the inclusion of employees was deemed inconsequential for SMMEs due to the invisibility of the workforce arising from the infusion of roles.

The inclusion of foreigners would have shed light on where the dynamics that playout regarding the variables investigated varied between locals and foreign-owned SMMEs. However, the inclusion of foreign nationals was undermined by their

reluctance to partake in the study citing privacy and confidentiality reasons including the risks of potential victimisation by locals. Since some of the SMME owners may have been undocumented foreigners, they had no mechanism of distinguishing the researcher from secret personnel of law enforcement agencies. Given that the focus of the study was not necessarily distinguishing between these groups by nationality (even though such distinction could be more revelatory), the negation of this dynamic (i.e., foreign owned businesses) did not fundamentally undermine the outcomes of this study.

Lastly, the study only aimed at SMMEs and as such, the results did not include large and established businesses. As literature suggests (Chimucheka & Mandipaka, 2015; Le, 2017), the dynamics of ICT competences, operational efficiency, knowledge management and level of firm competitiveness of large corporations are different from that of small firms. Based on this insight, the inclusion of large corporations with different dynamics with regard to the variables studied was deemed irrelevant.

5.6. Implications for further research

The study has five implications.

Firstly, the study was limited to one metropolitan area, future studies may broaden the investigation to other municipal areas or to cover the entire province to establish the extent to which findings from the current study can be further generalised to the entire province.

Secondly, this study employed the different variables from a quantitative approach which did not include control variables. As such, the study did not shed light on how these relationships play out in the presence of control variables such as entrepreneur's age, gender, racial background, years of entrepreneurship experience, exposure and experience in use of ICTs, study location, firm size and previous occupation category of entrepreneurs. While their inclusion would have been insightful, the researcher felt their inclusion would have broadened the scope of the study beyond his capacity to handle in terms of statistical techniques required and his work commitments and hence were excluded from this study. Future research may need to include these

control variables to shed light on how, and under what conditions do ICT competences, operational efficiency and knowledge management affect firm competitiveness.

Thirdly, the study explored direct relationships between variables without paying much attention to moderator variables. This opens an avenue for further research into moderating variables that moderate these relationships. The inclusion of one mediating variable (i.e., operational efficiency) was deemed sufficient to the expectations of a Masters study at the candidate's university.

Fourth, since the dynamics of large corporations and SMMEs in terms of variables studied may differ, testing them with reference to these groups would broaden understanding of whether large corporations experience these variables and their relationships the same way or differently. However, this would require a serious comparison of data sets and more rigorous analysis for both types of firms, something deemed beyond the scope of this study as the research was concerned about vulnerable emerging firms.

5.7. Concluding remarks

This chapter provided a conclusion based on both the literature review and empirical evidence. The study demonstrated the variables, such as ICT competences, knowledge management and operational efficiency, which have potential to either inhibit or greatly improve SMME competitiveness. At the core of the variables under study was how ICT competences and knowledge management influence both operational efficiency and firm competitiveness, respectively. While literature emphasized an individual influence of these variables on firm competitiveness, empirical evidence suggests that operational efficiency mediated the interaction between knowledge management, ICT competences and firm competitiveness. More significantly, empirical evidence revealed that ICT competences, knowledge management and operational efficiency collectively influence firm competitiveness. Lastly, the study provided some recommendations based on these findings, highlighted some limitations for the study and presented the implications of this study for future research.

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APPENDIX A

BIOGRAPHICAL STATEMENT

Mokgadi Mantje is an emerging researcher who holds a bachelor's degree in Business Administration and Honour's Degree in Educational Management from the Central University of Technology Free State. Mokgadi holds a National Diploma in Information Technology and is currently enrolled for Master' Degree in Business Administration at the same institution. His research interests are in the use of ICT, knowledge management and operational efficiency in under-competing SMMEs.

APPENDIX B

QUESTIONNAIRE

Dear Respondent(s),

As part of my M-Tech research at the Central University of Technology, I am conducting a survey that investigates the impact of ICT competencies and knowledge management on the operational efficiency and competitiveness of retail SMMEs in the Free State province. The study will be submitted at the University in the form of M-Tech thesis. I would be grateful if you could take time from your busy schedule to complete this questionnaire. Your participation in this research is voluntary and you are free to withdraw from the study without any risks or sanctions. The data generated from this questionnaire will be reported in aggregate form to protect your personal identity. The results will not be used for any other purpose than the production of the thesis. Should you have any questions about the research, please contact me or my supervisor at:

- My email id – mokgadimantje@gmail.com.
- Cell – 073 010 4052
- Prof Patient Rambe (Main Supervisor): 051 504 4064 or prambe@cut.ac.za

Thank you very much for your kind cooperation and positive response.

Mokgadi Mantje

Central University of Technology, Free State

Date:	

SECTION A: DEMOGRAPHIC DATA (COMPANY AND OWNER/MANAGER PROFILE)

Mark your appropriate answer with an (X)

1. Please indicate your gender

1 Male	2 Female

2. Please indicate your age (years)

1	2	3	4	5
(18-25 years)	(26-35 years)	(36-45 years)	(46-55 years)	(56+ years)

3. Please indicate your racial group.

1	2	3	4	5
Black	White	coloured	Asian	Other (specify…………………..)

4. Please indicate your highest qualification.

1	2	3	4	5
No formal education	Primary school	High school	Tertiary	Post graduate

5. Please indicate your role in the company.

1	2	3	4
Owner	Manager	Owner/Manager	Other……………………

6. Please indicate the type of business.

1	2	3	4	5	6
Supermarket	Butchery	Cosmetic Shop	Internet cafe	Spaza shop	Restaurant
7 Bakery	8 Fast Food Outlet	10 ICT (Software/Hardware	11 Other (specify……………………………)		

7. Please indicate the number of years the business has been operating.

1	2	3	4	5
(1-5 years)	(6-10 years)	(11-15 years)	(16-20 years)	(21+ years)

SECTION B: ICT COMPETENCY and ADOPTION

Please indicate the extent to which you agree or disagree with the following statements regarding your company. **Use the following scale to answer the questions:**

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

ICT: COMPETENCY		1	2	3	4	5
8	Majority of employees have at least basic computer education.					
9	The company reserves a budget for ICT knowledge and equipment acquisition.					
10	The company regularly evaluates its internal ICT capacity, knowledge and skills.					
11	The company has the necessary competencies to enable appropriate adoption of ICT.					
12	The company exposes employees to ICT related training/courses.					
ICT: ADOPTION						
13	The company utilize internet/ intranet in most of its operations.					
14	The use of ICTs has increased the productivity of the business					
15	The business frequently uses ICTs for conducting market research					
16	The use of ICTs has increased the competitiveness of the business					
17	The use of ICTs has improved the sales of the business.					

		1	2	3	4	5
18	The use of ICTs has increased the level of satisfaction of customers					
19	The use of ICTs has eased capturing of information					
20	The use of ICTs has eased sharing of information					
21	The business frequently uses ICTs for determining its monthly sales volume					
22	The business frequently uses ICTs for determining its suppliers					

SECTION C: KNOWLEDGE MANAGEMENT (KM) RECOGNITION

Please indicate the extent to which you agree or disagree with the following statements regarding your company. **Use the following scale to answer the questions:**

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

KM: RECOGNITION						
		1	2	3	4	5
23	The business considers knowledge management as critical to its routine operations					
24	The businesses recognises that knowledge management is critical to increasing its sale volumes					
25	KM initiatives have improved the operational efficiency of the business					
26	The business provides employees with continuous training and development in building their knowledge capacity.					
27	The business clearly specifies employee's roles and responsibilities on knowledge management					

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

KM: IMPLEMENTATION		1	2	3	4	5
28	My business has sufficient resource to support knowledge management initiatives.					
29	My business hires employees to fill knowledge management gaps					
30	My business appoints personnel to lead knowledge management initiatives.					
31	My business appoints personnel to lead knowledge management teams					
32	My business encourages knowledge sharing to improve efficiency of operations					
33	My business encourages knowledge transfer to improve efficiency of operations					

SECTION D: OPERATIONAL EFFICIENCY (OE)

Please indicate the extent to which you agree or disagree with the following statements regarding your company. **Use the following scale to answer the questions:**

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

OE: PROACTIVENESS		1	2	3	4	5
34	The firm leverages technology to improve operational efficiency					
35	The firm takes measures to enhance employee's efficiency in performing their duties					

36	The firm puts effort to effectively manage operational risks					
37	The firm puts effort to effectively deliver product/service to the customer					
38	The firm conducts sufficient training and business management skills to support operational efficiency					
39	The firm continually assesses its efficiency against that of competitors					

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

OE: INTELLIGENCE GENERATION						
		1	2	3	4	5
40	The business gathers and assesses competitor information (e.g. products, price, quality)					
41	The business gathers and assesses customer information (e.g. needs, preferences, buying trends)					
42	The business regularly discusses customer and competitor information with employees					
43	The business regularly discusses business with suppliers					
44	The business maintains corporate relationships with other companies					

SECTION E: KNOWLEDGE MANAGEMENT EFFECTING OPERATIONAL EFFICIENCY

Please indicate the extent to which you agree or disagree with the following statements regarding your company. **Use the following scale to answer the questions:**

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

		1	2	3	4	5
45	Knowledge retention has improved employee work ethics					
46	Knowledge circulation has increased integrated work processes					
47	Knowledge generation has increased work performance					
48	Internal knowledge transfer has improved operations					
49	Knowledge circulation has increased streamlined work processes					

SECTION F: COMPETITIVENESS

Please indicate the extent to which you agree or disagree with the following statements regarding your company. **Use the following scale to answer the questions:**

1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

		1	2	3	4	5
50	The firm forecasts better return on investment					
51	The company enjoys better market share					
52	The firm has increased its gross sales in the last three years					
53	The firm has increased its customers in the last three years					
54	The firm has retained customers in the last three years					
55	The business is able to attract talented employees					

Any other comments:

……

……

……

……

……

……

THANK YOU FOR YOUR TIME!!!

FACULTY RESEARCH AND INNOVATION

COMMITTEE FACULTY OF MANAGEMENT

SCIENCES RESEARCH ETHICS

APPROVAL LETTER

Date: 24/01/2022

This is to confirm that:

Applicant's Name	Mokgadi Mantje
Supervisors' Name[s] for Student Project (where applicable)	Prof P Rambe
Co - Supervisor	Dr L Mosweunyane
Level of Qualification for Student Project (where applicable)	M-Tech: Business Administration
Tittle of research project	THE INFLUENCE OF ICT COMPETENCES, KNOWLEDGE MANAGEMENT AND OPERATIONAL EFFICIENCY ON COMPETITIVENESS OF RETAIL SMMES IN THE MANGAUNG METROPOLITAN AREA (MMA), FREE STATE

Ethical clearance has been provided by the Faculty Research and Innovation

Committee in view of the CUT Research Ethics and Integrity Framework, 2016 with

reference number: **FMSEC05/18**
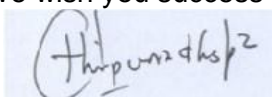
The following special conditions were set:

| XX | None |

| | Specific conditions |

The following specific conditions apply:

1. _____NA_____
2. _____NA_____
3. _____NA_____

We wish you success with your research project.

Professor C
ChipunzaFRIC
Chairperson)

DECLARATION:

Any changes made to the above arrangements or procedures will be brought to the attention of the Chairperson of the Faculty Research Committee.

We/I hold accountable to the Research Ethics Committee for conducting this research project in the manner herein described and in accordance with the spirit of the ethical guidelines of the Central University of Technology, Free State. We/I undertake to assume responsibility to advise the Faculty Research Committee promptly of any deviations, waivers, irregularities or harm occurring during the conduct of this research project.

P. Mantje

Signature of Principal Investigator/**Researcher**:/Student

Signatures of other Researchers involved in this Project, [if any]:   **N/A**

Signature(s) of Project Supervisor(s):

Date: 21 January 2022

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From :   I. Manase (PhD UKZN)

10 Laramie

Nienaber Street

Langenhovenpark

Bloemfontein

Date :   1 November 2021

Confirmation of proofreading and language editing of Mr Mokgadi Petros Mantje's M Tech Business Administration dissertation entitled, "The influence of ICT competences, knowledge management and operational efficiency on competitiveness of retail SMMEs in the Mangaung Metropolitan Area (MMA), Free State"

This serves to confirm that I have proofread and edited Mr Mokgadi Petros Mantje's dissertation entitled, "The influence of ICT competences, knowledge management and operational efficiency on competitiveness of retail SMMEs in the Mangaung Metropolitan Area (MMA), Free State" for the M Tech Business Administration degree at the Central University of Technology. The suggested sentence and language construction changes have been attended to, and as such, the dissertation can now be submitted for examination.

Sincerely,

Irikidzayi Manase, PhD English Studies, University of KwaZulu-Natal (Pietermaritzburg)
Email: irimanase@gmail.com / ManaseI@ufs.ac.za