

**THE INFLUENCE OF SUPPLY CHAIN RESPONSIVENESS,
COLLABORATION AND INFORMATION SHARING ON THE
PERFORMANCE OF SMALL TO MEDIUM ENTERPRISES IN A
DISTRICT MUNICIPALITY**



by

EUCHARIA AKUOMA MBA

Student number: 212052667

Dissertation submitted in fulfilment of the requirements for the degree

MAGISTER TECHNOLOGIAE

in the discipline of

LOGISTICS MANAGEMENT

in the

FACULTY OF MANAGEMENT SCIENCES

at the

VAAL UNIVERSITY OF TECHNOLOGY

SUPERVISOR: Dr O. Omoruyi

CO-SUPERVISOR: Dr E. Chinomona

2020

DEDICATION

I dedicate this dissertation to my husband, Mr Simon Amuchekwu Nwokedi, for his never-ending understanding and support and to my lovely son, Arnold Uchechukwu Nwokedi. I also extend this dedication to my mother, Pastor Mrs Juliet Mba, for her prayers and support. Above all, I dedicate this dissertation to God Almighty.

DECLARATION

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

Signed.....

Date.....

STATEMENT 1

This dissertation is being submitted in fulfilment of the requirements for the degree of Magister Technologiae: Logistics Management.

STATEMENT 2

The dissertation is the result of my own independent work/ investigation, except otherwise stated. Other sources are acknowledged by giving explicit references. A bibliography is appended.

Signed.....

Date.....

STATEMENT 3

I hereby give consent for my dissertation, if accepted, to be available for photocopying and for interlibrary loans and for the title and summary to be made to outside organisations.

Signed.....

Date.....

ACKNOWLEDGEMENTS

First, I offer my sincerest gratitude to my supervisor, Dr Osayuwamen Omoruyi Adesile, who through so much effort, patience and knowledgeable advice has dedicated not only her time and concentration towards the completion of this study but has also supported me throughout the challenging period of this study. I sincerely offer my appreciation to my Co-Supervisor, Dr Chinomona, for her moral support and knowledge. I am grateful to the Vaal University of Technology Higher Degrees Department for monetary support. I offer my sincere appreciation to the Head of Department, Dr C. Mafini, for his time, advice and knowledgeable support towards this study. During my endeavours to complete this study, I was blessed with a friendly and supportive group of students in my department who, in one way or the other, contributed to this study. I offer my deep gratitude to them for helping me, especially with running the data analysis of the study.

ABSTRACT

Supply chain management is becoming more complex for small- and medium enterprises (SMEs) and the need to improve performance seems to be significantly necessary. For SMEs to be efficient and effective towards minimising disruptions within supply chains, ensuring availability of resources and improving just-in-time delivery, information sharing coupled with supply chain collaboration and responsiveness are essential strategies for enhancing business performance. Therefore, this study regards supply chain collaboration, responsiveness and information sharing as major factors influencing not only SMEs performance.

In this study, a quantitative research methodology was applied. Relational governance theory (RGT) provided structure to a clear understanding of information sharing among SMEs and customers. The theory highlighted that SMEs aiming to improve their performance, should adopt the style of collaborating with the right suppliers and continuously communicate with the members of the supply chains. This structure guided the researcher towards planning, implementing and evaluating the research findings. An overview of the research methodology and the techniques used in the study are presented, including the Statistical Packages for Social Sciences (SPSS version 25.0 Windows) used to analyse and determine the reliability and validity of the research instrument. Results acquired show a strong relationship between the four constructs. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) results support the empirical findings, suggesting that the model fit the study. The reliability and validity of the constructs (composite reliability) and the average variance extracted sought the empirical findings that correlate the need for SMEs to employ information sharing, supply chain responsiveness and supply chain collaboration as a determinant influence on SMEs performance. The Cronbach alpha values ranges from 0.823 to 0.896 and AVE results ranges from 0.500 to 0.625 respectively which indicate acceptable reliability and validity for this study.

It is recommended that as focused responsiveness is critical, all efforts made by SMEs must be expanded in order to determine what constitutes desired responsiveness for individual members in the supply chain. Differentiated and highly responsive programmes for key members of the supply chain should be impartial with supply chain members oriented but less tailored approaches for lesser involved members. Enough and important information must be obtained in order to identify the member's requirements.

TABLE OF CONTENTS

DEDICATION.....	ii
DECLARATION.....	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT.....	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
CHAPTER 1 INTRODUCTION AND BACKGROUND OF THE STUDY	1
1.1 INTRODUCTION	1
1.2 RELATIONAL GOVERNANCE THEORY (RGT)	2
1.3 LITERATURE REVIEW OF RESEARCH CONSTRUCTS	3
1.3.1 Small- and medium enterprises	3
1.3.2 Supply chain responsiveness	4
1.3.3 Supply chain collaboration.....	4
1.3.4 Information sharing.....	4
1.3.5 SMEs performance.....	5
1.4 PROBLEM STATEMENT	5
1.5 RESEARCH HYPOTHESES	7
1.6 OBJECTIVES OF THE STUDY.....	7
1.6.1 Primary objective.....	7
1.6.2 Secondary objectives.....	7
1.6.2.1 Theoretical objectives	8
1.6.2.2 Empirical objectives.....	8
1.7 SIGNIFICANCE OF THE STUDY	8
1.8 RESEARCH DESIGN	8
1.8.1 Literature review.....	9
1.8.2 Empirical study	9
1.8.3 Target population.....	9
1.8.4 Sampling frame	9
1.8.5 Sampling techniques	10
1.8.6 Sampling size	10

1.9	METHOD OF DATA COLLECTION AND MEASUREMENT INSTRUMENT	11
1.9.1	Pilot study	11
1.10	DATA ANALYSIS AND STATISTICAL APPROACH.....	11
1.11	RELIABILITY AND VALID	12
1.11.1	Reliability	12
1.11.2	Validity	12
1.12	ETHICAL CONSIDERATIONS.....	12
1.13	OUTLINE OF THE STUDY	13
1.14	SYNOPSIS	14
	CHAPTER 2 SMEs BACKGROUND AND RESEARCH VARIABLES	15
2.1	INTRODUCTION	15
2.2	GLOBAL PERSPECTIVE OF SMEs.....	15
2.3	SMEs in SOUTH AFRICA	17
2.4	THEORETICAL FRAMEWORK FOR UNDERSTANDING THE IMPORTANCE OF INFORMATION SHARING.....	18
2.5	INFORMATION SHARING	20
2.6	SUPPLY CHAIN RESPONSIVENESS	23
2.7	SUPPLY CHAIN COLLABORATION.....	24
2.8	PERFORMANCE	25
2.9	HYPOTHESES DEVELOPMENT	27
2.9.1	Information sharing, responsiveness and collaboration	27
2.9.2	Supply chain collaboration and SMEs performance	28
2.9.3	Supply chain responsiveness and performance	28
2.9.4	Information sharing and SMEs performance	29
2.10	SYNOPSIS	29
	CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY	31
3.1	INTRODUCTION	31
3.2	RESEARCH OBJECTIVES AND APPROACH.....	31
3.2.1	Quantitative and qualitative research	32
3.2.2	Research design	33
3.2.2.1	Descriptive research	33
3.3	SAMPLING DESIGN PROCEDURE AND STRATEGY.....	34
3.3.1	Non-probability sampling.....	35
3.3.2	Target population.....	37
3.3.3	Sampling frame	39
3.3.4	Sample size	39

3.4	QUESTIONNAIRE DESIGN AND DATA COLLECTION METHOD.....	40
3.4.1	The questionnaire design process	40
3.4.2	Ethical issues.....	42
3.5	DATA PREPARATION.....	42
3.5.1	Data editing.....	42
3.5.2	Data coding	42
3.5.3	Data capturing.....	43
3.5.4	Data cleaning	43
3.6	DATA ANALYSIS	43
3.6.1	Reliability	43
3.6.2	Validity	44
3.6.3	Research model fit assessment	44
3.7	CORRELATION ANALYSIS	44
3.8	FACTOR ANALYSIS	45
3.8.1	Confirmatory factor analysis (CFA)	45
3.8.2	Model fit assessment	46
3.8.2.1	Chi-square (χ^2 /DF).....	46
3.8.2.2	Normed fit index (NFI)	46
3.8.2.3	Tucker-Lewis Index (TLI)	46
3.8.2.4	Incremental Fit Index (IFI).....	46
3.8.2.5	Comparative Fit Index (CFI).....	46
3.8.2.6	Root mean Square Error of Approximation (RMSEA).....	46
3.9	STRUCTURAL EQUATION MODELLING (SEM)	47
3.10	SYNOPSIS	48
CHAPTER 4	DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF	
	EMPIRICAL FINDINGS.....	49
4.1	INTRODUCTION	49
4.2	SIGNIFICANCE OF THE STUDY	49
4.3	EMPIRICAL OBJECTIVES OF THE STUDY	50
4.4	DATA ANALYSIS	50
4.4.1	Pilot study	51
4.4.2	SMEs demographic descriptions.....	52
4.5	Reliability Test	55
4.5.1	Cronbach’s alpha test	57
4.5.2	Composite reliability	57
4.5.3	Average variance extracted (AVE).....	57
4.6	Validity Test	58

4.6.1	Construct validity.....	58
4.6.2	Convergent validity.....	58
4.6.3	Discriminant validity	59
4.7	CONFIRMATORY FACTOR ANALYSIS (CFA)	60
4.8	STRUCTURAL EQUATION MODEL TESTING	62
4.9	DISCUSSION OF EMPIRICAL FINDINGS.....	65
4.9.1	Findings on information sharing and supply chain responsiveness (<i>H1</i> : IS & SR)	65
4.9.2	Findings on information sharing and supply chain collaborations (<i>H2</i> : IS & SC).....	66
4.9.3	Findings on supply chain collaboration and SMEs performance (<i>H3</i> : SC & SP).....	67
4.9.4	Findings on supply chain responsiveness and SMEs performance (<i>H4</i> : SC & SP).....	67
4.9.5	Findings on information sharing and SMEs performance (<i>H5</i> : IS & SP).....	67
4.10	SYNOPSIS	68
CHAPTER 5 CONCLUSIONS, RECOMMENDATION AND CONTRIBUTION OF THE STUDY		69
5.1	INTRODUCTION	69
5.2	THEORETICAL AND EMPIRICAL OBJECTIVES AND REFLECTIONS.....	69
5.3	LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH	74
5.4	IMPLICATIONS AND CONTRIBUTIONS OF THE STUDY	76
5.5	KEY LEARNING OUTCOME	77
5.6	SYNOPSIS	77
REFERENCES.....		79
APPENDIX A: QUESTIONNAIRE.....		93
APPENDIX B: CFA STATISTICAL RESULTS		97
APPENDIX C: SEM AND PATH ANALYSIS.....		101
APPENDIX D: ARTICLE PUBLICATION AND CONFERENCE PRESENTATION ..		105

LIST OF TABLES

Table 1:1:	Determining the sample size	10
Table 3.1:	Difference between probability and non-probability sampling design procedures and strategies	36

Table 3.2:	Determining the sample size	40
Table 3.3:	Code representing level of relationship between variables	45
Table 3.4:	The model fit indices	47
Table 4.1:	Summary of reliability results for the pilot study	52
Table 4.2:	Accuracy analysis statistics	55
Table 4.3:	Correlations and discriminant validity	59
Table 4.4:	Confirmatory factor analysis results	61
Table 4.5:	Structural equation model fit results	63
Table 4.6:	Hypotheses results	65

LIST OF FIGURES

Figure 1.1:	Research model	6
Figure 4.1:	Number of years that the SME is operating	52
Figure 4.2:	Annual sales	53
Figure 4.3:	Number of employees profiled in the SMEs	54
Figure 4.4:	Type of industry	54
Figure 4.5:	Confirmatory factor analysis	Error! Bookmark not defined.
Figure 4.6:	Path analysis	64

CHAPTER 1

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Supply chains for small- and medium enterprises (SMEs) are becoming more complex and the need to improve performance seems to be significantly necessary (Skipworth, Godsell, Yew Wong, Saghiri & Julien 2015:516; Turner, Aitken & Bozarth 2018:1434). Information sharing within SMEs collaborative relationships is an essential criterion for enhancing performance (Rao, Guo & Chen 2015:112). The major challenge confronting SMEs is the misperception that sharing information may lead to competitive disadvantage (Peschken, Shukla, Lennon & Rate 2016:198). As a result, many SMEs who strive to improve information sharing capabilities, are slow in their capability to respond to market changes. This may also be attributed to inefficient supply chain collaboration (Omar, Jayaraman & Dahlan 2016:5). Therefore, determining the extent to which supply chain responsiveness, collaboration and information sharing influence performance for SMEs within the supply chain is important.

According to Maghsoudi and Pazirandeh (2016:128), information sharing is necessary because it enables SME managers to improve performance. For example, adequate information shared within the supply chain can prevent stock-outs and increase resource productivity (Mohsam & Van-Brakel 2011:467). Sharing information can also improve the effectiveness of the logistics planning process, reduce inventory levels and lead-time, thereby increasing responsiveness, which positively have impact on SMEs performance (Halqachmi 2013:423).

Panahifar, Byrne, Salamand Heavey (2018:373) refer to information sharing as knowledge sharing or information integration, as well as the means of sharing useful information within a system or an organisational unit. These researchers further emphasise that organisations should identify first, what information should be shared, with whom the information should be shared, how the information should be shared and, lastly, when should the information be shared. For information sharing to be well integrated, all partners of the supply chain must have access and a shared understanding of the related information without any kind of delay or diversity (Song, Yu, Ganguly & Turson 2016:747). Therefore, SMEs within the supply chain should have access to the necessary information regarding all activities that need to take place, including the different aspects of performance data within the main process of the supply chain. Saunila (2017:5), argues that performance for SMEs could be referred to as the pursuit to achieving and

retaining competitive advantage. The ultimate success depends on the managerial ability to incorporate and coordinate supply chain strategy of which information sharing is a part. The need for SMEs to align information sharing with its performance goals is essential, as it will provide a coherent structure to obtaining competitive advantage in an industry.

The degree of information shared can generate performance opportunities for SMEs and create a means for SMEs to work collaboratively, thereby eliminating inefficiencies in information sharing (Costantino, Gravio, Shaban & Tronci 2014:292). For example, with supply chain integration, SMEs can take advantage of the value-added information to adjust existing performance levels (Cao&Zhang 2011:165). SMEs can also note that accurate information shared with customers can enhance quality product innovation and overall operational performance (Ye & Wang 2013:374). Marckelprang and Malhotra (2015:7), argued that information sharing can lead to accurate inventory levels and cost reduction. Therefore, there is a need for this study to present an investigative model towards evaluating the influence of information sharing, supply chain responsiveness and supply chain collaboration on SMEs performances in the Emfuleni Local Municipality.

1.2 RELATIONAL GOVERNANCE THEORY (RGT)

The common framework emulated by many researchers to enhance development of organisational responsiveness, supply chain collaboration and efficient information sharing is the relational governance theory (RGT) (Addae-Boateng, Wen and Brew 2015:290; Omar *et al.*, 2016:2; Petersen& Ostergaard 2018:268; Panahifaret *al.* 2018:366). These researchers have described RGT to be very important since it governs the relationship between an organisation and supply chains members. According to Cong and Chau (2015:468), RGT is defined as the appropriate theory to study strategic buyer-supplier relationships, which involves two or more partners that become mutually reliant and employ informal mechanisms to govern relationships.

Some researchers (Panahifaret *al.* 2018:373; Kembro & Selviaridis 2015:463) argue that organisations should highlight working closely and jointly with members directly connected to the supply chain in order to obtain adequate and accurate information. RGT can assist SMEs in terms of maintaining an integrated relationship between partners by ensuring relationship management and collaboration (Mallin, 2013:86). Collaboration among supply chain members can enhance long-term relationship as long as each partner within the chain, ensures that goals and objectives are obtained together through continuous development (Pilerot & Limberg 2011:598). RGT theory is based on expectation, rather than opportunistic performance and it can direct inter-personal as well as inter-firm relationships to a joint collaborative information

exchange (Kembro & Selviaridis 2015:459). RGT helps provide an understanding of why supply chain partners must engage in information sharing by emphasising the benefits of increased cooperation (Panahifaret *al.*, 2018:368), compared to cases where parties do not share information (Heidi, Pia, Kirsimarja & Paavo 2010:191). RGT is also useful to determine what information to share, with whom, when and how (Kembro, Selviaridis & Naslund 2014:612).

For this study, RGT provide a clear understanding of the benefitsof information sharing among SMEs and customers. SMEs, or any organisation aiming to improve its performance, should adopt the style of collaborating with the right suppliers and continuously communicating with supply chain members (Saunila 2017:8). Adopting the style of sharing collaborative information for purpose of transparency and ensuring accuracy in the information shared is important. This may not only enhance SMEs collaborating performance, but can further enhance their ability to collaborate efficiently and also to respond to customer changing demands in a timely manner (Minnaar 2014:1141). Therefore, this framework may influence the preference of responsiveness and governance mechanisms for coordinating and controlling inter-organisational exchanges of information for SMEs (Kembro *et al.*, 2014:615). RGT provide an insight of what information sharing, collaboration and responsiveness in supply chain is for SMEs (Mallin, 2013:87).

1.3 LITERATURE REVIEW OF RESEARCH CONSTRUCTS

Apart from SMEs reducing unemployment and developing the economy of the country, SMEs have a significant impact on supply chain management (Muritala, Awolaja & Bako 2012:21). SMEs play an important role in supply chain performance and supply chain can serve as purpose of suppliers, distributors, producers and customers who form part of the supply chain (Halqachmi 2013:429). In order to ensure that all the members of supply chain collaborate well, integrate information effectively and maintain flexible responsiveness, SMEs have to focus more on core-competencies (Kumar & Singh 2017: 636). Thus, supply chain management seems to be a key feature to promoting efficient management and development for SMEs (Kull 2018:24).

1.3.1 Small- and medium enterprises

In South Africa, small businesses with formal establishments were promoted with the purpose of creating an enabling environment for growth and expansion of SMEs as well as development and support of the economy (Urban & Naidoo 2012:241). According to the South African Small Business Act (26 of 2003), SME refers to any type of organisation owned by an individual, party or entity. SMEs are categorised as having less than 250 workers, a maximum of R40 million annual turnover, a minimum of 75 percent of company assets that are owned by the company

manager and a maximum of R27 million balance sheet (South Africa Web 2011:1). This study adopt the definition of SMEs provided by the South African National Small Business Amendment Act of (26 of 2003). A small business within the range of 50 employees, with an annual turnover of between R2 million and R25 million and a medium enterprise with employees between 50 and 200 and an annual turnover of between R4 million and R50 million is considered small to medium enterprises.

1.3.2 Supply chain responsiveness

Supply chain responsiveness is the ability to hasten activities of a market need; respond to business challenges; produce and market effectively with a broad range of low cost and high-quality products within a short lead-time (Qrunfleh & Tarafdar 2013:549). Supply chain responsiveness can also mean the ability of an organisation to respond to changes either within the external or internal environment (Moyano-Fuentes, Sacristan-Diaz & Garrido-Vega 2016:690). The abovementioned definition by Qrunfleh and Tarafdar (2013:549) was used in this study. According to Urban and Naidoo (2012:239) and Halqachmi (2013:434), quality information sharing capability can aid supply chain responsiveness in terms of being more proactive in detecting market changes, re-structuring of processes to convene innovative market needs, improving information systems and adopting new product development as well as process technologies ahead of the competitors.

1.3.3 Supply chain collaboration

Yunus (2018:352) defines supply chain collaboration as a mutual relationship between individual organisations that are working together to create competitive advantage. This is possible by ensuring that information is shared accurately in the right time; decisions are jointly agreed upon and benefits that can result from better productivity to satisfying customer's needs are shared and understood. Collaboration does not only mean developing information exchange, but also entails implementing a tactical and strategic level of information shared and potential performance across the supply chain (Raoet *al.*, 2015:115). For the purpose of this study, the definition provided by Yunus (2018:354) was adopted.

1.3.4 Information sharing

For this study, information sharing refers to the exchange of important data, opinions, positive and negative evaluations between organisations and suppliers in a collaborative relationship to enhance productivity and performance (Wu, Li & Chang 2016:872). According to Pooe, Mafini

& Loury-Okoumba (2015:3) information sharing is defined as the means of distributing useful information for systems or organisational units. Information sharing is regarded as very essential in the modern business daily operational activities. According to Songet *al.* (2016:752), information sharing is crucial for surviving the current competitive business environment. As such, it might be difficult for SMEs to survive if the information exchange within the supply chain is ineffective. Through information sharing, SMEs are able to improve response-time capabilities, reduce operational cost as well as improve customers' service.

1.3.5 SMEs performance

For the sake of improving response time and gaining useful knowledge through shared information, SMEs now appreciate the need for collaborative relationships with suppliers (Khorheh, Moisiadis & Davaezani 2015:23). For this study, performance is defined as the capability of SMEs to meet financial goals and objectives compared to its primary competitors (Halqachmi 2013:430). Therefore, SMEs can measure financial goals by concentrating on the sales growth, profit on sales margin and growth in the return on investments.

1.4 PROBLEM STATEMENT

In order to minimise disruptions within the supply chain, ensure availability of resources and improve just-in-time delivery, information sharing has become an essential strategy for businesses and other profit organisations (Cao&Zhang 2011:170; Wu *et al.*, 2016:875). Not sharing effective information can affect both the internal and external performance of any organisation negatively, whether small or large. Lack of sharing information can result in inefficiency of coordinating actions (Chen 2014:628), inefficiency in inventory management (Dai, Li, Yan & Zhou 2016:326), poor customer services (Panahifaret *al.*,2018:367), loss of revenue (Kim 2009:341; Tony, Tse, Yiu & Tung 2012:509) and ineffective transportation (Ewedairo, Chhetri&Jie 2018:111) within the supply chain. Therefore, obtaining real-time information sharing across all tiers within SMEs supply chain is essential to significantly improve collaboration, responsiveness and increase speed to the market, which may enhance performance for SMEs.

The real driver behind the success of rapidly growing innovative SMEs is rooted in the collaboration efficiency and the ability to respond to changing customer demands. These capabilities can be enhanced based on the extent to which information sharing is valuable and understood among SMEs within the supply chain (Afshan, Chatterjee, Chhetri2018:2499; Wu *et al.*, 2016:877). However, SMEs have far fewer embedded systems and processes that restrain

collaboration, obstruct fast decision-making and implementation within SMEs supply chain (Urban & Naidoo 2012:238). SMEs, with the entrepreneurial skills have significant advantage in the ability to develop rapidly, failure to enhance information sharing capability may become problematic as SMEs may lag behind in terms of being responsive for effective collaboration within and outside the organisation (Maghsoudi & Pazirandeh 2016:129). Information sharing can provide useful insights into market conditions and trends, thereby creating market opportunities for SMEs to gain competitive advantage and improve performance (Maghsoudi & Pazirandeh 2016:131). Therefore, a study that addresses the influence of information sharing on responsiveness and collaboration to enhancing SMEs performance in Emfuleni Local Municipality is important.

There are no similar studies so far, within the Emfuleni Local Municipality that have researched on supply chain responsiveness and supply chain collaboration as determinants of information sharing and SMEs performance. The conceptual framework in Figure 1 shows the possible influence of the research variables proposed for the study.

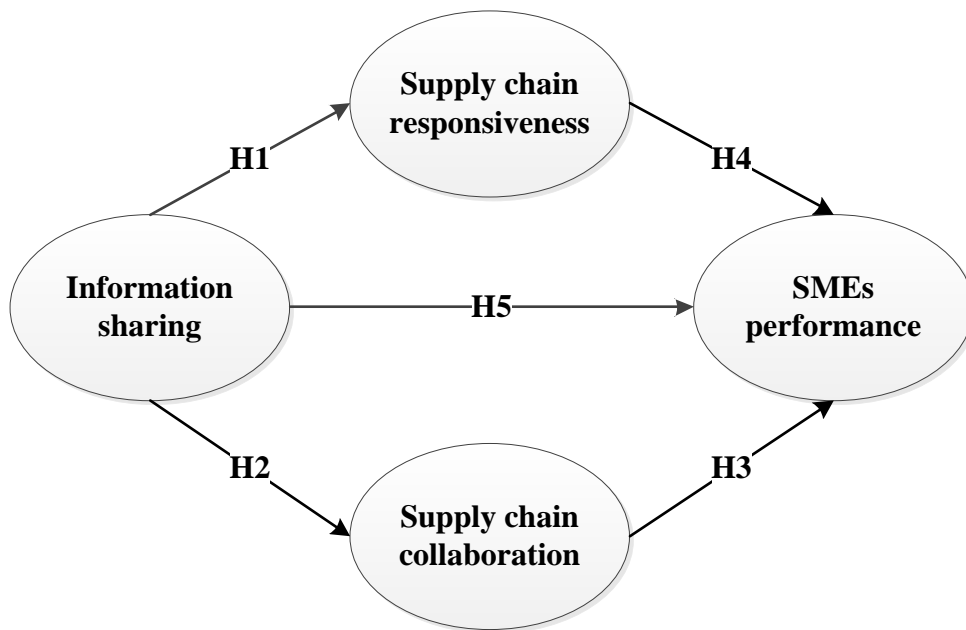


Figure 1.1: Research model

In developing this conceptual framework of SMEs information sharing, the groundwork developed by various researchers (Kim 2009:343; Cao&Zhang 2011:172; Chinomona & Poee *et al.*, 2013:6; Qrunfleh & Tarafdar 2013:545; Addae-Boateng *et al.*, 2015:291; Kang & Moon 2015:3; Rao *et al.*, 2015:118; Moyano-Fuentes *et al.*, 2016:693; Saunila 2017:3; Yunus 2018:357) was used in this study.

1.5 RESEARCH HYPOTHESES

Based on the theoretical background and framework, five hypotheses are formulated to determine the different constructs and relationships in the study. The information gathered as well as the relationship of the variables was tested to determine the influences and impact on SMEs performance.

Based on the conceptual framework the following hypotheses are developed for this study:

- H1:** Information sharing has a significantly positive influence on supply chain responsiveness.
- H₀1:** There is no relationship between information sharing and supply chain responsiveness
- H2:** Information sharing has a significantly positive influence on supply chain collaboration.
- H₀2:** There is no relationship between information sharing and supply chain collaboration
- H3:** Supply chain collaboration has a significantly positive influence on SMEs performance.
- H₀3:** There is no relationship between supply chain collaboration and SMEs performance
- H4:** Supply chain responsiveness has a significantly positive influence on SMEs performance.
- H₀4:** There is no relationship between supply chain responsiveness and SMEs performance
- H5:** Information sharing has a significantly positive impact on SMEs performance
- H₀5:** There is no relationship between information sharing and SMEs performance

1.6 OBJECTIVES OF THE STUDY

The objectives of the study are categorised into primary and secondary objectives. The secondary objectives are divided into theoretical and empirical objectives.

1.6.1 Primary objectives

The purpose of this study is to determine the influence of supply chain responsiveness, supply chain collaboration and information sharing on SMEs performance in a district local municipality within South Africa.

1.6.2 Secondary objectives

The secondary objectives are divided into theoretical and empirical objectives as follows:

1.6.2.1 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives have been formulated for the study:

- To review literature on SMEs global perspective and in South Africa
- To review literature on Relational Governance Theory
- To conduct a literature review on information sharing
- To carry out a literature synthesis on supply chain responsiveness
- To review the literature on supply chain collaboration
- To carry out a literature review on the SMEs performance.

1.6.2.2 Empirical objectives

The following objectives are formulated in support of the primary and theoretical objectives:

- To determine the influence of information sharing on supply chain responsiveness
- To examine the influence of information sharing on supply chain collaboration
- To determine the influence of supply chain collaboration on SME performance
- To establish the influence of supply chain responsiveness on SMEs performance
- To examine the influence of information sharing on SMEs performance.

1.7 SIGNIFICANCE OF THE STUDY

The result of the study strategically provides a coherent structure for SMEs. The structures increasingly improve the growth and expansion to the institution involved in delivering support service. It repositions SMEs competitive state by providing the ability to respond to change and improve information sharing efficiency. In addition, it assists SMEs to gain competitive advantage by intelligently, rapidly and proactively seizing opportunities through a responsive supply chain.

1.8 RESEARCH DESIGN

The study is located within the quantitative research paradigm. Punch (2014:48) defines quantitative research as a research concept that typically emphasises quantification in the collection and the analysis of data, based on the theory of variables that is measured with

numbers and analysed with statistical procedures in order to determine the generalisation of the theory.

1.8.1 Literature review

A literature review of the supply chain responsiveness, supply chain collaboration and information sharing as the factors determining the influence of SMEs performance was investigated. The study used textbooks, journals, electronic databases and the Internet as sources of information.

1.8.2 Empirical study

An empirical investigation was conducted in order to determine and obtain an understanding of variables influencing SMEs performance.

1.8.3 Target population

A target population is defined as a group of people identified as the intended recipients of an advertisement, product, or campaign, or a group of elements to which the researcher wants to make inference with, at least theoretically (Cooper & Schindler 2006:62). As such, the target population for this study are SME owners, managers or supplying management professionals existing in Emfuleni Local Municipality, consisting of Evaton, Sharpville, Sebokeng, Bophelong, Vereeniging and Vanderbijlpark.

1.8.4 Sampling frame

A sample frame is a list of elements from which the sample is actually drawn and is also known as functioning population (Cooper & Emory, 2009:18). Sample frame can also be referred to as a complete list of all the members of the population (Coldwell & Herbst, 2014:16). Cooper and Schindler (2006:64) define sample frame as a list or other device used to define a researcher's population of interest. Sampling frame defines a set of elements from which a researcher can select a sample of the target populations. It is a complete list of everyone or everything you want to study. The difference between a population and a sampling frame is that the population is general and the frame is specific. For instance, in this study, the sampling frame was derived from database of the Emfuleni Local Municipality and the Small Business Dictionary of the Vaal Triangle was used to select the target population.

1.8.5 Sampling techniques

According to Coldwell and Herbst, (2014:18), sampling is described as the process of choosing a sample with the view of drawing conclusions on the population selected. Sampling is done in two different ways, namely probability and non-probability sampling. This study adopted the non-probability sampling approach using the convenience sampling technique, in which every element is chosen to participate in non-random ways (Rouzies2013:198). Convenience sampling, known as availability sampling, is a type of non-probability sampling, which relies on data collection from population members conveniently available to participate in a study. This sampling technique is appropriate for this study because it is convenient and the subjects selected are available to be tested, as every subject is invited to participate (Cooper & Emory, 2009:21).

1.8.6 Sampling size

The sample size for this study was based on previous studies by Zhou and Benton (2007:1352), Bayraktar, Demirbag and Lenny Koh (2009:452), Chinomona and Pooe *et al.* (2013:8), Pooe *et al.* (2015:6) and Lee, Foo, Leong and Ooi (2016:142) on information sharing benefits among SMEs. Using previous research, the sample size of the main study is set at 300 SMEs. Table 1 outlines the sources for the selection of the sample size.

Table 1:1: Determining the sample size

Year	Authors	Scope of the study	Sample size used
2015	Pooe, Mafini & Loury-Okoumba	The influence of information sharing, supplier trust and supplier synergy on supplier performance: the case of SMEs.	309
2016	Lee, Foo, Leong & Ooi.	Can competitive advantage be achieved through knowledge management? A case study on SMEs.	229
2009	Bayraktar, Demirbag & Lenny Koh	A causal analysis of the impact of information systems and supply chain management practices on operational performance: evidence from manufacturing SMEs in Turkey	203
2007	Zhou & Benton	Supply chain practice and information sharing.	125
2013	Chinomona and Pooe	The influence of logistics integration on information sharing and business performance: the case of SMEs in South Africa.	108

1.9 METHOD OF DATA COLLECTION AND MEASUREMENT INSTRUMENT

A survey method was used in obtaining the data required. A structured questionnaire was developed. Structured questionnaires are considered easy to use, less expensive to administer and have a high response rate compared to other forms of data collection. The questionnaire was divided into five sections. Section A of the questionnaire consisted of questions that elicit respondents' demographic information. Section B of the questionnaire measured information sharing using questionnaire items adapted from a study by Chinomona and Pooe (2013:9). Section C measured supply chain responsiveness using questionnaire items adapted from a study by Qrunfleh and Tarafdar (2013:547). Section D of the questionnaire consisted of questions measuring supply chain collaboration using questions adapted from Kang and Moon (2015:6). Section E of the questionnaire focused on SMEs performance, which was measured using questionnaire items adapted from Kim (2009:339). The measurement items in sections B to E was in the form of a seven-point Likert scale with one denoting strongly disagree and seven denoting strongly agree.

1.9.1 Pilot study

During the pilot study, a smaller scale of the 40 questionnaire was used for pilot study before conducting the main study (Costantino *et al.*, 2014:297). A pilot study is a smaller scale study intended as planned and conducted with the aim of determining reliability and validity of a study before the intended study is conducted (Cockburn, Jahdi& Cockburn-Wootten2017:276). Even though a pilot study does not eliminate all systematic errors or any unexpected problems, it reduces the possibility of errors (Morrison, Clement, Nestel & Brown 2016:315). The basic objective of this pilot study is to determine the validity and reliability of the measuring instruments on a smaller scale before the actual full-scale empirical investigation (Burnette 2017:385). With this, the implication of the constructs was completely uncovered after conducting the main study.

1.10 DATA ANALYSIS AND STATISTICAL APPROACH

After conducting a pilot study on a smaller scale with questionnaires, the collected data for the pilot study was captured on an Excel spreadsheet, which was followed by sequences of cleansing procedures aimed at locating and correcting missing data entries. These exact procedures were repeated during the main study data analysis. Thereafter, the cleaned data was transcribed from Excel to the Statistical Package for Social Sciences (SPSS version 23.0), after which descriptive statistical analysis was conducted. A model fit analysis was conducted using confirmatory factor

analysis (CFA) and structural equation modelling (SEM). This was done using Analysis of Moment Structures (AMOS) 23.0 statistical software.

1.11 RELIABILITY AND VALID

This section discusses how psychometric properties of the measurement scales, namely reliability and validity were ascertained in this study.

1.11.1 Reliability

Reliability can be defined as the degree to which measures are free from error and yield consistent results (Ang, 2014:176). In this study, reliability was ascertained through the use of three indices, namely Cronbach's alpha value, composite reliability value and average variance extracted (AVE). Both Cronbach's alpha and composite thresholds should be equal to or greater than 0.7 as recommended by Van-Helvoort, Brand-Gruwel, Huysmans and Sjoer (2017:307) and Hair, Anderson, Tatham and Black (2006:48), whilst AVE estimates threshold value should be greater than 0.4 as indicated by Cheon, Lee, Crooks and Song (2012:1058).

1.11.2 Validity

Validity is the degree to which the instrument measures the construct it purports to measure (Ang, 2014:176). There are two measurement properties in validity, namely construct validity and content validity; the latter can be categorised into convergent validity and discriminant validity (Moutinho & Hutcheson 2011:327). Content validity was ascertained through a pilot study and the review of the questionnaire items by a panel of experts in supply chain management. Convergent validity was ascertained using item-to-total correlation values and item loading values (standardised regression weights) as indicated by Chinomona (2011:1). Discriminant validity was ascertained through the correlation matrix as endorsed by Ang (2014:176), who further mentioned that the acceptable threshold between constructs should be no greater than 0.7.

1.12 ETHICAL CONSIDERATIONS

Ethical considerations can be referred to as principles and conduct that clarify the conditions under which the research must be conducted (Fieser & Pojman, 2012:09). The following are ethical considerations relevant to the study:

- Independent objectivity in the interpretation of the survey findings was upheld.
- Participation in the study was voluntary.

- Permission was obtained from the management of the company in writing.
- Personal data from the individuals was kept confidential.
- Privacy of the respondent was respected.
- SMEs were informed before conducting the study.
- The questionnaire does not contain the names of the respondent.

1.13 OUTLINE OF THE STUDY

Chapter 1: Introduction and background of the study

This chapter provided an introduction and background to the study. The chapter highlights and discusses briefly the design of the research, problem statement and research objectives. A brief description of the statistical analysis, reliability, validity and ethical considerations regarding the study is presented.

Chapter 2: SMEs background and research variables

This chapter provided a brief discussion on SMEs background and characteristics. This chapter also elaborates on the research variables (supply chain responsiveness, supply chain collaboration, information sharing and SMEs performance) as well as the hypotheses development of the relationship.

Chapter 3: Research methodology

This chapter concentrates on the design and method of the research used in the study. Sampling techniques, methods of data collection and analysis are discussed.

Chapter 4: Analysis and interpretation of the research findings

The results obtained from supply chain responsiveness, supply chain collaboration, information sharing and SMEs performance were evaluated against findings from previous studies.

Chapter 5: Conclusions and recommendations of the study

Conclusions drawn from the research results and research objectives was discussed along with the implications of the results. Recommendations, limitations and future research directions are highlighted in this chapter.

1.14 SYNOPSIS

The research proposal provides an introduction and background to the study, an overview of the research topic was also provided. The theoretical framework, a literature review and problem statement to the study are discussed briefly. A conceptual model and research question for the study was developed, including the research hypotheses, objectives and the scope of the study. The research design was briefly summarised in order to provide a coherent structure for the study. Brief definitions of reliability, validity and key variables to the study were also provided. Ethical norms that need to be considered for the study were outlined. To carry out this study successfully, the problem statement, hypotheses as well as the scope of the study were further investigated.

CHAPTER 2

SMEs BACKGROUND AND RESEARCH VARIABLES

2.1 INTRODUCTION

Chapter 1 provided an introduction and background to the study. The theoretical framework, the literature review and problem statement to the study were briefly discussed. A conceptual model and research question for the study were also developed, including the research hypotheses, objectives and the scope of the study. The research design was briefly summarised in order to provide a coherent structure for the study. The previous chapter also provided a brief definition of a pilot study, reliability, validity and the key words of the study. Ethical norms that need to be considered for the study were outlined.

This chapter provides the literature review on the research concepts in order to clarify and guide the methodology of the research and to broaden the knowledgebase in the research area (Mallin, 2013:88). A brief explanation on small and medium enterprises (SMEs) background and characteristics were discussed. This chapter elaborates on the research variables, such as information sharing, supply chain responsiveness, supply chain collaboration and SMEs performance as well as the hypothesis development. The first section of the chapter covers a broad theoretical background of the study, which was elucidated from RGT. The definition, origin, aspect, development and objectives of the theory were discussed to clarify the need for the theory. The second section of the chapter reviewed all the research variables including SMEs definitions, overviews, types, functions, importance and the antecedence of the research variables.

2.2 GLOBAL PERSPECTIVE OF SMES

The interdependence of economies globally has forced both the larger organisations and SMEs to adapt to a rapidly changing and increasingly globalised world. Due to these developmental trends impacting on business competitive strategies, SMEs are faced with new business challenges and opportunities, such as advancement in information technology and communications, shorter product life cycles, new forms of competition and new business models available in the global market (Saunila 2017:6; Khorheh *et al.*, 2015:27). These challenging opportunities offer both tactical and strategic business approaches that may help or hinder the SMEs survival in the present competitive environment (Berisha 2015:18). In accordance,

governments and the world in general are devoting and designing SME development plans to assist SMEs in meeting these new business challenges within the competitive global business environment (Falkena 2012:11; Caner 2014:4).

However, as globalisation increases, SMEs may continue to ensure the opening of local products or services to the international markets, as well as competing with other competitors in the local markets (Lekhanya & Mason 2014:340). It is possible to believe that SMEs can also ensure the possibility of an extended international supply chain since larger organisations with direct foreign investments may have interest in using local suppliers in certain situations (Luiz 2013:11; Masutha 2015:1). For example, the trend of globalisation within the automobile industry has rooted car companies to invest greatly to drive other corporations like Ford, GM, Toyota and Fiat towards wanting to reduce direct investment by partnering with the local suppliers (South Africa Web 2011:1). SMEs can also be seen as a robust means of economic growth in most developing countries as they consist of the largest part of the vast majority of enterprises (Falkena 2012:7). Olawale (2014:1013), further argue that SMEs are a substantial generator of employment and they contribute as much as two-thirds of the entire employment globally.

Chaudhary and Ahalawat (2014:471) emphasise that SMEs are a key enabler to economic growth through the impact on gross domestic product (GDP), which has surpassed the 50 percent mark in many cases. A survey conducted by Cockburn *et al.* (2017:278), reported that the SME sector has contributed an estimated 5.6 million within the business sector, which has resulted in 11.6 million jobs created worldwide. Some strategic actions for SMEs were also executed with the aim to improve availability of quality business information and improve competitive advantage (Urban & Naidoo 2012:146). Strategic plans, such as increasing the supply of financial and non-financial support services, generating demand for small business in terms of product and services and reducing regulatory restraints for small businesses (Smit & Watkins 2012:6324) can aid SMEs towards gaining a competitive advantage. This shows that SMEs perform a central role in contributing to global economic growth and development (Masutha 2015:3). Therefore, if the capability to survive in the global market appears to be necessary for real competition among SMEs, then most of the competitive advantages are size-related, which gives SMEs more opportunity to explore some strategic actions that can help gain competitive advantage in the global market.

2.3 SMEs IN SOUTH AFRICA

According to the South African Small Business Act (26 of 2003), SMEs are referred to as any type of organisation that is owned by an individual, party or entity, either the organisation or business is registered or incorporated (South Africa Web 2011:8). This registered or incorporated entity, business or organisation may consist of the main person carrying on a SME within any economy sectors. It also includes any federation consisting entirely or partly of such alliance, as well as any branch of such business and Caner (2014:8). According to Gujrati (2013:51), SMEs make a major contribution to socio-political stability and can successfully absorb not just the major part of the unemployed labour force, but also significantly reduce crime and government expenditure on security and legal services. SMEs can be categorised in different ways, the different categories range between established formal SMEs (such as the white, Indian ownership, African and Coloured) and can be situated in townships, informal settlements or even rural areas (Small Medium Enterprises. 2001:6; Ladzani&Seeletse 2012:88).

SMEs are categorised as having less than 250 workers, maximum of R40 million annual turnovers, minimum of 75 percent of company assets that are owned by the company manager and a maximum of R27 million balance-sheets (Falkena 2012:8). Small enterprises are ranging between 50 and 100 employees, with annual turnover between R2 million to R25 million and medium enterprises with between 50 and 200 employees, annual turnover of between R4 million and R50 million (Urban & Naidoo 2012:142). There are some categories that can also qualify the SMEs, such as the survivalist enterprises, the micro enterprises, the very small enterprises, the small enterprises and the medium enterprises; all these categories fall under SMEs (Cao&Zhang 2011:162; Small and Medium Enterprises Categories 2007).

Minnaar (2014:1131) defines SMEs as businesses whose “personnel numbers fall below certain limits and outnumber large companies by a wide margin and also employ many more people, thus, responsible for driving innovation and competition in many economic sectors”. SMEs are the key source of job creation, economy growth, breeding platform for business ideas and a major driver for entrepreneurship (Berisha 2015:17). Therefore, this study used the definition provided by the South African National Small Business Amendment Act (26 of 2003), which defines SME as a small enterprise within the range of 50 employees, with annual turnover of between R1 million and R25 million; medium enterprise with employees between 50 and 200, annual turnover of between R4 million and R50 million.

The impact and strategic importance of SMEs in South Africa has been well documented (Neneh & Van-Zyl 2013:120; Lekhanya & Mason 2014:334; Liberta 2014:2; Tlale 2015:15). This

impact is achieved through the role of SMEs as the means of economic growth through job creation and contribution to reduce poverty. SMEs contribute about 97.5 percent of the total number of businesses and 55 percent of the labour force in South Africa (Hamann *et al.*, 2015:4). SMEs have also played a part in reinforcing South African economy in a way that they contribute to almost 30 percent of the country's economic growth (Halqachmi 2013:426). In addition, the contribution of SMEs to South Africa's overall employment output lies between 70 percent and 80 percent.

As development is a crucial phase for the South African economy, achieving millennium goals as well as reducing poverty and hunger may require a well-articulated practice (Mohsam & Van-Brakel 2011:471). South Africa hastened the speed of economic change by implementing programmes to develop SMEs and have grown in their contribution to the economy (Urban & Naidoo 2012:244). For example, the Centre for Small Business Promotion was established in South Africa with the purpose of creating an enabling environment for the growth and expansion of SMEs (Berisha 2015:19). SMEs in South Africa are expected to execute several roles ranging from poverty alleviation and employment creation to international competitiveness (South Africa Web 2011:11). These roles are not only important but are also significant to the policy instrument that was introduced to meet the divergent objectives of the SMEs (Caner 2014:2). These roles are also differentiated ranging from literacy training to technology advancement, which can possibly make South Africa the most competitive and dynamic knowledge based economy in Africa if well executed (Rao *et al.*, 2015:121). The significant of information sharing among SMEs in supply chain collaboration is discussed below.

2.4 THEORETICAL FRAMEWORK FOR UNDERSTANDING THE IMPORTANCE OF INFORMATION SHARING

Information sharing has been on the research agenda and has continued to attract the interest of many researchers and practitioner for several years. Many of these researchers have revealed that information sharing indeed leads to some physical benefits, such as reducing inventory levels, improving performance and obtaining a competitive advantage for any organisation (Mohsam & Van-Brakel 2011:463; Rao *et al.*, 2015:123).

Jonsson and Mattsson (2013:18) and Kembro *et al.* (2014:616), believe that information sharing is seen as an important construct in supply chain management as it creates a means of transparencies and understanding throughout or within the entire supply chain. Information sharing strengthens the collaboration capabilities and responsiveness among SMEs that are involved in the supply chain (Cong & Chau 2015:467). Despite the empirical evidence that

sharing information is the key to achieving high levels of performance and visibility, some organisations, especially among SMEs, still struggle to share information effectively with channel members. However, this may be due to the lack of institutional trust and some discrepancy on aspects, such as how, when and to whom should the information be shared (Li, Ye & Sheu 2014:14). Therefore, to have a better understanding of the significant impact of information sharing, RGT is proposed for this study and is discussed below.

RGT is one of the most popular theories successfully used and implemented by many researchers for information sharing, collaboration and responsiveness (Goswami *et al.*, 2013:7). Cong and Chau (2015:464), defined RGT as “the appropriate theory to study strategic buyer-supplier relationships, it involves two or more partners in a mutual relationship that is using an informal mechanism based on the social control to govern the relationship” (Minnaar 2014:34). RGT allows an organisation not only to be sure of what information should be shared, it also guides the organisation in terms of knowing whom to share the information with, how can the information be shared and why should the information be shared (Heidi *et al.*, 2010:196; Song *et al.*, 2016:748).

RGT is necessary for organisations to share information by ensuring that all customers or suppliers directly involved in the chain are aware of the activities that take place within the supply chain (Goswami, Engel & Kremer 2013:5). For example, if SMEs share adequate information, customers or clients can track the item ordered and suppliers can communicate the ongoing progress of the order to be delivered. RGT also has some phase of information sharing that clarifies why organisations should communicate daily activities with the customers, clients, suppliers, employees and stakeholders (Panahifaret *et al.*, 2018:367).

The first phase implies that an organisation should share information because of its collaborative effect, which may possibly lead to improved performance and competitive advantage (Jonsson & Mattsson 2013:8). Collaborative effects, such as joint relationship and dedicated involvement can lead to effective responsiveness. Another phase implies that not all information should be shared; some information should be kept within the organisation while some can be shared with the suppliers or members of the supply chain (Yu, Yan & Cheng 2011:11). Sharing information can help SMEs avoid going out of stock and stock repetition, while reducing the total stock level and stock cost, thereby allowing more accurate forecasts and decisions to be made (Halqachmi 2013:429). Information about new products can be shared to allow receiving a timely supply of goods from suppliers when the manufacturers obtain the real demand from retailers. The third phase implies that information must be transparent and understood by all parties directly

involved in the supply chain before it can be regarded as adequate information sharing (Addae-Boateng *et al.*, 2015:291).

Furthermore, Halqachmi (2013:428); argue that a key approach to govern inter-organisational relationships has emerged as a dominant perspective in improving relationships between organisations, customers and members involved in day to day activities. According to Ainin, Parveen, Moghavvemi, Jaafar and Shuib (2015:84), maintaining client and customer's relationship is very important when aiming to improve the organisation responsiveness and performance. Therefore, SMEs can focus on continuous open cooperative or communication strength by sharing information and creating an effective responsive structure. This will ensure that all members of the supply chain are fully informed and updated with all necessary activities, changes and new developments within the organisation (Petersen& Ostergaard, 2018:269).

For this study, RGT provides a better understanding of information sharing among SMEs and the entire supply chain. Information sharing can serve as a source of competitive advantage as it involves activities that are relevant for transferring or distributing important and valuable information from SMEs to partners, client or customers with the aim of improving value-added capabilities and creating a means for an efficient responsive system (Maghsoudi & Pazirandeh 2016:37). Hence, it is important for SMEs to ensure that all parties involved in the supply chain are fully engaged with the relevant information required to achieve benefits of inter-organisational information sharing and to obtain an effective collaborative structure (Ainin *et al.*, 2015:92). Collaborative structure among suppliers, customers, manufacturers, distributors, retailers, financial institutions, as well as other relevant agencies, can bring about competitiveness and firm performance (Afshan *et al.*, 2018:2498). Therefore, information sharing, and collaboration possess a significantly positive influence in improving SMEs performance. It can also create frequent interaction of supply chain partners and the capacity for SMEs to respond to customer demand and increase market share growth.

2.5 INFORMATION SHARING

Information sharing has increasingly become an important concern for SMEs and making information available for supply chain members, such as suppliers or subcontractors is very important (Peschken *et al.*, 2016:205). As a result, the importance of information sharing is regarded as essential in the modern business' daily operational activities (Zaheer & Trkman 2017:420). Information sharing can serve as a key role in a supply chain since it can help businesses to achieve specific objectives and benefits in terms of reductions in total costs and inventories (Tran, Childerhouse& Deakins 2016:1109). Maghsoudi and Pazirandeh (2016:130)

state that an organisation requires a free flow of information among members within the supply chain in order to retain its competitive advantage. This is so because organisations that encourage accurate and timely information sharing have been found to gain competitive advantage in the long term (Maghsoudi & Pazirandeh 2016:133; Wu *et al.* 2016:873). Information sharing can also assist diverse members of a supply chain to work efficiently and effectively together, allowing the organisation to outsource the inventory required if necessary with continuous monitoring of the order (Song *et al.*, 2016:750).

According to Maghsoudi and Pazirandeh (2016:128), information sharing refers to the exchange of important data, opinions, positive and negative evaluations between organisations and suppliers in a collaborative relationship with the aim to enhance productivity and performance. Because information sharing can enhance the competitive advantage of SMEs as a whole, it can then be viewed as a key approach and an enabler of supply chain integration for any surviving SMEs (Omar *et al.*, 2016:4; Tran *et al.*, 2016:1114). As a result, the advancement of information sharing has become more convincing for achieving a long-term coordination and effective responsive system, which may lead to increase performance outcome for SMEs (Mohsam & Van-Brakel 2011:466). Fink and Ploder (2009:38) advocate that information sharing is crucial for surviving the current competitive business environment. As such, it might be difficult for SMEs organisations to survive if the information exchange within the supply chain is ineffective (Cooper & Schindler, 2006:65). Through information sharing, SMEs can therefore improve response-time capabilities, reduce operational cost as well as improve customers' service by making better decisions on ordering, production planning and capacity allocation within the supply chain (Chinomona & Pooe 2013:11).

However, sharing information may not be easy, especially when information is power. As such, SMEs could be reluctant to share the business information, especially the understood information (Peschken *et al.*, 2016:202). It is important for SMEs to ensure a conducive organisational environment for information sharing because it represents a key enabler of improved business performance (Cockburn *et al.*, 2017:279; Saunila 2017:7). Another important part of information sharing is that most SMEs become misinformed with regards to when information should be shared. The current findings by Zaheer and Trkman (2017:425) and Maghsoudi and Pazirandeh (2016:132), illustrate three situations wherein SMEs may naturally avoid sharing information especially when it becomes critical to do so. For instance, SMEs that share more information with the members create an opportunity for members to become capable of making accurate decisions independently and members are highly similar to one another (Afshan *et al.* 2018:2456). These findings suggest that less availability of

information sharing with the employees, clients and suppliers might limit the chance of gaining access to improving performance for organisation. This is because accurate information flow can impact positively or negatively on SMEs efficient collaboration, effective responsiveness and performance level (Maghsoudi & Pazirandeh 2016:134). The robustness of information sharing can be enhanced by structuring SMEs discussions, framing SMEs tasks as intellectual and promoting a cooperative climate for all members of the supply chain (Yang & Maxwell 2011:175).

Information sharing enables collaboration and, hence, improving business performance (Panahifaret *et al.*, 2018:360). Panahifaret *et al.* (2018:377) define information sharing as the means of distributing useful and important information for systems or organisational units. Information sharing can be viewed as the main source of competitive advantage for SMEs, due to this, more businesses are investing in accurate information flow within the supply chain (Wu *et al.*, 2016:874). The paramount part is that information sharing cannot be isolated from the movement of goods or services. Within the supply chain, it is essentially the act of making required information accessible to others within the organisation, such as the employees, suppliers, stakeholders and customers (Zaheer & Trkman 2017:422). Information sharing enables managers to keep the individual knowledge flowing throughout the supply chain and incorporate it for practical purposes (Tran *et al.*, 2016:1111). Wu *et al.* (2016:872) further define information sharing as the means of capturing, organising, reusing and transferring experience-based information that occurs within the organisation and making that information available to others in the business. The most interesting quality of information is that its value develops when shared (Zaheer & Trkman 2017:423).

SMEs may deliberately limit sharing of information because of the threats and disadvantages associated with information sharing Song *et al.* (2016:757). In that, SMEs are likely to hold back information from other members involved in the supply chain if they predict that sharing such information will lead to the organisation losing its place of power, its position of influence, or its promotion in the market (Grabot, Marsina, Mayere, Riedel & Williams 2011:159). This may be attributed to the lack of trust among members of the supply chain. Since information sharing means distributing useful information for systems, people or organisational units, SMEs should answer four main questions before considering sharing information (South Africa WEB 2011). SMEs should first ask what to share, then whom to share it with, how to share and, finally, when to share (Costantino *et al.*, 2014:298). As such, giving a quality answer to these questions helped to avoid redundancy, reduce sharing costs and improve responses (Omar *et al.*, 2016:3).

2.6 SUPPLY CHAIN RESPONSIVENESS

Supply chain changing market requirement in terms of responsiveness is becoming more complex. This complexity requires SMEs to be more proactive in detecting market changes and adopting new product development (South Africa Web 2011:2; Rajagopal, Azar, Bahrin, Appasamy & Sundram 2016:18). One could argue that one of the sensible approaches to increasing supply chain responsiveness is to raise inventory levels of the finished goods or the components, which would create more flexible reaction to changes in customer demand (Minnaar 2014:1146). From the 1990s till date, supply chain responsiveness has gained attention from researchers and practitioners alike because of its positive impact on organisations' competitive performance ((Youn, Yang & Roh 2012:465; Qrunfleh & Tarafdar 2013:551; Tiwari, Mahanty, Sarmah & Jenamani 2013:216). Currently within the intensely competitive environment, organisations whether large or small are re-evaluating customer response time as a key towards achieving competitive advantage (Chae, Koh & Prybutok 2014:307; Turner *et al.*, 2018:1438).

According to Bicer, Hagspiel and de Treville (2018), coping with unexpected market changes with short lead-time within the business environment can be viewed as the gateway to achieving performance. In that, hastening reaction to market needs and responding to the business challenges require the realisation of the importance of effective supply chains responsiveness (Kumar & Singh 2017:644). Mallin, (2013:83) define responsiveness as the ability to react purposefully within an appropriate timescale to all customer demands or changes in the marketplace while maintaining competitive advantage (Qrunfleh & Tarafdar 2013:554). Supply chain responsiveness may be referred to as efficient if the focus is basically on cost reduction and no resources seem wasted on any non-value-added activities (Kumar & Singh 2017: 636).

Chae *et al.* (2014:308), define supply chain responsiveness as a network of organisations able to create wealth to the stakeholders by reacting quickly and effectively in a competitive market environment. Qrunfleh and Tarafdar (2013:526) define supply chain responsiveness as providing supply chain partners or members with the rightful needs at the right time. With regards to these definitions, it is necessary for SMEs to understand the changing needs of the market to respond effectively. This will provide them with a sustaining competitive position (Omar *et al.*, 2016:7). Qrunfleh and Tarafdar (2013:548), further defined responsiveness as the ability to react immediately within a required lead-time to customer demand or to take advantage of competitiveness in the marketplace. These definitions indicate that SMEscan perform well based on their level of response time to customers' orders and also based on their ability to give

prompt feed-back to the customers in terms of complaints with the product development (Halqachmi 2013:425). Quick response to a partner's requests might position SMEs to being first mover in the market, as a result, enhancing the performance level (Rajagopal *et al.*, 2016:20). Kumar and Singh (2017:635) emphasised that SMEs supply chain collaboration should be capable of reacting to sudden changes in the market environment. This is because, uncertain response time within any supply chain may result in higher inventory level which may lead to unnecessary additional cost such as warehousing, transportation and materials handling costs. As a result, SMEs may need to set a target that ensure quick product and service flow by the members of the supply chain (Moyano-Fuentes *et al.*, 2016:694).

Clearly, providing just-in-time responsiveness can enhance SMEs supply chain success because supply chain responsiveness is the expense of improved efficiency and effectiveness (Qrunfleh & Tarafdar 2013:560). For the purpose of this study, supply chain responsiveness is defined as the ability of SMEs to respond rapidly to changes in demand, by proactively establishing a virtual efficient product development system to meet the changing market requirements (Moyano-Fuentes *et al.*, 2016:692). Supply chain responsiveness may lead SMEs to concentrate on long-term profitability and investment in new product development as well as technological innovations, to better enhance changing customer needs and preference. The next section discusses the importance of supply chain collaboration.

2.7 SUPPLY CHAIN COLLABORATION

SMEs have tried putting effort towards identifying and implementing business opportunities leading to efficient supply chain collaboration (Adams, Richey, Autry, Morgan & Gabler 2014:300; Salam 2017:301). Afshan *et al.* (2018:2479) noted that, in the 70's and 80's business transactions that took place had no collaborative relationship between members of the entire supply chain. In present business environments, buyer-supplier collaboration has moved from transactional exchange towards proactive planning and relationship management (Cai, Liu&Liu 2009:516). Literature highlights the importance of collaborative relationships resulting in numerous advantages, such as reducing procurement and transactioncost as well as helping SMEs to achieve competitive advantage (Kumar& Banerjee 2012:907).

Some evidence also shows that collaborative relationships can assist SMEs in terms of managing risk by sharing information, providing access to complementary resources as well as improving profitability and performance through the expansion of competitive advantage gained over time (Kumar & Banerjee 2012:902; Hui, He-Cheng & Min-Fei 2015:128). Most of the studies on supply chain collaboration have largely focused on the significance and result portion related to

its role in planning activities, such as increased response time, resourcefulness and innovation (Salam 2017:304; Hui *et al.*, 2015:130). However, in this study, collaboration is viewed as an interactive relationship between supply chain members or partners with the purpose of exploiting information and resources through an integrative flow of products and information to achieve a common goal and obtain mutual benefits (Rao *et al.*, 2015:17).

According to Costantino *et al.* (2014:298), supply chain collaboration is defined as a process or procedure between two or more supply chain bodies, working collaboratively together in order to achieve a common goal (Moyano-Fuentes *et al.*, 2016:697). Collaborative relationship can be viewed as a long-term relationship between an organisation and its supply chain partners with the aim of working together, sharing information, resources and risks as well as considering not just individual but mutual objectives, goals and gains (Afshan *et al.*, 2018:2466). The literature shows that collaboration has a few aspects of essential understanding, such as, information sharing (Song and Liao (2019:55), collaborative communication (Salam 2017:301; Yunus 2018:355), incentive alignment and continuous integration with responsiveness to market changes (Cai *et al.*, 2009:518). Supply chain collaboration can also mean two or more independent SMEs working jointly to plan and execute the supply chain operations as well as underlying objective or goals (Ramanathan & Gunasekaran 2014:256). SMEs that adopt business strategy or maintain a collaborative relationship can gain revenue enhancements, cost reductions, operational flexibility that can help in terms of coping with demand uncertainties (Scholten & Schilder 2015:62; Song & Liao 2019:58). Therefore, if SMEs aim to achieve performance, the entire supply chain needs to ensure a rational amount of effort from all members in order to reach the attainment of potential benefits (Deshpande 2012:5). For instance, SMEs collaboration in demand planning and replenishment with all members can increase inventory turns, reduce inventory costs, reduce storage and handling costs, thus improve retail sales and performance (Wiengarten, Humphreys, Cao Fynes & Mckittrick 2010:143).

2.8 PERFORMANCE

Organisational goal refers to the desired result that an organisation predicts, plans and commits to archive (Yi-Hui 2015:5489). While performance refers to the capability of achieving market receptive and financial goals (Youn *et al.*, 2012:467). SMEs short-term performance goals are mainly to increase its productivity and reduce inventory as well as cycle time. On the other hand, the long-term performance goals are to increase its market share and net profits for all members in the supply chain (Song & Liao 2019:59). In achieving these goals, SMEs can start by consistently monitoring and measuring the overall performance behaviour with the purpose of

ensuring visibility and also providing guidelines to quickly get back on track if necessary (Ye & Wang 2013:371).

When dealing with performance, it is important that SMEs reflect on the latest performance management trends and then presume on how they can adapt the process for maximum productivity (Hall & Saygin 2012:399). In 2016, performance management continued to become a concern as flexibility becomes very important (Flynn, Huo & Zhao 2010:58). Yearly reviews began in favour of continuous performance management. Organisations started recognising that increased communication and interaction can lead to heightened productivity and performance, hence, reducing turnover (Song & Liao 2019:61). As a result, organisations started making the shift and introducing a quick responsive system with the aim of establishing real-time feedback. In 2017, the future for performance management brought significant changes as organisations began to acknowledge and embrace the new changes towards years to come, such as personal and career development (Chang, Ellinger, Kim & Franke 2016:284). With this, personal and performance improvement will advocate a flexible goal setting, which might eventually result in balance of performance goals and development objectives in years to come (Vakani & O'Beirne 2015:74; Song & Liao 2019:60).

According to Song *et al.* (2016:743), performance may be perceived as the feedback on operations, which are geared towards customer satisfaction, strategic decisions and objectives. It is also the process of quantifying the effectiveness and efficiency of action within supply chains (Mackelprang & Malhotra, 2015:9; Youn *et al.*, 2012:469). If performance comprises the actual results measured against the proposed results then performance measurement plays a vital role in translating the organisations strategy into a favourable result (Turner *et al.*, 2018:1439). Omar *et al.* (2016:8), noted that measuring performance provides a useful insight for SMEs in terms of conducting the annual review and understanding how its performance can be compared with the competitors. As performance measurement can also be the process of collecting, analysing and reporting data concerning performance (Rao *et al.*, 2015:119). Hence, it becomes important to understand the performance of all the supply chain participants within the overall system as this can serve as a tool for managing competitive advantage (Kataike, Aramyan, Schmidt, Molnar & Gellynck 2019:491).

Afshan *et al.* (2018:2461) and Song *et al.* (2016:751), argue that performance relates to how well an organisation has performed through working together cooperatively to achieve the goals depending on the period; either on a long- or short-term measurement. Qi, Huo, Wang and Yeung (2017:167) define performance as the ability for a purpose to produce results in the

dimension that is determined in relation to a particular target. Therefore, it is necessary to first have a purpose whose performance is to be considered; secondly, a dimension in which one is interested and then, thirdly, a particular set target for the result proposed (Song & Liao 2019:60). The study by Prajogo and Olhager (2012:519), emphasises that any organisation with the initiatives to attaining a performance level should first understand those financial criteria that can eventually lead to enhanced performance.

Ye and Wang (2013:376) measured performance with the use of both financial and market criteria, together with return on investment (ROI), profit margin on sales, market share, return on investment growth, growth of sales, growth of market shares and the overall competitive position. Wu *et al.* (2016:869) clearly state that performance means achieving the objectives or goals, which are set within an organisation. These objectives are sometimes viewed as key performance indicators. In other words, performance is intended to create guidelines and indication of effectiveness regarding an organisation and its supply chain activities (Youn *et al.*, 2012:471). Considering these studies, the same criteria by Ye and Wang (2013:376) was used in this study in terms of measuring SMEs performance.

2.9 HYPOTHESES DEVELOPMENT

2.9.1 Information sharing, responsiveness and collaboration

With the advanced need for supply chain visibility, accurate and viable information sharing has become the strategic means for organisations' collaboration within the supply chain to combat the presence of the bullwhip effect and uncertainty found in supply chain (Song *et al.*, 2016:744; Adams *et al.*, 2014:310). Having real-time and accurate information enables an organisation to manage responsiveness and collaboration effectively; thereby, enhancing faster cash flow for smooth business operation (Rao *et al.*, 2015:127). According to Kembro *et al.* (2014:621), supply chain aims at providing customers with the right product, at the right time and in the right place by utilising point-of-sales information and flexibility to respond to customers changing demands. As such, collaboration and responsiveness across organisations has been strengthened overtime (Fawcett, Osterhaus, Magnan, Brau & Mccarter, 2007:378). Having real-time visibility empowers a company to manage in real time, which means greater control. Greater operational control allows for the quicker detection of exceptions and disaster, tracking of constraints and commitments, and responsiveness. When business variables are not constant (and they often are not), lead time is everything, adequate sharing of significant information between collaborating organisations is the backbone of effective and efficient responsiveness (Afshan *et al.*, 2018:2462). According to Chae *et al.* (2014:314), SMEs supply chain is characterised by the

effective exchange of responsive and valid information, which is widely regarded as resourceful in achieving quality collaboration throughout the chain. Afshan *et al.* (2018:2473) further state that the greater the quality of information shared among SMEs supply chain partners, the more likely it is for the partners to coordinate the activities in a collaborative approach. Based on the abovementioned studies, the following hypotheses are formulated:

H1: Information sharing has a significant positive influence on responsiveness.

H2: Information sharing has a significant positive influence on collaboration.

2.9.2 Supply chain collaboration and SMEs performance

In the current business environment, maintaining and improving an integrated long-term relationship between SMEs partners is significant (Salam 2017:306). As SMEs are aiming to improve competitive advantage, relationships are important because supply chain collaboration is considered to yield organisation-specific benefits in terms of financial performance (Prajogo & Olhager 2012:517). A recent survey by Salam(2017:299)found that organisations that are best at collaborating with suppliers have a 40 to 65 percent advantage in the cash-to-cash cycle time over other average organisations and the top organisations have 50 to 85 percent of fewer inventories than other competitors do. Efficient collaboration among SMEs may lead to a better inventory reduction, faster product-to-market cycle times, as well as costs and lead time reduction (Prajogo & Olhager 2012:518). Therefore, supply chain collaborative practices among SMEs are an important determinant of performance enhancement. Based on this, it is hypothesised that:

H3: Supply chain collaboration has a significantly positive influence on SMEs performance.

2.9.3 Supply chain responsiveness and performance

For SMEs to obtain a continual undisrupted revenue and competitive advantage, the attainment of agility, robustness and resilience should be considered (Halqachmi 2013:438; Moyano-Fuentes *et al.*, 2016:699). These key characteristics serve as tools to maximise profitability, reach accurate on time demand and increase customer base long-term profitability as well as cost-saving opportunities through improved responsive efficiency (Qrunfleh & Tarafdar 2013:551). The pursuit to achieving and retaining competitive advantage depends on managerial ability to incorporate supply chain strategy, of which quick order fulfilment forms a part (Song *et al.*, 2016:747). According to Turner *et al.* (2018:1436), organisations that regard supply chain responsiveness as significant gradually improve as well as enhance efficiency within the inbound

logistics and effectiveness within the outbound logistics. As such, these organisations may become more proactive in detecting market changes throughout the supply chain and thereby enhancing and maintaining long-term relationships with both suppliers and customers. Youn *et al.* (2012:472) further argues that firms that are responsive have a greater success in improved reliability service, improved customer service, quality improvement, cost reduction, improved organisational structure and enhanced performance. Since proactive supply chains can lead organisations to both contemporary and financial measures, SMEs can maximise the competitive advantage through improved responsiveness, which improves performance (Urban & Naidoo 2012:240). Due to the above reviews, the following hypothesis is proposed:

H4: Supply chain responsiveness has a significantly positive influence on performance.

2.9.4 Information sharing and SMEs performance

Several researchers have empirically established the relationship between information sharing and performance. Mackelprang and Malhotra, (2015:7) investigated that information sharing has some beneficial aspect on performance with regards to accurate inventory levels and cost reduction. Meflinda, Mahyarni, Indrayani and Wulandari (2018:999), also note that accurate information sharing can reduce uncertainty, faster material flow, reduce inventory costs and increase customer satisfaction, thus, contributing to overall cost and service level performance. Accurate information sharing with customers and across the supply chain can influence positively quality product innovation and overall operational performance (Ye & Wang 2013:374). According to Song and Liao (2019:63), adequate information sharing is an enabler for preventing stock-outs, increasing resource productivity as well as facilitates increase in performance. Along this reasoning, the following hypothesis is proposed:

H5: Information sharing has a significantly positive impact on SMEs performance.

2.10 SYNOPSIS

It is reasonable to suggest that the possibility for SMEs to survive the current market environment and achieve a higher performance level depends on their ability to share accurate information, build effective collaborative relationships as well as the ability to initiate a quick response to customer demand and market changes. Hence, in this chapter, a literature review on

RGT was conducted in order to clarify the knowledgebase of the research variables. A brief explanation on SMEs' background and characteristics including definitions, overviews, types, functions and the importance were discussed. The research variables, which are information sharing, supply chain responsiveness, supply chain collaboration and SMEs performance, were broadly reviewed. The hypotheses development of the relationships between the research variables was theoretically developed. The next chapter concentrates on the research design and methodology used in the study.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Methodology is viewed as the framework that is related to a set of model assumptions, assumed to be used when conducting a research (Mingers & Willcocks 2017:17). The previous chapter reported on the literature review with the aim to clarify and broaden the knowledgebase in the research area. A brief explanation on SMEs background and characteristics was discussed. The variables, such as information sharing, supply chain responsiveness, supply chain collaboration and SMEs performance were broadly reviewed, as well as SMEs definitions and overviews. The hypotheses development of the relationship was assumed and a broad theoretical background of the study was discussed.

This chapter focuses on the methodology that was used to gather information regarding factors that influence SMEs performance. The first part of the chapter explains the research objectives and approach. Sampling design procedure, such as the population and selection of the sample are also discussed. Afterwards, experimental procedures were explained as well as a detailed discussion on the measuring instruments. The statistical analysis technique of the data was discussed. This chapter finally concludes with the explanation of the reliability and validity of the data.

3.2 RESEARCH OBJECTIVES AND APPROACH

The research general objective is to determine the influence of supply chain responsiveness, supply chain collaboration and information sharing on SMEs performance in a district local municipality within South Africa. The specific theoretical objectives were to conduct a literature study regarding information sharing; to carry out a literature synthesis on supply chain responsiveness; to review the literature on supply chain collaboration and to carry out a literature review on the SMEs performance. The specific empirical objective of this study was to determine the influence of information sharing on supply chain responsiveness and collaboration, to examine the influence of supply chain collaboration, responsiveness and information sharing on SMEs performance. In order to determine and examine these factors, two methodological approaches were outlined to decide which one would be suitable for this study.

These two methodological approaches, known as quantitative and qualitative research, differ as the methods and uniqueness vary (Holguin-Veras, Leal & Seruya 2017:76).

3.2.1 Quantitative and qualitative research

Methodological design is defined as the preparation for conducting a study that consists of methodology methods and tools involved within a quantitative or qualitative research (Toews, Booth, Berg, Lewin & Meerpohl 2017:134). According to Alexander, Tsai, Kohrt, Lynn, Matthews, Betancourt and Shari (2016:4), qualitative research is an interpretative and primarily an exploratory research because it is used to gain an understanding of the fundamental motives, decisions and drives to understand phenomena. A qualitative research provides the researcher with subjective reality insight regarding the problem that is required to develop ideas or hypotheses for a potential quantitative research (Twining, Heller & Nussbaum 2017:108). Catherine (2017:454) defines qualitative research as a type of collective knowledge research that helps researchers collect and work with non-numerical statistics with purposively selected samples that seek to interpret and understand meaning through the targeted population or places.

Qualitative research focuses on multi methods, such as participative observation, interviews and focus groups involving a naturalistic approach to its subject matter (Flick, 2014:542). This means that qualitative researchers study phenomena in their natural methods and attempt to make sense or interpret phenomena depending on the meanings that people bring to them (Lenzholzer & Brown 2016:110). Vijayalakshmi and Sivapragasam (2008:56) state that quantitative research can involve a philosophical mode of operation as it is flexible in terms of its strategy. Quantitative research aims to measure the world objectively. Quantitative research is described as data that can be represented using numbers or can be analysed using statistics. Quantitative research is known to test hypotheses and make predictions while using randomisation in order to be able to generalise the study (Xiaoyong, Shanshan, Datong, Pengfei & Yuanjiang 2017:114). The questions in a quantitative research remain constant (Toews *et al.*, 2017:136). According to Twining *et al.* (2017:109), quantitative research is a research method used for experiments, surveys and questionnaires to describe and explain the phenomena.

Kerstin, Antoine, Jonasson, Andreas and Lubberink (2017:220) mention that quantitative research methods could include techniques, such as observations, pilot studies, quantitative analysis and statistical methods for data analysis. Quantitative measurement focuses on specific variables. Quantitative research can also be viewed as the statistical, mathematical or numerical analysis of data collected through manipulating the pre-existing statistical data using computational techniques (Xiaoyong *et al.*, 2017:116). Quantitative research can produce a more

reliable objective and can restructure a problem to a limited number of variables (Violante & Vezzetti 2017:19).

After thorough consideration of examining the relationships between the research variables and testing the study theory hypotheses, the decision to adopt a quantitative research method was taken (Alexander *et al.*, 2016:6). Quantitative research is used to utilise a survey design and to shed more light on the general issues, phenomena and allegations pertaining to information sharing for SMEs and the ability to respond and collaborate within SMEs supply chain (Kerstin *et al.*, 2017:223). The research design of the study is discussed in the next section.

3.2.2 Research design

Research design is defined by Malhotra, (2010:101) as the plan that describes how, when and where data was collected and analysed; research design is used for conducting a study with the overall control against issues that may hamper validity of findings. A research design refers to the general strategy that you choose in order to integrate the different components of the study in a consistent and logical manner (Poggenpohl 2015:44). It guides the researcher towards a plan on how to proceed towards determining the level of relationships between the variables, thereby ensuring an effective way to address the research problem (Lenzholzer & Brown 2016:111). This means that research design contains the blueprint for the collection, measurement and analysis of data (Gemser & Bont 2016:46). According to Churchill, Brown and Suter, (2010:79), research design is important for reliability of the result that was achieved. This result provides a solid base for the entire research, which is needed to allow smooth working of the research operations.

Poggenpohl (2015:46) state that research design is the detailed outline of how an investigation or testing took place, how the instruments were used and the proposed means that was used for analysing the data collected. According to Ding, Liu, Shen, Liu and Fu (2017:191), a research design helps the researcher come up with an insight of what, where, how much and by what means was the arrangement conditions for collecting data be. In order to collect data without changing or manipulating the environment, a descriptive research was used in this study. The next section further motivated the reason a descriptive research was chosen for this study.

3.2.2.1 Descriptive research

A descriptive research is used to describe various characteristics of the population or phenomenon that is being studied (Alexander, Chris, Daniyal & Riaz2017:162). The characteristics used to describe the situation or population are usually categorical system, which

are also known as descriptive categories (Nassaji 2015:129). Descriptive research is done primarily in order to determine or describe the data and the subject of the study. This is because it addresses the question of what the population categories are, for example, what are the characteristics of Gauteng province population or the situation being studied (Maferetlhane 2012:13). Descriptive research is done with the aim to answer questions, such as which the primary target group for the product is (Catherine 2017:455). Descriptive research is known to be unique within the number of variables employed in the study. Compared to the other types of research, descriptive includes multiple variables for analysis yet it requires only one variable (Violante & Vezzetti 2017:20).

Descriptive research statistically employs data collection and analysis techniques, which can yield reports regarding the measures of essential propensity, variation and correlation (Malhotra, 2010:103). What differentiates descriptive research from the others is the combination of its characteristic summary and co-relational statistics that focuses on specific types of research questions, methods and outcomes (Alexander *et al.*, 2017:165). According to Honnette, Vinson, White and Kliewer (2008:807), a descriptive research can be defined as a study designed to represent the participants by accurate means. There are three main ways to collect this information accurately, namely observational, which is defined as the method used for viewing and recording the participants, it is all about watching people and observing them (Mingers & Willcocks 2017:18). This observational method comes in two essences, namely the naturalistic, known as field observation, in this case researchers observe the subject within a natural environment, while the other in the view is laboratory observation where the researcher observes the subjects in a laboratory setting (Yarcheski, Noreen, Mahon & Yarcheski 2010:1112).

Descriptive study also has two types, namely cross-sectional studies and longitudinal studies (Catherine 2017:456). A cross-sectional study is used to measure units from a sample of population at a point in time and these samples are based on small or large samples (Honnette *et al.*, 2008:811). In cross-sectional study, samples are drawn as a representative of a larger population. For this study, descriptive research was conducted through a set of brief descriptive coefficients that summarise a given data situated and represented in the entire population of the sampling. The next section focuses on the sampling strategy adopted in this study.

3.3 SAMPLING DESIGN PROCEDURE AND STRATEGY

A sample is a subset of the population in which you must select participants of the research study, while procedure is the process of choosing a sub-group from population in order to participate in the study (McDaniel & Gates, 2013:442). A sample is the selected number of

individuals representing a large group from which they were selected (Marchi, Ferrara, Bertini, Fares & Salvati 2017:182). Strategy is the plan you set out to be sure that the sample you use in the research study represents the population, which you drew (Malhotra, 2010:377). It is important for the researcher to note why the selected sample for the study should naturally flow from chosen research design and research methods (Agnieszka, Ghauri, Yeniyurt & Cavusgil 2015:26).

Two sampling techniques, namely probability sampling, which is a sampling technique in which subjects of the population get an equal chance to be selected as a representative sample, while non-probability sampling is a method of sampling where the sample is not known but individuals from the population was selected as a sample (Brown, Strauss, LaBar, Gold & Morey 2014:154). This study adopted the non-probability sampling approach using the convenience sampling method, in which every element is chosen to participate in non-random ways.

3.3.1 Non-probability sampling

There are two sampling methods namely: Probability and non-probability sampling (Cooper & Schindler, 2006:34). This study adopted the non-probability sampling. Non-probability samples are means of purposefully setting proportions of levels or strata within the sample (Driessen, Peng & Houtum 2017:115). According to Ebeida, Mitchell, Swiler and Romero (2016:64), non-probability sampling is generally used to ensure insertion of an exact segment of the population. The percentage may or may not vary dramatically from the actual percentage in the population. The researcher set allocations and independent population characteristics (Abellan, Mantas & Castellano 2017:136).

Non-probability sampling, selecting the most appropriate strategy for the study, the researcher must first decide on which type of study is being conducted (Meagen 2016:516). These studies adopt population. With a population study, the researcher is more interested in estimating or describing some characteristics of the population by using a sample to draw conclusions, which is called statistical interference (Cooper & Schindler, 2006:36). A non-probability sampling approach was adopted in this study using the convenience sampling technique, in which every element is chosen to participate in non-random ways

Convenience sampling is a type of non-probability sampling, also referred to as availability sampling. This sampling relies on data collection from population members conveniently available to participate in a study. A convenience sampling technique is appropriate for this study because it is convenient and the subjects selected are available to be tested, as every

subject is invited to participate (Angerhofer & Angelides 2006:291; Khorheh *et al.*, 2015:21).

Table 3.1 illustrates the difference between probability and non-probability sampling strategies.

Table 3.1: Difference between probability and non-probability sampling design procedures and strategies

Non-probability sampling				
	Quota sampling	Convenience sampling	Judgement sampling	
Definition	Method of gathering representative data from a group	One of the main types of non-probability sampling methods, is made up of people who are easy to reach	A type of a non-random sample that is selected base on the opinion of an expert	
Used	Population is divided and assigned appropriate quotas based on the prior knowledge and understanding of characteristics	Researcher includes people who are easy to reach as the population group	A list of all units, items, people, etc is used to define the population to be studied	
Key	The representative individuals are chosen out of a specific subgroup	A population is selected on the basis of its convenient availability	sample depends on the experience, skill, knowledge and insight from one choosing the sample to provide accurate information	
Procedure	Quota categories usually involve age, gender and occupation	Process when researcher selects sample elements quick and easy	Result obtained are subject to some degree of bias, due to the frame and population not being identical	
Probability sampling				
	Simple Random Sampling	Stratified Random Sampling	Systematic Sampling	Cluster sampling
Definition	A subset of a statistical population in which each member of the subset has an equal probability of being chosen	Population sample that requires the population to be divided into smaller groups, called 'strata'	Probability sample members from a larger population are selected according to a random starting point and a fixed periodic interval.	a probability sampling procedure in which elements of the population are randomly selected in naturally occurring groupings
	Simple Random Sampling	Stratified Random Sampling	Systematic Sampling	Cluster sampling

Used	In population sampling situation when reviewing historical or batch data	In population sampling situations when reviewing historical or batch data.	In process sampling situations when data are collected in real time during process operations.	When the is so large
Key	Each unit in the population has an equal probability of being selected among the sample	The population has different groups and group are fairly represented	Unlike population sampling a frequency for sampling must be selected	Population is divided into subgroups
Procedure	Assigning a number to each unit in the population and using a random number table or mini tab to generate the list.	Each group independent samples are drawn and the size of each sample is proportional to the relative size of group.	Every fourth unit, the first five units every hour.	random sample is chosen from subgroups and often associated with area sampling

Source: (Raghunath & Rushti 2017:2)

Referring to Table 3.1, since the study is not targeting the entire population, the study used a convenience sampling method with the aim of obtaining basic data necessary for the study, meanwhile avoiding any complications of using a random sampling (Driessen *et al.*, 2017:114). It is important for the researcher to identify the target population of the study while outlining the sampling method.

3.3.2 Target population

Gathering data to obtain provable information for research purpose is important. Gathering data can involve deciding on what trends are desirable within the market environment, as well as aligning organisational goals together with the objectives to meet customers' needs and demands (Meagen 2016:512). First, the researcher needs to understand the difference between target and sample populations before obtaining the data (Cooper & Schindler, 2006:38). A research population is a large set of individuals or objects considered the focus of a scientific inquiry. It is also important that the population survey is carried out (Nunnally, 1978:236). Due to the observations that large numbers of populations might not be able to test accurately, every individual in the population becomes too expensive and time-consuming to achieve. (Kerstin *et al.*, 2017:25).

A research population can also be considered as well-defined sets of individuals or objects that are known to have similar characteristics (Yarcheski *et al.*, 2010:1117). All individuals or

objects within the population generally have a common, binding characteristic or trait and usually, the description of the population together with the common binding characteristic of its members is most likely the same (Xiaoyong *et al.*, 2017:118). For example, government officials are a well-defined group of individuals that can be considered as a population and all the members in this population are indeed officials of the government. Target population is defined as a group of people identified as the proposed beneficiaries of an advertisement, product, campaign or a group of elements of which the researcher desires to make inference (Alexander *et al.*, 2016:8).

Du Plessis & Rousseau (2007:21), further define target population as some set or group of people that are identified as the intended recipients of an advertisement, survey or message. It is known to assist researchers in developing efficient and effective policies and practices that guide the research purpose. Successful surveys should be able to articulate not only the people mandated to participate in the data collection but the ones that have been able to fully participate in it (Violante & Vezzetti 2017:21). It is important to know which category falls outside the survey and which one does not (Malhotra, 2010:106). Target population is defined by Wiid and Diggines (2011:172) as those units for which the findings of the survey are meant to generalise or the entire group of individuals or objects in which researchers are interested in generalising the end results. According to Mingers and Willcocks (2017:19), target population can be viewed as the entire group or population whose properties are estimated via a sample and they are usually the same as the total population. Target population is also the aggregation of elements (members of the population) from which the sample is actually selected (Lenzholzer & Brown 2016:113).

For the purpose of this study, target population is defined as a group of people identified as the intended recipients of a survey or campaign consisting of SMEs that are functioning within the Emfuleni Local Municipality (Maferethane 2012:15). Based on this, the research target population was restricted to SMEs within Emfuleni Local Municipality, consisting of other smaller towns, such as Evaton, Sharpville, Sebokeng, Bophelong, Polokong, Vereeniging and Vanderbijlpark.

3.3.3 Sampling frame

Sampling frame defines a set of elements in which a researcher can select a sample of the target populations (Ebeida *et al.*, 2016:65). The sampling frame of this study consists of SMEs. Major towns represented in this survey were Vereeniging and Vanderbijlpark due to their proximity and other reasons for differentiating the sampling include time and cost (Zikmund & Babin, 2013:356). In this study, a database of the Emfuleni Local Municipality and the Small Business Dictionary of the Vaal Triangle was used to select the target population for this study.

3.3.4 Sample size

Zikmund (2010:519) defines a sample size as the number of organisations, units of a person, animals, patients and specified circumstances that are suited in a population. The sample size is required to be large enough to have a chance of dictating the difference between two groups (Abellan, Mantas, Castellano 2017:137). The sample size is used to maximise the chance of uncovering a specific represented difference that is statistically important (Yarcheski *et al.*, 2010:1115). According to Cooper and Schindler (2006:34), a sample size is the number of observations that are used for calculating estimates of a given population. For example, if the researcher gave out questionnaires to 90 SMEs then 90 SMEs would be the sample size (punch 2014:48).

In this study, the final sample size may turn out to be much smaller than the actual designated sample size if it happens to be considered non-response (Malhotra, 2010:379). It is not always all the units that are designated; sample size needs to be processed as some completed questionnaire can be much higher than the anticipated. Before anticipating the right sample size, a pilot study is carried out in an attempt to predict an appropriate or the exact sample size for the full-scale project as well as to improve various aspects of the study design. In this study, a sample size of 300 respondents was estimated and 500 questionnaires were distributed whilst 340 questionnaires were valid including the pilot testing. The sample size for this study was based on previous studies by Zhou and Benton (2007:1356); Bayraktar *et al.* (2009:452); Chinomona and Poee (2013:8); Poee *et al.* (2015:6) and Lee *et al.* (2016:148).

Table 3.2: Determining the sample size

Year	Authors	Scope of the study	Sample size used
2015	Pooe, Mafini & Loury Okoumba, V.W.	The influence of information sharing, supplier trust and supplier synergy on supplier performance: the case of SMEs.	309
2016	Lee V.H., Foo, A.T.L. Leong, L.Y & Ooi K.B.	Can competitive advantage be achieved through knowledge management? A case study on SMEs.	229
2009	Bayraktar, E., Demirbag, M. & Lenny Koh, S.C.	A causal analysis of the impact of information systems and supply chain management practices on operational performance:evidence from manufacturing SMEs in Turkey	203
2007	Zhou, H. & Benton, W.C	Supply chain practice and information sharing.	125
2013	Chinomona, R. & Pooe, R.I.D.	The influence of logistics integration on information sharing and business performance: the case of SMEs in South Africa.	108

These researchers used self-administered questionnaires because of the advantages of cost effectiveness and ease to administer. Self-administration also improves response rate. In the next section, the questionnaire and data collection method was discussed.

3.4 QUESTIONNAIRE DESIGN AND DATA COLLECTION METHOD

The most important part of the survey is in the creation of the questions that must be outlined in a way that resulted in obtaining the required information from the respondents. There could be no other scientific principles that assure an ideal questionnaire except from the design, which is, the skill learned through experience. Therefore, it is important to outline the questionnaire protocols and collection methods.

3.4.1 The questionnaire design process

Questionnaires are designed to attain three major goals, such as to maximise the significance and accuracy of the data collected and to maximise the participation of the respondents as well as to facilitate the data collection and analysis (Van-Helvoort *et al.*, 2017:307). Chen *et al.* (2014:6898) define a questionnaire as a reinvented outlined set of questions that enable a respondent's record response that are usually within a close defined alternative. It is important to ensure that the questionnaire designing process is well aligned to accurately measure the

opinions, behaviour or experiences of the public (Flick, 2014:530). If the data gathered are not accurately collected or randomly sampled, the entire process could be a waste, as such, it is very important that a good measure that involves both writing and organising a unique questionnaire is designed (Zikmund (2010:523). In order to avoid gathering information that could be built on a shaky foundation of ambiguous or biased questions, the following steps were involved in the questionnaire design.

In order to specify the actual data needed from the respondents, a structured questionnaire was designed. Adequate information was conveyed by ensuring that all the important data were listed in such a way, the respondent are able to understand every question and gives a complete response. Once the required data are specified, the interviewing methods are determined, the content of the question is designed in a simple language that is easy to understand. Then the order of the questions is identified including layout, format, positioning and spacing of the question as these might have a significant effect on the results. The questionnaire was divided into parts and numbered accurately, which was discussed in detail. All the aspects of the questionnaire were tested afterwards, namely the question content, structure, wording, sequence, form, layout, instructions and the question difficulty considering the questionnaire design being a multistage process that needs attention to many details.

The literature in this study was used as the guideline for developing the statements primarily on the basis of the instruments used in other studies. Multi-item scaled questions were used to test the research hypotheses, such as Likert scales. The questionnaire was divided into five sections. Section A of the questionnaire consisted of questions that elicit respondents' demographic information, such as the number of years operating in business, annual sales of business, number of employees for business and type of industry the business is. Section B of the questionnaire measured information sharing using a questionnaire adapted from a study by Chinomona and Pooe (2013:5). The questions were asked based on the extent to which the organisation shares information with its trading partners. Section C questions were based on the extent to which organisation supply chain is responsive, using questionnaire items adapted from a study by Qrunfleh and Tarafdar (2013:547). Section D of the questionnaire consisted of questions that measured the extent to which the organisation collaborates with its supply chain, using questions adapted from Kang and Moon (2015:8). Section E of the questionnaire focused on comparing SMEs performance with the industry average and it was measured using questionnaire items adapted from Kim (2009:340). The measurement items in sections B to E were in the form of a seven-point Likert scale with one denoting strongly disagree and seven denoting strongly agree. While collecting data, some limitations were encountered due to the time constraint.

3.4.2 Ethical issues

- Ethical considerations can be referred to as principles and conduct that clarify the conditions under which the research has to be conducted (Pedroni & Zio 2017:273). Fieser and Pojman, (2012:11) observed that there are four main issues that may arise when performing research, namely harm to the participants, lack of informed consent to the participants and invasion of the participant privacy and deception. Therefore, this study ensured that the research was conducted in an ethical manner; independent objectivity in the interpretation of the survey findings was upheld, participation in the study was voluntary, personal data from the individuals was kept confidential and the questionnaires contained the names of the respondents. Independent objectivity in the interpretation of the survey findings was upheld.

3.5 DATA PREPARATION

When analysing the data that have been collected in a questionnaire, the preparation process remains the first step to take (Rouzies2013:207). Data preparation process is viewed as the means of translating data from a questionnaire to a format that can be analysed (Moutinho & Hutcheson 2011:326). These data preparation processes include ensuring the accuracy of the data entered into the computer for analysis (Malhotra, 2010:441). Therefore, to analyse accurately the data collected, there are four preparation phases, namely data editing, coding, capturing and cleaning.

3.5.1 Data editing

Editing of the data can be referred to as the means of accurately accessing the data with the aim of improving perceptions and preparing for coding (McDaniel & Gates, 2013:445). In order to maintain consistency during editing the data, it is important that the completed questionnaires be checked for errors or data that might not have been completely responded to. According to Fourie (2015:84), editing is defined as carefully checking every questionnaire one after the other with the purpose of ensuring that all questions asked were answered. During the editing process, it is vital to check the completeness and legibility of the data while getting it ready for coding (Hair *et al.*, 2006:22).

3.5.2 Data coding

Coding is the process of transforming raw data into symbolic characters in order to specify and classify each category depending on where the response number is placed or assigned (Bryman & Bell, 2011:127). Coding the data numerically helps transfer and group the responses to

numeric codes of the particular question (Malhotra, 2010:443). Coding also enables the researcher process the data into the computer without misplacement of data (Zikmund & Babin, 2013:355). The researcher and the supervisor, as well as statistician, carefully coded the completed questionnaire data collected in this study.

3.5.3 Data capturing

While capturing the data, the coded information was transferred from the questionnaires, also known as the coding sheet, into the computer through keypunching. In this study, the researcher used the Microsoft Excel program for data capturing. The data were captured directly from the questionnaires into the computer as well as into an MS Excel spreadsheet.

3.5.4 Data cleaning

The cleaning process took place involving the values of data that fall outside of a scale code or was left out. According to Zikmund and Babin (2013:371), data cleaning is done to create a means of making use of close checking the data with the aims of detecting codes that are not defined for a particular variable. In this study, the data were cleaned and transcribed from Excel to SPSS.

3.6 DATA ANALYSIS

The data analysis was conducted using CFA and SEM to test the theoretical connection and the significance of the relationships between the variables. Descriptive statistics, AMOS statistical software as well as path modelling was performed subsequently. Coding the data from the questionnaire into the Microsoft Excel spread sheet and then copied to SPSS was also done in order to assess each of the relationships simultaneously instead of separately. While assessing the relationships, incorporated multi-scale items can be used to account for the possibility of measurement errors within each scale and the reliability and validity of the study can be checked (Hair *et al.*, 2006:27).

3.6.1 Reliability

Reliability can be defined as the degree to which measures are free from error and yield consistent results (Ang, 2014:177). Reliability is ascertained using three indices, namely Cronbach's alpha value, composite reliability value and AVE. Both Cronbach's alpha and composite thresholds should be equal to or greater than 0.7 as recommended by Van-Helvoort *et*

al. (2017:309) and Hair *et al.* (2006:56), whilst AVE estimate threshold's value should be greater than 0.4 as indicated by Cheon *et al.* (2012:1058).

3.6.2 Validity

Validity is the degree to which the instrument measures the construct it purports to measure (Scholtes, Terwee & Poolman 2011:239). There are two measurement properties in validity, namely construct validity and content validity; the latter can be categorised into convergent validity and discriminant validity (Moutinho & Hutcheson 2011:327). Content validity was ascertained through a pilot study and the review of the questionnaire items by a panel of experts in supply chain management. Convergent validity was ascertained using item-to-total correlation values and item loading values (standardised regression weights) as indicated by Chinomona (2011:1). Discriminant validity was ascertained through the correlation matrix as endorsed by Anderson and Gerbing (1988:413), who further mention that the acceptable threshold between constructs should be no greater than 0.7.

3.6.3 Research model fit assessment

This study used a CFA to create the possibility that the model fit the conceptualised research model or not. The use of model fit indicators were used to assess the model fit, such as, goodness of fit index (GFI), augmented goodness of fit index (AGFI), chi-square degrees of freedom, normed fit index (NFI), incremental fit index (IFI), composite fit index (CFI), RMSEA and tucker-lewis index (TLI).

3.7 CORRELATION ANALYSIS

Correlation analysis is used to describe the amount of strength and direction of the relationships between two variables (Hatcher & O'Rourke 2014:45). McDaniel and Gates (2013:445) defined correlation analysis as measurement that involves the closeness of relationship between two variables or joint variation variables at a time. A researcher can use a correlation analysis when aiming to establish the extent to which a variable affects the other (Qrunfleh & Tarafdar 2013:526). In correlation analysis, the degree of establishment that changes in one variable automatically changes in another (Zhang, Vonderembse & Su Lim 2005:79). Correlation analysis does not entertain the way data are ranked, rather it only requires the measure of data to be ranked in a manner that the rank can be assigned to either a small or large value (Bryman & Bell, 2011:132). In this study, Pearson's correlation procedure was adopted. According to Maferetlhane (2012:17), Pearson's correlation coefficient is described as a measure of strength

linear relationship between two variables. This study used correlation analysis for two major reasons: the first one is to identify the presence of multi-collinearity, known as a condition for using non-parametric technique in data analysis; the second one is correlation analysis with the purpose of exploring the relationships between the constructs used. In order to determine the level of relationship strength between variables, Table 3.3 illustrate the threshold and criteria.

Table 3.3: Code representing level of relationship between variables

Size of relationships	Interpretation	Strength
(0.50 to 1.00)	Strong relationship	High correlation
(0.30 to 0.49)	Moderate relationship	Medium correlation
(0.10 to .29)	Relationship	Weak correlation
(.00 to 0.09)	No relationship	Very weak

Source; (Bryman & Bell, 2011:132)

3.8 FACTOR ANALYSIS

In this study, factor analysis is described as procedures that are used to reduce and summarise data (Violante & Vezzetti 2017:22). The factor analysis procedures aim at identifying the simple patterns and factors of the fundamental relationships; it is also achieved through the means in which the variables are grouped and reduced to some set of small factors (McDaniel & Gates, 2013:431). This study used factor analysis to revalidate structure as well as the reliability of the measurements used. This study used the CFA.

3.8.1 Confirmatory factor analysis (CFA)

As soon as this particular set of data has been obtained, CFA was used to check if obtained structure fits the data. CFA confirms the number of underlying dimensions of the instrument (which are the factors) and the pattern of item-factor relationship (which are the factor loadings), (Flick, 2014:547). The adequacy of the measurement model was assessed by CFA using AMOS, version 23.0. The adequacy of the CFA measurement model was achieved through the means of assessing the importance of item loadings of all the variables, which is the model fit (Hair *et al.*,2006:38). Model fit refers to the extent at which the hypothesised theoretical model fits the model deduced from the actual empirical data of the study sample (Byrne 2010:6).The CFA model that was presented in this study is a pure measurement model coupled with un-gauged covariance existing between each of the possible latent variable pairs (Nunnally, 1978:216).

These goodness-of-fit values are used to evaluate the measurement model as recommended by Cooper and Emory (2009:14) and Flick (2014:547). This assessment is discussed in the section below.

3.8.1.1 Model fit assessment

The model fit is assessed regarding the criteria detailed in 3.8.1

3.8.1.2 Chi-square (χ^2 /DF)

The chi-square (χ^2 /DF) is a method used in this study to assess the general fit of the model value and the result must be below three, as recommended by Chinomona (2011:132) and Coldwell and Herbst, (2014:48).

3.8.1.3 Normed fit index (NFI)

The NFI is used to evaluate the model by the means of comparing the χ^2 value of the model to the χ^2 value of the null model and the value must be greater than 0.9, according to Malhotra, (2010:119).

3.8.1.4 Tucker-Lewis Index (TLI)

TLI prefers simpler models and is known to address the issue of sample size associated with NFI; the value must meet or exceed 0.9 as recommended by McDaniel and Gates, (2013:437)

3.8.1.5 Incremental Fit Index (IFI)

IFI was developed to rectify the issue of parsimony and sample size related to NFI, the value must meet or exceed 0.9 as asserted by Coldwell and Herbst, (2014:27)

3.8.1.6 Comparative Fit Index (CFI)

The CFI assumes that all the latent variables are uncorrelated, it also compares the sample covariance matrix with the null model and value must meet or exceed 0.9, this is recommended by Malhotra, (2010:120) and McDaniel and Gates, (2013:438).

3.8.1.7 Root mean Square Error of Approximation (RMSEA)

Another criterion is the RMSEA; this index reports on how well the model is, by means of indefinite but optimally selected parameter estimates that would fit the populations covariance matrix and the value must fall below 0.05 and 0.08 as recommended by Cooper and Emory,

(2009:16), Bryman and Bell (2011:127) and Chinomona (2011:122). Table 3.4 presents the results.

Table 3.4: The model fit indices

Fit indicators	Explanation	Acceptable threshold
(CMIN/DF)	Chi-square	Tabled chi-square smaller or equal to 3
(NFI)	Normed fit index	Value equal to or greater than 0.90
(IFI)	Increment fit index	Values greater than 0.09
(TLI)	Tucker-Lewis index	Values greater than 0.09
(CFI)	Comparative fit index	Values greater than 0.09
(GFI)	Goodness-of-fit index	Values greater than 0.09
(AGFI)	Adjusted goodness-of-fit index	Values greater than 0.09
(RMSEA)	Root mean square error of approximation	Less than 0.08 with confidence interval

Source; (Bryman & Bell, 2011:130)

It is important to establish an acceptable threshold measurement model before estimating and interpreting the relationships among variables (Nunnally 1978:212). In this regard, CFA was elucidated as a precursor for SEM, which specified the structural model.

3.9 STRUCTURAL EQUATION MODELLING (SEM)

SEM can be viewed as a statistical method that presents other techniques, such as factor analysis and multiple regression analysis (Driessen *et al.*, 2017:114). Bryman and Bell (2011:129) described SEM as a multivariate data analysis technique, which estimates or tests relationships between one or more dependent or independent variables (Malhotra, 2010:444). It is also a statistical method that offers an extension to other multivariate techniques, especially factor analysis and multiple regressions (Malhotra, 2010:108). SEM provides researchers with a means to test a specified set of relationships and serves as a technique for observing large samples; mostly over 200 samples (Fourie 2015:91). SEM was used in this study to test the proposed relationships simultaneously. More details on the interpretation of SEM will be presented in the Chapter 4 of this study.

3.10 SYNOPSIS

This chapter focused on explaining the research methodology in detail by describing the phases that the investigation went through with the aim of achieving practical aspects of the research investigation. It further provided detailed information about the research objectives and approaches that were followed. Sampling design procedures, such as the population and the selection of the sample were also discussed. The sampling strategy as well as the frame and procedures were detailed as the steps followed while collecting the data. The data analysis process was also reviewed and different statistical procedures were discussed. This chapter also explained the reliability and validity of the data. In the following chapter, the statistical analysis of the data and interpretations of the findings are reported.

CHAPTER 4

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF EMPIRICAL FINDINGS

4.1 INTRODUCTION

The previous chapter presented an overview of the research methodology and the techniques used in the study. The sampling design procedure was detailed, the data analysis process was reviewed and a different statistical procedure was discussed. The SPSS was used to analyse and determine the reliability and validity of the research instruments. The strategy used in collecting, capturing, coding, processing and analysing the data was also made available in detail.

This chapter focuses on the statistical analysis of the data and interpretations on the findings of the empirical study. The results obtained from supply chain responsiveness, supply chain collaboration, information sharing and SMEs performance will be evaluated followed by the explanations of the actual findings. The results acquired from SPSS will be explained by presenting the demographic description of the sample and the correlations analysis including the hypotheses testing. This chapter will further present the CFA and the SEM results, explaining the figures acquired. Furthermore, the chapter conclude with the reliability and validity of the measurement instrument aiming at the possibility of the significance of the study that was estimated in Chapter 1.

4.2 SIGNIFICANCE OF THE STUDY

In Chapter 1, the study proposed that the results of the study would strategically present SMEs with a coherent structure. Coherent structures that can help them improve their growth, expanding development and supporting the institution involved in delivering support service. SMEs can also gain the ability to respond to change by improving the information sharing efficiency hence, repositioning SMEs to a competitive position. SMEs should be able to gain competitive advantage through effective supply chain responsiveness given that it creates means for them to take advantage intelligently, rapidly and proactively of every opportunity presented. Therefore, this study will present in detail the interpretation and analysis discussions that clarify and guide methodology of the research analysis towards a broadened knowledge base of research area as discussed in Chapter 1. The next section outlines empirical objectives of the study that were discussed in Chapter 1.

4.3 EMPIRICAL OBJECTIVES OF THE STUDY

In Chapter 1, the researcher aimed to gain knowledge through observing and experiencing the indirect and direct empirical evidence or research of other researchers. Empirical evidence can be analysed quantitatively. The researcher used quantitative methods to quantify the evidence, making sense through it in a quantitative form as noted in Chapter 3 (Coldwell & Herbst 2014:82). In order to observe this evidence accurately, some empirical objectives were clearly outlined in Chapter 1, with the aim of collecting answerable evidence (data) for the purpose of the study.

During the introduction and background of the study the following empirical objectives were stated:

- To determine the influence of information sharing on supply chain responsiveness
- To determine the influence of information sharing on supply chain collaboration
- To determine the influence of supply chain collaboration on SME performance
- To examine the influence of supply chain responsiveness on SMEs performance
- To examine the influence of information sharing on SMEs performance.

From these objectives, predictions about the hypotheses among constructs were derived. These predictions were tested using a suitable experiment, which will be observed by the end of this chapter. The theory hypotheses and predictions were based on, analysed and checked if supported or not, or may need to go through modification and then subjected to further testing.

4.4 DATA ANALYSIS

Data analysis involves observing information in order to identify predictable patterns, interpret the empirical findings and make sense of the predictable hypotheses developed in Chapter 1 (Malhotra, 2010:104). In order to achieve these, software solutions, such as SPSS and AMOS were used to perform efficient and optimum data analyses. After analysing the data, some results were acquired based on the respondent's answers to the questionnaire. Corresponding with the sampling techniques used in Chapter 3, the sample size was estimated at 300, 500 questionnaires were distributed but only 324 valid questionnaires were useful for the final analysis excluding 40 questionnaires for pilot testing. A survey method was used to obtain the data required. A structured questionnaire divided into five sections was used for collecting the data. Section A of the questionnaire consisted of questions to elicit respondents' demographic information. Section

B of the questionnaire measured information sharing using questions adapted from a study by Chinomona and Poee (2013:9). Section C measured supply chain responsiveness using questions adapted from a study by Qrunfleh and Tarafdar (2013:547). Section D of the questionnaire consisted of questions measuring supply chain collaboration using questions adapted from Kang and Moon (2015:6) and Section E of the questionnaire focused on SMEs performance measured using questions adapted from Ang (2014:178).

Before the analysis of the data, the researcher entered the data into the computer ensuring accuracy by editing, coding, capturing and cleaning it for analysis. 85 percent of the questionnaires were useful and it could be assumed that the rest of the questionnaires were neither returned nor completed. This resulted into a valid response of 85 percent rate. Before concluding Chapter 4, the reliability of the study will be compared with the accepted threshold. For the study to be reliable, the Cronbach's alpha and composite thresholds should be equal to or greater than 0.7 as recommended by Van-Helvoort *et al.* (2017:310) and Hair *et al.* (2006:5), whilst AVE estimates threshold value should be greater than 0.4 as indicated by Cheon, Lee, Crooks and Song (2012:1058).

4.4.1 Pilot study

In this study, pilot testing is conducted with the aim of evaluating feasibility of some crucial components of the full-scale study; feasibility, such as techniques, methods, questionnaires and interviews as well as how they function together in a context. A pilot study can help reveal ethical and practical issues that could hamper the main study (Moutinho & Hutcheson 2011:330). The pilot study can help the researcher identify intended mistakes, refine the data collection process, achieve analysis plans and gain crucial knowledge about participant burden even before commencing with the main study (Hair *et al.*, 2006:3). In case of any flaws detected while completing survey instruments, a pilot study will prompt the researcher to revise item wording or change the way the questions are presented (Moutinho & Hutcheson 2011:329). In the process of this study, the researcher has been able to identify and mitigate risks that could be associated with sample size, sample selection, data collection and data analysis.

After analysing findings from the pilot study, some changes were made; the researcher modified the items of the construct and some questions were slightly modified. However, no item was deleted because the reliability results show Cronbach alpha values greater than 0.7.

Table 4.1: Summary of reliability results for the pilot study

Constructs	No of items	Cronbach's alpha
Information sharing	5	0.917
Supply chain responsibility	5	0.858
Supply chain collaboration	9	0.945
SMEs performance	6	0.855
Total	25	

4.4.2 SMEs demographic descriptions

SMEs are the actual growth engine in the economy of many countries and especially in South Africa (South Africa Web 2011:6). SMEs play a significant role in improving the input of macroeconomic. In this study, SMEs profiles were determined by the number of years in operation, annual sales of the business, number of employees working with the company and type of industry the business is. This section summarises the characteristics of respondents in the data analysis.

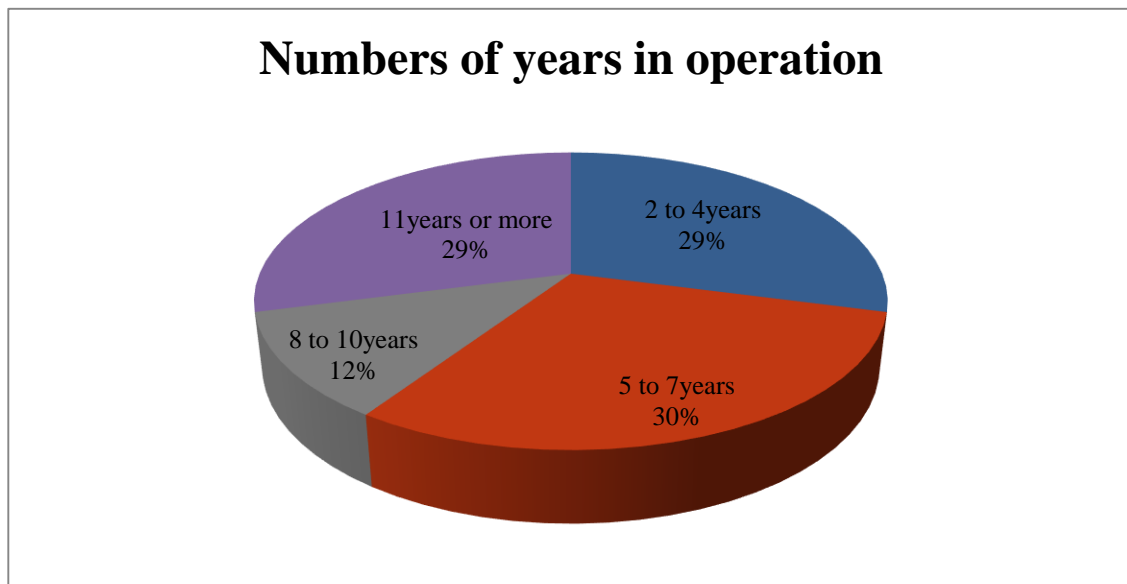


Figure 4.1: Number of years that the SME is operating

According to the pie chart in Figure 4.1, 29 percent of SMEs operating in the business within 2 to 4 years responded to the questionnaire and 30 percent of respondent claims to have been in the business within 5 to 7 years. 12 percent of the SMEs also claim to be in the business from 8

to 10 years and 29 percent have been in the business from 11 years and above. The highest average are the SMEs operating within 5 to 7 years, which was 30 percent.

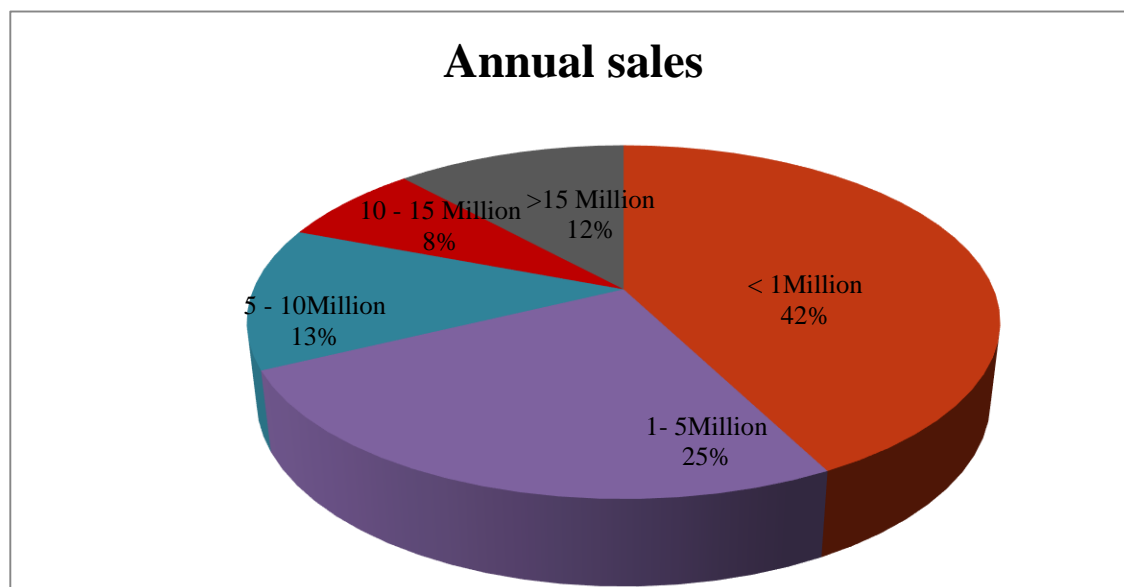


Figure 4.2: Annual sales

In Figure 4.2, SMEs annual sales rates are categorised from less than 1 million of which 42 percent of the participant who responded claimed to have been established within that range. 25 percent of respondents have ranges between 1 million to less than 5 million and 13 percent of respondents claimed that their annual sales are between 5 million to less than 10 million. 8 percent fall between 10 million to less than 15 million and 12 percent claim to have annual sales of 15 million and above. These findings might not be factual due to the view that some SMEs fear that information given in terms of the annual sales may reach the tax authorities as some fail to fulfil tax obligations.

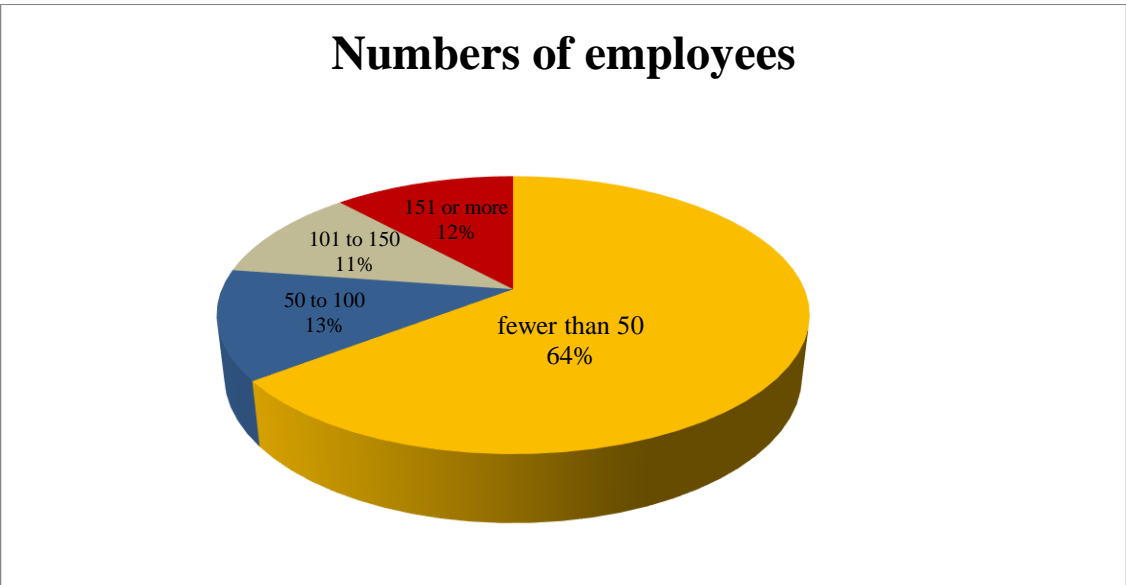


Figure 4.3: Number of employees profiled in the SMEs

As presented in Figure 4.3, the number of employees profiled with the participating SMEs is rated from fewer than 50 employees to 151 employees or more. SMEs respondents that claimed to have fewer than 50 employees were 64 percent and 13 percent claimed to have between 50 and 100 employees, whilst 11 percent claimed to have 101 to 150 employees and 12 percent claimed to have 151 employees. This demographic section adopted the definition of SMEs detailed in Chapter 2 of the study. From the findings, SMEs having less than 50 employees are rated the highest average.

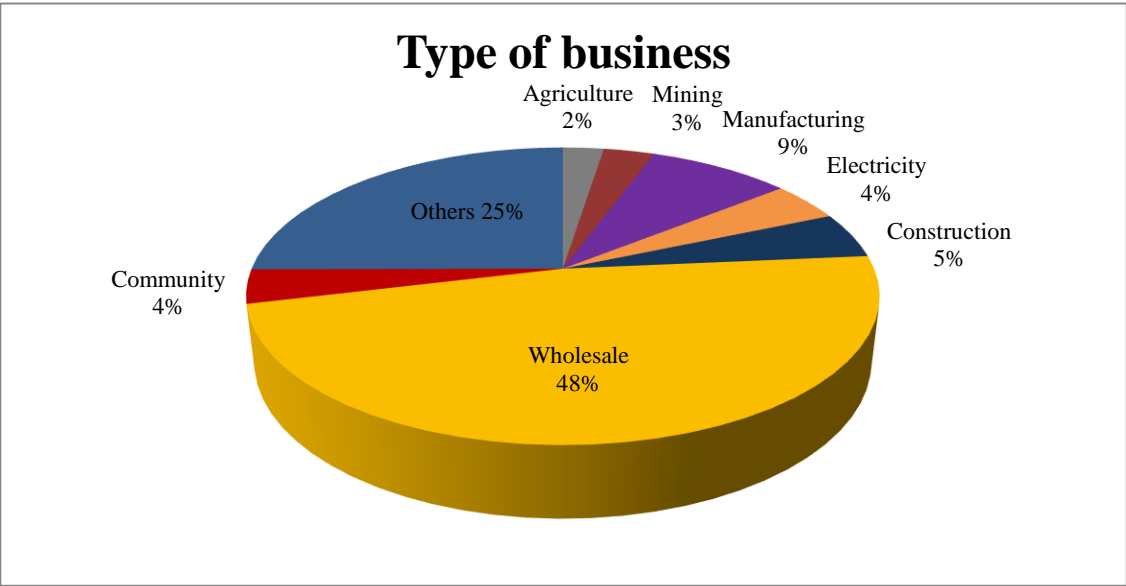


Figure 4.4: Type of industry

Figure 4.4 presents the type of industry the SMEs are operating. Referring to the results presented in pie chart above, the majority of SMEs that responded to the questionnaire are wholesalers at 48 percent. The next highest percentage is others at 25 percent; others could be any type of SMEs but some observations were made during the collection of the questionnaire that most people that ticked others are not sure of where they actually belong as they expect every type of business label in the questionnaire. Manufacturing, storage or transportation SMEs were 9 percent, while the agricultural, hunting, forestry or fishing were 2 percent. Some of the SMEs claimed to fall under community, social, communicating or personnel services amounting to 4 percent and some of them claimed to fall under electricity, gas or water supply amounting to 4 percent. The construction SMEs amounted to 5 percent while the mining or quarrying were 3 percent.

4.5 RELIABILITY TEST

Reliability is referred to as the extent to which a scale generates consistent results with conditions that the measurements are repeated several times (Fornell and Larcker 1981:34). Reliability analysis is determined through obtaining proportion of a systematic variation in a scale and can be done by determining the relationships between the scores obtained from different running of the scale (Malhotra, 2010:147). The Cronbach alpha test is used to certify if there is reliability while CR and AVE tests confirm and validate the presence of reliability (Hair *et al.*, 2006:8). Table 4.2 presents the reliability results.

Table 4.2: Accuracy analysis statistics

Research variables		Descriptive statistics		Cronbach's test		C.R.	AVE	Factor loading
		Mean	Std. Dev.	Item-total	α Value			
INFORMATIONSHARING	IS1	5.02	1.872	0.692	0.896	0.869	0.625	0.730
	IS2	4.87	1.737	0.737				0.785
	IS3	5.06	1.794	0.765				0.814
	IS4	4.88	1.927	0.767				0.830
	IS5	4.88	1.837	0.761				0.820

Table 4.2: Accuracy analysis statistics (continued ...)

Research variables		Descriptive statistics		Cronbach's test		C.R.	AVE	Factor loading
		Mean	Std. Dev.	Item-total	α Value			
SUPPLY CHAIN RESPONSIVENESS	SR1	5.27	1.597	0.571	0.823	0.824	0.500	0.637
	SR2	5.39	1.637	0.623				0.690
	SR3	5.32	1.553	0.638				0.705
	SR4	5.22	1.571	0.654				0.747
	SR5	5.23	1.624	0.598				0.695
SUPPLY CHAIN COLLABORATION	SC1	5.01	1.706	0.612	0.881	0.906	0.518	0.670
	SC2	4.90	1.703	0.676				0.725
	SC3	4.81	1.703	0.661				0.708
	SC4	4.95	1.685	0.675				0.727
	SC5	5.00	1.688	0.717				0.765
	SC6	5.05	1.655	0.639				0.676
	SC7	4.98	1.628	0.692				0.756
SMEs PERFORMANCE	SP1	5.18	1.691	0.643	0.839	0.850	0.503	0.675
	SP2	5.11	1.563	0.649				0.732
	SP3	5.01	1.575	0.656				0.723
	SP4	4.65	1.649	0.663				0.712
	SP5	4.98	1.695	0.602				0.736
	SP6	5.18	1.691	0.643				0.675

AVE: average variance extracted; CR: composite reliability; * Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree.

Note: ^asignificance level $p < 0.05$; ^bsignificance level $p < 0.01$; ^csignificance level $p < 0.001$

***Measurement CFA model fits criteria:** CMIN/DF= 1.651; NFI=0.906, TLI=0.950, CFI=0.960, IFI=0.961, RFI=0.900; RMSEA=0.034

4.5.1 Cronbach's alpha test

Referring to Table 4.2, the results show that the Cronbach alpha value for information sharing is 0.896, supply chain responsiveness is 0.823, while supply chain collaboration is 0.882 and SMEs performance is 0.840. Each variable varies from 0.823 to 0.896, which means that the results meet the acceptable threshold of 0.7 as recommended by Hair *et al.* (2006:9). In addition, the item to total value results range from 0.571 to 0.767. The results validate the reliability of the measurement instruments used in the study.

4.5.2 Composite reliability

Composite reliability (CR) has been consistently referred to as McDonald's coefficient and it is obtained by combining all the true score variances and co-variances present in the composite of indicator variables that are related to constructs (Nunnally, 1978:208). The sum is divided by the total variance in the composite. In this study, the internal reliability of each variable was examined by conducting the CR test recommended by (Malhotra, 2010:114). This was done using the formula:

$$CR_{\eta} = \frac{(\sum \lambda_{yi})^2}{(\sum \lambda_{yi})^2 + (\sum \epsilon_i)}$$

This formula indicates: $CR = (\text{square of the summation of the factor loadings}) / \{(\text{square of the summation of the factor loadings}) + (\text{summation of error variances})\}$.

To determine sufficient internal consistency of the variables, a CR index that is greater than 0.6 is required (Malhotra, 2010:114; McDaniel & Gates, 2013:435). As indicated in Table 4.2, the CR values range from 0.824 to 0.906 and are considered acceptable. This indicates that the internal reliability for all the variables of the study exists. The CR was calculated using a scientific calculator based on the formula provided above.

4.5.3 Average variance extracted (AVE)

AVE for each of the constructs is obtained through the sum of squares of completely standardised factor loadings correctly divided by the sum plus the total error variances for indicators (Nunnally, 1978:213). According to (McDaniel & Gates, 2013:436), "the average variance extracted estimate reflects on the overall amount of variance in the indicators that is accounted for by the latent variables". The AVE was examined using the following formula:

$$V_{\eta} = \frac{\sum \lambda_{yi}^2}{(\sum \lambda_{yi}^2 + \sum \epsilon_i)}$$

$$AVE = \frac{\text{summation of the squared of factor loadings}}{\{(\text{summation of the squared of factor loadings}) + (\text{summation of error variances})\}}$$

According to McDaniel and Gates (2013:436), a good representation of latent variables for the item is identified when the variance extracted estimate is above 0.4. Therefore, Table 4.2 confirms good results ranging from 0.500 to 0.625. All AVE values show good representation of latent constructs for the measuring items.

4.6 VALIDITY TEST

A validity test is the extent to which a test measures what it is supposed to measure accurately. Validity is referred to as the degree to which an evidence and theory supports the interpretations of the test scores achieved through the proposed tests (McDaniel and Gates, 2013:422). In Chapter 3, the researcher indicated that in order to measure the validity of the scale, attempts will be made to determine whether what was intended to be measured is measured (Malhotra, 2010:116). Therefore, this study determined the test validity by using three concepts, namely construct validity, convergent validity and discriminant validity.

4.6.1 Construct validity

Construct validity is used with the aim of making sure that a particular measure has actually measured the construct that it is intended to (Flick, 2014:427). Mostly, using a panel of experts creates more familiarity with the construct leading to a way in which this type of validity can be assessed. The result presented in Table 4.2 for IS is 0.896, SR is 0.823, SC is 0.882 and SP is 0.840 respectively. This scale is acceptable because they are above the benchmark value of 0.60.

4.6.2 Convergent validity

Convergent validity is used to determine the level that a construct converges with its indicators. This is done by explanation of item variances (McDaniel and Gates, 2013:414). Factor loading was used to assess the convergent validity of items by checking the correlations in item-total index. Factor loadings were also examined with the aim of identifying convergent validity of measurement items recommended by Chinomona (2011:112) and Coldwell and Herbst, (2014:89). Malhotra, (2010:139), states that items reveal good convergent validity when they load strongly on their frequent construct. Other studies also maintained that a loading above 0.5 indicates convergent validity (McDaniel & Gates, 2013:434). Due to this aspect, Table 4.2 shows that the item totals for this study loaded well on their individual constructs with values that vary from 0.571 to 0.767. Therefore, this shows a good convergent validity where items

describe more than 50% of their individual constructs. In addition, since the CR values are above the recommended threshold of 0.4, the existence of the convergent validity is confirmed.

4.6.3 Discriminant validity

In accordance with the discussion of the discriminant validity detailed in Chapter 3, Cooper and Emory, (2009:164) state that when determining if discriminant validity is present or not, there is a need to identify the observed variable that shows a higher loading on its individual construct compared to any other construct that is included in the structural model. In order to check if discriminant validity is present, the correlation between the measuring constructs should be less than 1.0 as recommended by (Malhotra, 2010:116). Correlation is referred to as a technique that is used to measure the relationship existing between two or more variables. When two variables are correlated, it means that they diverge together. In addition, the correlation can be either positive or negative, when determining if the correlation is positive the score must be high on one and associated with high scores on the other and the low scores on one are associated with low scores on the other.

Table 4.3: Correlations and discriminant validity

Correlations and discriminant validity				
Research variables	IS	SR	SC	SP
Information sharing	1.000			
Supply chain responsiveness	.489	1.000		
Supply chain collaboration	.513	.615	1.000	
SMEs performance	.436	.496	.548	1.000

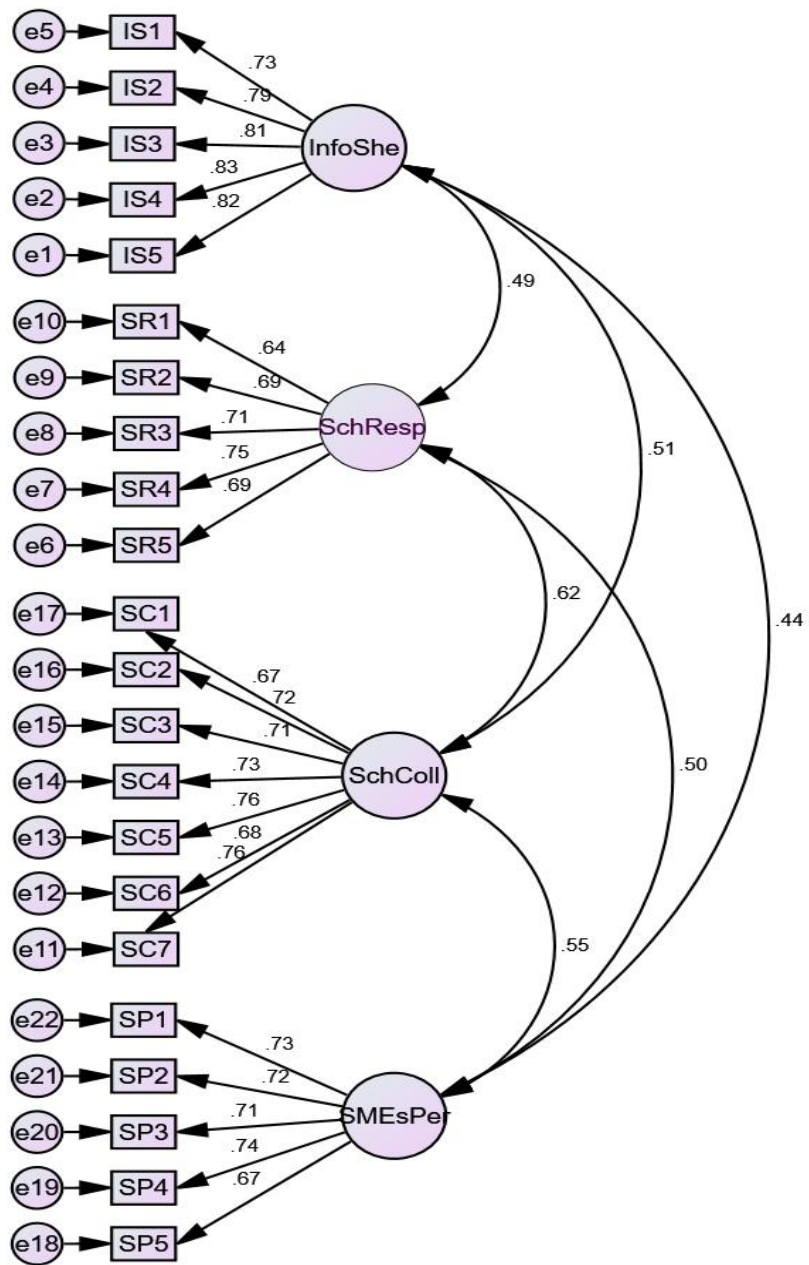
Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree. **Note:** ^asignificance level $p<0.05$; ^b significance level $p<0.01$; ^c significance level $p<0.001$.

According to Moutinho & Hutcheson (2011:328), there are other criteria when determining the correlation of the constructs or variables, the first criteria is that correlation coefficients can vary numerically between 0.0 and 1.0 depending on the outcome the closer the correlation is to 1.0, the stronger the relationship existing between the two variables. When a correlation is 0.0 it clearly indicates that there is no relationship between the variables but when the correlation coefficient is -1.0 it shows that there is strong relationship between the variables. Another criterion is the sign of the correlation coefficient. When there is a positive correlation coefficient,

variable one increases then variable two also increases and when variable one decreases then variable two decreases, which means that the variables move in same direction when there is a positive correlation. A negative correlation on the other hand means that when variable one increases then variable two decreases; the variables move in the opposite directions when the correlation is negative. The third criterion is statistical significance of the correlation and it is indicated by a probability value of less than 0.05; meaning that when the probability of obtaining correlation coefficients is by chance less than five times out of 100, the result indicates that a relationship is present. When the correlation coefficient is -0.80 then statistically there is a significant negative relationship between the variables size and reading score ($p < .001$), resulting in correlation occurring by chance less than one time out of 1000. The fourth criterion is the effect size of the correlation, which is also known as the coefficient of determination and it is defined as r^2 . The coefficient of determination can vary from 0 to 1.00 indicating that proportion of variation in the scores is predicted from the relationship between two variables. Table 4.3 indicates that the inter-correlation values for all paired latent variables are less than 1.00, thereby confirming the existence of discriminant validity.

4.7 CONFIRMATORY FACTOR ANALYSIS (CFA)

The CFA model presented in this study is a pure measurement model coupled with un-gauged covariance existing between each of the possible latent variable pairs (Nunnally, 1978:216). The findings of the CFA results are detailed in Table 4.4 and Figure 4.5.



AVE: Average variance extracted; CR: composite reliability; * Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree.

Note: ^asignificance level $p < 0.05$; ^b significance level $p < 0.01$; ^c significance level $p < 0.001$

Figure 4.5: Confirmatory factor analysis

Table 4.4: Confirmatory factor analysis results

CFA indicator	Acceptance level	Default model value	Decision
Chi-square	<3.00	1.651	Accepted level
CFI	>0.900	0.960	Accepted level
RFI	>0.900	0.900	Accepted level
IFI	>0.900	0.961	Accepted level
TLI	>0.900	0.950	Accepted level
NFI	>0.900	0.906	Accepted level
RMSEA	<0.08	0.034	Accepted level

Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= Agree; 7=strongly agree. **Note:** ^asignificance level $p<0.05$; ^b significance level $p<0.01$; ^c significance level $p<0.001$.

In this study, a chi-square test is used to observe the general fit of the model as recommended by Coldwell and Herbst, (2014:22). The chi-square value over degree of freedom of value that is below 0.3 was achieved which is an indication that it meets the acceptable model fit as asserted by Chinomona (2011:132). In Table 4.4, there is an indicator value for chi-square over degree of freedom of 1.651 that signifies the acceptable model fit because is below the required threshold 0.3. The NFI value is (0.906), TLI value is (0.950), IFI value is (0.961), CFI value is (0.960), TLI value is (0.950) and RFI is (0.900), respectively. All these CFA criteria are greater than 0.9 and, therefore, confirm acceptable model fit. McDaniel and Gates (2013:438) state that the RMSEA value must fall below 0.08, indicating a good model fit. The RMSEA value indicated in Table 4.4 is 0.034, which is an acceptable threshold; this can be considered to validate good model fit. The next section discusses the structural model testing.

4.8 STRUCTURAL EQUATION MODEL TESTING

SEM is referred to as a multivariate statistical analysis technique that is used to analyse structural relationships. This technique entails the combination of factor analysis as well as multiple regression analysis and it is used to analyse the structural relationship between the measured variables and latent constructs. This study used SEM because of its capability to estimates multiple and interrelated dependence in a single analysis. The SEM was conducted with the purpose of evaluating causal relationships that exist among latent variables (Flick, 2014:472). The procedure includes multiple regression analysis and path analysis of the models

relationship among latent variables as recommended by Churchill, *et al.* (2010:79). Table 4.5 is a representation of the path model.

Since the acceptable value of CFA measurement model fit is secured, the study proceeds to the next stages of examining SEM model fit and testing of the hypotheses. Table 4.5 represents the structural equation model fit results. The results show the acceptable goodness-of-fit of the model. The acceptable model is detailed with the chi-square value (CMIN/DF) of 1.899, which is less than the recommended threshold level of <0.3; the Root mean square error of approximation (RMSEA) value is 0.040, CFI value is 0.945, RFI value is 0.900, IFI value is 0.946, TLI value is 0.932 and NFI value is 0.900. Most of these results are within the recommended level of greater than 0.900 as recommended by Nunnally (1978:212).

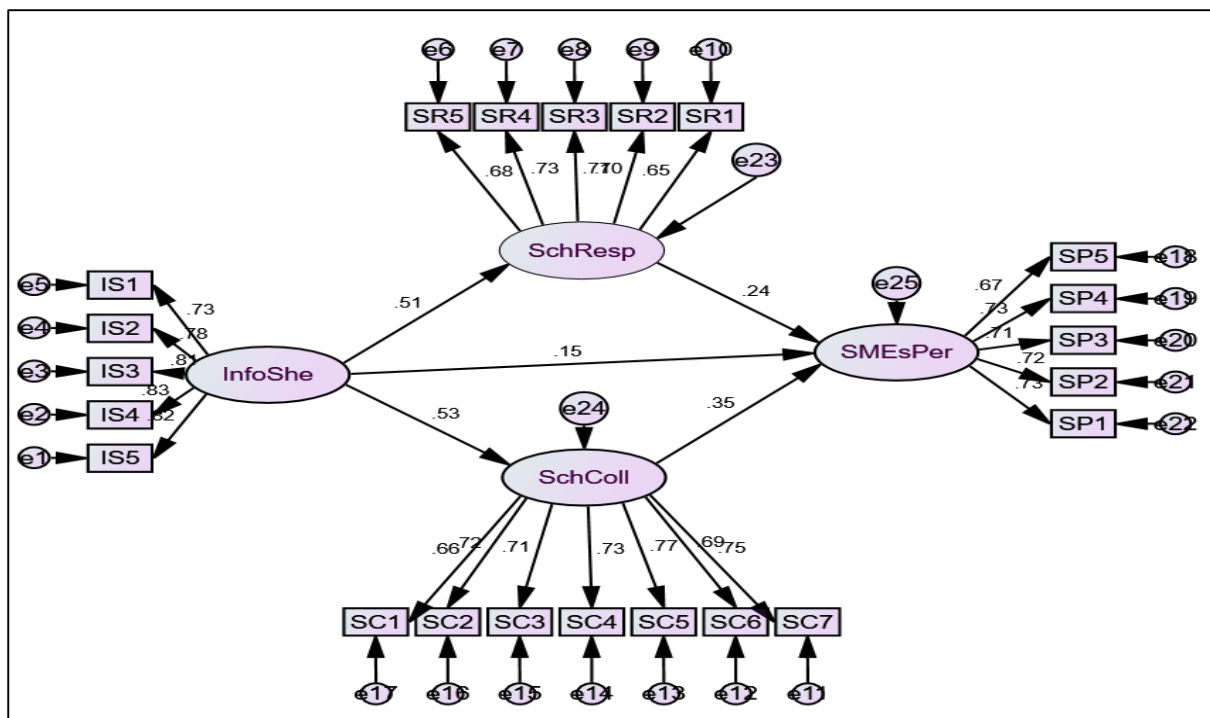
Table 4.5: Structural equation model fit results

SEM indicator	Acceptance level	Default model value	Decision
Chi-square	<3.00	1.899	Accepted level
CFI	>0.900	0.945	Accepted level
RFI	>0.900	0.900	Accepted level
IFI	>0.900	0.946	Accepted level
TLI	>0.900	0.932	Accepted level
NFI	>0.900	0.900	Accepted level
RMSEA	<0.08	0.040	Accepted level

Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree. **Note:** ^asignificance level $p<0.05$; ^b significance level $p<0.01$; ^c significance level $p<0.001$.

In order to test the relationships between information sharing, supply chain responsiveness, supply chain collaboration and SMEs performance, SEM was employed in this study. Flick (2014:532) posits that one of the benefits of SEM is its ability to help a researcher account for measurement error in the variables. For this reason, the hypothesised model will assume four components, namely information sharing (IS) supply chain responsiveness (SR) supply chain collaboration (SC) and SMEs performance (SP). The parameter values estimated for the path diagram are reported in Table 4.5, along with the output results of the SEM analysis for the model fit.

The parameter estimates of the structural model disclose the direct influence of information sharing on supply chain responsiveness, direct influence of information sharing on supply chain collaboration, supply chain collaboration impact on SMEs performance, the influence of supply chain responsiveness on SMEs performance and the direct impact of information sharing on SMEs performance. The results presented in Table 4.4 and Table 4.5 support the proposed research hypotheses that were formulated in Chapter1. The previous section presented statistics model fit above the acceptable thresholds recommended by Nunnally (1978:212) and Flick (2014:547). Figure 4.6 shows the path analysis between the constructs.



AVE: Average variance reliability; CR: composite reliability; SR: supply chain responsiveness; SC: supply chain collaboration; IS: information sharing; SP: SMEs performance; * scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree.

Note: ^asignificance level $p < 0.05$; ^b significance level $p < 0.01$; ^c significance level $p < 0.001$.

Measurement SEM model fits criteria: CMIN/DF= 1.899; NFI=0.900, TLI=0.932, CFI=0.945, IFI=0.946, RFI=0.900; RMSEA=0.040

Figure 4.6: Path analysis

Table 4.6: Hypotheses results

Construct Measured			Path coefficient	S.E.	C.R.	P	Label
H1: SR	<---	IS	.516	.050	7.473	***	Accepted
H2:SC	<---	IS	.537	.052	8.360	***	Accepted
H3: SP	<---	SC	.353	.075	3.195	***	Accepted
H4: SP	<---	SR	.235	.068	4.740	***	Accepted
H5: SP	<---	IS	.146	.060	1.827	.068	Rejected

AVE: Average variance extracted; CR: composite reliability; SR: supply chain responsiveness; SC: supply chain collaboration; IS: information sharing; SP: SMEs performance; * Scores: 1=strongly disagree; 2=disagree; 3=slightly disagree; 4=neutral; 5=slightly agree; 6= agree; 7=strongly agree. Note: ^asignificance level $p<0.05$; ^b significance level $p<0.01$; ^c significance level $p<0.001$. **Measurement SEM model fits criteria:** CMIN/DF= 1.899; NFI=0.900, TLI=0.932, CFI=0.945, IFI=0.946, RFI=0.900; RMSEA=0.040

During the introduction and background of this study, five hypotheses were developed. These hypotheses went through assessment in order to check how well the relationships influence each other. These steps are aimed at examining the causal relationships that exist among latent variables by path analysis (McDaniel & Gates, 2013:416). According to Flick, (2014:463) SEM emphasises that a latent variable usually directly or indirectly influences other latent variables, which could result in estimating results that portray the possibility of the latent variables being related. For this study, the estimated results were elicited through hypothesis testing, which were indicated in Table 4.6 and Figure 4.5. This table and figure indicate the proposed hypotheses, path estimates and p-values, indicating if the hypothesis is rejected or supported or rather weak. The literature asserts that $p<0.05$, $p<0.01$ and $p<0.001$ serve as indicators of relationship significance and positive factor loadings indicate strong relationships among the latent variables (Flick, 2014:465). The general empirical findings, including the hypotheses testing results, are discussed below.

4.9 DISCUSSION OF EMPIRICAL FINDINGS

4.9.1 Findings on information sharing and supply chain responsiveness (H1: IS & SR)

Hypothesis 1, which states that information sharing has a significantly positive influence on supply chain responsiveness is strongly supported (Path=0.52, $P<0.000$, PV= ***). **H1** therefore,

confirms that SMEs with real-time information sharing initiatives can gain more efficient supply chain responsiveness throughout the supply chain. SMEs supply chains are benefited by their ability to exchange information effectively to aid quick response to the customer's changing demands. Accurate information sharing may improve SMEs chances of being more proactive in detecting market changes, re-structuring of processes to convene innovative market needs as well as adopting new product development ahead of their competitors. The findings of *H1* strongly indicate the presence of intermediate measure of relationships between information sharing and supply chain responsiveness. Having a high path coefficient implies that SMEs business performance and growth highly depend on their ability to respond to market demand accurately at the right time, right place and in the right quantity and quality. The relationship between information sharing and supply chain responsiveness is also consistent with the findings of Chinomona & Pooe (2013:12) and Qrunfleh and Tarafdar (2013:553) on supply chain responsiveness. These studies claimed that information sharing has a significant positive influence on supply chain responsiveness.

4.9.2 Findings on information sharing and supply chain collaborations (H2: IS & SC)

The finding empirically confirms the assertion in the literature, which states that information sharing has a significantly positive influence on supply chain collaboration ($P=0.54$, $P<0.000$, $PV=***$). *H2* further proves that the level of quality information shared among SMEs is more likely to create an effective collaborative relationship within the supply chain. With this, SMEs can manage inventory levels, whilst being flexible in their operational lead-time. SMEs operational flexibility may lead to overcoming the presence of the bullwhip effect and market uncertainties caused by lack of accurate information. The accuracy and quality of information shared can help SMEs to collaborate successfully with partners and suppliers in a win-win situation. As a result, SMEs will achieve and retain a high level of competitive advantage (Chinomona & Pooe 2013:13; Kang & Moon 2015:4). The path coefficient also indicates that information flow is the stronghold of efficient collaborative relationships. Therefore, information sharing and supply chain collaboration are essential business strategies that SMEs should embrace. *H2* is significant and supported.

4.9.3 Findings on supply chain collaboration and SMEs performance (H3: SC & SP)

The finding empirically confirms that supply chain collaborative practices among SMEs are important determinants of performance enhancement (Path=0.35, $P < 0.001$, $PV = ***$). H3, therefore, confirms that the ability of SMEs to implement a collaborating relationship outside organisational boundaries will likely result in faster product-to-market cycle times, costs and lead-time reduction. SMEs supply chains benefit for their ability to improve competitive advantage and inter-firm relationships, enhancing SMEs towards organisation-specific benefits in terms of financial performance (Kim 2009:345). With this, SMEs are able to maintain and improve integrated long-term relationship among supply chain partners. Hence, **H3** is significant and supported.

4.9.4 Findings on supply chain responsiveness and SMEs performance (H4: SC & SP)

From Table 4.6 and Figure 4.5, the finding ($P = 0.24$, $P < 0.000$, $PV = ***$) empirically confirms that SMEs with a responsive supply chain capability have a greater chance to achieving success. This is true because global markets require speed to compete effectively with rivals. SMEs may further have to improve on reliability service, customer service and product quality in a quick and responsive manner to achieve business performance. The findings also authenticate that supply chain responsiveness may enable SMEs to gradually improve efficiency and effectiveness within the supply chain. SMEs supply chains are benefited by their ability to obtain a continual undisrupted revenue and competitive advantage with the attainment of agility, robustness and resilience. As a result, SMEs can gain both contemporary and financial measures by maximising their competitive advantage through improved responsiveness, which improves performance. The result of the finding is consistent with Youn *et al.* (2012:473), who state that responsive SMEs have a greater success in improved reliability service, improved customer service, quality improvement, cost reduction and organisational performance. Therefore, **H4** is significant and supported.

4.9.5 Findings on information sharing and SMEs performance (H5: IS& SP)

H5 examines the direct impact of information sharing on SMEs performance. The result (Path=0.15, $P < 0.068$) demonstrates that information sharing and SMEs performance has a weak relationship and it is not supported. Therefore, the null hypothesis is accepted because there is no relationship between information sharing and SMEs performance. The weak relationship may

indicate that information sharing does not necessary enhance SMEs performance if the information shared is not useful and not beneficial to the success of the organisation. As such, it might be difficult for SMEs to survive if the information exchange within the supply chain is ineffective (Cooper & Schindler, 2006:67). Therefore, SMEs should enhance the usefulness of information gained through a collaborative relationship with suppliers and customers, which may result in responsiveness and higher levels of business performance.

4.10 SYNOPSIS

The measurement model with all four constructs was assessed using CFA and SEM to determine if the proposed model fit or not. The combination of these results suggested that the measurement model exhibited a good level of model fit. The convergent validity and discriminant validity were accessed. The reliability of the constructs (composite reliability) and the AVE were used as the measures for convergent validity; the CR of all constructs exceeded the benchmark of 0.7. All construct AVEs exceeded the suggested value of 0.5. Discriminant validity is demonstrated when the respective AVE is larger compared to the squared correlation existing between two constructs. In general, the four constructs show evidence of high discriminant validity.

The overall results indicate:

H1: Information sharing has a significantly positive influence on supply chain responsiveness

H2: Information sharing has a significantly positive influence on supply chain collaboration

H3: Supply chain collaboration has a significantly positive influence on SMEs performance

H4: Supply chain responsiveness has a significantly positive influence on SMEs performance

H5: There is no relationship between information sharing and SMEs performance

The following chapter discusses the limitations, recommendations and conclusion of the study.

CHAPTER 5

CONCLUSIONS, RECOMMENDATION AND CONTRIBUTION OF THE STUDY

5.1 INTRODUCTION

This chapter provides the general overview of the study. Information derived from supporting empirical findings and the results obtained from Chapter 4 are discussed and summarised. The first section consists of a summary and discussion of the entire study, empirical findings and hypotheses. The second section provides recommendations and limitations for future studies. The third section presents the contribution and implications of the study. The chapter will further conclude after outlining the key learning outcome of the study. Results acquired from the SPSS were presented in detail along with write-ups. CFA and SEM results are explained and presented in a table format. The overall results obtained from using CFA and SEM are analysed with the aid of tables, graphs, figures, correlations and comparisons of the initial estimated hypothesis with the empirical findings of the study. The reliability of the constructs (composite reliability) and the AVE were also presented along with interpretations. This chapter presents the summary and conclusions of the empirical findings on the need for SMEs to employ information sharing, supply chain responsiveness, supply chain collaboration as a determinant influence on SMEs performance thus, advancing and expanding their understanding of the diverse evidence based on the key learning outcomes.

5.2 THEORETICAL AND EMPIRICAL OBJECTIVES AND REFLECTIONS

In Chapter 1, some theoretical objectives were set to achieve the primary objective, namely to conduct a literature review on information sharing, carry out a literature synthesis on supply chain responsiveness, review the literature on supply chain collaboration and carry out a literature review on the SMEs performance. As these objectives were being attained, some empirical objectives were also set out. The empirical finding was revisited in this section and the next section will proceed with a brief summary of the data analysis results obtained in Chapter 4.

Empirical objective 1: To determine the influence of information sharing on supply chain responsiveness

With the empirical need to determine this influence, the researcher adopted the supporting literature by Chinomona and Pooe (2013) and Qrunfleh and Tarafdar (2013) to develop a

motivational correlation between information sharing and supply chain responsiveness. The relationship between these two constructs was analysed in Chapter 4 with results confirming that SMEs can improve their response time capability through information sharing. Thus, SMEs could make better decisions on distribution planning, thereby reducing overall operational cost and customer service. The hypotheses were further accessed with results showing significant positive relationships and influence between information sharing and supply chain responsiveness. To confirm this relationship statistically, SEM was used and it was confirmed in Chapter 4 to be a positive relationship.

Empirical objective 2: To determine the influence of information sharing on supply chain collaboration

In Chapter 1, the study estimated that there is a relationship between information sharing and collaboration. The researcher further reviewed the literature on supporting empirical findings detailed in Chapter 2, suggesting that SMEs can benefit from information sharing through collaboration with key suppliers. SMEs can also achieve the advantage of their workers working collaboratively together, which was assumed as an opportunity for SMEs to collaborate with their partners and suppliers within the supply chain. In order to test and prove this relationship, Chapter 4 presented the data analysis processes concerning achieving the statistical result. The influence of information sharing on supply chain collaboration was confirmed to have a strong correlation.

Empirical objective 3: To examine the influence of supply chain collaboration on SMEs performance

This study adopted a reviewed on the relationship between supply chain collaboration and SMEs performance from theoretical findings by Kang and Moon (2015) and Kim (2009). A literature review was carried out in Chapter 2 and it was observed that SMEs aiming to achieve higher levels of business performance, should consider supply chain collaboration as important. The hypothesis that was developed, which stated that supply chain collaboration has a positive influence on SMEs performance was proven to be true using AMOS. The result gained from the hypothesis advocates that SMEs could improve performance along with integrated long-term relationships in a collaborative manner.

Empirical objective 4: To determine the influence of supply chain responsiveness on SMEs performance

As mentioned in Chapter 2, with the help of a literature review, there is need for SMEs to adopt the initiative of sharing accurate information in collaborative relationships to aid responsiveness. In order to prove this, a literature review was carried out along with the data analysis in Chapter 4 to access the correlation of the research variables. In this study, supply chain responsiveness was proven to have a positive influence on SMEs performance. Supply chain responsiveness can help SMEs achieve competitive advantage in terms of customer satisfaction and business performance. This influence was not only theoretically, but also statistically proven with path analysis results showing a strong relationship between the two constructs.

Empirical objective 5: To examine the impact of information sharing on SMEs performance

In Chapter 1, a hypothesis was estimated that information sharing has a positive impact on SMEs performance. A literature review was conducted in Chapter 2 to determine theoretically the importance of information sharing on SMEs performance. The review postulated that SMEs could benefit from information sharing; information sharing within a supply chain can positively influence SMEs product quality, innovation capability and responsive capabilities. In order to test these empirical findings, Chapter 3 of this study provided the data analysis process. It was noted in Chapter 4 that SMEs can achieve potential performance outcome through efficient responsiveness to a market's changing demands and through collaborative relationships within the supply chain.

The literature highlighted that information sharing plays an important role in different supply chain functions, such as demand planning, order execution, capacity planning and purchasing. This current study also reviewed information sharing to have impact on SMEs performance through supply chain responsiveness and supply chain collaboration. In this study, it has been shown that empirical data analysis done on the construct provided helpful insights that led to a methodology for a valid and reliable model fit. This study postulated that, to enhance performance, three enablers of supply chain must be fully developed, reviewed, tested and analysed. As a result, the importance of information sharing is very significant within the modern business operational activities.

In Chapter 2, the literature was reviewed on the importance of supply chain responsiveness. The literature review revealed that SMEs could improve response-time capabilities, improve customer service and make better decisions regarding ordering and production planning. As observed in Chapter 2, if organisations are quick to respond to customers, it will place them on the level of being the first to take advantage of the market. The study also emphasised that when

SMEs have gained the capability to be more reactive to any changing market requirements necessary, they are considered to have a high degree of responsiveness, thereby improving performance. Supply chain collaboration was reviewed; other authors showed that collaboration efforts have improved performance while others posit that any efforts made by SMEs to implement a networking relationship can result in competitive advantages.

This research was expected to support the contention that the presence of information sharing, supply chain responsiveness and supply chain collaboration is generally expected to have a significant effect on SMEs performance. Until this stage, the overall analysis result obtained in Chapter 4 proved this expectation to be valid and the next sections will provide the summary of the results acquired from the data analysis and the hypotheses will be summarised individually. The summary will consist of reflections on the literature reviewed in Chapter 2, a brief explanation of the results obtained and the status of the outcome.

H1: Information sharing has a significantly positive influence on supply chain responsiveness

Section 5.1 described the current research that supports the posited relationships between information sharing and supply chain responsiveness. According to the results obtained in the data analysis and interpretation stage, the availability of information and responsiveness are positively related. The current research reinforces the importance of the relationship between the two constructs by determining the influence of information sharing on responsiveness. The influence was further proven after analyses had been done. The correlated item total statistics result ranging from 0.571 to 0.767 is also considered acceptable. Furthermore, the CFA analysis was conducted with the aim of accessing the goodness-of-fit values which was conducted with the presence of the entire construct using criteria, such as the chi-square (χ^2 /DF) result of 1.651, normed fit index (NFI) value of 0.906, Tucker-Lewis index (TLI) value of 0.950, incremental fit index (IFI) value of 0.961, comparative fit index (CFI) value of 0.960 and the root mean square error of approximation (RMSEA) value of 0.034 were acceptable. The hypothesis was supported with significant value (Path=0.52, $P < 0.001$) showing that information sharing has a significantly positive influence on supply chain responsiveness.

H2: Information sharing has a significantly positive influence on supply chain collaboration

Information sharing among SME members and partners of the supply chain has long been recognised as a competitive construct that influences responsiveness. Such information exchange

motivates SMEs to ask what to share, whom to share with, how to share and when to share. The type of information shared can include production planning, inventory level returns, forecast accuracy, price levels and pricing, sales data, promotion performance and on-time delivery. Information sharing was reviewed to enhance SMEs towards operational efficiency and visibility. With this, cost reductions, increased sales and customer satisfaction are guaranteed. This research has also proven information sharing is an important prerequisite for effective collaboration. In Chapter 1, a hypothesis was developed stating that information sharing has a positive influence on supply chain collaboration. CFA analysis was conducted. Hypothesis 2 was supported with significant value (Path=0.54, $P < 0.001$). The coefficient between these two constructs supports **H2**, which states that information sharing has a significant positive relationship with supply chain collaboration.

H3: Supply chain collaboration has a significantly positive influence on SMEs performance

In chapters 1 and 2, it was reviewed that SMEs that are within a supply chain relationship tend to do better and hold up to a 40 to 65 percent advantage in their cash-to-cash cycle time and can gain more competitive advantage compared to their competitors. An overall implementation of supply chain collaboration may well coincide with an overall performance improvement. As stated in **H3**, it is expected that SMEs can collaboratively maintain effective and coherent operations, both with suppliers and customers, in order to outperform market competition. Correlated item total statistics resulted ranging from 0.602 to 0.717, which is also considered acceptable. CR was calculated for all the constructs of the study; the sum was divided by the total variance that exists in the composite using the formula as stated in Chapter 4. Therefore, this current finding empirically confirms **H3**, which states that supply chain collaboration has a significantly positive influence on SMEs performance.

H4: Supply chain responsiveness has a significantly positive influence on SMEs performance

This study has proven the output of the relationship between supply chain responsiveness and SMEs performance serves as a guide, providing insight for SMEs to project and manage their collaborative activities more effectively. An intuitive expectation is that organisations that collaborate more with their suppliers and partners are likely to maintain a continual monitoring system throughout the operational activities. In this study, supply chain responsiveness is regarded as an enabler for SMEs to become more proactive in detecting market changes within their supply chain, hence creating an advantage for them to continually enhance and maintain a

long-term relationship with their customers and suppliers. The relationship between these two constructs has statistically proven that responsive organisations have higher advantages of achieving improved customer service, reliability and quality improvement. Therefore, the research findings confirm **H4** to be significant.

H5: Information sharing has a significantly positive impact on SMEs performance

Hypothesis 5 postulated that there is a positive and significant relationship between information sharing and SMEs performance. The findings were achieved through data analysis conducted in Chapter 4 and was found not to be significant, thereby accepting the null hypothesis. The result was not consistent with the assumption made in Chapter 1. This may be as a result of inaccurate information sharing among which can contribute towards unimproved SMEs buyer-supplier relationships, ineffective collaborative partnerships and inefficient responsiveness. In order to authenticate these assumptions, the researcher theoretically and statistically tested this statement. All the necessary assessments were done with the aim of ensuring that the results obtained meet the required outcome. The direct path coefficient value and the significant level (Path=0.15, $P < 0.068$) between information sharing and SMEs business performance revealed a weak relationship.

5.3 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

From the initial stage of this study, the researcher acknowledged that evaluating the findings would by no means be accomplished without limitations and recommendations for future research. The researcher aimed at discussing several limitations along with recommendations on how to overcome those limitations regarding future studies. One of the limitations revolves around the fact that the study was only within Emfuleni Local Municipality SMEs. Further studies can consider basing the study within South African SME sector in general. Some of the relationships examined were not favourable, such as the relationship between information sharing and SMEs performance. It can be considered a clear concern with information sharing since most empirical studies reported a correlation between information sharing and performance. This could be equally reasonable because the relationship found within the indirect correlation between information sharing and performance was strong.

A relatively small sample size of 500 SMEs was employed and it limited the extent to which the information can be generalised. If the sample targeted the entire South Africa instead of a district municipality, more reliable data could have been achieved even though, it would have been time consuming to travel to all those areas. Using a closed-end structured questionnaire can also be

considered as a limitation as SMEs are limited to the answer the questions presented to them. Opinions on how the business can be developed through information sharing, supply chain responsiveness and collaboration cannot be generalised.

Observing the influence of information sharing, supply chain responsiveness, supply chain collaboration and SMEs performance requires further investigation. The study will only broaden organisations that are represented by the SMEs database. Further studies should inflate to scope a broader range of businesses. The collected data that was retrieved from several sectors of SMEs, such as the agriculture, hunting, forestry or fishing, mining, or quarrying, manufacturing, storage or transporting, electricity, gas or water supply, construction, wholesale or retail trade, community, social, communicating or personal services were simplified. The study can collect information focusing only on manufacturing, storage or transporting, wholesale or retail trade with the aim of simplifying the data collection. Future research, therefore, could consider the means of utilising a multi-matched pair by collecting the data not only from the SMEs but also from the members of their supply chain in order to allow a cross-check of the data collected. Preferably, this data should also be collected from multiple respondents, equally from manufacturing, storage or transporting, wholesale or retail trade, as a result, increasing the validity of the data.

It is important to prioritise to ensure that key members of the supply chain are included. As focused responsiveness is critical, all efforts made by SMEs must be expanded in order to determine what constitutes desired responsiveness for individual members in the supply chain. Differentiated and highly responsive programmes for key members of the supply chain should be impartial with supply chain members oriented but less tailored approaches for lesser involved members. Enough and important information must be obtained in order to identify the member's requirements. The current study has reviewed that responsive and collaborative firms have leveraged information towards improving operating performance. Collaborative and responsive firms have been more successful in increasing efficiency within their supply chain. For the benefit of all members of their supply chain, SMEs can focus on commitment to share information that is more adequate, respond to what supply chain members want rather than speculating and collaborate more with them, to improve and monitor the performance on a close manner. When such efforts are made, SMEs can develop the initiatives to adopt the style of sharing information with the entire members of their supply chain and respond quickly to any market changes or new development. It is important to note the implications and contribution of the study, which will be discussed in the next section.

The concern of the information sharing literature revolves around the assumption of whether information sharing holds a highly demonstrable strong relationship on performance. The literature review of this study asserted that information sharing strengthens SMEs collaboration capabilities and responsiveness within the supply chain (. Although this study found information sharing had the strongest impact on performance through supply chain responsiveness and supply chain collaboration, information sharing can also influence performance directly with a strong relationship. It was reviewed in Chapter 2 that information sharing enables SMEs to improve response time, reduce operational cost as well as improve customer's service. The study further discussed the outcome of the results and how favourable they were, but discussion structure alone does not alter the strength between information sharing and performance. To achieve performance, SMEs need to employ information sharing to enhance on-time responsiveness and collaboration. More research is needed to determine the influence or impact of information sharing directly correlating with SMEs business performance. This might seem like an appropriate support, but it does not necessarily mean that these are the only data necessary to be acquired. Future researchers must also consider determining the appropriate scale for information sharing influencing responsiveness, collaboration and performance.

Information sharing has some significant implications for performance. The implications are that speed, flexibility and responsiveness lead to greater supply chain performance hence, securing a competitive edge in the market place. SMEs are often advised that in order to be more flexible, obsession with responsiveness to customers should be initiated. However, tangible examples, based on empirical evidence of the benefits associated with responsiveness, are that it allows organisations the means of identifying the basic market opportunities and the ability to take advantage by reacting to market opportunities quickly. With collaboration, organisations will have to learn to trust their collaborating partners by setting up joint business goals and jointly designing processes that will lead them to their goals. The implication is that these goals may not be easy to achieve, SMEs can then take advantage of the contributed benefits by striving to develop a well-defined collaborative objective, instituting joint performance measurement, communicating risk and sharing rewards with partners; with this, creating strategic alliance that is built on trust may result.

Adequate information sharing contributes to improved visibility that leads to effective coordination. A collaborative relationship built on information sharing is essential to superior performance as it assists SMEs to reach a long-term relationship with potential partners of the

supply chain. Collaboration can also lead SMEs towards gaining long-term process planning and complete integrated processes, such as truckload utilisation, manufacturing scheduling and warehouse management. On the other hand, responsiveness has contributed benefits, such as faster cycle times, increasing sales and reducing distribution operation. If SMEs can understand the relationship that exists between information sharing, supply chain responsiveness and supply chain collaboration, it will necessitate the need for them to adopt these constructs. The results obtained from the data analysis of this study show these relationships to be strong both from the supporting empirical findings and statistical data analysis results. Therefore, the general lesson from this study is that SMEs should acknowledge information sharing as the number one critical step when aiming at improving quick response time, collaborating and business performance. The next section will briefly discuss the learning outcome of the study, both for SMEs and future researchers.

5.5 KEY LEARNING OUTCOME

With the current turbulent business environment, SMEs are left with the choice of attempting to initiate information sharing with the aim of developing and maintaining a sustainable competitive advantage hence, improving performance. This study has presented a framework that information sharing can improve supply chain responsiveness and supply chain collaboration. SMEs now must develop the style of sharing information with key supply chain partners. SMEs must be sure of who they share information with, why they share the information, what information should be shared and why they should share the information. SMEs should learn to acknowledge the fact that supply chain collaboration can provide channels of communication, which may keep members informed of all necessary information. SMEs can improve their extended performance, quickly react to markets' changing needs and collaboratively work with all members of the supply chain by using information sharing as a determinant. With future researchers, the result of the study has empirically and statistically proven the reliability and validity of the study. The future researchers can now see the need for them to improve all aspect of the data collection and analysis strategically, that could have been a limitation. This study, therefore, concludes with the fulfilment that not only were the previously estimated hypotheses accomplished, the objectives of the study were also attained.

5.6 SYNOPSIS

In a changing business environment, SMEs should focus on improving their competitive advantage by first, considering adopting information sharing, supply chain responsiveness and supply chain collaboration as a key lever in driving success. To motivate these postulates, this

current study was carried out with the support of other empirical findings. The literature highlighted that information sharing plays an important role in different supply chain functions, such as demand planning, order execution, capacity planning and purchasing. This study also reviewed information sharing to have impact on SMEs performance through supply chain responsiveness and supply chain collaboration. This study postulated that to enhance performance, three enablers of supply chain must be fully developed, reviewed, tested and analysed. As a result, the importance of information sharing was regarded as significant within the modern business operational activities. Chapter 1 consisted of the background and introduction of the study, providing a brief discussion on the constructs as well as the theoretical framework. In Chapter 2, the literature was reviewed in detail and initial hypotheses that were developed in Chapter 1 were stated. Chapter 3 detailed the data analysis process and all packages that will be used to analyse the data. Since it is important for the study to present and interpret the results obtained from the analysis, Chapter 4 of the study proceeded with interpretations on individual hypotheses developed in the study. The study hereby approaches the concluding part where the general findings of the hypotheses were discussed. The objective of the study was revisited with the aim of checking if the objectives were reached or not. Implications, recommendations, contributions and limitations of future studies were discussed, concluding the chapter with a summary of the study learning outcomes. It can be suggested that SMEs can employ information sharing, supply chain responsiveness and supply chain collaboration as determinants to improve performance.

REFERENCES

- Abellan, Mantas, C.J. & Castellano, J.G. 2017. A random forest approach using imprecise probabilities. *A Research Knowledge-Based Systems*, 134(15):72-84.
- Adams, F.G., Richey, R.G., Autry C.W., Morgan, T.R. & Gabler, C.B. 2014. Supply chain collaboration, integration, and relational technology: how complex operant resources increase performance outcomes. *An International Journal of Business Logistics*, 35(4):299-317.
- Addae-Boateng, S., Wen, X. & Brew, Y. 2015. Contractual Governance, Relational Governance, and Firm Performance: The Case of Chinese and Ghanaian and Family Firms. *American Journal of Industrial and Business Management*, 5:288-310.
- Afshan, N., Chatterjee, S. & Chhetri, P. 2018 Impact of information technology and relational aspect on supply chain collaboration leading to financial performance: a study in Indian context. *Benchmarking: An International Journal*, 25(7):2496-2511.
- Ainin, S., Parveen, F., Moghavvemi, S., Jaafar, N.I. & Shuib, N.L. 2015. Factors influencing the use of social media by SMEs and its performance outcomes. *Industrial Management & Data Systems*, 115(3):72-110.
- Alexander, C., Tsai, B., Kohrt, A., Lynn, T., Matthews, T., Betancourt, S. & Shari, L. D. 2016. Promises and pitfalls of data sharing in qualitative research. *Social Science & Medicine*, 169:191-198.
- Alexander, J.F., Chris, L., Daniyal, J.J. & Riaz, A. 2017. Describing the first 2000 registrations to the Research Registry. *Journal of Surgery Protocols*, 32(4):162-174.
- Ang, S.H. 2014. *Research design for business & management*. London: SAGE Productions.
- Angerhofer, B.J. & Angelides, M.C. 2006. A model and a performance measurement system for collaborative supply chains. *Decision Support Systems*, 42(1):283-301.
- Bayraktar, E., Demirbag, M. & Lenny Koh, S.C.A. 2009. Causal analysis of the impact of information systems and supply chain management practices on operational performance, evidence from manufacturing SMEs in Turkey. *Journal of Management Science*, 12(4):445-462.

- Berisha, G. 2015. Defining small and medium enterprises. International institute for critical approach to the definition of small and medium enterprises. *Journal Business Management*, 28(3):17-28.
- Bicer, I., Hagspiel, V. & de Treville, S. 2018. Valuing supply-chain responsiveness under demand jumps. *Journal of Operations Management*, 61:46-67.
- Burnette, M. 2017. Tacit knowledge sharing among library colleagues: a pilot study. *Reference Services Review*, 45(3):382-397.
- Bryman, A & Bell, E. 2011. *Business research methods*. 3rd ed. New York: Oxford University Press.
- Brown, V.M., Strauss, J.L., Labar, K.S., Gold, A.L. & Morey, R.A. 2014. Acute effects of trauma-focused research procedures on participant safety and distress. *An International Psychiatry Research Journal*, 215(1):154-158.
- Caner, S. 2014. The Role of Small and Medium Size Enterprises in Economic Development. *Business Management*, 16(5):2-11.
- Cai J., Liu X., Xiao z. & Liu J. 2009. Improving supply chain performance management: A systematic approach to analysing iterative KPI accomplishment. *Decision Support Systems*, 46(6):512-521.
- Cao, M. & Zhang, Q. 2011. Supply chain collaboration: impact on collaborative advantage and firm performance. *Journal of Operations Management*, 29(3):163-180.
- Catherine, C. 2017. A celebration of diversity and a cautionary tale European Management. *European Qualitative Research Journal*, 34(5):453-456.
- Cooper, D.R & Schindler, P.S. 2006. *Business research methods*. International. Singapore: McGraw-Hill Education.
- Chae, H.C., Koh, C.E. & Prybutok, V.R. 2014. Information technology capability and firm performance: contradictory findings and the possible causes. *MIS Quarterly*, 38(1):305-326.
- Chang, W., Ellinger, A.E., Kim, K. and Franke, G.R. 2016. Supply chain integration and firm financial performance: a meta-analysis of positional advantage mediation and moderating factors. *European Management Journal*, 34(3):282-295.

- Chaudhary, S. & Ahalawat, S. 2014. Credit flow to SMEs in India: a study conducted at bank of Baroda. *Business and management research review*, 3(3):2319-2828.
- Chen, I.J., Lee, Y. Y. & Paulraj, A. 2014. Does a purchasing manager's need for cognitive closure (NFCC) affect decision-making uncertainty and supply chain performance? *International Journal of Production Research*, 52 (23):6878-6898.
- Chen, S.C. 2014. Information needs and information sources of family caregivers of cancer patients. *Journal of Information Management*, 66(6):623-639.
- Cheon, J., Lee, S., Crooks, S.M. & Song, J. 2012. An investigation of mobile learning readiness in higher education based on the theory of planned behaviour. *Journals of Computers & Education systems*, 59(3):1054-1064.
- Chinomona, R. 2011. Non-mediated channel powers and relationship quality: a case of SMEs in Zimbabwe channels of distribution. PhD. Thesis. [Online]. Taiwan National Central University: Taiwan. Available: <http://thesis.lib.ncu.edu.tw/ETDsearch/getfile?URN=964401607&filename=964401607.pdf> Accessed: 14/07/2016.
- Chinomona, R. & Poole, D. 2013. The influence of logistics integration on information sharing and business performance: case of small medium enterprises in South Africa. *Journal of Transportation & Supply Chain Management*, 7(1):1-9.
- Churchill, G.A., Brown, T.J. & Suter, A.T. 2010. Basic marketing research. 7th ed. Mason: Thomson.
- Cockburn, T., Jahdi, K. & Cockburn-Wootten, C. 2017. Engaging CSR Drivers in SMEs Business Conversations: A Pilot Study in Ibero America. *Corporate Social Responsibility & Corporate Governance*, 27:275-296.
- Coldwell, D. & Herbst, F. 2014. *Business research*. Cape Town: Juta Academic.
- Cong, Q.I. & Chau, P.K. 2015. Exploring the key factor leading to IT outsourcing success in China. *Research Journal of Information Technology*, 28(3):462-469.
- Cooper, D.R. & Emory, C.W. 2009. *Business research method*. 5thed. Florida: Irwin.

- Costantino, F., Gravio, G.D., Shaban, A. & Tronci, M. 2014. The impact of information sharing and inventory control coordination on supply chain performances. *Journal of Computers & Industrial Engineering*,76(8):290-306.
- Dai, H., Li, J., Yan, N. & Zhou, W. 2016. Bullwhip effect and supply chain costs with low-and-high-quality information on inventory shrinkage. *International Research Journal*, 24(2):312-469.
- Deshpande, A. 2012. Supply chain management dimensions, supply chain performance and organisational performance: an integrated framework. *International Journal of Business & Management*, 7(8): 2-19.
- Ding, F., Liu, J., Shen, C., Liu, Z. & Fu, X. 2017. An overview of research on waverider design. methodology.*Acta Astronautica*, 140:190-205.
- Du Plessis, P.J. & Rousseau, G.G. 2007. *Buyer behaviour: understanding consumer Psychology and marketing*. Cape Town: Oxford University Press.
- Driessen, J.P.C., Peng, H. & Houtum, G.J. 2017. Maintenance optimization under non-constant probabilities of imperfect inspections.*Reliability Engineering & System Safety*,165(16):115-123.
- Ebeida, S.E., Mitchell, S.A., Swiler, L.P. & Romero, V.J. 2016. Geometric adaptive sampling for probability of failure. *Reliability Engineering & System Safety*, 15(12):64-77.
- Ewedairo, K., Chhetri, P. & Jie, F. 2018. Estimating transportation network impedance to last-mile delivery: A Case Study of Maribyrnong City in Melbourne.*The International Journal of Logistics Management*, 29(1):110-130.
- Fawcett, S.E. Osterhaus, P. Magnan, G.M. Brau, J.C. & Mccarter M.W. 2007. Information sharing and supply chain performance: the role of connectivity and willingness. *Supply Chain Management*, 12(2):358-368.
- Falkena, H. 2012. Small Medium Enterprises and the Contribution to the South African economy. establishment of different categories of SMEs.*Industrial & Commercial Training*, 18(37):7-15.
- Fieser, J. & Pojman, L.P. 2012. *Business ethics, discovering right and wrong*. 7thed. New York: Wordsworth Cengage Learning.

- Fink, K. & Ploder, C. 2009. Balanced system for knowledge process management in SMEs. *Journal of Enterprise Information Management*, 22(1/2):36-50.
- Flick, U. 2014. *An introduction to qualitative research*. 5th ed. London: SAGE Publications.
- Flynn, B.B. Huo, B. & Zhao, X. 2010. The impact of supply chain integration on performance: a contingency and configuration approach. *Journal of Operations Management*, 28:58-71
- Fourie, L.E. 2015. The role of social media as an information source in the decision making of Students when selecting a university. *Master of Commerce in Business Management thesis Pretoria*. University of South Africa.
- Fornell, C. & Larcker, D.F. 1981. Evaluating structural equation models with un-observable variables and measurement error. *Journal of Marketing Research*, 18(1):39-50.
- Gemser, G. & Bont, C. 2016. Design-Related and Design-Focused Research: A Study of Publication Patterns in Design Journals. *The Journal of Design, Economics, and Innovation*, 2(1):46-58.
- Goswami, S., Engel, T. & Krcmar, H. 2013. A comparative analysis of information visibility in two supply chain management information systems: *Journal of Enterprise Information Management* 26(3):5-22.
- Grabot B., Marsina S., Mayere A., Riedel R. & Williams P. 2011. Planning information processing along the supply-chain. *International Journal of Behavioural Operations in Planning & Scheduling*, 12(4):123-158
- Gujrati, R. 2013. Determining the Role of SME's in the Economy of South Africa. *An International Masters Journals*, 86(1):34-72.
- Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. 2006. *Multivariate data analysis*, 6th ed. London: Prentice-Hall.
- Hall, D. C. & Saygin, C. 2012. Impact of information sharing on supply chain performance. *International Journal of Advanced Manufacturing Technology*, 58(4):397-409.
- Halgachmi, A. 2013. A strategy to increase responsiveness, service quality and stretch resources. *International Journal of Productivity & Performance Management*, 62(4):220-235.

- Hamann, R., Smith, J., Tashman, P. & Marshall, R.S. 2015. Why do SMEs go green? An analysis of wine firms in South Africa. *Business & Society*, 1-35.
- Hatcher, L. & O'Rourke, N. 2014. A step-by-step approach to using SAS for factoranalysis and structural equation modelling. SAS institute, Cary.
- Heidi, O., Pia, H. L., Kirsimarja, B. & Paavo, R. 2010. The Dynamics of Relational and Contractual Governance Mechanisms in Knowledge Sharing of Collaborative R&D Projects. *Knowledge and Process Management*, 17:188-204.
- Holguin-Veras, J., Leal, A. & Seruya, B. 2017. Urban freight policymaking: The role of qualitative and quantitative research. *An International Research Journal of Transport Policy*, 56:75-85.
- Honnette, J.E., Vinson, W.E., White, J.M. & Kliewer, R.K. 2008. Contributions of Descriptively Coded Type Traits to Longevity of Holstein Cows. *Journal of Dairy Science*, 63(5):807-815.
- Hui, Z., He-Cheng, W. & Min-Fei, Z. 2015. Partnership management, supply chain collaboration, and firm innovation performance: an empirical examination. *International Journal of Innovation Science*, 7(2):127-138
- Jonsson, P. & Mattsson, S.A. 2013. The value of sharing planning information in supply chains: Relational Governance Theory. *International Journal of Physical Distribution & Logistics Management*, 43(4):2-40.
- Kang, S. & Moon, T. 2015. Impact of organisational competence on supply chain performance through supply chain collaboration. *Journal of Science and Technology*, 8(12):1-10
- Kataike, J., Aramyan, L.H., Schmidt, O., Molnár, A. & Gellynck, X. 2019. Measuring chain performance beyond supplier–buyer relationships in agri-food chains. *Supply Chain Management: An International Journal*, 24(4):484-497.
- Kembro, J. & Selviaridis, K. 2015. Supply chain management: exploring information sharing in the extended supply chain. *An International Research Journal*. 20(4):455-470.
- Kembro, J., Selviaridis, K., & Naslund, D. 2014. Theoretical perspectives on information sharing in supply chains: a systematic literature review and conceptual framework. *Supply Chain Management*, 19(5/6):609-625.

- Kerstin, H., Antoine I., Jonasson, M., Andreas, F. & Lubberink, M. 2017. Quantitative positron emission tomography in brain research. *Brain Research*, 1670(1):220-234.
- Khorheh, M.A., Moisiadis, F. & Davarzani, H. 2015. Management of environmental quality: socio-environmental performance of transportation systems. *International Research Journal*, 26(6):16-25.
- Kim, S.W. 2009. Investigation on the direct and indirect effect of supply chain integration on firm performance. *International Research Journal*, 7(1):335-336.
- Kumar, G. & Banerjee, R.N. 2012. Collaboration in supply chain. *International Journal of Productivity & Performance Management*, 61(8):897-918.
- Kumar, R. & Singh, R.K. 2017. Coordination and responsiveness issues in SMEs supply chains, a review. *Benchmarking: An International Journal*, 24(3):635-650.
- Kull, J.T. 2018. Small and medium enterprise research in supply chain management: the case for single-respondent research designs. *Journal of supply chain management*, 54(1):23-34,
- Ladzani, M.W. & Seeletse, S.M. 2012. Business social responsibility: how are SMEs doing in Gauteng, South Africa? *Social Responsibility Journal*, 8(1):87-99.
- Lee, V.H., Foo, A.T.L., Leong, L.Y. & Ooi, K.B. 2016. Can competitive advantage be achieved through knowledge management? a case study on SMEs. *Expert System with Applications*, 65:136-151.
- Lekhanya, L.M. & Mason, R.B. 2014. Selected key external factors influencing the success of rural small and medium enterprises in South Africa. *Journal of Enterprising Culture*, 22(3):331-348.
- Lenzholzer, S. & Brown, R.D. 2016. Post-positivist microclimatic urban design research: A review. *Landscape & Urban Planning*, 153:111-121.
- Liberta. 2014. What is Gross Domestic product? [Online]. Available: <<http://liberta.co.za/blog/what-is-gross-domestic-product/>> [Accessed 5/11/2016].
- Li, Y., Ye, F. & Sheu, C. 2014. Social capital, information sharing and performance: Evidence from China. *International Journal of Operations & Production Management*, 34(11):14-30.

- Luiz, J. 2013. Small business development, entrepreneurship and expanding the interest of SMEs. Literature review on South Africa small enterprises. *A Business Management Journal*, 14(57):2-13.
- Maghsoudi, A. & Pazirandeh, A. 2016. Supply chain management: visibility resource sharing and performance in supply chain relationships. *An International Journal*, 130(1):125-139.
- Mackelprang, A.W. & Malhotra, M.K. 2015. The impact of bullwhip on supply chains: Performance pathways, control mechanisms, and managerial levers. *Journal of Operations Management*, 36(4):5-32.
- McDaniel, C. & Gates, R. 2013. *Marketing research*. 9th ed. Hoboken, New Jersey: Wiley.
- Maferetlhane, O.I. 2012. The role of indigenous knowledge in disaster risk reduction: a Critical analysis. Masters: Development and Management. Potchefstroom: North-West University.
- Malhotra, N.K. 2010. *Marketing research: an applied orientation*. 6th ed. New Jersey: Pearson.
- Mallin, C. 2013. *Corporate Governance*. 4th ed. United Kingdom: University Press, Oxford.
- Marchi, M., Ferrara, C., Bertini, G., Fares, S. & Salvati, L. 2017. A sampling design strategy to reduce survey costs in forest monitoring. *Ecological Indicators*, 81:182-191.
- Masutha, M. 2015. Small business incubators in South Africa: Emergence, geography and local impacts. PhD. Thesis. [Online]. University of Johannesburg: Johannesburg. Available: <<https://ujdigispace.uj.ac.za>> [Accessed: 14/09/2016].
- Meagen, R. 2016. Chin-Chung Tsai Qualitative research methods: Why, when, and how to conduct interviews and focus groups in pharmacy research Currents in Pharmacy Teaching and Learning. *An International Research Journal*, 8(4):509-516.
- Meflinda, A., Mahyarni, M., Indrayani, H. & Wulandari, H. 2018. The effect of social capital and knowledge sharing to the small medium enterprise's performance and sustainability strategies. *International Journal of Law & Management*, 60(4):988-997.
- Mingers, J. & Willcocks, L. 2017. An integrative semiotic methodology for IS research. *Information and Organisation Journal*, 27(1):17-36.
- Minnaar, R. 2014. Advanced review in management: governance and control of shared service centre. *International Research Journal*, 56(4):1139-1149.

- Minnaar, R. 2014. Governance and control of shared service centers. *Advanced review in Management. International Journal of Management Science*, 133(2):3-64.
- Mohsam, F. & Van Brakel, P.A. 2011. Information and knowledge sharing trends of small and medium-sized enterprises. *South Africa Journal of Information Management*, 13(1):462-472.
- Morrison, J., Clement, T., Nestel, D. & Brown, J. 2016. Under discussed, underused and underreported: pilot work in team-based qualitative research. *Qualitative Research Journal*, 16(4):314-330.
- Moutinho, L & Hutcheson, G. 2011. *The SAGE dictionary of quantitative management research*, vol.3. London: SAGE Publication.
- Moyano-Fuentes, J., Sacristan-Diaz, M. & Garrido-Vega, P. 2016. Improving supply chain responsiveness through Advanced Manufacturing Technology: the mediating role of internal and external integration. *Production Planning & Control*, 27(9):686-697.
- Muritala, T., Awolaja, A. & Bako, Y. 2012. Impact of small and medium enterprises on economic growth and development. Department of Economics and Financial Studies. *International Journal of Business and Management*, 1(1):18-22.
- Nassaji, H. 2015. Qualitative and descriptive research: data type versus data analysis. *Language Teaching Research* 2015, 19(2):129 -132.
- Neneh, N.B. & Van Zyl, J.H. 2013. Achieving optimal business performance through business practices: evidence from SMEs in selected areas in South Africa. *Southern African Business Review*, 16(3):118-144.
- Nunnally, J.C. 1978. *Psychometric theory*. 2nd ed. New York: McGraw-Hill.
- Urban, B. & Naidoo, R. 2012. Business sustainability: empirical evidence on open skills in SMEs. *Journal of Small Business and Enterprise Development*, 19(1):237-242.
- Olawale, F.O. 2014. External environmental factors impacting on access to debt finance by small and medium enterprises in South Africa. *Mediterranean Journal of Social Sciences*. 5(20): 1013- 1019.
- Omar, M.A., Jayaraman, K. & Dahlan, N. 2016. Investigating the relational factors for inter-firm information exchange based on commitment-trust theory. *Journal of Global Business and Social Entrepreneurship*, 2(1):1-12.

- Panahifar, F., Byrne, P.J., Salam, M.A. & Heavey, C. 2018. Supply chain collaboration and firm's performance: the critical role of information sharing and trust. *Journal of Enterprise Information Management*, 31(3):358-379.
- Peschken, T., Shukla, P., Lennon, J. & Rate, S. 2016. The role of information alignment and entrepreneurial traits on SME internationalization. *Management Research Review*, 39(2):196-214.
- Petersen, B. & Ostergaard, K. 2018. Reconciling contracts and relational governance through strategic contracting, *Journal of Business & Industrial Marketing*, 33(3):265-276.
- Pilerot, O. & Limberg, L. 2011. Information sharing to reach collective understanding. a study of design scholars' information practices. *Journal of Documentation*, 18(4):595-612.
- Poggenpohl, S.H. 2015. Communities of Practice in Design Research. *The Journal of Design, Economics & Innovation*, 1(1):44-57.
- Pehrsson, A. 2014. Firms' customer responsiveness and performance: the moderating roles of dyadic competition and firm's age. *Journal of Business & Industrial Marketing*, 29(1):34-44.
- Pooe, D., Mafini, C. & Loury-Okoumba, V.W. 2015. The influence of information sharing, supplier trust and supplier synergy on supplier performance: the case of small and medium enterprises. *Journal of Transport & Supply Chain Management*, 9(1):1-11.
- Prajogo, D. & Olhager, J. 2012. Supply chain integration and performance: the effects of long-term relationships, information technology and sharing, and logistics integration. *International Journal of Production Economics*, 135:514-522.
- Punch, K. 2014. *Introduction to social research: quantitative and qualitative approaches*. London: Sage Publication.
- Qi, Y., Huo, B., Wang, Z. & Yeung, H.Y.J. 2017. The impact of operations and supply chain strategies on integration and performance. *International Journal of Production Economics*, 185(4):162-174.
- Qrunfleh, S. & Tarafdar, M. 2013. Supply chain management: lean and agile supply chain strategies and supply chain responsiveness. *International Research Journal*, 582(6):523-577.

- Raghunath, A. & Rushdi, A. 2017. Preliminaries and Basics of *Probability Sampling Survey.Theory & Applications*, 1-21.
- Rajagopal, P., Azar, N. A. Z., Bahrin, A. S., Appasamy, G. & Sundram, V. P. K. 2016. Determinants of supply chain responsiveness among firms in the manufacturing industry in Malaysia. *International Journal of Supply Chain Management*, 5(3):18-24.
- Ramanathan U. & Gunasekaran, A. 2014. Supply chain collaboration: Impact of success in long-term partnerships. *International Journal of Production Economics*, 147 (11):252-259.
- Rao, Y., Guo, K.H.G. & Chen, Y. 2015. 2015. Information systems maturity, knowledge sharing, and firm performance. *International Journal of Accounting & Information Management*, 23(2):106-127.
- Rouzies, A. 2013. Mixed methods: arelevant research design to investigate mergers and acquisitions. *Advances in Mergers &Acquisitions*, (12):193-211.
- Salam, M.A. 2017. The mediating role of supply chain collaboration on the relationship between technology, trust and operational performance: an empirical investigation, Benchmarking: *An International Journal*, 24(6):298-317.
- Scholten, K. & Schilder, S. 2015. The role of collaboration in supply chain resilience.*Supply Chain Management: An International Journal*, 20(4):624-637.
- Saunila, M. 2017. Understanding innovation performance measurement in SMEs. *Measuring Business Excellence*, 21(1):1-16.
- Song, M. &Liao, Y. 2019. Information sharing, operations capabilities, market intelligence responsiveness and firm performance: a moderated mediation model.*Baltic Journal of Management*, 14(1):58-78.
- Song, H., Yu, K., Ganguly, A. & Turson, R. 2016. Supply chain network, information sharing and SME credit quality: *Industrial Management & Data Systems. Journal of Enterprise Information Management*, 116(4):13-123.
- South Africa WEB. 2011. Small business in South Africa. *Small Business Review*, [Online]. Available: <<http://www.southafricaweb.co.za/page/small-business-south-africa>> [Accessed 13/05/2016].

- Skipworth, H., Godsell, J., Wong, C.Y., Saghiri, S. & Julien, D. 2015. Supply chain alignment for improved business performance: an empirical study. *Supply Chain Management: An International Journal*, 20(5):511-533.
- Small Medium Enterprises. 2001. Defining South Africa Small Medium Enterprises: Business intelligence and Business analysis. (<https://www.techtarget.com.za>" <https://www.techtarget.com.za>). Retrieved: 16th May 2016.
- Smit, Y. & Watkins, J.A. 2012. A literature review of small and medium enterprises risk management practices in South Africa. *African Journal of Business Management*, 6(21):6324-6330.
- Tiwari, M.K., Mahanty, B., Sarmah, S.P. & Jenamani, M. 2013. Modeling of Responsive Supply Chain. *IIT Kharagpur Research Monograph Series*. CRC Press: New York.
- Tony, S.M., Tse, Y., Yiu, T. & Tung P. 2012. Revenue management: resolving a revenue optimization paradox. *International Journal of Contemporary Hospitality Management*, 24(4):507-521.
- Toews, I., Booth, A., Berg, R.C., Lewin, S. & Meerpohl, J. 2017. Further exploration of dissemination bias in qualitative research required to facilitate assessment within qualitative evidence syntheses. *Journal of Clinical Epidemiology*, 88:133-139.
- Turner, N., Aitken, J. & Bozarth, C. 2018. A framework for understanding managerial responses to supply chain complexity. *International Journal of Operations & Production Management*, 38(6):1433-1466.
- Twining, P. Heller, R.S. & Nussbaum, M. 2017. Some guidance on conducting and reporting qualitative studies. *Computers & Education*, 106:1-9.
- Tran, T.T.H., Childerhouse, P. & Deakins, E. 2016. Supply chain information sharing: challenges and risk mitigation strategies. *Journal of Manufacturing Technology Management*, 27(8):1102-1126.
- Xiaoyong, Z., Shanshan, S., Datong, W., Pengfei, C. & Yuanjiang, P. 2017. Carbohydrates. *An International Journal of Analytical Chemical*, 985(8):114-120.

- Van-Helvoort, J., Brand-Gruwel, S., Huysmans, F. & Ellen Sjoer, 2017. Reliability and validity test of a Scoring Rubric for Information Literacy. *Journal of Documentation*, 73(2):305-316.
- Vakani, S.F. O'Beirne, F.O. 2015. Performance improvement CME for quality: challenges inherent to the process. *International Journal of Health Care Quality Assurance*, 28(7):746-750.
- Violante, M.G. & Vezzetti. E. 2017. article/pii/S0166361516303566" An assessment framework for products attributes analysis Computers in Industry. Kano qualitative vs quantitative approach, 86:15-25.
- Vijayalakshmi, G. & Sivapragasam, C. 2008. *Research methods: tips and techniques*. MJP Publishers: Chennai.
- Wiengarten F., Humphreys, P., Cao, G., Fynes, B. & Mckittrick, A. 2010. Collaborative supply chain practices and performance: exploring the key role of information quality Supply Chain Management: *An International Journal* 15(2):463-473.
- Wiid, J. & Diggins, C. 2011. *Marketing research*. Cape Town: Juta.
- Wu, Y.L., Li, E.Y. & Chang, W.L. 2016. Nurturing user creative performance in social media networks: an integration of habit of use with social capital and information exchange theories. *Internet Research*, 26(4):869-900.
- Yang T.-M., Maxwell T.A. 2011. Information-sharing in public organisations: a literature review of interpersonal, intra-organisational and inter-organisational success factors. *Government Information Quarterly*, 28(2):164-175.
- Yarcheski, A., Noreen, E., Mahon, T. & Yarcheski J. 2010. A descriptive study of research inscientific nursing from 1985-2010. *International Journal of Nursing Studies*, 49:1112-1121.
- Ye, F. & Wang, Z. 2013. Effects of information technology alignment and information sharing on supply chain operational performance. *Computer & Industrial Engineering*, 65(3):370-377.
- Youn, S., Yang, M.G., Roh, J.J., 2012. Extending the efficient and responsive supply chains framework to the green context. *Benchmarking: An International Journal*, 19 (4/5):463-480.
- Yu, Z., Yan, H. & Cheng, T.C.E. 2011. Benefits of information sharing with supply chain partnerships. *Industrial Management & Data Systems*, 101(3):11-90.

- Yunus, E.N. 2018. Leveraging supply chain collaboration in pursuing radical innovation. *International Journal of Innovation Science*, 10(3):350-370.
- Zaheer, N. & Trkman, P. 2017. An information sharing theory perspective on willingness to share information in supply chains. *The International Journal of Logistics Management*, 28(2):417-443.
- Zhang, Q., Vonderembse, M.A., & Su Lim, J. 2005. Logistics flexibility and its impact on customer satisfaction. *International Journal of Logistics Management*, 16(1):71-95.
- Zhou, H. & Benton, W.C. 2007. Supply chain practice and information sharing. *Journal of Operations Management*, 25:1348-1365.
- Zikmund, W.G & Babin, B.J. 2013. *Essentials of Marketing Research*. 5th ed. Mason, Ohio: Cengage Learning.
- Zikmund, W.G. 2010. *Business research methods*. 7th ed. TX: Dryden Press: Fort Worth.

APPENDIX A: QUESTIONNAIRE

VAAL UNIVERSITY OF TECHNOLOGY



FACULTY OF MANAGEMENT SCIENCES

QUESTIONNAIRE

The Influence of Supply Chain Responsiveness, Collaboration and Information Sharing on the Performance of Small to Medium Enterprises in a District Municipality

Thank you for paying attention to this academic questionnaire. The objective of the study is to determine the influence of supply chain responsiveness, collaboration and information sharing on the performance of small to medium enterprises in a district municipality. Duration in completing the questionnaire is 10 minutes. As a manager or owner in your organisation, kindly complete this questionnaire independently and honestly within the allocated timeframe. By completing the questionnaire, it is assumed that you are aware of the purpose of the study and has given consent to participate in the study. The research is purely for academic purposes and the information will be kept confidential.

Researcher: E.A Mba

Contact number: +27748281328

Email address: mbaeucheria4logistics@gmail.com

Supervisor email: osayuiwameno@vut.ac.za

Below is the questionnaire to be answered, please answer the following questions by marking the appropriate answer(s) by ticking (✓)

SECTION A: COMPANY PROFILE

A.1 Please indicate the number of years operating in business

2 to 4 years		5 to 7 years		8 to 10 years		11years or more	
--------------	--	--------------	--	---------------	--	-----------------	--

A.2 please indicate the annual sales of the business (R)

Less than R1 million		R1million to less than R5 million		R5million to less than R10 million		R10million to less than R15million		R15million or more	
----------------------	--	-----------------------------------	--	------------------------------------	--	------------------------------------	--	--------------------	--

A.3 Please indicate the number of employees for the business

Fewer than 50		50 to 100		101 to 150		151 or more	
---------------	--	-----------	--	------------	--	-------------	--

A.4 please indicate the type of industry the business is

A4.1	Agriculture, hunting, forestry or fishing	
A4.2	Mining, or quarrying	
A4.3	Manufacturing, storage or transporting	
A4.4	Electricity, gas or water supply	
A4.5	Construction	
A4.6	Wholesale or retail trade	
A4.7	Community, social, communicating or personal services	
A4.8	Others please	

SECTION B: INFORMATION SHARING (IS)

Please indicate to what extent you agree/disagree with the following statements regarding your organisation's information sharing with its trading partners:

		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
IS1	We inform our trading partners in advance of changing needs	1	2	3	4	5	6	7
IS2	Our trading partners share proprietary information with us	1	2	3	4	5	6	7
IS3	Our trading partners keep us fully informed about issues that affect our business	1	2	3	4	5	6	7
IS4	Our trading partners and us exchange	1	2	3	4	5	6	7

		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
	information that helps in the establishment of business planning							
IS5	Our trading partners and us keep each other informed about events or changes that may affect the other partners	1	2	3	4	5	6	7

SECTION C: SUPPLY CHAIN RESPONSIVENESS (SR)

Please indicate to what extent you agree/disagree with each statement regarding your organisation's supply chain responsiveness by ticking the appropriate number provided:

		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
SR1	Our organisation is able to handle difficult non-standard orders	1	2	3	4	5	6	7
SR2	Our organisation is able to meet special customers specification	1	2	3	4	5	6	7
SR3	Our organisation is able to produce product characterized by numerous features options, sizes and colour	1	2	3	4	5	6	7
SR4	Our organisation is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand	1	2	3	4	5	6	7
SR5	Our organisation is able to rapidly introduce large numbers of product improvements/variation	1	2	3	4	5	6	7

SECTION D: SUPPLY CHAIN COLLABORATION (SC)

Please indicate to what extent you agree/disagree with each statement in terms of your organisation's collaboration with suppliers:

		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
SC1	Our organisation jointly plan on product assortment with supplier	1	2	3	4	5	6	7
SC2	Our organisation jointly plan on promotional events with supplier	1	2	3	4	5	6	7
SC3	Our organisation jointly develop demand forecasts with supplier	1	2	3	4	5	6	7
SC4	Our organisation jointly resolve forecast exceptions with supplier	1	2	3	4	5	6	7
SC5	Our organisation consult on pricing policy with supplier	1	2	3	4	5	6	7
SC6	Our organisation jointly decide on availability level with supplier	1	2	3	4	5	6	7
SC7	Our organisation jointly decide on inventory requirements with supplier	1	2	3	4	5	6	7

SECTION E: SMEs PERFORMANCE

Please rate the level of your organisation's performance as compared to the industry average, you may agree/disagree with each statement

		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
SP1	Our organisation has a high level market share growth	1	2	3	4	5	6	7
SP2	Our organisation has a high level of total cost production	1	2	3	4	5	6	7
SP3	Our organisation has a high level of return on investment	1	2	3	4	5	6	7
SP4	Our organisation has a high level of return on assets	1	2	3	4	5	6	7
SP5	Our organisation has a high level of financial liquidity	1	2	3	4	5	6	7
SP6	Our organisation has a high level of net profit	1	2	3	4	5	6	7

Thank you

APPENDIX B: CFA STATISTICAL RESULTS

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
IS5 <--- InfoShe	1.000				
IS4 <--- InfoShe	1.061	.063	16.956	***	
IS3 <--- InfoShe	.969	.059	16.536	***	
IS2 <--- InfoShe	.905	.057	15.746	***	
IS1 <--- InfoShe	.906	.063	14.293	***	
SR5 <--- SchResp	1.000				
SR4 <--- SchResp	1.040	.090	11.522	***	
SR3 <--- SchResp	.970	.088	10.995	***	
SR2 <--- SchResp	1.001	.093	10.790	***	
SR1 <--- SchResp	.902	.090	10.062	***	
SC7 <--- SchColl	1.000				
SC6 <--- SchColl	.909	.076	12.004	***	
SC5 <--- SchColl	1.048	.076	13.719	***	
SC4 <--- SchColl	.995	.077	12.991	***	
SC3 <--- SchColl	.978	.078	12.605	***	
SC2 <--- SchColl	1.002	.077	12.944	***	
SC1 <--- SchColl	.928	.078	11.884	***	
SP5 <--- SMEsPer	1.000				
SP4 <--- SMEsPer	1.062	.095	11.181	***	
SP3 <--- SMEsPer	.981	.090	10.889	***	
SP2 <--- SMEsPer	.989	.090	11.027	***	
SP1 <--- SMEsPer	1.082	.097	11.131	***	

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
IS5 <--- InfoShe	.820
IS4 <--- InfoShe	.830
IS3 <--- InfoShe	.814
IS2 <--- InfoShe	.785
IS1 <--- InfoShe	.730
SR5 <--- SchResp	.695
SR4 <--- SchResp	.747
SR3 <--- SchResp	.705
SR2 <--- SchResp	.690
SR1 <--- SchResp	.637
SC7 <--- SchColl	.756

	Estimate
SC6 <--- SchColl	.676
SC5 <--- SchColl	.765
SC4 <--- SchColl	.727
SC3 <--- SchColl	.708
SC2 <--- SchColl	.725
SC1 <--- SchColl	.670
SP5 <--- SMEsPer	.675
SP4 <--- SMEsPer	.736
SP3 <--- SMEsPer	.712
SP2 <--- SMEsPer	.723
SP1 <--- SMEsPer	.732

Covariances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
InfoShe <--> SchResp	.829	.132	6.281	***	
InfoShe <--> SchColl	.950	.139	6.818	***	
SMEsPer <--> InfoShe	.750	.130	5.783	***	
SchResp <--> SchColl	.853	.120	7.078	***	
SMEsPer <--> SchResp	.638	.108	5.921	***	
SMEsPer <--> SchColl	.770	.117	6.578	***	

Correlations: (Group number 1 - Default model)

	Estimate
InfoShe <--> SchResp	.489
InfoShe <--> SchColl	.513
SMEsPer <--> InfoShe	.436
SchResp <--> SchColl	.615
SMEsPer <--> SchResp	.496
SMEsPer <--> SchColl	.548

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
InfoShe	2.265	.260	8.702	***	
SchResp	1.269	.192	6.623	***	
SchColl	1.513	.197	7.687	***	
SMEsPer	1.303	.203	6.405	***	
e1	1.101	.112	9.847	***	
e2	1.155	.120	9.637	***	
e3	1.082	.108	9.974	***	
e4	1.154	.110	10.481	***	
e5	1.633	.147	11.137	***	
e6	1.359	.130	10.490	***	
e7	1.089	.112	9.710	***	
e8	1.208	.117	10.355	***	

	Estimate	S.E.	C.R.	P	Label
e9	1.400	.133	10.550	***	
e10	1.509	.136	11.087	***	
e11	1.131	.106	10.662	***	
e12	1.482	.130	11.419	***	
e13	1.180	.112	10.554	***	
e14	1.333	.121	10.990	***	
e15	1.444	.129	11.176	***	
e16	1.372	.125	11.014	***	
e17	1.598	.139	11.462	***	
e18	1.561	.144	10.839	***	
e19	1.242	.124	10.051	***	
e20	1.219	.117	10.399	***	
e21	1.161	.113	10.244	***	
e22	1.323	.131	10.116	***	

Model Fit Summary (CFA)

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	72	335.220	203	.000	1.651
Saturated model	275	.000	0		
Independence model	22	3575.388	253	.000	14.132

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.906	.883	.961	.950	.960
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.802	.727	.770
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	132.220	85.835	186.503
Saturated model	.000	.000	.000
Independence model	3322.388	3132.788	3519.315

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.583	.230	.149	.324
Saturated model	.000	.000	.000	.000
Independence model	6.218	5.778	5.448	6.121

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.034	.027	.040	1.000
Independence model	.151	.147	.156	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	479.220	485.220		
Saturated model	550.000	572.917		
Independence model	3619.388	3621.222		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.833	.753	.928	.844
Saturated model	.957	.957	.957	.996
Independence model	6.295	5.965	6.637	6.298

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	407	434
Independence model	47	50

APPENDIX C: SEM AND PATH ANALYSIS

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
SchResp <--- InfoShe	.376	.050	7.473	***	
SchColl <--- InfoShe	.433	.052	8.360	***	
SMEsPer <--- SchResp	.239	.075	3.195	.001	
SMEsPer <--- SchColl	.324	.068	4.740	***	
SMEsPer <--- InfoShe	.109	.060	1.827	.068	
IS5 <--- InfoShe	1.000				
IS4 <--- InfoShe	1.058	.062	17.009	***	
IS3 <--- InfoShe	.962	.058	16.467	***	
IS2 <--- InfoShe	.902	.057	15.767	***	
IS1 <--- InfoShe	.902	.063	14.274	***	
SR5 <--- SchResp	1.000				
SR4 <--- SchResp	1.044	.095	11.007	***	
SR3 <--- SchResp	1.003	.093	10.769	***	
SR2 <--- SchResp	1.043	.098	10.651	***	
SR1 <--- SchResp	.933	.094	9.920	***	
SC7 <--- SchColl	1.000				
SC6 <--- SchColl	.927	.077	12.062	***	
SC5 <--- SchColl	1.063	.078	13.675	***	
SC4 <--- SchColl	1.011	.078	12.992	***	
SC3 <--- SchColl	.982	.079	12.442	***	
SC2 <--- SchColl	1.003	.079	12.735	***	
SC1 <--- SchColl	.920	.079	11.588	***	
SP5 <--- SMEsPer	1.000				
SP4 <--- SMEsPer	1.062	.097	10.929	***	
SP3 <--- SMEsPer	.981	.092	10.643	***	
SP2 <--- SMEsPer	.989	.092	10.780	***	
SP1 <--- SMEsPer	1.083	.099	10.880	***	

Standardized Regression Weights: (Group number 1 - Default model)

	Estimate
SchResp <--- InfoShe	.514
SchColl <--- InfoShe	.535
SMEsPer <--- SchResp	.235
SMEsPer <--- SchColl	.353
SMEsPer <--- InfoShe	.146
IS5 <--- InfoShe	.822

		Estimate
IS4	<--- InfoShe	.829
IS3	<--- InfoShe	.809
IS2	<--- InfoShe	.784
IS1	<--- InfoShe	.727
SR5	<--- SchResp	.680
SR4	<--- SchResp	.734
SR3	<--- SchResp	.713
SR2	<--- SchResp	.703
SR1	<--- SchResp	.646
SC7	<--- SchColl	.752
SC6	<--- SchColl	.685
SC5	<--- SchColl	.771
SC4	<--- SchColl	.734
SC3	<--- SchColl	.705
SC2	<--- SchColl	.721
SC1	<--- SchColl	.660
SP5	<--- SMEsPer	.668
SP4	<--- SMEsPer	.730
SP3	<--- SMEsPer	.706
SP2	<--- SMEsPer	.717
SP1	<--- SMEsPer	.726

Intercepts: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
IS5	4.876	.102	47.729	***	
IS4	4.879	.107	45.526	***	
IS3	5.062	.100	50.734	***	
IS2	4.873	.097	50.448	***	
IS1	5.019	.104	48.225	***	
SR5	5.229	.090	57.914	***	
SR4	5.217	.087	59.715	***	
SR3	5.319	.086	61.613	***	
SR2	5.393	.091	59.245	***	
SR1	5.266	.089	59.310	***	
SC7	4.981	.091	55.015	***	
SC6	5.046	.092	54.828	***	
SC5	5.000	.094	53.257	***	
SC4	4.947	.094	52.808	***	
SC3	4.808	.095	50.769	***	
SC2	4.904	.095	51.784	***	
SC1	5.009	.095	52.813	***	
SP5	4.985	.093	53.322	***	
SP4	4.650	.091	51.211	***	
SP3	5.009	.087	57.710	***	
SP2	5.115	.086	59.396	***	

	Estimate	S.E.	C.R.	P	Label
SP1	5.183	.093	55.664	***	

Model Fit Summary (SEM)

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	71	387.338	204	.000	1.899
Saturated model	275	.000	0		
Independence model	22	3575.388	253	.000	14.132

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.892	.866	.946	.932	.945
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.806	.719	.762
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	183.338	131.632	242.853
Saturated model	.000	.000	.000
Independence model	3322.388	3132.788	3519.315

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.674	.319	.229	.422
Saturated model	.000	.000	.000	.000
Independence model	6.218	5.778	5.448	6.121

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.040	.033	.046	.998
Independence model	.151	.147	.156	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	529.338	535.254		
Saturated model	550.000	572.917		
Independence model	3619.388	3621.222		

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.921	.831	1.024	.931
Saturated model	.957	.957	.957	.996
Independence model	6.295	5.965	6.637	6.298

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	354	377
Independence model	47	50

APPENDIX D:

ARTICLE PUBLICATION AND CONFERENCE PRESENTATION

Appendix 'D' includes the following attached files:

1. 10th Annual International Conference on Social Sciences (ICSS) Publication and Acceptance Letters
2. 31st Southern African Institute of Management Scientist (SAIMS) Conference Confirmation of attendance and presentation of Master thesis
3. NRF Search Confirmation
4. Turnitin (Evidence of Plagiarism Check)