A MODEL FOR SUPPLY CHAIN RISK MANAGEMENT AND OPERATIONAL PERFORMANCE IN THE FOOD RETAIL INDUSTRY IN ZIMBABWE

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DECLARATION

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

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This dissertation is being submitted in partial fulfilment of the requirements for the degree of Master Technologiae: Logistics

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

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DEDICATION

I dedicate this study to my family for their appreciation, kind-heartedness, love and care that they have shown me, allowing me to gain confidence and inspiration towards greater achievements. I also specially dedicate this study with love, respect and admiration to my mother, Mrs Indy Gobvu for her encouragement and immeasurable support at all times.

ABSTRACT

The importance of the food retail industry and its role in stimulating economic growth and ensuring food availability as the final actor in the food supply chain in many countries is well documented in literature. This stands true in the case of Zimbabwe, where the industry has grown tremendously to become a significant contributor to the gross domestic product through employment creation, tax contributions and infrastructural development. Despite these contributions, the industry faces challenges in the form of supply chain risks. This is primarily due to the nature of the retail supply chain in Zimbabwe where over two-thirds of the products sold are imported. This forms the basis of this study which seeks to understand how supply chain risk management in food retail firms impacts on firm operational performance. Thus, this study aimed to investigate the relationships between supply chain risk management and operational performance in the food retail industry in Harare, Zimbabwe.

To achieve the study's aim, several variables were considered; namely, supply chain risk management, supply chain risk information sharing, and supply chain risk analysis and assessment, supply chain risk-sharing mechanisms and operational performance.

The study followed a quantitative research approach based on a positivist paradigm. A total of 264 food retail firm owners, managers and professional employees who possess knowledge on supply chain risk management in Harare were selected using a non-probability, purposive sampling technique. Data were then collected using a close-ended survey questionnaire which was developed using adapted measurement scales. The collected data were analysed using the Statistical Packages for Social Sciences (SPSS version 25.0) and the Analysis of Moment Structures (AMOS version 25.0) statistical software. The applied data analysis techniques included descriptive statistics and inferential statistics. Inferential statistics used two approaches, namely, Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM). The EFA tested for the factor structure of the collected data, whereas SEM tested for both psychometric properties of measurement scales and the relationships in the proposed hypotheses.

The results of the study showed that supply chain risk management has a direct and significant relationship with both supply chain risk information sharing and supply chain risk analysis and assessment. Supply chain risk analysis and assessment yielded a positive and significant relationship with supply chain risk-sharing mechanisms. The relationship between supply chain risk analysis and assessment and supply chain risk-sharing mechanisms was significant but weak.

Supply chain risk-sharing mechanisms had a strong and positive relationship with operational performance. There was, however, no significant direct relationship between supply chain risk management and operational performance.

Insights gained from this study have merit from both theoretical and practical perspectives. Theoretically, the study provides an understanding of some driving factors to supply chain risk management, supply chain risk-sharing information sharing, supply chain risk analysis and assessment, supply chain risk-sharing mechanisms and operational performance within the food retail industry in Zimbabwe. Since there is limited evidence of similar previous studies in Zimbabwean food retail firms, the results are an essential addition to the existing body of literature within the area of supply chain management and supply chain risk management in the context of a developing country. From a management perspective, the study suggests specific recommendations that should be implemented for the optimisation of all five constructs.

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LIST OF ABBREVIATIONS

ABBREVIATION	FULL TITLE
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
B2B	Business-to-Business
B2C	Business to Customer
CFA	Confirmatory Factor Analysis
CFI	Comparative fit index
CPFR	Collaborative Planning, Forecasting, and Replenishment
CR	Composite Reliability
CZI	Confederations of Zimbabwe Industries
DCV	Dynamic Capabilities View
EFA	Exploratory Factor Analysis
ERM	Enterprise Risk Management
GDP	Gross Domestic Product
GFI	Goodness of Fit Index
NFI	Normed Fit Index
NRZ	National Railways of Zimbabwe
PTC	Postal and Telecommunications Corporation
RBV	Resource Based View
RMSEA	Root Mean Square Error of Approximation
SCRLC	Supply Chain Risk Leadership Council
SEM	Structural Equation Modelling

SME	Small to Medium Enterprises
SPSS	Statistical Package for Social Sciences
TLI	Tucker Lewis Index
UNECA	United Nations Economic Commission for Africa
VAT	Value Added Tax
ZIMASSET	The Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMSTATS	Zimbabwe Statistics
ZINARA	Zimbabwe National Road Agency

CHAPTER 1
INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The food retail industry in Zimbabwe has grown significantly in the past decade (Chikweche, 2015:125; Ndlovu, 2017:1). This growth is largely attributed to the dollarisation of the economy at the onset of 2009 when a new government of National Unity was put in place (Mukuhlani, 2014:175; Grant Thornton, 2014:5 & Chikweche, 2015:122). The dollarisation of the economy gave some businesses a new lease of life and operations resumed with the Zimbabwean food retail sector being one of the fastest-growing sectors in the country's recovery era (Zimwara & Mbohwa, 2015:152). The Zimbabwean retail marketplace became dominated by a relatively small number of large retailers who aggressively pursued strategies to increase their sales, market share and profits (Vutete & Vutete, 2015:33). Compared to other Sub-Saharan markets, Zimbabwe has always had a more structured formal supply channel system, especially of retail chains, that could only be compared to that of South Africa (United Nations Development Programme, 2008:59). Prior to this brief economic recovery, the supply chain systems of most retail outlets had come under threat in 2008 where numerous business operations collapsed, and inflation rates reached unparalleled levels, rendering the local Zimbabwean currency essentially worthless. This challenging and toxic environment created key supply chain obstacles for retailers of all types of goods, especially the food retail industry (Chikweche, 2015:122). However, with dollarisation, inflation levels normalised, and most businesses were able to reengineer their practices, bringing relief to their operations (Ngamanya & Chidakwa, 2017:17).

Despite the dollarised economy, socio-economic and political problems resurfaced in Zimbabwe after 2013, which were attributed to the disputed general elections (Chitiyo & Kibble, 2014:2). The economic situation was reversed, leading to the re-emergence of instability in the critical areas of the economy. As a result, many retail supply chains opted to source most of their products from neighbouring countries as a strategy to maintain their growth (Chikweche, 2015:124). Zimbabwe's retail sector contributes the highest share of imports with 66, 68 per cent of all imports traded by the retail sub-sector in Zimbabwe coming from South Africa (North-West University, 2016:6). However, the decision to divert to distant sources adds supply chain risks such as delivery uncertainties, theft of physical and intellectual property, currency exchanges and those related to

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lengthy transportation links (Ayers & Odegaard, 2012:1051). While it is widely acknowledged that businesses across all industries face an array of supply chain risks and problems, the situation appears to be worse in Zimbabwe, where firms, particularly in the food retail industry, have been inundated with dire constraints in their supply chains (Makanda, 2015:1). Some of these supply chain risks that have led to the heavy dependence on imports include an underperforming economy, leading to poor infrastructure, electricity and clean water shortages, liquidity challenges, socio-political challenges, stiff competition from imports and a collapsed agricultural sector (The Zimbabwe Independent, 2013:1; Confederations of Zimbabwe Industries, 2015:7).

Different researchers have identified diverse types of supply chain risks, ranging from natural disasters to political instability (Chopra & Sodhi, 2004:56; Christopher & Peck, 2004:1; Hallikas *et al.*, 2004:45; Kleindorfer & Saad, 2005:53; Kiser & Cantrell, 2006:12; Tang, 2006:451; Wagner & Bode, 2008:307; Hantsch & Huchzermeier, 2013:125; Punniyamoorthy, Thamaraiselvan & Manikandan, 2013:79; Fazli *et al.*, 2015:453; Giannakis & Papadopoulos, 2015:455). Other supply chain risks are categorised as operational risks, which include but is not limited to equipment malfunctions, systemic failures, abrupt discontinuity of supply such as when the main supplier goes out of business, bankruptcy and other less severe forms of financial distress and human-centred issues ranging from strikes to fraud (Kleindofer, 2005:54; Tang, 2006:453). Zsidisin and Ritchie (2009:4) also have similar views, advocating that risk within the context of supply chains may be categorised in the following dimensions: disruptions to the supply of goods or services; volatility in price; inferior quality products or services either upstream or downstream; and the reputation of the firm. These form the basis of this study because Zimbabwean businesses are operating in an economically and politically unstable environment whereby firms are subjected to such threats (Tinarwo, 2016:151; Chikweche, 2015:122).

The existence of the above risks invokes the need by businesses to develop appropriate supply chain risk management (SCRM) strategies. Supply chain risks are detrimental to the stability of any industry (Punniyamoorthy *et al.,* 2013:79). A report by Prince Waterhouse Coopers (2009:1) states that a threat in a supply chain can reduce revenue and market share, increase existing cost base, consume time, threaten customer satisfaction, threaten company reputation and damage credibility with related stakeholders ultimately crippling the firm's operational performance. Because of these challenges, it is important therefore, for the food retail industry to manage

risks/threats in their supply chains. The benefits of managing risks in a supply chain include cost advantages, profitability, better trust internally, which, with suppliers, capitalises on low-cost local sourcing while maintaining an acceptable supply risk (Supply Chain Risk Leadership Council (SCRLC), 2011:7; American Production and Inventory Control Society, 2015:6). Leveraging data from SCRM can enable indirect benefits including but not limited to brand reputation, sustainability and reduced logistics and procurement costs (Prince Waterhouse Coopers, 2009:2; American Production and Inventory Control Society, 2015:6; Prakash, Soni & Rathore, 2019:18). One of the most important benefits of managing supply chain risk is an improvement in operational performance because SCRM seeks to manage, control, reduce or eliminate real or potential risk exposure to the overall supply chain performance (Punniyamoorthy *et al.*, 2013:79).

1.2 PROBLEM STATEMENT

The food retail industry remains an important economic contributor in Zimbabwe. The Gross Domestic Product (GDP) of Zimbabwe stands at USD15 billion (ZAR224 billion), and the service sector/tertiary under which the food retail industry operates constitutes 59, 4 per cent of the GDP (Global Finance, 2017:1; Zimbabwe National Statistics Agency, 2017:17). It has further been noted by Business Monitor International Research (2017:1) that the food retail industry remains one of the most outstanding sectors in the Zimbabwean economy and its current contribution to GDP is undoubtedly higher. However, the industry is susceptible to numerous supply chain risks that threaten both its immediate and long-term success. For example, the local supply base for food products remains constrained since the agricultural sector has almost collapsed (International Monetary Fund, 2017:29). As a result, most food products have to be sourced from international suppliers, but the situation remains unstable since the industry faces challenges related to the lack of foreign currency with which to import food products (International Monetary Fund, 2017:9). The policy and legislative environment in Zimbabwe are both unfavourable and unpredictable as the government tries to find ways of improving the economy (Makanda, 2015:2). The overall economic environment in the country is characterised by turbulence, as seen through a deep-rooted liquidity crisis, the lack of investor confidence, government fraud and ethical misconduct (Confederation of Zimbabwe Industries, 2015:24). Worse still, the socio-political climate in the country remains unstable, as marked by social unrest and political battles (Monyau & Bandara,

2017:11). Other supply chain risks include product shortages due to the low-capacity use of the local manufacturing sector and cash flow management challenges (Zimwara, 2015:154).

The supply chain exposures prevalent in Zimbabwe have had a significant negative impact on the operations of businesses in both the food industry and the broader economy. Although capacity utilisation has been improving for firms whose products were placed under the statutory instrument 64 of 2016, which imposed an import ban on certain products, many firms find it difficult to plan ahead, achieve capacity utilisation and to operate profitably (Monyau & Bandara, 2017:13). As noted by the Confederations of Zimbabwe Industries (2014:1), many affected firms have resorted to downsizing their operations, while some have ultimately closed down. For instance, according to Monyau and Bandara (2017:13), about 4 610 firms, including those operating in the food industry closed down their operations between 2013 and 2014. While the failure and ineffectiveness of Zimbabwean food retail supply chains can be attributed to many faults, this study generally hypothesises that the inability of most firms to manage supply chain risk is a major contributing factor. To deal with such challenges, information is needed on how firms within the food retail industry may be able to deal with risks existing within the Zimbabwean food retail supply chain. Hence this study is intended to investigate how supply chain risk management (SCRM) may influence operational performance (OP), leading to some recommendations that may be useful to firms operating in that industry.

Interest by both researchers and practitioners in the issue of SCRM is fairly recent and the first SCRM workshop, identified by a scientific journal, dates from 2003 in the United Kingdom (Lavastre, Gunasekaran & Spalanz, 2014:3388). Since then, a considerable amount of research on SCRM has been conducted in developed nations compared to developing nations. It is, however, notable that despite the extensive literature on SCRM (for example, Cavinato, 2004:383; Chopra & Sodhi, 2004:53; Juttner, 2005:120; Manuj & Mentzer, 2008:192; Lavastre *et al.*, 2014:3381; Sharma & Bhat, 2014:1023), there is minimal evidence of such research studies in developing countries in Africa. Moreover, most studies have not investigated the relationship between SCRM and operational performance in firms. Although there seems to be an increase in research about SCRM in emerging markets, (for example, Mndzebele, 2013; Sunjka & Emwanu, 2013), research on Africa remains limited. As a result, available literature provides limited answers to new questions concerning SCRM strategies in the dynamic African markets. Also, the conceptual

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model under consideration in this study has not yet been tested in the food retail industry in Zimbabwe. To occupy these research gaps, this study investigates the relationship between SCRM and OP in the food retail industry in Zimbabwe. It is significant in that its results can be used by managers in that industry to manage supply chain risks and hence improve the operational performance of their firms.

1.3 RESEARCH OBJECTIVES

1.3.1 Primary Objective

The primary objective was to test a conceptual model for SCRM and OP in the food retail industry in Harare, Zimbabwe.

1.3.2 Theoretical Objectives

The following theoretical objectives were set for the study:

- to review the literature on the nature and composition of the Zimbabwean food retail industry;
- to explore the literature on SCRM and its associated dimensions;
- to review the literature on supply chain risk information sharing (SCRIS);
- to explore the literature on supply chain risk analysis and assessment (SCRAA);
- to review the literature on supply chain risk-sharing mechanisms (SCRSM); and
- to analyse literature on OP.

1.3.3 Empirical objectives

The following empirical objectives were set for the study:

- to determine the perceptions of supply chain personnel and managers towards SCRM, SCRIS, SCRAA, SCRSM and OP in the food retail industry in Harare:
- to determine the relationship between SCRM and SCRIS n the food retail industry in Harare;
- to examine the relationship between SCRM and SCRAA in the food retail industry in Harare;
- to establish the relationship between SCRIS and SCRSM in the food retail industry in Harare;

- to establish the relationship between SCRAA and SCRSM in the food retail industry in Harare; and

- to determine the relationship between SCRSM and OP in the food retail industry in Harare.

1.4 CONCEPTUAL MODEL

A conceptual model is a representation of a system that shows a set of relationships between factors (Robinson, 2008:3). The conceptual model shown in Figure 1.1 was developed, highlighting the relationships that are under investigation. SCRM is the predictor variable to the outcome, OP. SCRIS, SCRAA and SCRSM represent the mediating variables.
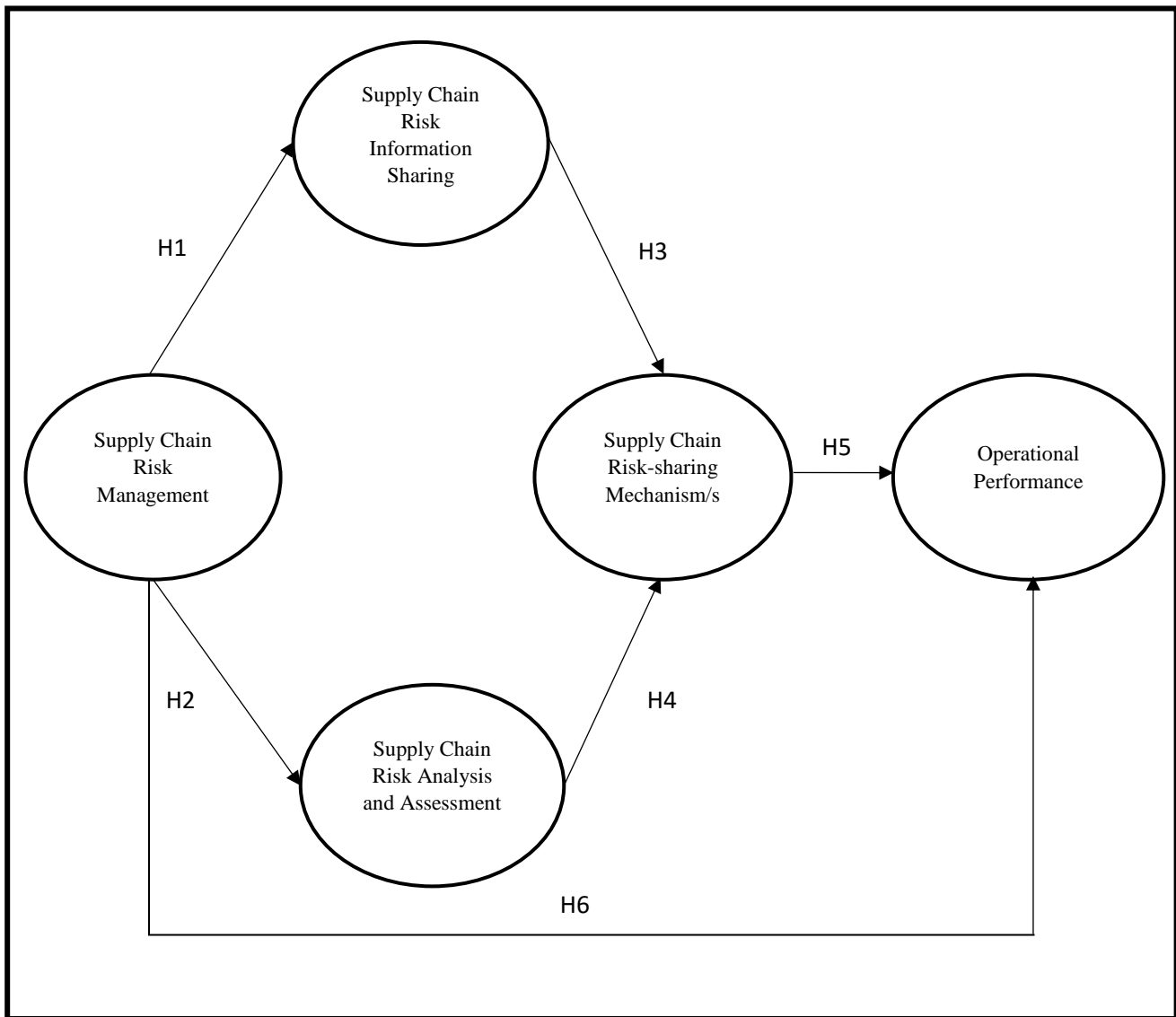
Figure 1.1: Conceptual Model for SCRM and Operational Performance

Source: Author's own compilation

1.5 SUMMARY OF HYPOTHESES

The study tested the following hypotheses:

H1: There is a positive and significant relationship between SCRM and SCRIS in the food retail industry in Zimbabwe.

H2: There is a positive and significant relationship between SCRM and SCRAA in the food retail industry in Zimbabwe.

H3: There is a positive and significant relationship between SCRIS and SCRSM in the food retail industry in Zimbabwe.

H4: There is a positive and significant relationship between SCRAA and SCRSM in the food retail industry in Zimbabwe.

H5: There is a positive and significant relationship between SCRSM and OP in the food retail industry in Zimbabwe.

H6: SCRM has a significant and positive relationship with OP in the food retail industry in Zimbabwe.

1.6 PRELIMINARY LITERATURE REVIEW ON RESEARCH CONSTRUCTS

This section provides an abstracted literature review of the stated five constructs. This aims to provide familiarisation with the nature of key constructs that make up this study. First to be presented is the predictor variable, supply chain risk management. Thereafter, the mediating variables will be deliberated on. These are: SCRIS, SCRAA, and SCRSM, referred to as the supply chain risk information processing system (Fan *et al*., 2017:64). Finally, the outcome variable is presented and explained.

1.6.1 SUPPLY CHAIN RISK MANAGEMENT

Several authors including Zsidisin and Ritchie (2009:2), Sodhi, Son and Tang (2012:2), Lavastre *et al*. (2014:3382) and Ivanov, Tsipoulanidis and Schönberger (2019:16) consistently state that there is no universal definition for SCRM. This is because the concept is still developing, such that

most scholars choose to highlight particular dimensions or perspectives appropriate to their focus of attention. However, for the purposes of this study, a definition by Lavastre *et al*. (2012:3388) was adopted. This definition views SCRM as the coordination of activities to direct and control a firm's end-to-end supply chain regarding supply-chain uncertainties. Supply chain risk is defined as the likelihood of loss at any point in the end-to-end supply chain, from sources of raw materials to end use of customers (SCRLC, 2011:4). Singhal, Agarwal and Mittal (2011:16) suggest that the prime objective of SCRM is to identify the potential sources of risks and put forward suitable action plans to mitigate them. Most scholars agree that the main stages of SCRM involve five sequential stages, namely, risk identification, assessment, analysis, treatment, and monitoring (Mavia, Gohb & Mavic, 2016:218). Firms have the option of selecting the most appropriate risk mitigation strategy, as there is no distinguished one-way strategy to support firms from supply chain risks (Lavastre *et al.*, 2014:3382). Mitigation strategies can be divided into four categories, namely, risk elimination, reduction of frequency and consequence of risk, transferring the risk using insurance, and sharing or accept the risk (Zsidisin & Ritchie, 2009:213).

When SCRM is adopted and institutionalised as part of organisational culture, it improves risk awareness amongst employees (Meyer *et al*., 2019:2), thereby helping them to recognise and report suspicious activities that threaten the success of the organisation (Chen, Sohal & Prajogo, 2013:2188). This information after being assessed can be communicated to other stakeholders in the supply chain so that appropriate action can be taken, which ultimately limits the impact of the potential risk (Ritchie & Brindley, 2007:1402; Zsidisin & Ritchie, 2009:2). This makes SCRM a critical activity for firm and supply chain success.

1.6.2 SUPPLY CHAIN RISK INFORMATION SHARING

Supply chain information sharing can be defined as the extent to which critical and proprietary information is communicated to one's supply chain members (Kocoglu, Imamoglu & Ince, 2011:115), and a willingness to make strategic and tactical data available to other members (Tran *et al.*, 2016:1103). The intensification of competition across global markets has brought many firms and organisations to realise that it is inadequate to improve efficiencies within themselves. Instead, the focus must be applied on improving efficiencies across entire supply chains to attain sustainable competitive advantages (Li & Lin, 2006:1641; Trkman, Oliveira & McCormack, 2016:1062). Information sharing among supply chain partners and across all levels of the firm has

subsequently become a key factor for a successful SCRM system (Pfohl, Kohler &Thomas, 2010:33; Meyer *et al.*, 2019:7). Effective SCRM first requires sharing information between supply chain partners, openness towards sharing risk-related information and accepting that supply chain risk as joint risk across all involved partners is pivotal for successful SCRM (Juttner, 2005:212; Kleindorfer & Saad, 2005:5). As suggested by Tummala and Schoenherr (2011:479) through SCRSM, the collected risk information from supply chain partners can be stored and updated as needed. This information can be used for the continuous improvement of risk assessment and management. Through effective SCRSM, supply chain partners can obtain a complete and clearer picture of potential risks (Lavastre *et al.*, 2014:3385). This decreases the chances of poor supply chain performance caused by the lack of effective information sharing. The sharing of risk-related information also enables firms to accurately and adequately analyse possible risks and assess the probabilities and likely effects of these risks (Pfohl, Kohler & Thomas, 2010:34). In this manner, the sharing of accurate supply chain risk-related information leads to success in overall SCRM.

1.6.3 SUPPLY CHAIN RISK ANALYSIS AND ASSESSMENT

Risk analysis and assessment involves the evaluation of the likelihoods and consequences of prospective exposures, either using frequency data or based on expert judgments, scenarios and subjective probabilities (Haimes, 2008:14; Grötsch, Blome & Schleper, 2013:2842). Sodhi and Tang (2012:48) highlight that risk analysis and assessment is a rational process conducted by SCRM experts, which provides clear and specific knowledge on the nature of threats existing within a supply chain. Key aspects of the risk analysis and assessment relate to identifying where in the supply chain the risks are located and determining how to use that information to quantify probabilities of the identified threats as well as potential consequences (Knemeyer, Zinn & Eroglu, 2009:143; Meyer *et al*., 2019:6). Supply chain risk assessment enables firms to obtain and communicate potential supply risk issues with management and suppliers thereby ensuring that adequate resources are provided for managing that risk (Zsidisin, Ellram, Carter & Cavinato, 2004:397). As a result, information obtained from supply risk assessment can be used to create supply strategies that reduce the probability of that supply risk from occurring (Zsidisin, Ellram *et al.,* 2004:399). Moreover, risk analysis and assessment help firms to understand better the point of occurrence of each type of risk and its consequences, which in turn enables them to develop a shared awareness of diverse types of risks and their potential effects on different supply chain

partners (Sodhi & Tang, 2012:49). Thus, it is more likely to facilitate firms to design better SCRSM.

1.6.4 SUPPLY CHAIN RISK-SHARING MECHANISM

Supply chain risk-sharing is an approach to management in which the cost of the consequences of risk is distributed amongst the players in that supply chain, instead of letting one firm bear them alone (Ellinger *et al.*, 2012:249; Meyer *et al*., 2019:4). A mechanism for sharing supply chain risks requires that firms collaborate in sharing relevant information on existing and potential threats (Huan, Sun & Cheng, 2017:67). This implies that risk information is first discovered and received through SCRIS, is evaluated in supply chain risk analysis and evaluation and then applied into functionality through the supply chain risk-sharing mechanism (Tummala & Schoenherr, 2011:479). The availability of a platform for sharing risks within the supply chain facilitates the removal of information irregularities amongst departments and partners, and the opportunistic behaviour of other supply chain players can be easily identified (Huan *et al.*, 2017: 67). In turn, supply chain players are more likely to trust one another and are more knowledgeable about any exposures and relevant potential losses they may face (Kleindorfer & Saad, 2005:53; Trkman *et al*., 2016:1065). Huan *et al.* (2017:68) argue that by effectively applying the collected and processed risk information, the SCRSM can improve a firm's operational performance in several ways. First, the information and risk-sharing mechanism help resolve conflicting objectives and align incentives facilitating joint efforts in activities to respond to risks (Yan & Dooley, 2013:323). Second, the risk-sharing mechanism can help supply chain partners better anticipate and coordinate their supply and demand (Cachon, 2003:2; Meyer, Niemann, Uys & Beetge, 2019:7). Third, the risk-sharing mechanism can help partner firms appropriately allocate costs and benefits related with risk events and make the distributed supply chain work in an integrated way to achieve better performance (Li, Huang, Cheng & Ji, 2014:381). Thus, risk-sharing considers all partners' interests and ensures that mutual benefits are realised within a supply chain (Meyer *et al*., 2019:7).

1.6.5 OPERATIONAL PERFORMANCE

Operational performance is defined as the degree to which a firm's operations can achieve the goals of being right, fast, on time, productive and able to change (Slack, Chambers & Johnson, 2010:32). However, it has to be noted that there is no general definition when analysing a concept such as operational performance since different firms have different metrics to measure their own

performance (Andersen, 2010:314). A few of the metrics are common across the entire business environment, which includes customer satisfaction index, employee satisfaction index, revenue generation, productivity and gross profit (Chenhall & Smith, 2007:266-277). Flynn, Huo and Zhao (2010:60) identify growth measures, integration measures, time efficiency, productivity, profitability, cost-effectiveness, and the ability to respond to a changing environment as some of the measures of operational performance. In their study, Jiang, Frazier and Prater (2006:1282) used quality, delivery and customer service as the measures of operational performance. Chen and Paulraj (2004:140) argue that financial performance should be the main measure of operational performance since it is linked to the shareholder profit motive. Authors such as Beamon (1999:275) and Wiklund (1999:40) mention that if measured together, growth and financial performance give a more detailed description of the actual operational performance of the firm than if each does individually. To fully understand SCRM and its relationship to operational performance, there is a need to examine how individual dimensions of operational performance respond to SCRM (Gunasekaran & Kobu, 2007:2821). Therefore, after considering the multi-dimensional nature of operational performance, this study incorporated several dimensions such as profitability, customer satisfaction and growth in the measurement scales to provide more robust and realistic evidence.

1.7 RESEARCH METHODOLOGY

Scientific research should be conducted using relevant methodology (Neuman, 2014:8). This section of the research proposal contains the outline of how the study was conducted to show the feasibility of executing the research before any resources are committed. The research methodology consists of the research design, sampling design, procedures for data collection, data analysis, ethical considerations and chapter outline.

1.7.1 Research Design

A research design is a blueprint of a study that outlines how the study will be conducted (Stephen, 2016:203). The importance of a research design is found in its expression of a causal connection between variables, generalising to larger groups of individuals than those forming part of the investigation, understanding behaviour, and specifically the meaning of social behaviour (Bryman, 2012:27). For this research, a quantitative approach was followed, which implies that a questionnaire eliciting numeric data was drafted and distributed across the selected sample, and

the results were analysed using statistical software/s. Objective theories were tested by examining the relationships amongst variables.

1.7.2 Literature Review

Theory relating to SCRM, its dimensions and OP, were gathered from library journals, articles and online academic search engines such as Google Scholar and ResearchGate, digital databases including but not limited to Emerald Insight, Science Direct and Scopus. Industry reports, textbooks and organisational records and other sources were also used to develop the theoretical framework of the study.

1.7.3 Empirical Study

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

1.7.3.1 Sampling Design

Sampling design is the researcher's provisional plan for a quantitative description of trends, attitudes or opinion of a population by studying a sample of that population (Creswell, 2013:235; Alison & Gass, 2015:11). The sampling design for this study comprises the target population, sampling frame, sample size, sampling approach and sampling technique.

1.7.3.2 Population

A population refers to the entire group or set of individuals from which research data are to be collected (Neil, 2015:3). This study utilises managers and supply management professionals in food retail firms in Zimbabwe as its population.

1.7.3.3 Target population

Target population refers to all the members who meet the particular criterion specified for a research investigation (Alvi, 2016:10). In this study, the target population comprised of managers and supply management professionals employed by food retail firms in Harare. This study focused on Harare because it is the capital city and the economic hub of Zimbabwe. Moreover, since it is the most developed city with many commercial activities, a study in Harare will fairly represent the activities of other cities and towns in Zimbabwe.

1.7.3.4 Sampling Frame

A sampling frame is a list of all the items/ individuals selected from a population for investigation purposes (Alvi, 2016:11). According to Kumar (2014:46), it is of utmost importance to determine the most appropriate sample size because if a sample size is too large it equates to unnecessary wastage of resources, while a sample of very small size may adversely affect the accuracy of sample estimates and thus, in turn, the very utility of a sampling plan**.** A list of the registered firms operating in the food industry was obtained from the Ministry of Industry and Commerce in Zimbabwe.

1.7.3.5 Sample Size

Sampling size refers to the number of respondents from which the required information is obtained (Kumar, 2014:45). Determining the minimum required sample size that is representative of the general population is an important part of quantitative research for achieving the main objectives of the study (Omair, 2014:143). It is generally the norm that larger samples result in accurate and robust statistical findings, while smaller ones are less accurate. In this study, the sample size was determined by benchmarking with previous research which is related to the current study. Evidence of sample sizes used in previous related studies is indicated in Table 1.1.

Table 1.1: Basis for sample size used for the study

Construct	Citation	Sample size	Region
Supply Chain Risk Management	Fan, Sung and Cheng (2017:69)	350	China
	Juttner (2005:124)	137	England
	Lavastre, Gunasekaran and Spalanzani (2014:3398)	142	France
	Mhelembe & Mafini (2019:6)	307	South Africa
Supply Chain Risk Information Sharing	Li and Lin (2006:1648)	196	USA
	Nadia Zaheer and Peter Trkman (2017:425)	387	Pakistan
Supply Chain Risk Analysis and Assessment	Ohlhausen (2007:2)	215	USA
Supply Chain Risk-sharing Mechanism	Joshi, Kathuria and Porth (2003:353)	98	USA
	Chen and Paulraj (2004:119)	400	USA
	Chari & Ngcamu (2017:433)	122	Zimbabwe

Construct	Citation	Sample size	Region
Operational Performance	Flynn, Huo and Zhao (2010:62) Schoenherr and Swink (2011:102)	617 405	America, Asia-Pacific and Europe.
	Kwamega, Li & Abrokwah (2018:317)	320	Ghana

As indicated in Table 1.1, when all constructs are summed, the least sample size used is 98 and the highest used is 617. Based on this guideline and considering that this study employed a quantitative approach, the sample size was initially pegged at n=350, which is a fair representation of a variety of managers and supply management professionals in food retail firms in Harare.

1.7.3.6 Sampling Technique

Sampling is the process of selecting a suitable representative part of a population for determining parameters or characteristics of the entire population (Gentles, Charles, Ploeg & McKibbon, 2015:1172). Selecting a sample that is representative of the general population is an important part of quantitative research. This study seeks to choose respondents who can be expected to have the best knowledge about SCRM and supply chain issues in their firms. Since a sampling frame for food retail firms operating in Harare will be available, firms will be selected using a probability simple random sampling technique. However, the sample of managers and supply management professionals in these firms was selected using a non-probability purposive sampling technique. In a purposive or judgement sampling technique, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. It is a technique that does not need underlying theories or a set number of respondents (Etikan, Musa & Alkassim, 2015:2). To be included in the study, respondents were expected to possess some knowledge of logistics, operations and supply chain management (SCM) and to have been in that position for at least one year.

1.7.4 Procedures for Data Collection

Data collection is a research process that informs how relevant information to address the research problem was gathered (Sani, 2013:40). In this study, data were collected using a self-administered survey questionnaire distributed in person by the researcher to managers and supply management

professionals of food retail firms in Harare, Zimbabwe over a projected period of three and a half months.

The questionnaire for this study was divided into seven sections. Section A consists of demographic information of the respondents and their firms. Sections B to F contains segmented questions about the five constructs under consideration in this study. Section B elicited responses on SCRM using eight questions adapted from Florio (2017:149). Section C sought responses on SCRIS using seven questions adapted from Fan, Li, Sun and Cheng (2017:73). Section D gathered information on SCRAA using seven questions also adapted from Fan *et al*. (2017:73). Section E contained five questions on SCRSM adapted from Fan *et al*. (2017:73). Section F elicited responses on OP using seven questions adapted from Flynn (2010:69) and Fan *et al*. (2017:73). The questions on OP measured its three dimensions, namely, operational flexibility (three items,) quality (two items) and cost (two items). Response options in sections B to F of the questionnaire was presented in a seven-point Likert-type scale (ranging from 1= "strongly disagree" to 7= "strongly agree"). Not all questions were extrapolated in their original format but were adjusted to fit the context of this study. Since this study used a quantitative approach, all questions were close ended. Measurement scale items and their sources are presented in Chapter 4, section 4.9.2.1.

1.8 DATA ANALYSIS AND STATISTICAL APPROACHES

The first step in data analysis was to code the data in a Microsoft Excel spreadsheet to subject it to a data cleansing process to identify any missing entries. Data were analysed using both descriptive and inferential statistics. Data from section A of the questionnaire, which seeks to establish the demographic details of respondents were analysed using descriptive statistics. Data from the other sections that seek to test the hypotheses were analysed using inferential statistics. The Statistical Package for Social Sciences (SPSS version 24) and the Analysis of Moment Structures (AMOS version 24) software were utilised in statistical analysis. Since the measurement scales were adapted from previous literature and then adapted for the study, a Confirmatory Factor Analysis (CFA) was conducted in order to test the psychometric properties and the model fit. Relationships between research constructs were tested using Structural Equation Modelling (SEM). In order to establish whether collected data supports the conceptualised model, several indices such as the Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Incremental Fit Index (IFI), Normed Fit Index (NFI) and Random Measure of Standard Error Approximation (RMSEA) were used.

1.8.1 Reliability and Validity

Reliability refers to the consistency of a measure (Kumar, 2014:218). Tavakol and Dennick (2011:447) define reliability of research as how closely the same constructs in a research instrument replicate similar results. Assessing the reliability of study findings requires research professionals to make judgments about the 'soundness' of the research in relation to the application and appropriateness of the methods undertaken and the integrity of the final conclusions (Noble & Smith, 2015:1). Reliability for each of the questionnaires used in this study was determined through the Cronbach Alpha coefficient, Composite Reliability and Item-total correlations. The recommended values for Cronbach's Alpha and Composite reliability is 0.7, and the threshold for item-total correlations should be 0.5 (Hair, Black, Babin & Anderson, 2010:86).

Validity refers to the ability of an instrument to measure what it is supposed to measure (Kumar, 2014:386). This helps in determining whether or not an instrument addresses what it is purposed for. Face validity was determined through a review of the questionnaire by a panel of academics who are experts in SCM. Content validity was ascertained through a pilot study of the questionnaire, using a convenient sample of 50 respondents. Convergent validity was assessed using factor loadings ($\geq$0.5) and the Average Variance Extracted (AVE $\geq$0.5). Discriminant validity was assessed through inter-factor correlations (Hair *et al.*, 2010:87).

1.9 ETHICAL CONSIDERATIONS

Research ethics refers to the moral principles guiding research from its inception through to completion and publication of results (British Psychological Society, 2014:5). In this study, the following research ethics were considered:

1.9.1 Informed consent

Informed consent denotes that the researcher must accurately inform respondents about the nature of the research study in order for them to participate in the study with their full knowledge (Armiger, 1997:330). Consent can be written or verbal in order to participate in the research study but for the purpose of this study. All respondents were requested to complete a formal consent form before completing the questionnaire.

1.9.2 Voluntary Participation

The dignity, rights, safety and well-being of respondents must be the primary consideration in any research study (Stevens, 2013:11). Participation in the study was voluntary, and respondents were not coerced in any way to participate in this study. Respondents were allowed to terminate their participation at any given time with no consequences.

1.9.3 Confidentiality and anonymity

Information provided by respondents was not ascribed to any individual but was treated with confidentiality, and the anonymity of all respondents was fully guaranteed. The identities of the subjects were not linked to personal responses, and the names of respondents did not appear on the questionnaire.

1.9.4 Permission to conduct the study

Permission to undertake this study was granted by the management of food retail firms that participated in this study.

1.10 CHAPTER CLASSIFICATION

The proposed research study culminated into a comprehensive dissertation, and the chapters are classified as follows:

Chapter One: Introduction and Background of the study

This chapter comprises of the introduction and background of the study. It also highlights the problem statement and research objectives. In addition, the formulation of hypotheses, literature review and methodological factors such as research design, data collection, statistical analysis and ethical considerations are included.

Chapter Two: Literature Review of the Food Retail Industry

This chapter explores the literature on the food retail industry and provides background information on how that industry has developed, its contribution to the economies of different countries, challenges faced, and practices used to identify risk. It includes both international and

Zimbabwean contexts to give fitting comparisons. The chapter further discusses how firms operating in that industry have adopted SCRM practices.

Chapter Three: Literature Review on Research Constructs

This chapter reviews the literature on all research constructs under consideration in this study. These are SCRM, SCRM, SCRIS, SCRAA, SCRSM and OP. Some of the discussed issues include the definitions of the research constructs, factors influencing them, their antecedents, their relationships with each other, benefits of these practices and the relationship between SCRM and OP.

Chapter Four: Research Methodology

This chapter provides an in-depth discussion of the research design and method of research used in the study. It includes the research paradigm, the target population, sampling frame, sampling technique, sampling size, method of data collection and measuring instrument employed in the collection of data as well as statistical methods to be used in the analysis. Besides, strategies employed to ensure quality data are reported and ethical considerations pertaining to the study are also elaborated on.

Chapter Five: Data Analysis and Interpretation

The chapter provided the results of the study based on statistical analyses. It further provides an interpretation and analysis of the findings. An evaluation of the study is supported by previous literature, which either confirms or contradicts the results.

Chapter Six: Conclusions and Recommendations

This chapter provides an overview of the study, the conclusions drawn from the results, recommendations of strategies and ways to improve SCRM in food retail firms. It also presents limitations, indicates suggestions for future research and offers some concluding remarks, to sum up the study.

CHAPTER 2
LITERATURE ON THE FOOD RETAIL INDUSTRY

2.1 CHAPTER OVERVIEW

This chapter reviews literature that focuses on the food retail industry, partially referred to as the fast-moving consumer goods (FMCG) industry and the role it plays in Zimbabwe's economy as well as its global contributions. The aspects that are discussed include the definition and characterisation of the food retail industry, the supply chain structure of the industry, trends impacting the industry, the global overview of the industry spanning down to its relevance to Zimbabwe, challenges that are experienced in the Zimbabwean context, and a general review of the Zimbabwean retail industry. The chapter uses a wide range of sources from local and international literature as it reflects on the various issues that impact the industry.

2.2 DEFINITIONS AND CHARACTERISATION OF THE FOOD RETAIL INDUSTRY

Retail is one of the largest sectors in many national economies (Luce, 2013:3) with food retailing constituting the largest share of the total global retail sales (Food and Agriculture Organisation of the United Nations, 2009:5). This subsequent section seeks to describe and provide definitions of the food retail sector.

Retailing involves companies that are involved primarily in the activity of purchasing products from other organisations with the intent to resell those goods to the final customer, generally without transformation, and rendering services incidental to the sale of merchandise (Zentes, Morschett & Schramm-Klein, 2017:1). The International Labour Organisation (2011:1) defines retail as the final step in the distribution process, in which retailers are organised to sell merchandise in small quantities to the final consumers.

A retailer, according to Kaviya, Sudha and Nithyarani (2017:83), is a merchant, occasional agent or business enterprise, whose main business is selling directly to ultimate consumers for non-business use. He performs many marketing activities, such as buying, selling, grading, risk-trading, and developing information about customer's wants. The retailing process is the last step in the distribution of merchandise; retailers are therefore organised to buy merchandise in large quantities and sell it in small quantities to the public. The services added to the products commonly include transportation and stock-keeping to ensure that the products are available at the point of sale. The

retailing process also encompasses the selection of products for retail assortment, the provision of sales advice, after-sales service and many other functions (Zentes *et al*., 2017:1).

The food retail industry consists of the total revenues generated through supermarkets, hypermarkets, warehouses, discounters, convenience stores, independent grocers, bakers, and all other retailers of food and drink (UK Essays, 2017:3). This research focuses principally on food retailing due to its relevance and importance as witnessed through many international players involving themselves in the African food retail market scene, the importance of food availability and food security as emphasised by the Food and Agriculture Organisation of the United Nations (2009:6).

The study does not attempt to cover other major retail product categories such as home furniture and related household goods, which account for approximately 10 per cent of all sales; clothing and footwear, and constitutes about 8.5 per cent of sales; leisure goods, health, and beauty products, which has roughly 7 per cent of sales (Food and Agriculture Organisation of the United Nations, 2009:5), or any other non-food products. Food retailing accounts for approximately 40 per cent of all retail sales worldwide (Food and Agriculture Organisation of the United Nations, 2009:5).

2.2.1 Types of retail formats

The food retail industry is composed of firms dedicated to the provision of food and food-related products and services coming from primary activities such as agriculture, forestry and fishing (Manzini & Accorsi, 2012:251). The industry has several formats, which includes supermarkets, hypermarkets and convenience stores. Table 2.1 provides a description of formats and description in terms of size and stock-keeping units of the food retailing firms. (The area size was rounded off to the nearest whole number).

Table 2.1: Key Food Retail Formats

Key Food Retail Formats			
Format	**Store Size (square meters)**	**Stock Keeping Units Offered**	**Format Description/ Value Proposition**
Hypermarket	9,000 - 23,000	80,000 - 125,000	One-stop shop, offering a wide selection of products and services, generally located on the city periphery
Warehouse Club	9,000 - 23,000	5,000 - 15,000	"Only for members" store selling products in bulk packs at wholesale rates
Supermarket	2,000 - 5,000	20,000 - 50,000	In-city store selling predominantly food & household products
Discount Store	500 - 2,000	1,000 - 3,000	Store selling limited items at 10-30% lower prices in a 'no frills' ambience. High on Private Labels
Speciality Store	100 - 1,000	2,000 - 4,000	Offers limited width and high depth of products with emphasis on quality
Convenience Store	100 - 1,000	2,000 - 5,000	A neighbourhood store which stocks small quantities of everyday use items

Source: Naqvi, Malhotra and Chugh (2015:2)

The global food retail industry covers a variety of store formats. On a broad level, food retail can be characterised into the formats exhibited in Table 2.1. The table shows the differences between

food retail formats in terms of their physical sizes, the average amount of stock units available and their description in terms of what they offer to customers. Hypermarkets are usually the largest in terms of size and product offerings. They are often termed one-stop shops because they offer a wide selection of products and services. Warehouse clubs in terms of size are similar to hypermarkets, but the difference is that warehouses sell goods in bulk whereas hypermarkets sell in smaller lots. This contributes towards warehouses having a lower stock-keeping range compared to hypermarkets. Supermarkets are the most popular version of retail formats (Stiegert & Kim, 2009:22). They are much smaller in size but relatively larger compared to other smaller versions such as speciality and convenience stores.

Since supermarkets and hypermarkets have a wider range of product availability globally, they account for the highest distribution share with more than 50 per cent of the food being sold worldwide coming from these formats (Naqvi *et al*., 2015:2). However, future demands are advancing the growth of smaller stores closer to the consumers and new formats like discounters and warehouse clubs. Large global retailers are seen moving that way. Besides these traditional channels, online retailers are also growing at a fast rate. There is an emerging league of mixed formats based on new evolving customer needs (Naqvi *et al*., 2015:2).

The food retail industry is growing in employment figures through the growth of the total number of retail establishments, but the most growth is associated with multi-unit retail firms. Stores in multi-unit chains have significant advantages over independent rivals as they are better positioned to make investments in modern information and SCM technology. Retail firms that operate as part of a chain represent the most productivity, attaining the largest relative profits, the highest survival rates, and the most stable employment rates (Davisa, Freedman, Lanec, McCalla, Nestoriakd & Parke, 2004:5).

This section highlights the different formats of food retailers as well as the structure of retailers that are found in the industry. It has been shown that there are different formats of food retailers, with the most common being supermarkets. Food retailing in the context of this study excludes retailers selling food for immediate or take away consumption such as restaurants, bars and cafes. The defining characteristic of food retailers is that they sell groceries. The next section discusses the changes in retail supply chains and how they impact firms and supply chains as a whole.

2.2.2 Outline of general services offered by a retailer

The general services which retailers provide as well as the roles they play in the supply chain are briefly outlined in this section.

Retailers aim to make the consumers shopping as easy and convenient as possible by anticipating the wants of the consumers and then supplies them the right kind of goods at reasonable prices. Retailers perform the service of bulk-breaking, for example, dividing large quantities into small units, such as individual cans, bottles, boxes, wrappers, packages, appropriate for consumer use. Retailers also provide a choice of selection by offering a wide assortment of merchandise to their customers. They create time and place utility by storing the products in off season and by transporting these goods to the places where they can be readily available as and when needed by the consumer (Kaviya *et al.,* 2017:85).

Moreover, retailers assume risks by guaranteeing the goods they sell to consumers. In line with assuming trading risks, some retailers offer credit accounts with long term instalment programmes. Retailers add to the convenience and ease of consumer purchasing by offering convenient shopping locations, market information, free parking and provide after-sales services such as free delivery, free alteration, exchange facilities and instructions in the use of certain goods as well a multitude of other services to achieve increased patronage. More importantly, retailers help the producers in distributing their products by using advertisement display and personal selling (Kaviya *et al*., 2017:85).

2.3 THE FOOD RETAIL SUPPLY CHAIN FROM A GLOBAL PERSPECTIVE

The global food retail industry is undergoing tremendous processes of transformation and modernisation (Luce, 2013:1; Chkanikova, 2016:3; Duff & Phelps, 2016:3). This is causing significant changes in the food supply chains of developing countries, particularly in supermarket- driven chains, but the implications of these changes are poorly understood (Maertens, Min`ten & Swinnen, 2012:1). This section explains the formation of the food retail supply chain, the changes that have been experienced, and an analysis of the impact of those changes.

Food retailers provide a wide assortment of products from different suppliers who also have their own suppliers. According to Dani (2015:9), food supply chains should be viewed as value chain

systems in which the raw materials from agricultural sources are transformed as they move through the chain and increase in value for final consumption. This interconnection of value-adding activities creates a supply chain. A supply chain aims to build collaborative working relationships between distributors, retailers, manufacturers, sales and marketing agents with the ultimate goal of creating an efficient food distribution system (UK Essays, 2017:4). According to Chkanikova (2016:3), food supply chains span across three major economic sectors: agriculture, food processing and distribution (wholesaling and retailing). By connecting farmers with end consumers, food supply chains provide the farmers with opportunities to improve their economic and social wellbeing, while consumers benefit from access to a wide variety of food products.

In many countries, food retailers have long been dependent on a mixture of local produce and imported foods although more recently, as result of world trade, there has been an increase in the importation of food products (Terazono, 2017:1). Although there has been an increase in food trade globally with major food retailers practising it (Daviron & Douillet, 2014:11; Murphy, 2015:89), Smith (2008:49) poses an argument that local food supply chains are often considered to be relatively sustainable, partly because they support local farming, reduce emissions and risks created by longer supply chain. Duff and Phelps (2016:5) further state that local produce in most countries remains the bulk of what retailers sell due to the rising concern of buying locally as well as having a rising interest in knowing specifically where their food comes from. Furthermore, according to a report from the United Nations Food and Agricultural Organisation (FAO) (2017:1), the cost of importing food across the globe was forecasted to rise by six (6) per cent in 2018. It signals major shifts in food supply chains, which have to strike a balance between sourcing locally or incurring higher import costs. It can, however, be posited that food supply chains are the lifeline for food availability in supermarket and food retail shelves. Whether these chains are local or international, the availability of food at the right time, right quality and right quantity are of supreme importance (Dani, 2015:1; UK Essays, 2017:3).

Food retailers are intermediaries in the distribution channel who have long been considered a passive link in the value chain between manufacturer and consumer. They were usually the inert recipients of products allocated to them by manufacturers in anticipation of demand (Zentes, Morschett & Schramm-Klein, 2017:2). Today, however, retailers are the active designers and controllers of products supply in reaction to known customer demand (Chkanikova, 2016:3; Zentes

et al., 2017:2). The size and increased bargaining power of the food retailing industry, as well as its strategic positioning at the intersection between dispersed supply chain players, food retailers, have often ascribed the role of change agents able to influence, control, organise and manage the supply chain from production to consumption (Chkanikova, 2016:3). Retailers now use their position to become the dominant players in the distribution channel (Sparks, 2015:5). Having extended their channel control and focused on efficiency and effectiveness, retailers are now attempting to engender a more cooperative and collaborative stance. They recognise that there are still performance efficiencies that can be obtained but only as a channel rather than as a single firm (Christopher, 2016:301).

The literature on the changes in the food retail supply chains seems to suggest that food retailers have evolved into influential supply chain players with the ability to influence both upstream and downstream supply chain activities. On the one hand, they can lower food prices for consumers, thereby creating opportunities for farmers and processors to gain access to quality-differentiated food markets. On the other hand, they can create challenges for small retailers, farmers, and processors who are not equipped to meet the new competition and requirements from the retailers.

Generally, supply chains are not designed to be in agreement with risk evaluation and assessment, although one of the most critical issues in supply chains is the management of risk (Marucheck *et al*., 2011:708). In food retail supply chains, where risk factors may have ripple effects on food product quality and safety, supply chain inefficiencies pose a serious threat, not just to firms and their supply chains but also to the final consumer (Marucheck *et al*., 2011:708). Given that food retailers have a variety of products sourced from different suppliers, a typical supermarket or retail outlet is involved in several supply chains. An increase in the number of supply chains a focal firm is involved in will expose the firm to a multitude of risks. Ferni and Sparks (2009:4) further reiterated that the trick behind retail SCM is in making product availability look easy, day in and day out while understanding consumer demand and reacting to its sometimes-volatile dimensions. In as much as there are different categorisations of risks that affect retail supply chains, this study considered supply chain risks to greater detail.

The food retail industry is one of the largest and most important industries in the modern market place (Chkanikova, 2016:3). Food retailers have, over the past decades evolved into some of the most convenient and diverse businesses in the world (Luce, 2013:1). Several supply chain drivers

such as electronic data interchange, third party logistics providers, supply chain modelling, supply chain collaboration and customer relationship management can be attributed towards the success of the food retail industry (Marucheck, Greis, Mena & Cai, 2011:709). These supply chain drivers have made SCM in the food retail industry more effective to help businesses grow. It can, therefore, be posited that the developments in the industry would not have been possible without effective SCM and the effective management of risks thereof. This management must be present at all levels of the supply chain and in all aspects of business for it to be truly effective and foster growth and success within the industry. Over time, the most successful businesses in the food retail industry will be those who manage their supply chains and associated supply chain risks more effectively (Marucheck *et al.*, 2011:709).

Developments by Reardon and Gulati (2008:1) highlight that the modernisation of food retail chains procurement systems has reduced costs and made the food retail industry even more competitive. When food retail chains modernise their procurement systems, they require more from suppliers with respect to volume, consistency, quality, costs, and commercial practices. Bienabe and Vermeulen (2007:2) add to the notion by stating that modernisation mechanisms have resulted in the establishment of centralised buying and distribution centres. Moreover, developments in the food retail sector have seen a drastic decline in traditional wholesale systems. Centralised buying usually involves buying in larger quantities. Therefore, food retail chains prefer to source from medium and large processing enterprises which are usually better positioned than small enterprises to meet supermarkets' requirements.

It was noted by Bianabe, Bramley and Vermeleulen (2011:39) that the impact of globalisation has resulted in South African and other foreign-owned supermarket retailers that trade in Zimbabwe and across Africa source the majority of merchandise, including consumables from their countries of origin. This further adds on to the elongated supply chains of their Zimbabwean outlets, thereby instigating risks. It is, therefore, necessary to acquire a deeper revelation of the problematic nature of supply chain risk on the retail and consumer goods industry of Zimbabwe, given that it has one of the highest import bills. The evident nature of high import bills signals longer supply chains on the part of retailers who import products. Globally, food retail firms such as supermarkets have expanded their roles to include development of their own in-house brands, setting quality standards, and influencing policy (Hattersley & Dixon, 2010:189). Most traditional food retailers

have overtime expanded their businesses portfolios to include non-food retailing such as PnP clothing (Pick n Pay: 2017:3). Essentially, these are some of the major changes that have occurred in retail supply chains.

This section explores literature on the changes that are experienced in the food retail supply chains, how those changes have impacted firms and the industry as a whole, and also briefly outlines the drivers of those rapid transformations. Food retail supply chains are highly crucial since they avail nutrition to millions of people, as such, the changes that have resulted in the elongated nature of those supply chains as already established should be addressed with the utmost scrutiny to ensure food availability is constant, efficient and effective. More so, the efficient management of a firm's supply chain is critical for financial success in terms of revenue, cost and asset productivity. It has also been shown that food retailers have evolved from their previous stance as ordinary distributors to one of the key deciders and influencers in the food supply chain. The next section explores the food retail industry from a global perspective.

2.4 GLOBAL OVERVIEW OF THE FOOD RETAIL INDUSTRY

In order to have a clear understanding of the food retail industry in the Zimbabwean context, it should be first explored from a macro global perspective. UK Essays (2017:1) highlights that the global food retail industry has become tightly competitive in the last few years. Firms need to understand the competitive nature of the global food industry to understand changing consumer preferences and strategically position themselves in the industry. This segment, therefore, seeks to explore and understand the food retail industry in various regions and countries, the operations of the industry in those areas as well as the impact and contributions it has.

Food and groceries take up a large share of consumers' disposable income and are a key category in the expenditure of consumers globally. It is reported by Persistence Market Research (2014:1) and Naqvi, Malhotra and Chugh (2015:2) that the industry is worth an estimated USD6.6 trillion (ZAR98 trillion) globally and is continually growing, with an anticipated growth rate of 6.1 per cent per annum over the following years to reach an estimated value of over USD 8,5 trillion (ZAR127 trillion) in 2020. This growth is primarily due to the increase in populations and growing food demand in developing nations. According to reports published by Persistence Market Research (2014:2), the Asia-Pacific region has the largest market share of the food retail industry

due to factors such as increasing per capita income, increasing urbanisation, smaller families and a growing level of education. Europe is considered second as a result of the presence of many branded stores and discounters followed by North America. Health and nutritional concerns among consumers are the major factors fuelling the growth of the food retail market in North America. Sub-Saharan Africa is increasingly attracting recognition from global retailers as one of the fastest-growing consumer markets in this decade (McKinsey Report, 2012:3), in particular, personal consumption in Sub-Saharan Africa increased exponentially over the years. Although Africa is still small in terms of its contribution to the global food retail revenues, it is significant for its above-average growth prospects and the emergence of regional retail investment. An approximated USD33.7 billion (ZAR502 billion), which is 68 per cent of all retail sales in Africa were accounted for by food retailing sales in 2013 (Africa Focus, 2015:11), with positive growth projections.

In most developed countries, retailing has also experienced a reasonable increase in the scale of operations and market concentration. This is due partly to the appearance of large-scale retail chains that have taken over market share from independently owned small shops. Some of these retail chains first developed from family-owned enterprises into regional groups and then into nationally and even internationally active retail operations (Zentes *et al*., 2017: 4). One notable example is that of Wal-Mart which developed from a small enterprise into the world's largest retailer, employing over 2 million people worldwide with a turnover of USD312 billion (Walmart, 2017:1), far larger than the GDP of many developing nations.

In the last decade, the food retail industry had a massive expansion globally over the years, characterised by mergers and acquisitions both in developed and developing economies (Duff & Phelps 2016:8). Examples include the acquisition of Roundys by Kroger for USD803 million (ZAR12 billion) in 2015, and Ahold merged with Delhaize Group, which had a value of USD12 billion (ZAR179 billion). On the African front, the food retail market has seen injections of foreign direct investment into the sector. The most notable foreign investment was that of Wal-Mart, the American food retail giant, which acquired a controlling share in Africa's second-largest retailer, Massmart in 2011 (Africa Focus, 2015:11; Massmart & Wal-Mart, 2016:2).

There is generally a mutually beneficial relationship between the foreign investors and the developing nations as retail foreign direct investment provides developing countries with immense

benefits at the macro level, such as modernisation resulting in better wages for workers, lower retail prices, better quality for consumers, higher fiscal income for government and diffusion of new ideas to local companies to help them upgrade productivity (Durand, 2007:394; Africa Focus, 2015). Additionally, developing countries offer vital growth opportunities to large foreign retailers from developed nations that would have experienced low margins in their saturated domestic markets (UK Essays, 2017:2).

Many retailers have developed into international multi-channel retailers, operating in other countries and offering different retail formats for their customers. For example, the French retailer Carrefour, American leading retailer Walmart and South Africa's MassMart are now multi-format group that uses hypermarkets, supermarkets, convenience stores, discount stores and other formats to sell its assortment to customers in over 30, 28 and 13 countries respectively (Carrefour, 2015: 1; Wal-mart, 2018:np; Massmart, 2016:1). It is of importance to note that more than half of Carrefour's turnover is earned outside its French home market. There is no literature to substantiate the nature of risks associated with this foreign acquisition, but the fact that the industry is expanding at such an exponential rate does pose some supply chain risks.

2.4.1 Economic contributions of the food retail industry in selected countries

The GDP is one of the indicators of an economy's performance in terms of output (Adeyemi, 2011:9). The information extrapolated from the GDP is used to make vital decisions and most importantly, for the purposes of this study, shows the economic contributions of a sector to the economical functionality of a country. The amount of a country's tax revenue is highly dependent on the amount of activities carried out in economic activities therefore, considering the fact that the food retail industry is one of the more thriving sectors (Africa Focus, 2015:11), the tax earnings that are received by many governments, especially the Zimbabwean government, comes from the food retail industry (African Economic Outlook, 2014:3).

Furthermore, a country with strong retail activities is more likely to entice investors into their economy (Adeyemi, 2011:9). This is one of the most important decisions for investors when reviewing new economies to break into. Table 2.2 shows a diagrammatic depiction of the contributions of the retail industry in selected countries. Countries were selected randomly to provide an overview of the food retail industry from different regions.

Table 2.2: Contributions of the food retail industry to the economies of selected countries

Country	GDP Contribution	Value (Turnover per Year)	Total employees	Sources
USA	5.9%	USD1,14 trillion	4 800 000	(Amadeo, 2018:1)
Britain/ UK	5%	366 billion pounds sterling	2 900 000	(Career Transition Partnership, 2018:8; Retail Economics, 2018:1)
South Africa	14,4%	R220 billion	2 825 000	(University of Pretoria, 2016:51; Makhitha, 2014:1751)
Zimbabwe	15,3%			(African Economic Outlook, 2014:255)

It should be noted that the information provided in Table 2.2 pertains to the entire retail sector inclusive of non-consumables as sufficient data on the food retail industry in seclusion is not readily available. Since the food retail industry is part of a larger sector which is the retail sector, an indication of the sector is depicted from the total values. Moreover, as supported by literature, the food retail sector is usually the most dominant sub-sector of the retail industry due to the ever-increasing demand for food and nutrition (Makhitha, 2014:1751; Africa Focus, 2015:11).

The statistics presented in Table 2.2 reveal that the food retail industry, as part of the broader retail industry plays a pivotal role in the economic development of both developing and developed countries. Literature from Makhitha (2014:175), Amadeo (2018:1), Career Transition Partnership (2018:8) and Retail Economics (2018:1) seems to suggest that employment directly and indirectly attributable to the food retail industry represents figures between five (5) per cent in developed countries to as much as 14 per cent in developing countries. In most economies where literature was studied, the food retail industry represents the largest share of the retail industry, accounting for major employment, GDP contribution, sales and annual turnover figures as well as VAT taxes injecting into the fiscus (African Economic Outlook, 2014:255; University of Pretoria, 2016:51). This goes to show the economic footprint that the industry has both in the developing and

developed world and as such, it is of utmost importance to embrace any study that seeks to enhance the survival and success of this industry.

The preceding discussion makes it clear that the food retail industry is an exceptionally successful industry with massive global value. Its size and influence have an impact on many factors such as contributions to the GDP, employment and its ability to alter businesses through mergers and acquisitions. The next section discusses the literature focusing on the factors that are currently shaping and influencing the food retail industry in Africa.

2.5 TRENDS INFLUENCING THE FOOD RETAIL INDUSTRY AND ITS SUPPLY CHAINS IN AFRICA

The literature on the food retail industry in Africa seems to consistently approve that the industry is heavily impacted by current trends that have influenced and are still influencing the industry. African retailers are increasingly adopting global trends that are greatly impacting their industry, thereby creating ample opportunities for more agile retailers that apply the industry's global lessons to their local operations (Africa Focus, 2015:11). The World Bank (2012:1) posits that the economic and political environments continue to be factors of influence which shape the retail space in Africa. However, Africa Focus (2015:11); Hugo (2015:5) and Dani (2015:5) advocate that the food retail industry is a very complex environment influenced by industrial, technological, economic, social and political factors that shape the availability and nature of food products. This section, therefore, analyses those influences and provides literature on how they have influenced the industry, and also considers anticipated changes in the future.

2.5.1 Demographic changes in Africa's young population

Africa has the world's largest young population and estimates from the United Nations Economic Commission for Africa (2016:5) suggest that it will double by 2045. Typically, when the labour force grows more rapidly than the population dependent on it, resources for consumption and investment become more available, providing opportunities for economic growth (KPMG, 2016:2). Considering this information, it can be concluded that a rise in the percentage of the young population is a catalyst for economic growth thereby creating more demand for consumables and increasing consumer expenditure.

2.5.2 Urbanisation

Urbanisation refers to a process whereby larger parts of the population move from the countryside to the cities or suburbs (Jernbeck & Sojde, 2017:26). The United Nations figures indicate that in sub-Saharan Africa, the urbanisation rate increased from 11.2 per cent in 1950 to 24.1 per cent in 1980, and 36.4 per cent in 2010. It is further expected to increase to 45.9 per cent by 2030 and 56.7 per cent by 2050 (United Nations, 2014:1). The increased rate of urbanisation in Africa facilitates social and economic transformations which have a major impact on changing demand patterns and tastes thereby favouring the establishment of supermarkets for the availability of food (Stiegert & Kim, 2009:21). According to KPMG (2016:2), the effect of urbanisation on economic growth or vice versa is dependent on job creation and the structure of the economy but holding everything constant, an increase in urbanisation should provide an atmosphere for increased spending on retail products, which will undoubtedly impact the consumer food retail industry.

2.5.3 Income growth

Several reports have identified the rise in income levels in Africa, giving rise to the middle-class group (African Development Bank, 2011:1; Melber, 2016:9; Van Blerk, 2018:3). Holmberg (2016:1) establishes that one of the primary forces driving economic growth in sub-Saharan Africa is the growing middle-income class. According to Van Blerk (2018:2), understanding the middle class is important to firms that wish to expand in any market. The concept of a middle class carries with it a sense of financial stability, developed consumer culture and a clear trajectory of growth. Estimates from the African Development Bank (2011:1) approximates that the size of the African middle class was 350 million people in 2010 or 34 per cent of the population, and these figures are expected to rise in the coming years. The African Development Bank (2011:1) qualifies the middle class as a group of people with a daily per capita consumption expenditure of between USD 2 (ZAR30) and USD 20 (ZAR298). Van Blerk (2018:4), on the other hand, describes the middle class in three distinct profiles. First, it is a group of people who have a disposable income in which not more than 75 per cent of it is spent on utilities, second, its people that are employed, run a business or in further education and third, have a secondary school education and higher qualifications. There is, however, a lot of criticism against these classifications as they also include people that can barely make ends meet (Hugo, 2015:5; KPMG, 2016:8; University of Pretoria, 2016:51). The definition of the middle class proves to be a subject of debate as there is no one

accepted meaning. The various definitions put forward are based on numerical (income), social (socio-professional) or behavioural categories, or a combination of all three.

None the less, literature seems to suffice the notion that regardless of the different classifications that the middle class may have according to different schools of thoughts, the African middle class is indeed growing. Van Blerk (2018:5) forecasts that the African consumers are continuously shifting towards a middle-income bracket, which will exponentially raise the sales of food and beverages. Moreover, as people start to earn more money and move into the middle-income group, brand consciousness is awakened, and more emphasis is placed on quality. The upper-middle-income group is categorised by very high purchasing power and increased leisure time. Finally, people classified in the middle to the high-income group have extremely high levels of purchasing power, and quality, convenience, variety, and luxury, which are valued greatly (KPMG, 2016:8).

2.5.4 Healthier and more informed customers

Consumers are no longer limited to considering the price when making purchasing decisions but are now conscious of the health implications of the food that they consume (Nguyen & Gizaw, 2014:3). This trend does provide an opportunity for retailers to carve a niche in the food retail industry. Moreover, Chikweche (2015:131) notes that the market has changed, and consumers are looking for more than convenience since they now have more shopping options from which to select. This has placed pressure on food retail chains to re-invent their business models. Consumers are now seeking a more complete shopping experience that is convenient, but that still provides them with an opportunity for one-stop shopping (Hugo, 2015:5). This gap had been identified by the big supermarket chains who are capitalising on it in different ways.

2.5.5 Online shopping

The food ethics council (2015:4) points out that online grocery shopping is not yet a profitable venture but the increase of mobile connectivity in sub-Saharan Africa, as mentioned by Holmberg (2016:1), could potentially give rise to it. Over the last decade, the Internet has changed the way consumers make purchases. Whether the business-to-business (B2B) system or business to customer (B2C), there has been a considerable level of convenience that comes with buying products online. One of the most prominent advantages of online shopping is its ability to save the cost of travel and other imminent expenses. While Fernie and Sparks (2009:208) also argue that

the B2C sector has not been profitable because of various reasons, for instance the presence of intermediaries, an increasing number of enterprises are looking into this channel to increase their baseline. It is only certain that this online trend will continue as many more people begin to have access to various sophisticated devices that can help them in making online buying (Adeyemi, 2015:13). Amazon and e-bay are examples of pioneers of the online shopping experience, which have made major revenues through their various innovation strategies. It can, therefore, be argued that with the level of connectivity and technology sophistication, online grocery shopping will become the norm.

Because of the above-stated sentiments, it can be agreed upon that Africa's online food retailing remains relatively under-developed at present, with most shopping being done at traditional brick and mortar shops. In as much as online shopping is a new technological wave that is gaining recognition among many industries, its influence in the industry of food retailing may not be as impactful due to the nature of the product (food). It can be argued that consumers' reluctance to buy groceries online is not the same as buying clothes online.

This section is dedicated to reviewing literature focusing on the factors that are responsible for the dynamic changes in the food retail industry from a sub-Saharan Africa perspective. Overall, it may be stated that as the food retail industry continues to expand and as times change, it is necessary for managers, directors and supply chain personnel to direct their focus towards the factors influencing the industry to adapt the operations of their retail supply chains effectively. Considering these, trends in strategy implementation may improve the functionality of the chain from the perspective of food quality and availability, competitiveness and pricing. It thus can ensure food retail firms can achieve their intended goals in their operations. Much has been deliberated about the prospects for consumer spending in Africa, primarily driven by demographics and rapid economic growth. This has fuelled massive interest from international retailers to establish a footprint on the continent. Moreover, a younger and more informed continental demographic has an input on the development of the industry since they are the main target market. The next section is a narrower discussion of literature focusing on the food retail industry from a Zimbabwean perspective.

2.6 THE FOOD RETAIL INDUSTRY IN ZIMBABWE

In this section, the food retail industry is condensed to the Zimbabwean context. An analysis of the composition of the Zimbabwean economy is made, followed by a description and examination of the industry with an emphasis on the structure of the retail industry in Zimbabwe, the market composition and the business players involved in the industry, giving reference to the competitive nature of the industry.

2.6.1 Composition of the Zimbabwean economy

The Zimbabwean economy is classified into several sectors which provide major contributions to the GDP. These sectors include mining, transport and communication, manufacturing, agriculture, and retail (Zimbabwe National Statistics Agency, 2014:1). The retail industry is one of the largest contributing sectors to the economy and made the highest contribution to the GDP in 2013, contributing at least 15.3 per cent (African Economic Outlook, 2014:255). This is also supported by the Zimbabwe Revenue Authority (2014:7), which indicated that Value Added Tax (VAT) contributed the highest tax revenue of 28 per cent in 2014. Since the manufacturing industry is currently experiencing very low capacity utilisation of 36.3 per cent (Confederation of Zimbabwe Industries, 2014:6) compared to the relatively growing food retail industry (Zimasset, 2013:1; Musekiwa, Chiguvi & Hogo, 2013: 47), it is plausible to argue that much of the VAT comes from the food retail industry. Moreover, the Zimbabwean economy is sustained more by commercial activities rather than manufacturing and processing activities. This is supported by a survey that was conducted by the Zimbabwe National Statistics Agency between August 2013 and June 2014 indicating that 59.2 per cent of business operators are in the retail trade (Zimbabwe National Statistics Agency, 2014:3).

Zimbabwe, specifically Harare, is currently saturated with many small startup businesses, mostly informal and unregistered (Sengere, 2018:1). Literature suggests that a significant number of individuals are pushed into starting small unregistered businesses due to unemployment (Papadaki & Chami, 2002; Asah *et al*., 2015; Baporikar *et al*., 2016). For example, Frazer *et al*. (2012) observed that most small startups had ventured into business not by choice or to explore business opportunities, but to get employed. This is the case in the context of Zimbabwe, given that about 50 per cent of economically active persons are self-employed (Zimbabwe National Statistics

Agency, 2013). According to the German Chamber of Commerce and Industry (2015:2), although the Zimbabwean formal trade in food and consumer goods is still growing, the Zimbabwean economy is becoming increasingly informal due to the high unemployment rate. Other unofficial reports state that up to 90 per cent of the economically viable individuals are unemployed.

2.6.2 Structure of the Zimbabwean food retail industry

The Zimbabwean food retail industry mainly comprises firms and small businesses engaged in the selling of finished products to end-user consumers. The food retail industry in Zimbabwe has shown growth over the last recent years due to several reasons among them, an increasingly substantial number of businesses entering the industry both in the formal and informal sectors (The Government of Zimbabwe, 2013:21). In this unit, a closer look into the description of the food retail industry and its consumer market in the Zimbabwean context will be provided.

The end of the hyperinflationary era in Zimbabwe followed by the introduction of the multi-currency regime in 2009 created a relatively stable economy, which opened opportunities for expansion in the retail sector (Mlambo, 2017:10). This made the country an attractive destination for new players in the retail industry (Musekiwa, Chiguvi & Hogo, 2013:47). The country has seen Pick n Pay, one of Africa's big players in the retail industry, investing USD13million (ZAR194 million) for a 49 per cent stake in TM supermarkets, one of Zimbabwe's most successful food retail brands. Shoprite, another big player in the region, already has a footprint in the country through a branch in Bulawayo. The retail industry in Zimbabwe has been growing over the last years that even small businesses such as Food World, Afro Foods and Shoppa Stoppa now having a network of 16 branches nationwide with a total monthly revenue of USD 2 million (ZAR30 million) (Musekiwa, Chiguvi & Hogo, 2013: 47; Confederations of Zimbabwe Industries, 2013:2).

The Zimbabwe Environmental Law Association and Danish Institute for Human Rights (2015:4) and The Government of Zimbabwe (2013:21) unanimously point out that Zimbabwe's retail industry has embarked on a growth trajectory that could see the industry become a major hub for growing businesses, despite the declining economic situation in the country. Although retailers have existed in Zimbabwe for a long time, the introduction of global brands and outlets after the introduction of the multi-currency system in February 2009 kick-started the industry, compelling local retailers to expand their operations to compete with their larger international competitors.

2.6.3 Retail industry market composition

To understand the market composition of the retailing industry, predominantly food retailing, household expenditure is used (Prasad & Aryasri, 2011:68). A household is an important consumption unit because several significant purchase decisions are made at the household level (Mlambo, 2017:12). Berman and Evans (2011) define a household as a person or persons who occupy a housing unit whether they are related or not. The composition and size of a household influences shopping patterns or frequency, types and quantities of goods to satisfy the needs of household members or the allocation of income to expenditure lines (Mlambo, 2017:12).

A statistical research study compiled by Nielsen (2013:2) shows that the consumer-packaged goods categories account for 31 per cent of the monthly household expenditure for households in Harare, Zimbabwe. This implies that over a third of household income in most households is directed towards food expenditure. Furthermore, three out of four consumers surveyed purchase food items from formal retail supermarkets (Nielsen, 2013:2). These statistics signify a healthy industry with a fairly large market. With 78 per cent of the Harare urban population purchasing groceries from formal retail outlets (Nielsen, 2013:2), a growth trail is directed towards the food retail industry. It is also plausible to state that traditional trading outlets such as tuck shops and small shops selling mostly food items, although useful, is less important to Zimbabwean consumers than in other countries.

Information provided by Zimbabwe Statistics (2017:6) denotes that Harare has the biggest urban population in Zimbabwe. Urban dwellers have a stronger purchasing power parity compared to rural dwellers. Therefore, it can be posited that the food retailing market in Harare, Zimbabwe, is profitable given the demographics of city dwellers and the increasing urban population. The success of the food retail industry is typically important for Zimbabwe, not only for food availability reasons but also for the continuous growth of the economy.

2.6.4 Zimbabwe Food Retail Players

The Zimbabwean food retail industry is inundated with competition among supermarket chains; OK Zimbabwe, TM/Pick n Pay, Spar, Choppies and other smaller brands. There is also a vigorous amount of competition coming from the informal sector (Karombo, 2015:1), which appears to be

on the rise due to the high unemployment rates in the country. In this section, the Zimbabwean food retail players will be presented and discussed.

2.6.4.1 OK Zimbabwe Limited

OK Zimbabwe Limited is a Zimbabwean supermarket retail firm headquartered in Harare, Zimbabwe. The company was formed in 1942 as Deltrade Ltd and changed its name to OK Zimbabwe Limited in 2001. It offers groceries in various categories, including dry groceries, butchery, delicatessens, take-away, bakery, and fruit and vegetables sections. They also provide non-edible items such as basic clothing and houseware products. The company operates 63 stores primarily under the OK stores, Bon Marce' stores, OK mart, i-tech, and OK Value brands (OK Zimbabwe Limited, 2018:1).

In this regard, the Group has specifically profiled its stores in terms of design, product range, services and other offerings in a way that effectively caters for the specific requirements in the low, middle and high-income consumer categories. The diversified distribution channel allows the Group to targ*et al*l segments of the market. Chikweche (2015:125) states that OK is the biggest supermarket chain in Zimbabwe by revenue.

OK Zimbabwe Limited has maintained its position as one of the dominant supermarket retailers in the country's competitive retail industry despite the effect of liquidity constraints and low disposable incomes. The Group has developed its own brands through the OK Pot 'O' Gold, OK Value, Bon Marche' Premier Choice and Shoppers' Choice labels.

2.6.4.2 TM/Pick n Pay

Pick n Pay is a retailing firm primarily focusing on the provision of food items. It was founded in 1967 by Raymond Ackerman after purchasing the first few stores. The brand has grown and expanded across South Africa and the region with its existence in Namibia, Botswana, Zambia, Mozambique, Mauritius, Swaziland and Lesotho. Additionally, Pick n Pay, and TM Supermarkets have since entered a joint venture through which PnP now controls 49 per cent of the TM Supermarket Group after a USD13 million (ZAR194 million) investment (Pick n Pay, 2017:14; Chikweche, 2015:125).

There has been an improved trading result from TM Supermarkets (TM) in Zimbabwe, notwithstanding the challenging trading conditions in the region. The TM result was underpinned by its ongoing refurbishment programme, with encouraging results from its rebranded Pick n Pay supermarkets. The TM/PnP brand operates 56 stores in Zimbabwe and is continually growing (Pick n Pay, 2017:12). TM/ PnP Zimbabwe was recognised with a number of awards from the Confederation of Zimbabwean Retailers in 2016, including the Best Retail Branch Network and the Consumer Choice award as Zimbabwe's Supermarket of the year (Confederations of Zimbabwe Industries, 2017:1; Pick n Pay, 2017:12).

2.6.4.3 Choppies

Choppies is a food, and general merchandise retailer managed through Botswana, selling a range of products at an affordable cost. The group commenced operations in Botswana in 1986, with a single store under the name Wayside Supermarket. Choppies Zimbabwe is the Zimbabwean operation of Botswana Stock Exchange-listed supermarket retail chain. Choppies Zimbabwe is owned by Nanavac Investment (Pvt) Ltd, which is itself owned 51 per cent and 49 per cent to the Botswana stock exchange listed Choppies (Pindula, 2018:1). Choppies entered Zimbabwe through the acquisitions of enterprises in Bulawayo and acquisitions of the existing Spar network (Choppies, 2018:1).

A report by Pindula (2018: 3) states that Choppies had 13 stores in July 2014 all based in Bulawayo. The company then announced that it was investing a total USD10 million (ZAR149 million) into its Zimbabwean operation in an expansion that would see it open more branches around the country (Financial Express. 2014:2). In November 2014, Choppies opened branches in Harare, making its expansion reach 32 branches by June of 2018 across Zimbabwe (Pindula (2018:3). The group has developed Centralized Distribution Centers in Botswana, South Africa, and Zimbabwe. Currently, the supply in Botswana is 60 per cent centralised, while South Africa and Zimbabwe are at 80 per cent and 50 per cent respectively (Choppies, 2018:1).

2.6.4.4 Others/ Independent retailers

Independent food retailers are businesses that are privately owned and do not belong to a larger chain or group (Stofile, Mushatu, Nair, Daniels, Goosen, Khalil & Essa, 2011:2). Independent retailers are usually tailored around a specific geographical area, servicing a niche community with

a specific product range. They are often characterised by owner-managed stores, lower overheads, semi-skilled employees and their ability to quickly adapt (Stofile *et al*., 2011:2).

The Zimbabwean food retail industry is engulfed with stiff competition from new entrants in the form of independent food retail outlets resulting in the historically predominate retail giants losing a grip on the market share (Makwembere, 2012:1). Independent retailers have generally been regarded as common actors in the retail sector regardless of location due to their universal competitive advantage of locational convenience that ensures long opening hours and local shopping (Chikweche, 2015:122). Some of Zimbabwe's successful independent retailers include Food World, Food Chain, Town & Country and Afro Foods (Makwembere, 2012:1).

Another group of food retailers are entrepreneurs of Indian descent who specialise in small retail outlets that sell products at lower prices than the big chains. Some of these independent retailers have since transformed themselves into wholesalers and are mainly active in the capital city, where they sell products to small-scale informal distributors (Chikweche, 2015:125).

It would have been worthwhile to mention the Spar Group, but recent literature seems to suggest that the retail chain is pulling its operations from the Zimbabwe retail space (Zimbabwe Business Report, 2016:1). Spar is a voluntary trading organisation under which independent retailers work together with their distribution centres to build scale, buying power, and the Spar brand to mutual benefit. In Zimbabwe, Spar consists of 10 corporate stores and 70 locally owned independent retailers across the country, forming what is essentially a franchise network (Chikweche, 2015:125).

2.6.4.5 The informal sector

The informal sector as defined by Sikwila and Karedza (2016:79) refers to traders, vendors or economic activities that are unregistered as per Companies Act (Chapter 24:03) and thereby avoid paying tax. The size of the informal sector in Zimbabwe's urban areas has grown over the last four decades from 1980 up to the present day. Potts (2008:152) and Gumbo (2013:54) identify several reasons for the rise in the informal sector. These include the poor performance of the formal economic sector; poverty; over-urbanisation; a population growth that exceeds the economic growth; and excessive regulations in terms of registering a formal business and government policies. The major cause in Zimbabwe can, however, be attributed (among other reasons) to the

recession that led to company closures, thereby increasing unemployment from 11 per cent in 1982 (Zimbabwe Statistics, 2014:9) up to the unofficial 90 per cent that currently holds.

According to the United Nations Economic Commission for Africa (UNECA) (2014:46), the African retail market is characterised by approximately 90 per cent of transactions occurring through informal channels. The International Labour Organisation (2013:3) further supports this claim by pointing out that in some developing countries, the informal sector has been showing rapid growth over the past few years and is now much larger than the formal sector. According to Schneider, Buehn and Montenegro (2010:8), the informal sector constitutes a large component of the economy in many developing countries.

Many of the food items found in the informal sector are reasonably cheap per unit and are purchasable in small quantities in ways commonly not possible from supermarkets and larger outlets (Petersen & Charman, 2015:3). Such trading fills a market niche in informal food retailing, which allows for continued business operations despite the emergence of formal supermarkets and wholesalers on the fringes of the informal economy (Crush & Frayne, 2011:4). Makwembere (2012:2) goes further to put forward the notion that in Zimbabwe during 2012, food retailers in informal circles were performing relatively far better than the larger supermarket chains.

In addition, as proposed by Petersen (2016:1), informal food retailers do not possess the advantages of significant up-stream value-chain impacts; their procurement standards are not as efficient as their formal counterparts; hence they cannot easily meet stringent quality, cold-chain and reliability standards (Greenberg, 2015:7). Through product selection, placement, in-store promotion and advertising, large corporate food retailers promote branded products emerging from highly concentrated, capital-intensive food processing industries. They thus cultivate a consumer food environment which disadvantages small and informal retailers. This encourages the further consolidation of up-stream segments of food value chains spanning from production, processing and packaging. It can, therefore, be posited that inasmuch as the informal sector does pose a certain level of competition primarily due to low overhead costs, the formal retailers have the upper hand and therefore have a more sustainable competitive advantage.

Africa Check (2014:2) reports that the Minister for Small and Medium Enterprise and Co-operative Development, Minister Sithembiso Nyoni, stated that about 5.7 million people work in Zimbabwe's informal sector with an annual turnover of USD7.4 billion (ZAR110 billion). The

major drawback inasmuch as it earns people living is that it deprives the government of taxes that could be used for further developments. Despite the large size of the informal sector in Zimbabwe compared to the formal sector (Potts, 2008:152), its recognition as the largest overall employer has received a little acknowledgement from the city authorities and government (Sikwila & Karedza, 2016:79).

The impact of food retailing in Zimbabwe cannot be understated. This section analysed and discussed literature relating to the make-up of the Zimbabwean food retail industry, the general impact it has as well as the food retail players and the competition they pose on one another. The literature exhibited an operational industry that has the potential for further growth. The formal sector, although incapacitated to some extent by the informal sector, has shown tenacity and resilience by managing to remain profitable, employing thousands of people and contributing to the economy of Zimbabwe even in the harshest of environments.

2.7 IMPORTANCE AND CONTRIBUTIONS OF THE FOOD RETAIL INDUSTRY

The food retail industry provides numerous benefits, spanning from micro benefits up to macro benefits that impact the nation. This section seeks to analyse literature on the benefits that are posed to the economy because of the food retail industry. The factors put into consideration include the creation of employment, the development of new stores, facilitation of local income, and its effect upon the surrounding real estate.

2.7.1 Employment creation

Retail activities are an important aspect of a nation's economic progress. There are various ways to identify the benefits of the food retail industry in the economy and one of the first benefits to look at is employment creation. Food retailing activities create jobs in various ways (Reardon & Gulati, 2008:1). Adeyemi (2015:8) highlights that all links in the retail value chain are potential job creators. Job creation can be direct or indirect, meaning that a food retail outlet creates the need for suppliers of fresh produce and other food items, transportation, warehousing, sales and other related fields. Results from a study conducted by Berman (2012:3) on the economic impact of new grocery store development shows that a grocery store can have an employment multiplier of nearly 20, meaning that for every directly created job, 20 more are either created or supported elsewhere in the economy.

Furthermore, between 50 and 75 per cent of directly created jobs are filled locally, helping to pump income into the local community. Berman (2012:14) further states that the effect of a single store cannot be overstated because a single store can affect the average annual income by instantly raising the income level of a community's labour force. Employment created at a single store means that previously unemployed or underemployed and unskilled local residents will be able to work. Hence, the more retail outlets there are in a country, the more impact there is on her unemployment levels (Adeyemi, 2015:8).

In the United States of America, the U.S. Bureau of Labor Statistics (2010:2) states that expenditures at food and beverage stores supported 3 million jobs in 2009, and the figures continue to rise. According to Zimbabwe Statistics (2014:8) and the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) (2013:1), the food retail industry in Zimbabwe is among the largest employers with dominant players including OK Zimbabwe, TM/ Pick n' Pay Choppies and Spar supermarkets. There has been much literature, as already, stated that the food retail industry is amongst the few vibrant sectors in the economy, employing thousands of Zimbabweans in an economy where unemployment levels are despondently high. It can, therefore, be perceived that the Zimbabwe retail industry is one of the biggest formal employers in the country given that it is one of the very few industries that refused to subjugate to the harsh economic environment that led to the demise of other industries.

2.7.2 Income and tax revenue creation

Apart from job creation, income is also created within the communities where food retailing is present. Grocery stores and supermarkets as an industry are high producers of revenue. According to the Reinvestment Brief (2007:2) and Berman (2012:3), food retail chains could increase economic activity in the communities and surrounding regions. Berman (2012:14) further states that one of the most beneficial consequences of grocery store development, especially in urban communities, is the creation of significant amounts of tax revenue for the state and local municipalities. The food retail industry has a significant economic impact on state and local economies, providing tax revenues to the state and providing millions of workers worldwide with a source of income (Navqi *et al.*, 2015:7). The tax attributed from the formal food retail industry

includes individual employee tax, excise duty and import tax on imported goods and services, corporate tax, profits, and value-added tax, among others (Zimbabwe Statistics, 2014:2).

One of the most notable tax revenues attributed to the food retail industry is the Value Added Tax. Zimbabwe's consumption tax, which is referred to as Value-added tax (VAT) is 15 per cent; in South Africa, VAT is levied at the rate of 15 per cent as of 31 March 2018 prior to 14 per cent; for the United Kingdom, the general rate for VAT is 20 per cent (Sales Tax Handbook, 2018:1; South African Revenue Services, 2018:1, & Government of United Kingdom, 2018:2). More specifically, the Food Marketing Institute (2010:2) posits that grocery stores and supermarkets averaged the highest sales globally, which implies a large contribution in terms of Value Added Tax. Simply put, the food retail industry, with its grocery stores and supermarkets are among the most economically productive when it comes to total sales.

Taking into consideration the Value Added Tax charged for consumer goods in different countries and also accounting for the fact that food retailing accumulates the highest sales around the globe, the tax contributions towards the economies within which the retail chains operate in cannot be understated. Tax money is then used to grow the economies in different ways, thereby advancing the development of the countries.

2.7.3 Infrastructural development and impact on surrounding residential real estate

The area of food retailing is still closely dominated by brick and mortar compared to non-consumable retailing, which is taking a progressive leap towards online shopping (Lai & Skoufis, 2014:2; Weber & Badenhorst-Weiss, 2018:85). The presence of food retailers and their success, therefore, implies that infrastructural developments in the form of retail supermarkets and other food retail formats is experienced. The development of new grocery stores has an immediate and significant effect on commercial and residential real estate. Data from Berman (2012:9) and Lai and Skoufis (2014:3) indicate that the opening of a new store instantly boosts home values by between 4 and 7 per cent thereby creating wealth in the communities and regions of operations. While the effect on commercial real estate is less measurable, it is no less significant. The new store acts as an anchor retailer, attracting smaller retailers to the area and helping to reduce community vacancy rates and spur economic development. As a result of infrastructural

development, the economic and infrastructural standpoint of the community, region and eventually, the nation improves.

2.7.4 Contribution to the Gross Domestic Product

Relating to the information provided by African Economic Outlook (2018:1), real GDP growth for Zimbabwe was 2.9% in 2017, with estimates for 2018 and 2019 projected to show economic expansion of 0.9% and 1.1%, respectively. This steady growth could be attributed to many reasons; however, it can be substantiated that the food retail industry with its current form in Zimbabwe contributes immensely towards the GDP considering the infrastructural developments in terms of retail outlets, direct and indirect employment, and tax revenues. For instance, TM/PnP, the Zimbabwean and South African-merged food retail chain recorded a 45 per cent growth in shared profits as of the 52 weeks ending February 2018 (Pick n Pay, 2018:41). Pick n Pay's African operations recorded revenues of over R4, 6 billion, year ending February 2018 with TM Supermarkets in Zimbabwe being the stand-out performer with strong turnover and profit growth margins (Pick n Pay, 2018:41). Other contributions such as linkages to other industries, including payments to direct payments to industries and the public sector, wages paid to food retail industry employees and suppliers circulate and generate additional economic activity.

The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset, 2013:1) identifies the retail industry as a core industry in facilitating employment creation and developing small and medium enterprises in Zimbabwe, which eventually contributes towards the GDP of the country. While other sectors such as the manufacturing industry struggle to recover from the period of economic upheaval, the retail industry, primarily the food retail industry has stayed afloat with large retailers turning over USD1, 5 billion (ZAR22 billion) dollars each year The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset, 2013:1). In an economy where 90 per cent of the population is formally unemployed, such annual turnovers signify the significance and relevance of the food retail and consumer goods industry in Zimbabwe.

2.7.5 Food availability and affordability

The food retail industry facilitates the availability of nutritious food at an affordable cost to the communities that the retail chains operate in (Navqi *et al.*, 2015:7). With a population of over 1, 9 million (World Population Review, 2018:np), the food retail industry in Harare, the capital of

Zimbabwe, facilitates the provision of consumers with safe, healthy and affordable food every day. The food retail industry has contributed to the affordability of food for consumers through long-run innovations that have increased and diversified food supplies. Many food retailers provide more and varied store brand products, providing lower-cost alternatives to consumers.

2.7.6 Societal contributions of the food retailing industry

The contributions of the food retail industry go beyond quantifying total industry sales and turnovers. The industry contributes to society's goals for ensuring adequate and secure food supplies, food system sustainability and nutritious diets. It also has initiatives and commitments to support food banks and food access, to reduce food waste and greenhouse gas emissions, and to reduce sugars in diets in order to promote healthy living (Committee for Economic Development, 2017:6).

Additionally, Chkanikova and Mont (2012:6) advocate that food retailers are expanding their organisational boundaries beyond the core activity of selling. Retailers are complying with increasing expectations of key stakeholders to address sustainability impacts at various stages of food supply chains (Forum for the Future 2009:42; European Commission 2010:158). European food retailers have recently started reporting on the launch of a wide array of sustainability initiatives to reduce environmental and social impacts in the food retail supply chains (Forum for the Future 2009:42). On the African front, Pick n Pay has one of the most vibrant sustainability initiatives. Their 'War on Waste' initiative focusing on reducing food waste, using water and electricity more efficiently and carefully, and they also embarked on recycling and reusing among many other programmes, ultimately empowering other small firms in the process. They have also committed to accurate procurement and replenishment, thus steadily reducing the amount of food which goes to waste in stores (Pick n Pay, 2018:1).

In line with changing consumer needs, the food retail industry has managed to address the increasingly sophisticated consumer tastes and needs. Morden day urban dwellers do not possess sufficient lands for cultivation and therefore rely on food retail chains for the provision of healthy produce and grocery items. Consumption patterns have shifted over time towards lean meat, low fat, less sugar and fewer fats. Such changes have implications for the food retail industry as

processing must restructure and invest overtime to supply a different mix of products with different kinds of processing (Committee for Economic Development. 2017:6).

Drawing from the discourse above, it is evident that the food retail industry provides vast contributions to the micro status of an economy such as household income and societal contributions up to the macro status such as improvement in the GDP of a country. The section shows that when the individual benefits of the food retailing industry are considered together, the potential economic impact of the sector is immense. Ultimately, macro-economic benefits are experienced, thereby resulting in a larger contribution towards the economic development a nation. The next section discusses various challenges that are faced by the food retail industry in Zimbabwe.

2.8 CHALLENGES FACED BY THE FOOD RETAIL INDUSTRY IN ZIMBABWE

This section discusses literature, focusing on the constraints and obstacles that are faced by the food retail industry in Zimbabwe. These constitute some of the root problems that lead to the risks that this study seeks to address. It can be posited that, with accurate remedies to the challenges explored in this section, supply chain risks could be minimised, thereby achieving optimum operational performance for the firms involved.

2.8.1 Cash flow crisis

Liquidity or cash flow crisis is defined as an acute drying up or shortage of liquidity in the real economy, which could show a fall in the prices of assets below their fundamental price, reduction in market participants and/ or difficulties in trading assets (Brunnermeier, 2009:77; Amihud, Mendelson & Pedersen, 2013:40). Borio and Drehmann (2009:3) also weighed in on the definition and presented a liquidity crisis as the negative financial situation characterised by sudden and prolonged evaporation of both market and funding liquidity, lack of cash flow, with potentially serious consequences for the stability of the financial system.

Zimbabwe is experiencing a turbulent economic environment characterised by unavailability of foreign lines of credit and other external sources of financing, shortages of the much needed foreign currency, low capitalisation for manufacturing, general shortages of cash in banks and last but not least, shortages of food and basic commodities (Chikomba, Dube & Tsekea, 2013:10; Government of Zimbabwe, 2013:22; Dlamini & Mbira, 2017:213). The Zimbabwean economy is

currently facing a very turbulent economic environment and, consequently, tremendous risks are experienced in businesses including the food retail industry, which leads to the shortage of basic commodities (Karombo, 2018:1).

The President of the Confederation of Zimbabwe Retailers, Denford Mutashu (2017) during a meeting of retailers with Reserve Bank of Zimbabwe officials in September 2017 expressed concern regarding the liquidity challenges that the economy was facing, directly crippling the ability of retailers to import. He further noted that import premiums also increased to as much as 35 per cent, which may result in retailers unable to import or if they do, it leads to higher prices which creates another circle of hardships since there isn't much cash in circulation.

2.8.2 Dysfunctional political landscape

Srivastava, Chaudhuri and Srivastava (2015:592) consider politically related challenges as the most important since they can directly or indirectly influence all the other performance measures that impact retail firms and their supply chains. Several scholars including Hadjikhan and Ghauri, (2001:263) and (Hadjikhani, Lee and Ghauri, (2008:912) have drawn attention to the role in which local government institutions play in the development of the retail industry in developing countries. Ho (2005:92); and Schneider, Buehn and Montenegro (2010:6) argue that government institutions play a key role in the development of the retail industry in developing countries through policies, laws, and regulations. State agencies provide guidelines within the food retail industry through policies. Given the value of this argument, it can also be argued that inasmuch as the government can build the food retail industry, it can also impose policies and regulations that may destroy the functionality of the industry (Schneider, Buehn and Montenegro, 2010:6), for instance, Zimbabwe's political landscape has been inundated with questionable legislation such as the statutory instrument 64 of 2016 which to some extent was justified due to the need for local production but had an adverse impact of importing abilities of retailers.

On the other hand, Nielsen (2013:2) posits that the Zimbabwean economy is fast recuperating after a decade of economic contraction, which has resulted in greater confidence across all consumer groups. High literacy, combined with high penetration of mobile and print media makes it convenient to inform and market to consumers about new product offerings. However, the political climate in Zimbabwe is tense and conducting business in the country can be difficult.

Therefore, it can be agreed that crafting and developing an understanding of potential government regulatory changes, analysing them properly in terms of the impact on business and developing proactive plans to address any potential impediments would be marginally important for the optimum performance of retail firms.

2.8.3 Poor rail and road infrastructure

It is widely known that logistics is the glue that holds supply chains together. A supply chain cannot be functional without the efficient and effective flow of merchandise. The road and rail infrastructure in Zimbabwe are not the most advanced; neither does it have the most positive contributions to the bottom line of retail firms. The retail space in Africa is generally characterised by weak supporting infrastructure for distribution. Common examples include poor distribution systems and transport networks that cause a variety of potential disruptions and delays, leading to some form of uncertainty or risk exposure (Lee, Johnson & Gahring, 2008: 143; Christ & Ferrantino, 2011:1750).

The National Railways of Zimbabwe (NRZ), Postal and Telecommunications Corporation (PTC), Zimbabwe National Road Agency (ZINARA), and others have deteriorated to an extent where they can no longer discharge their mandates by providing the services essential to keeping the economy functioning optimally (Mlambo, 2015:13). The national railway system has virtually collapsed, goods that used to be ferried around the country and to neighbouring markets by railway are now being carried primarily by road, thus hastening the deterioration of the country's road network. The much-exerted pressure on the roads resulted in potholes, damage to vehicles, and numerous traffic accidents, among other problems (Confederation of Zimbabwe Industries, 2012: 14).

One of the core functions of a food supply chain is to ensure that consumables are delivered efficiently and on time with minimal disruptions and damages, but the poor state of Zimbabwe's rail and road system poses a further risk to the smooth flow of merchandise.

2.8.4 Lack of suitable storage facilities

Food retailers require two kinds of storage/ warehousing storage facilities; basic sheltered facilities for basic dry foods and temperature-controlled spaces commonly referred to as cold storages for perishables and cold products (Naqvi *et al*., 2015:14). Both are critically low compared to the

requirement. Most developing nations face challenges of inadequate storage facilities, and Zimbabwe is no exception to this problem.

2.8.5 Inadequate local supplies

Despite constant pressure by the Zimbabwean government towards food retailers to adjust their supply chain strategies to support local sourcing, Zimbabwe's industry and manufacturing have been struggling with a low capacity utilisation of below 40 per cent. Moreover, the agricultural sector has been on a slump, which has further deterred the government's efforts to improve local produce. Retailers have therefore resorted to imports mainly from South Africa and other foreign nations (Chikweche, 2015:124; Confederations of Zimbabwe Industries, 2015:7; OK Zimbabwe Limited, 2018:1).

It should be noted that importing products because of regional comparative advantages is not the same, as Zimbabwe that imports more and exports very little. In the case of Zimbabwe, the majority of all basic commodities and other foodstuffs are imported. This implies that Zimbabwe has a minimal comparative advantage for locally produced products concerning its trading partners, leaving food retailers vulnerable to this predicament. The supply chains of Zimbabwean retailers are long given that Zimbabwe has a very high import bill; thus, this arrangement has no beneficial attributes to the retailing firms in Zimbabwe.

In a nutshell, Zimbabwe's food retail industry is defying the odds. Despite predictions of a looming collapse of the industry brought on by an imports-restriction law, a liquidity crunch, competition from informal traders and a fall in consumers' disposable income, the industry is performing fairly well.

2.8.6 Competition from the informal sector

It is already established through empirical evidence that players in the informal sector do not pay taxes as opposed to the high taxes that are charged to formal firms (Nyamwanza *et al.*, 2014:2). Overhead costs are therefore lower for the informal players, which substantiate the fact that they pose unfair competition to the formal players. The size of the informal sector in most developing nations, including Zimbabwe, could, however, signal an opportune gap for the increased establishment of formal retail presence to capture larger portions of this market share. However, hurdles such as the diverse consumer mix, low levels of established distribution networks,

infrastructure constraints and political and economic uncertainties include challenges for big formal retail chains setting up in-country operations (Deloitte, 2015:5).

This section analysed literature experienced by the food retail industry in Zimbabwe. The industry contributes immensely to the Zimbabwean economy, but it faces various challenges. In light of the specifics above, it can be established that the root of many problems associated with the food retail industry is political. The inability of the central authorities to construct policies and remedies that would rectify and re-energise the food retail industry among other industries has made doing business Zimbabwe challenging, even for the fairly better-off food retail industry. This makes it apparent that there is a need to continuously work on the challenges affecting the industry to avert its various consequences with a view to stimulate further development of the industry and country as a whole. The subsequent section provides a detailed summary of this chapter.

2.9 CHAPTER SUMMARY

The food retail industry of Zimbabwe is a vital topic to look at, given that Zimbabwe was once the biggest agricultural nation in Africa with the ability to provide its populace with sufficient food but now imports most of the consumables found in food retail shelves. The Zimbabwe food retail industry has a long way to go in some areas that retailers in advanced economies have achieved. There is, however, a positive outlook driven by trends such as increasing food demand and a growing interest in healthy and nutritious consumption. As a result of the growth of the food retail industry as well as its importance to the country's fragile economy, there is a need for large-scale interventions and investments in supply chain risk practices to make the supply chains more efficient and risk-free. It was affirmed that although this industry contributes immensely to the Zimbabwean economy and is poised for growth in the future, it faces various challenges, among them competition form the informal sector, cash flow constraints and inadequate local supplies. The government should create an ecosystem conducive to investment and must clear up the hurdles for foreign direct investment and even local investment in the food retail industry. The beneficiaries of this investment in supply risk management will not just be the retailers and the consumers, but also the government, which has the responsibility of providing food security and feeding an increasing population.

CHAPTER 3
RESEARCH CONSTRUCTS AND HYPOTHESIS DEVELOPMENT

3.1 CHAPTER OVERVIEW

The current chapter is a review of the literature of key theories and constructs be used to ground this study as well as their respective antecedents, significances, measurements, and the development of hypotheses. It will commence with the analysis of research theories, followed by a clarification of the concept of SCM and explaining its relevance in addressing the requirements of this study. Subsequently, a literature review of all five constructs (SCRM, SCRIS, SCRAA, SCRSM and OP) is provided as well as the relationships between those constructs. The closing section of this chapter focuses on the development of the hypothesis that links the constructs/variables.

3.2 3.2. UNDERPINNING SUPPLY CHAIN RISK MANAGEMENT THEORIES

This section discusses the theories that attempt to explain the dynamics of SCRM. These have been selected according to their application in different SCM areas.

3.2.1 Resource-Based View (Dynamic Capabilities View)

The study first considers the Resource-Based View (RBV) with particular emphasis on the Dynamic Capabilities View (DCV). The capabilities perspective has evolved from the resource-based view and rests on the assumption that a firm's success is to a large extent, driven by its ability to adapt to a changing environment. The DCV has been used in earlier studies seeking to understand the relationship between uncertainties in supply chain and organisational actions and outcomes (Li, Chung, Goldsby & Holsapple, 2008:416; Abrahamsson, Christopher & Stensson, 2015:11; Kauppi, Longoni, Caniato & Kuula, 2016:484; Brusset & Teller, 2017:60).

The DCV states that an organisation operating in a dynamic environment and facing uncertainties in the supply chain needs to develop capabilities to manage the uncertainties resulting in supply chain risk (Teece, 2007:1320). These capabilities enhance communication, coordination, and joint action with other players in the supply chain to react to impending risks and seize opportunities as well as reconfigure and adapt to the changing environment. They help the organisation to plan and execute the organisational function and achieve desired outcomes in a robust manner (Williams, Roh, Tokar & Swink, 2013:544). Inspired from DCV, it can, therefore, be posited that companies

facing supply chain risks seek to enhance supply chain integration and also institutionalise risk-sharing with key elements both inside (internal functional units) and outside the firm (key suppliers and customers) to achieve and maintain optimum operational performance.

The effective management of risks in supply chains requires an understanding not only of the risks themselves but also the capabilities and resources that can be utilised in the process (Vilko, 2008:37). The dynamic capabilities' view is adopted in this study because it complements the perspective of SCRM in terms of explaining the differences in organisational risk management capabilities and the mutual complementation of the resources and capabilities in the network of actors. It clarifies the differences between the risk-management capabilities of supply chain partners and therefore, can help to identify the essential elements on which to focus when developing an effective risk-management strategy.

3.3 SUPPLY CHAIN MANAGEMENT

Literature suggests that SCRM developed from SCM and broke out to be one of the most discussed concepts affecting firms and their supply chains (Prakash *et al*., 2019:70). This section therefore briefly presents SCM aided by diagrammatic illustrations of a supply chain to create an understanding of how supply chain risks emanate. The concept of SCM, according to Lu (2011:8) and Du Toit and Vlok (2014:27), can be traced back to their origins in the 1980s, describing it as a range of activities performed by the organisation in procuring and managing supplies. Interest in SCM has steadily increased since then when firms saw the benefits of collaborative relationships within and beyond their own organisation.

3.3.1 Definitions of Supply Chain Management

Definitions of SCM differ depending on the context in which it is defined, therefore there isn't a standard definition for SCM. Its concept is derived from two major aspects which are purchasing and supply management, and transportation and logistics management (Feldmann & Müller, 2003:63; Du Toit & Vlok, 2014:28). In relation to the purchasing and supply management perspective, SCM is associated with the integration of the supply base. The transportation and logistics management aspects are synonymous with integrated logistics systems focusing on inventory reduction and reducing costs. These two perspectives evolved into an integrated SCM that integrates all activities in the supply chain, leading to the following inclusive definitions:

A supply chain is a group of inter-connected participating companies that add value to a stream of transformed inputs from their source of origin to the end products or services demanded by the designated end consumers (Lu, 2011: 9). Chen and Paulraj (2004:119) define a supply chain as a network of materials, information, and services processing links with the characteristics of supply, transformation, and demand. They further defined SCM as the planning and controlling of materials and information flows as well as the logistics activities, not only internally but also externally between companies.

A supply chain as defined by Mangan, Lalwani, Butcher and Javadpour (2012:10) is a network of all business entities involved through the upstream and downstream linkages in the various processes and activities that create value to the end customer in the form of products and services. On the other hand, Fantazy, Kumar and Kumar (2010: 685) define SCM as an integrated approach, beginning with planning and control of materials, logistics, services, and information stream from suppliers to manufacturers or service providers to the end client. Figure 3.1 illustratess the structure of a supply chain.
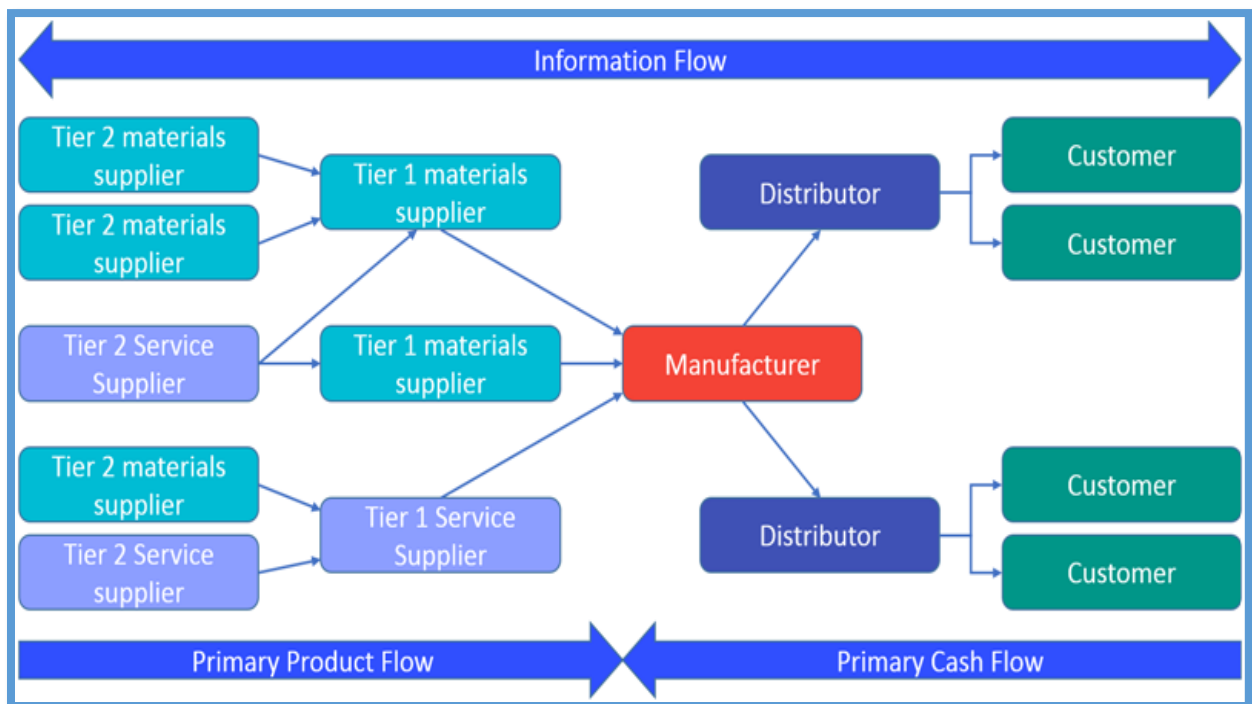
Figure 3.1: An illustration of a firm's supply chain
Source: Sharma (2015:1)

As shown diagrammatically in Figure 3.1 above, a supply chain is a network of integrated businesses ranging from suppliers, manufacturers, distributors and retailers that are involved in the flow of products, funds as well as information from the tier 2 suppliers through the focal firm down to the final customers. Sanders (2012:3) states that a supply chain encompasses the sourcing of raw materials from suppliers, transforming raw materials into semi-finished products, assembling them into finished products, storage, order entry and tracking, distribution and delivery to the retailers until they reach the final customers.

Tier 1 or first-tier suppliers are commonly known as the supply base because they supply the components, subsystems and modules used in production directly to the focal firm or manufacturer of the original equipment. Tier 2 suppliers are further downstream, supplying the tier 1 suppliers with the necessary raw materials. Sanders (2012:5) identifies tier 1 consumers as the wholesalers and distributors who directly buy the finished goods from the focal firm and resells them to retailers. Tier 2 customers purchase from the wholesalers and sell to the end-users who happen to be the tier 3 customers or final consumers. The management of the linkages and relationships between the firms in the supply chain producing goods and services is known as SCM.

The objective of any supply chain is to optimise operational chain performance by delivering a product or service to the ultimate customer at minimal cost and at the required time. In many industries today, competitive success depends upon performance improvements at the supply chain level (Ghosh & Federowicz, 2008:453). However, raw materials, finished goods and semi-finished goods pass through various processes, geographic and political regions, changes of ownership and modes of transportation before reaching the end customers (Stecke & Kumar, 2009:202). These processes and evolving supply chain trends expose potential points where supply chains are vulnerable to disruptions; thus, SCRM focuses on developing innovative approaches for the management of disruptions (Ghadge, Dani, Chester, Kalawsky, 2013:523).

A brief summation of SCM was provided in this section, supported by definitions and a diagram of the structure of a typical supply chain. The nature of the supply chain depicted in Figure 3.1 closely resembles that of a food supply chain, which this research study seeks to address. The section also introduced the connection between SCM and SCRM.

3.4 SUPPLY CHAIN RISK MANAGEMENT

It is generally acknowledged that SCRM denotes the coordination of resources and collaboration of partners to preserve the functionality of a supply chain or return it to normality in the event of a disruption/ risk (Prakash, 2019:69). Thus, managers must address these risks by managing disruptive anomalies across the supply chain, not just within their own organisations (Riley, Klein & Sridharan, 2016:955). This subsequent section is thus dedicated to the exploration of the literature on the determinant variable (SCRM). A conceptualisation of the variable is analysed, followed by definitions as provided by the available literature. The sources of risks are also discussed along with the significance, antecedents, measurement and results as determined by past literature.

3.4.1 The conceptualisation of supply chain risk management

Owing to the complexity of modern-day supply chain networks, a vast range of inherent risks, ranging from minor delays to the disruption of an entire chain are expected. Unlike any other risks, supply chain risks extend beyond the boundaries of a single firm (Juttner, 2005:120; Vilko, Ritala, & Edelmann, 2014:14; Ivanov *et al.*, 2019:17). Intensifying competition, among other factors has forced companies to improve efficiency in many aspects of their businesses. While intensifying efficiency in their supply chains, firms expose themselves to greater uncertainties, which this is what SCRM aims to control (Meyer 2019:3). As a concept, it is at the intersection of SCM and risk management as shown in Figure 3.2.
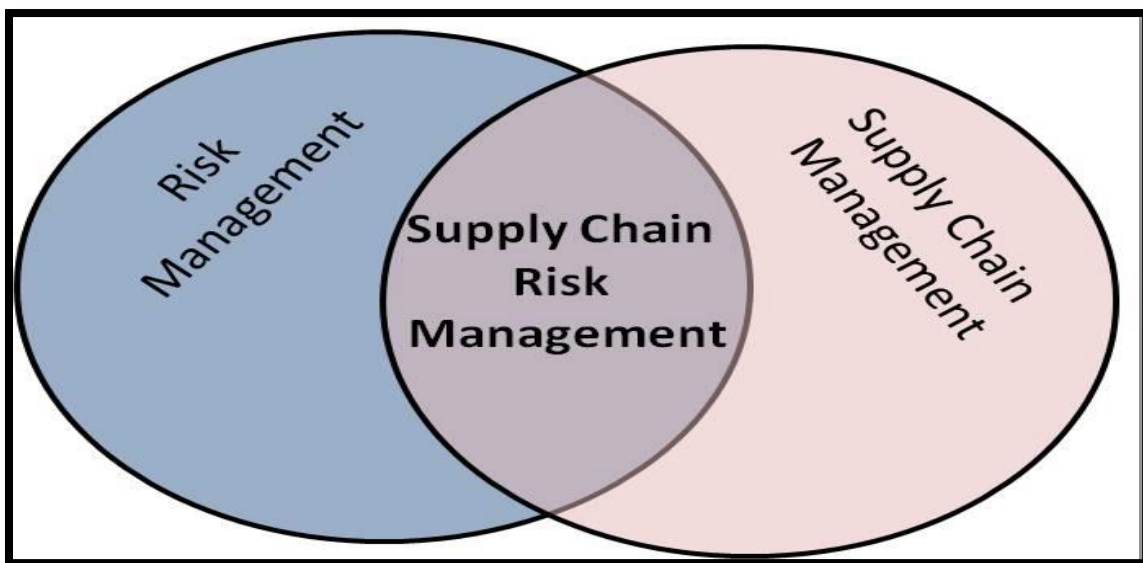
Figure 3.2: Supply chain risk management as a concept

Source: Vilko (2008:43)

As shown in Figure 3.2, when risk management is considered in SCM, SCRM develops. Lavastre *et al*. (2014:3388) define SCRM as the management of risk that implies both strategic and operational horizons for long-term and short-term assessment. Brindley (2004:3), on the other hand, describes SCRM as the management of supply chain risk through coordination or collaboration among supply chain partners to ensure profitability and continuity. According to Breuer, Siestrup, Haasis and Wildebrand (2013:333), SCRM is the implementation of strategies that assist in managing risks facing the supply chain through continuous risk assessment to reduce vulnerability and ensure continuity. The aim of SCRM is therefore to control the risks and uncertainties caused by, or impacted on, logistics-related activities or resources (Wieland & Wallenburg 2012:888; Meyer *et al*., 2019:3).

Supply chains have vulnerabilities as they are exposed to disturbances arising from risks within and external to the chain (Peck, 2005:211; Waters, 2011:13). These vulnerabilities reflect the weaknesses of a supply chain to disruption (Vilko, Ritala, & Edelmann, 2014:8). Juttner (2005: 122) and Waters (2011:7) describe supply chain vulnerability as the propensity of risk sources and drivers to outweigh risk-mitigating strategies, thus causing adverse consequences in the chain and jeopardising its ability to serve the end customer market effectively. SCRM, in turn, is a function that aims to identify the potential sources of risk and to implement appropriate actions to avoid or contain supply chain vulnerability (Narasimhan & Talluri, 2009; Ghagde *et al*., 2012).

Risk management has gained much-increasing attention, especially in the supply chain context both from researchers and practitioners due to the levels of uncertainties that characterise modern-day supply chains (Colicchia & Strozzi, 2012:406; Meyer *et al*., 2019:2; Prakash *et al*., 2019:71). SCRM plays a significant role in successfully managing business processes proactively. Supply chain risk stems from several sources which include external, internal, supplier and distribution risks (SCRLC, 2011:12). As such, SCM, faced with these risks, requires specific and adequate responses such as techniques, attitudes and strategies for the management of those risks. Since every firm aims for success and seeks efficient and effective operations with minimal interruptions, SCRM is exceedingly crucial. SCRM can create a competitive advantage in a firm when risks are identified, estimated, managed and controlled (Mndzebele, 2013:2).

Poor handling of supply chain risks could result in various inefficiencies in poor service levels and increase costs, which ultimately diminishes the firm's operational performance. The complexity of supply chains has heightened the risk exposure of supply chain risk among many firms, which can have not only long-term stock price effects but also loss of reputation and leads to deficient performance (Sodhi, Son & Tang, 2012:3).

Ideally, risk has two distinctive meanings: the first identifies risk purely as a danger, and the other meaning views risk as both a danger and an opportunity (Mitchell, 1995:118; Truong & Hara, 2018:220). The notion that risk inherits primarily negative consequences corresponds to the common human perception of risk. Several supply chain risk researchers including Harland, Brenchley and Walker (2003:52), Manuj and Mentzer (2008:196), Punjawan and Geraldine (2009:954), Mndzebele (2013:36), and Ivanor *et al*. (2019:11) deliberated several definitions and concluded that supply chain risk is associated with the chance of danger, damage, loss, injury or any other undesired consequences. According to classical theories, the fluctuations around the expected value of a performance measure are used as deputation for risk (Wagner & Bode, 2008:309). This means that risk is equated with variance and consequently has both a potentially negative and positive. Following these considerations, Juttner, Peck and Christopher (2003:200) defined supply chain risk as a variation in the distribution of possible supply chain outcomes, their likelihood, and their subjective value.

For this study and considering the impact of recent disruptions on supply chains, the former notion of risk as purely negative corresponds best to supply chain business reality. For this reason, 'positive impacts' of risk will not be included. In this study, we understand risk as the negative deviation from the expected value of a certain performance measure resulting in undesirable consequences for the focal firm. Hence, the risk is associated with the damage or loss resulting from a supply chain disruption.

3.4.2 Origins and evolution of Supply Risk Chain Management

The field of SCRM originates from the idea of enterprise risk management (ERM), the paradigm for managing the portfolio of risks that threaten organisations (Gordon, Loeb & Tseng, 2009:302). According to Kleindofer and Saad (2005:53) and Gordon *et al*. (2009:302), risk management has been historically placed under Enterprise Risk Management (ERM), hence the approach to

modelling risks is built on the principles of ERM. Enterprise risk management is a process applied in terms of strategy setting across the enterprise and, designed to identify and manage potential events that may affect the organisation to provide reasonable assurance regarding the achievement of set objectives. Several other risk management portfolios such as healthcare risk management, financial risk management, project risk management as well as the subject matter for this paper, SCRM has stemmed from risk management research and literature (Handfield & McCormack, 2007:10).

There are two approaches to risk management, according to Sunjka and Emwanu (2013:640). First is the traditional approach, which is siloed in nature; that is, different risks are delegated to various specialised people in the organisation who use different instruments to manage the designated risks. The other approach is Integrated Risk Management (IRM) or Enterprise Risk Management (ERM), which calls for a coordinated, strategic framework or a portfolio view in the management of risk (Ghadge *et al*., 2013:524). SCRM, as viewed from the perspective of this study, follows a process that is driven by systemic interrelationships focused at identifying and reducing risks, not only at an organisational level but the entire supply chain.

3.4.3 Definitions of supply chains risk management

There are various definitions of supply chain risks. Literature provides few clear definitions due to the nature of the subject, which is highly contested among scholars (Rao & Goldsby, 2009:97). This study identifies definitions that best suit its context.

Supply chain risks refer to the likelihood of threats or disturbances at any point in the end-to-end supply chain, from sources of raw materials to end use of customers (SCRLC, 2011:4). According to SCRLC (2011:4), SCRM is the coordination of activities to direct and control an enterprise's end-to-end supply chain with regard to supply-chain risks. Waters (2011:75) defines SCRM as the process of systematically identifying, analysing and dealing with risks to supply chains.

Similarly, Wagner and Bode (2008:309) and, Bode and Wagner (2015:216) define supply chain risk as a combination of an unintended and irregularity triggering event that materialises somewhere in the supply chain or its environment. It is a consequential situation which significantly threatens normal business operations of the firms in the supply chain.

It is noted by Zheng, Yildiz and Talluri (2015:5031) that SCRM is an inter-organisational collaborative endeavour utilising quantitative and qualitative risk management methodologies to identify, evaluate, mitigate and monitor unexpected macro and micro-level events or conditions which might adversely impact any part of a supply chain. Pujawan and Geraldin (2009:956) advocate that SCRM aims to reduce the probability of risk events occurring and to increase resilience, which is the capacity to recover from a disruption.

Although SCRM is still an emerging concept and has rather unclear boundaries at this stage, Sodhi *et al*. (2012:2); Sunjka and Emwanu (2013:640) state that executives are increasingly reporting concerns about the rise of supply chain risks. In relation to the perception of industry needs, SCRM is essentially a loss and damage reduction mechanism (Bloss *et al*., 2009:248) but for the loss and damage to be identified and quantified, the impact of the risk must be examined on the operational performance of the firms in question.

3.4.4 Supply chain risk sources

Supply chain risk sources are unpredictable variables which can materialise within an organisation, network or environment. According to Olson and Wu (2010:695), risk drivers can arise from a variety of origins including the external environment, from within an industry, from within a specific supply chain, from specific partner relationships, or specific activities within the organisation. These risks materialise because of uncertainties regarding future risk events, which can appear at any point in time in the supply chain (Wagner & Bode, 2008:310; Aqlan & Lam, 2016:78). Different scholars identify differing supply chain risk sources, for example, Svensson (2000:731) ascertains two categories, which are quantitative and qualitative. Chopra and Sodhi (2004:54) proposed nine, which includes disruptions, delays, systems, forecast, intellectual property, procurement, receivables, inventory, and capacity. Jüttner, Peck and Christopher (2003:203) categorise the sources of risks into three distinct groups, namely, environmental risks (those external to the supply chain), network-related risks, and organisational risks (those which cannot be predicted with certainty and that affect the supply-chain-outcome variables).

As established, supply chain risks come in various categorisations. Vilko (2008:37) suggests that the categorisation should be tailored to the supply chain in question. Some categorisations are industry-specific while others are general. In the present study, supply chain risk sources are

classified into four distinct classes as proposed by Wagner and Bode (2008:310), namely: 1) demand-side risks, 2) supply-side risks, 3) regulatory, legal and bureaucratic risk, and 4) infrastructural risk.

3.4.4.1 Demand-side risks

Demand-side risks, according to Juttner (2005:198) and SCRLC (2013:12), are caused by disruptions arising from downstream supply chain operations. They include disruptions in the distribution network such as delays in the distribution centre and disruptions in the physical distribution of products to the end customer, for example, truck driver strikes. Demand side risks are usually a result of ineffective communication between downstream supply chain partners, which results in unforeseeable consumer demands which cause mismatches between a firm's demand projections and actual demand. Demand mismatches can lead to bullwhip effects characterised by an amplification of demand volatility in the upstream direction of the supply chain (Wagner & Bode, 2008:310).

A hypothesis by Wagner and Bode (2010:310) suggests that high demand-side risks directly lower supply chain performance. In addition, such disruptions have consequences, which include costly shortages, product obsolescence and inefficient capacity utilisation. Demand-side risk management is viewed in some respects as a relatively manageable problem, but it still is a major risk source for many firms (Wagner & Bode, 210:310). Spekman and Davis (2004:419) provide an example of Cisco Systems Inc who in 2001 wrote off 2.5 billion USD (USD37 billion) in inventory due to lack of communication among its downstream supply chain partners.

3.4.4.2 Supply Side risks

Unlike the demand-side risks that have to do with the downstream side of operations, supply-side risks are associated with upstream side disruptions. Supply-side risks relate to events that affect the continuity of supply as a result of an interruption of the buyer-supplier relationship (Wagner & Bode, 2008:311). Supply-side risks are found in purchasing, supply networks, and supplier relationships. Earlier research by Kraljic (1983:109) was among the first to emphasise the need for firms to proactively assess and manage the uncertainties in their supplier portfolio to guard against costly supply disruptions.

Supply chain disruptions are resultant from unsolved problems in the supplier's production and operations management, causing capacity constraints and shortages. Also, inferior quality purchased products are a significant risk that has a domino effect throughout the supply chain to the final customer. Wagner and Bode (2008:311), emphasise that the higher the supply risk, the lower the supply chain performance.

Another recognised supply-side risk is opportunistic behaviour tendencies by suppliers (Hallikas, Karvonen, Pulkkinen, Virolainen, & Tuominen, 2004:49; Li *et al.*, 2015:85; Fan *et al.*, 2017:67). This organisational lock-in is usually experienced when a purchasing firm is over-dependant on a supplier that it has minimal options (Spekman & Davis, 2004:420; Huan *et al.*, 2017:67). The inability of purchasing firms or suppliers to adapt to technological changes may also pose detrimental effects that will ultimately affect firm and supply chain performance (Wagner & Bode, 2008:311). Lastly, with the increased reliance on outsourcing, supply-side risks continually increase.

3.4.4.3 Regulatory, legal and bureaucratic risks

Regulatory, legal and bureaucratic risks refer to the legal enforceability and execution of supply chain-relevant laws and policies such as trade and transportation laws as well as the degree and frequency of changes in these laws and policies (Wagner & Bode, 2008:311). In many countries, authorities may act as a factor of uncertainty in supply chain operations, especially if the products travel across several countries to reach the final customer. Regulatory risks are external to both the individual firms and the whole supply chain, meaning they cannot be controlled. Therefore, the supply chain partners must create manoeuvres to adjust their supply chains to the legal and bureaucratic frameworks of the countries and regions in which they operate.

Supply chain disruptions associated with regulatory, legal and bureaucratic risks include the actions or decisions of authorities that may restrict the design and influence the operative performance of supply chains (Wagner & Bode, 2008:311). Regulatory changes are usually abrupt and difficult to anticipate; for example, the new road pricing scheme for freight vehicles in Europe substantially increased transportation costs. In Zimbabwe, the administrative statutory instrument 64 of 2016, which imposed import bans on certain products into Zimbabwe could have affected the supply chain operations of many retail outlets (Donga, Ngirande & Shumba, 2018:369). For

firms and supply chains to meet the legislative prerequisites they often require more complex supply chains that incur higher costs (Wagner & Bode, 2008:311), hence the higher the regulatory, legal and bureaucratic risk, the lower the supply chain performance.

Efforts to create a borderless Africa to ease trade across the continent are still under review at the African Union, and such developments can bring about developments that will reduce the constraints brought about by regulatory risks, but for now, it is still a matter of concern.

3.4.4.4 Infrastructure risks

Infrastructure risk is the potential for loses due to failures of organisational structures and facilities Spacey (2015:1). Chopra and Sodhi (2004:54) explain supply chain infrastructure risk source as disruptions that materialise from the infrastructure that a firm maintains for its supply chain operations. It includes technical problems such as equipment malfunctions, machine breakdowns, disruptions in the supply of electricity or water, IT failures or breakdowns, in addition to human-centred issues such as vandalism, sabotage, labour and industrial accidents.

It can be argued, to a certain extent, that many firms in Zimbabwe have been affected by infrastructural risk due to the use of outdated machinery and equipment, hence the decline in capacity utilisation of many manufacturers who supply retail chains (Nyoni, 2018:1). Globally, firms have become increasingly dependent on technology and consequently have become vulnerable to IT-related problems such as cyber-attacks and virus attacks (Wagner & Bode, 2008:312). Based on the above, it is evident that the higher the infrastructural risk, the lower the supply chain performance.

3.4.5 Supply chain risk drivers

The increase in complexity of global supply chains is attributable to many drivers, including reduced product lifecycles, market globalisation, the development of communications and other technologies, e-business, complex international networks of industrial partners, unpredictable demand, cost pressures, increasing use of outsourcing, reliance on suppliers, international governmental intervention, and more lean and agile logistics (Harland, Brechley & Walker, 2003:54; Brindley, 2004:7; Hult, 2004:3; Hillman, 2006:11; Craighead, Blackhurst, Rungtusanatham & Handfield, 2007:131; Narasimhan & Talluri, 2009:114; Thun & Hoenig, 2011:244; Lavastre *et al.,* 2014:3388).

3.4.6 Significance of supply chain risk management

From a business continuity perspective, SCRM manages exposure to serious business disruptions arising from risk within and outside the supply chain. In this sense, SCRM aims to build the capability to reduce vulnerability and ensure business continuity (Juttner, 2005:50; Goh, Lim & Meng, 2007:168; Wieland & Wallenburg, 2012:890). On the financial viewpoint, SCRM strategies lead to closely matching the desired cost savings and profitability targets of firms and their related supply chains (Faisal, Banwet & Shaknar, 2007:684; Manuj & Mentzer, 2008:205). With such compelling literature, it can be posited that when a firm is better able to manage supply chain risks, it can lead to a competitive advantage over competition hence improved market position. Thus, SCRM aims not only to reduce costs and vulnerability but also to ensure profitability, business continuity, and potentially longer-term growth.

3.4.7 Results of supply chain risk management

Hendricks and Singhal (2005:502) establish that not only can failure to manage supply chain risk lead to drastic downturns in a firm's share price, which can be challenging to recover, but it can also generate conflicts amongst the firm's stakeholders. They identified that on average, major supply chain disruptions have the potential to reduce the stock market value of a firm by 10%. Sodhi *et al*. (2012:3) also state that firms that are affected and suffering from the occurrence of uncertain events caused by supply chain risks experienced up to 40% lower stock returns relative to their industry benchmarks. It should be noted that, according to Hood and Young (2005:564), many organisations may have gone out of business specifically because of their failure to adopt effective risk management strategies. Wu & Olson (2009:696) further contribute to this ideology by advocating that institutionalising a culture of SCRM can make firms more prepared to deal with risk exposure.

On the other hand, SCRM can offer cost savings by protecting against sales and market-share loss and rebuilding costs. It can also give firms a competitive advantage and enable them to recover faster than their competitors. Disruptions carry costs, for example, workers who have to log additional hours to compensate for shortfalls caused by disruptions. Identifying these cost savings can help justify investing in SCRM, especially if these investments can assist firms make the most of their resources. SCRM can also offer intangible benefits such as avoiding damages to firm reputation or brand (SCRLC, 2011:7). Furthermore, the implementation of the SCRM process

showed increased resilience among grocery retailers when faced with a disruption occurrence. This makes SCRM a very critical component as it can immensely result in the failure or success of an organisation.

3.4.8 Measurements of supply chain risk management

The subject of SCRM is evolving, and as such, there have been studies developed by researchers in variable disciplines to test the influence of this variable. Fan *et al*. (2017:73) used six constructs adapted from Juttner (2005:124) and, Manuj and Mentzer (2008:196). Manuj (2008:232) did a qualitative study with seven key measurement scales. Chen and Pauraj (2004:142) measured supply chain performance using a 14-item measurement scale across two dimensions, which are supplier operational performance, and buyer operational performance. These measurement scales were derived from Bozarth, Handfield and Das (1998:248); Carr and Pearson (1999:312); Carter, Smeltzer and Narasimhan (1996:227); Hartley, Zirger and Kamathal (1997:60); Tan, Lyman and Wisner (2002:620); Ahire, Golhar and Waller (1996:35); Tan, Kannan and Handfiled (1998:7), Jayaram, Vicky and Droge (1999:1010); Kathuria (2000:638) and Shin *et al*. (2000:327).

This segment elaborated literature on the conceptualisation of SCRM, its definitions as provided by different scholars and the origins of the concept. It was identified that there are several sources from which risks can originate. It is important to understand the source and nature of risks before mitigation strategies can be hypothesised. SCRM has been established to be a highly significant concept among many reasons that aid business continuity. Also highlighted are the drivers, measurements and results of SCRM.

3.5 SUPPLY CHAIN RISK INFORMATION SHARING

Information about supply chain risks is highly complex, ambiguous, and uncertain. Therefore, to be effective in SCRM, firms need to put in place an effective SCR information processing system that has adequate information processing capability to process SCR information (Fan *et al*., 2017:64). This study conceptualises the requisite information processing capability concerning the gathering, processing, and application of supply chain risk information as being accomplished by three processes, namely: supply chain risk information sharing (SCRIS); supply chain risk analysis and assessment (SCRAA); and supply chain risk-sharing mechanisms (SCRSM). This section explores the literature on the first mediating variable, SCRIS.

3.5.1 Conceptualisation of supply chain risk information sharing

Literature relating to this variable has predominately been on information sharing, but the basic undertone is that SCRIS and supply chain information sharing are indivisible. Therefore, SCRIS and supply chain information sharing will be used interchangeably. According to Hsu, Kannan, Tan and Leong (2008:297) and, Shou, Yang, Zhang and Su (2013:2), information sharing in the context of SCM is the extent to which a firm openly communicates important and sensitive information to its partners. SCRIS is the exchange of data relevant for enabling the monitoring of supply chain process flows and making timely interventions against potential risks and their related disruptions (Li, Fan, Lee & Cheng, 2015:83). Another definition by Bayraktar, Koh, Gunasekaran, Sari and Tatoglu, (2008:196) stipulates that information sharing is communication or sharing of a firm's long term important and sensitive proprietary information between supply chain partners.

Industry competition has evolved from inter-organisational to inter-supply chain, which has led to a greater need for elevated levels of cooperation and information sharing between supply chain players (Tran, Childerhouse & Deakins, 2016:1102). Strategic information sharing is a key driver of SCM and SCRM as it allows supply chain players to work together to create an integrated and coordinated supply chain (Chopra & Meindl 2007:482). Levastre *et al*. (2014:3381) and Pfohl *et al*. (2010:36) recognise information sharing among supply chain partners as a primary requirement for an effective SCRM system.

Supply chain partnering firms may share information ranging from inventory levels, promotional calendars, product descriptions, pricing, shipment tracking and inventory management information such as replenishment order forecasts and inventory levels (Cox, Dick & Rutner, 2012:50). SCRIS, according to Fan *et al*. (2017:64), includes abnormal information that may affect the supply chain. Such information includes inventory, logistics, quantity, quality, and monetary issues along the whole supply chain, as well as information about the market, politics, technology, and meteorology in the environment, exchange rate fluctuations and market forecasting. The impacts can be limited to a certain region or regions or transmit along the whole supply chain.

Despite the potential benefits of SCRIS as highlighted in several studies, its practical implementation in supply chains is not always achievable (Fawcett, Wallin, Allred, Fawcett & Magnan, 2011:38; Spekman & Davis, 2016:43). Coordination among SC members, while

desirable, is often impractical, since it is deemed to be too costly or too risky (Geunes, Romeijn & Van Den Heuvel, 2016:815). Information hoarding is one of the major risks that make partners reluctant or unwilling to share their firm's strategic information (Nogues, 2014:27). Opportunistic behaviours among supply chain partners occur when a partner retains some crucial information that should be shared with other partners to use for their personal benefit. Information hoarding can lead to a decline in the operational performance of the supply chain because it exposes other players to potential risks (Dittmann 2013:48). Additionally, companies need to bear the risk that information may be leaked intentionally or unintentionally by suppliers (Huang, Li & Ho, 2016: 1518).

A report produced by the Grocery Manufacturers Association (2018:1) pointed out that retailers may not have an incentive to share data with suppliers. Moreover, a study performed by Forrester Research (2006:1) on 89 retailers reported that only 27% of retailers engaged in collaborative information sharing. In this context, achieving full information sharing is not always possible.

In light of the stated literature, it may appear that there may be little general agreeable consensus on the benefits associated with SCRIS as opposed to the consequences. However, Salman (2014: 317) is of the view that a firm's potential to share risk information is embedded in its ability to reduce information asymmetry, increase visibility regarding the identity, location and status of flows transiting in supply chains, and minimise uncertainties and opportunistic behaviour. Supply chains that do not share risk information are deemed more likely to create gaps and misalignments in their risk management processes.

Moreover, in the absence of SCRIS among supply chain partners, managers cannot be aware of market uncertainties and impending risks that may affect the effective flow of the supply chain. Basically, SCRIS provides a foundation on which managers can make good decisions.

3.5.2 Risk information sharing structures

There are various structures through which supply chain risk information can be shared. Liu and Kumar (2003:525) identify three structures of information sharing, which are, sequential, reciprocal, and hub and spokes.

3.5.2.1 Sequential information sharing

Sequential information sharing is a one-way information sharing flow structure whereby one supply chain partner's output is the next supply chain partner's input. As a result, such a flow of information links the collaborative processes between the neighbouring supply chain partners into a sequential chain. A typical example whereby information is shared sequentially is that of Toyota's information chain where Toyota's suppliers provide information to Toyota in a one-way format (Liu & Kumar 2003:525; Juarez & Ko, 2018:2).

3.5.2.2 Reciprocal information sharing

Reciprocal information sharing, on the other hand, is a two-way information sharing structure among several supply chain partners. Each supply chain player has an obligation to provide risk information to other partners to create a reciprocal web of information sharing whereby every partner is equally aware of what is taking place in the supply chain. The bi-directional flow of information among several partners may pose some irregularities between the shared information of different supply chain partners, therefore, it is imperative to synchronise and integrate strategic information, share interactive processes to enhance coordination and reduce uncertainty and conflict which may result from collaborating supply chain partners (Liu & Kumar, 2003:525; Goh & Sandhu, 2013:292).

3.5.2.3 Hub-and-spokes information sharing

The hub-and-spoke is a web-based information sharing structure also referred to as e-hub. It facilitates the availability and communication of information to all supply chain partners on a single platform. The main function of the e-hub includes coordinating, storing, aggregating and maintaining information about each supply chain partner, making decisions and communicating the decisions to all partners involved. An effectively centralised e-hub improves collaborative planning, forecasting and replenishment (CPFR) (Liu & Kumar 2003:525; Meyer *et al*., 2019:7).

3.5.3 Emergence of supply chain risk information sharing

The origins of SCRIS according to Zhang, Sheng and Ghenniwa (2004:2), cannot be pinpointed to any direct specification, although the inception of web-based technologies and the internet has provided a foundation for the concept. Initially, communication between firms was rather dispersed, but the introduction of the internet in firms and supply chain processes significantly

developed SCRIS among firms to its current conceptualisation (Amin, Mahasan & Khan, 2014:662).

In traditional supply chains before the growth of the use of information technology, such as Electronic Point of Sales and Internet-Based Electronic Data Interchange, information sharing methods included the use of personal contacts, social events and face-to-face meetings (Tesfom, Lutz & Ghauri, 2004:412). These traditional methods were not as effective in communicating risk information to participants of a supply chain and often created barriers to effective information sharing. It resulted in limited knowledge of the market and deprived supply chains of achieving optimal performance (Andersen, 2006:82).

3.5.4 Drivers of information sharing

Information sharing is a widely investigated subject with extensive literature, as such, different scholars have identified different antecedents specific to their areas of investigation. Yang and Maxwell (2011:164) identify information sharing antecedents as information security, information technology and capability, trust and leadership, and legislation. Wu, Chang and Hsu (2014:123) recognise trust, commitment, reciprocity and power as the key drivers of information sharing. A study by Moberg, Cutler, Gross and Speh (2002:757) categorise information antecedents into three categories with their variables, namely: 1) information characteristics; information quality; 2) organisational characteristics; information technology commitment, organisational size, SCM commitment; and 3) relationship characteristics: trust, and commitment.

This study will, therefore, extrapolate common antecedents identified in previous research. In his study of collaboration management, Salman (2014: 317) posits the view that an inability to share risk information in the supply chains is deemed likely to create gaps and misalignments in their risk management processes. It is therefore of marginal importance to establish and identify the antecedents influencing a firm's ability to be involved in mutual risk-sharing with other supply chain players. Figure 3.3 shows the common risk information sharing antecedents.
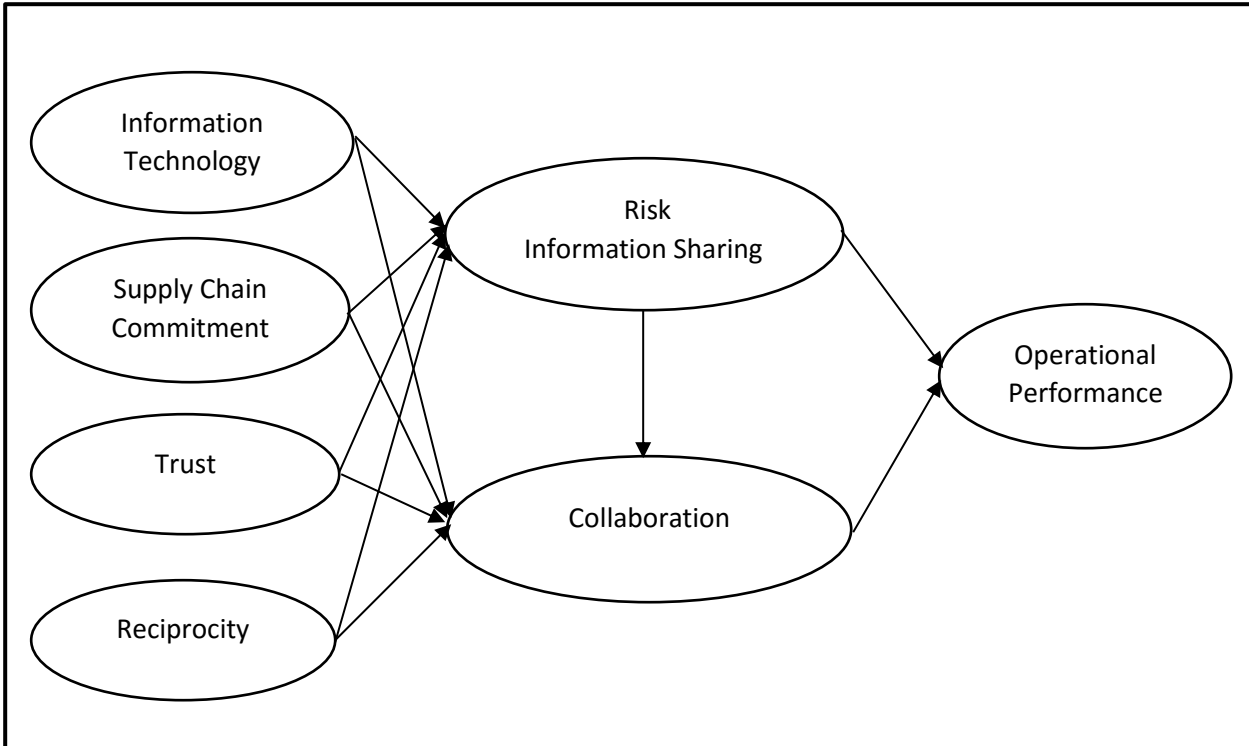
Figure 3.3: Antecedents of risk information sharing

Source: Moberg, Cutler, Gross and Speh, (2002: 757); Wu *et al*. (2014:123)

Information technology capability is a major factor that impacts on supply chain members' willingness to share proprietary and sensitive data (Driss & Asmae, 2008:1). Prajogo and Olhager (2012:516) further contribute to that idea by stating that information technology can also be a critical factor for the success of inter-organisational information sharing. The use of IT in supply chains has received considerable attention with various Business-To-Business (B2B) communication technologies being developed. These include web internet, B2B private (Ethernet), and EPOS (Electronic Point of Sale) (Prajogo & Olhager, 2012:516). Ghosh and Federowicz (2008:453) also state that the use of technology illustrates a desire for supply chain members to benefit from innovations that can improve the timeliness and accuracy of inter-organisational information sharing. Okoumba (2015:54) further advocates that supply chain partners that are technologically oriented may provide an effective and efficient platform for their business counterparts to engage in sharing critical information which is vital for the improvement of overall productivity and performance of their respective supply chains. Considering that risk-related information contains sensitive data that may affect a firm's operations, it can be posited that the

capability and ability to have a secure information system that cannot be accessed or breached easily may catalyse the willingness of information sharing between supply chain partners.

Supply chain commitment, according to Wu *et al.* (2014:123), is an effective construct leading up to a firm's ability to share information. Firms that show a prominent level of commitment towards their relationships can devote time, resources, expertise and share information with related partners for the overall achievement of their common goal (Yang, Wang & Lai, 2008:600). Commitment, therefore, creates an atmosphere whereby relationships between supply chain partners is strengthened, which ultimately enables them to disclose sensitive and propriety data without fear of information mismanagement (Okoumba, 2015:55).

In relation to the 'trust' antecedent, Corsten and Kumar (2005:80) and Wu *et al.* (2014:123) posit that trust impacts a firm's intention to share information as it enables partners to be more engaged and willing to enter into strategic collaboration and partnership that may yield significant benefits and increase the overall productivity of a firm's supply chain performance. Trust reflects the confidence of one party in a two-way relationship that the other party will not exploit its vulnerabilities (Svensson, 2001:432; Wu *et al.*, 2014:123). According to Okoumba (2015:57), trust is regarded as one of the prerequisites to any long-lasting business relationship and should then be maintained and preserved if any organisation aspires to be successful in its industry. In a supply chain, it would seem trust is of vital importance because it encourages members to act and conduct their business transactions in a way that portrays fairness and goodwill towards other aligned firms.

Reciprocity in the supply chain can facilitate information sharing between partnering firms (Humphreys, Lai & Sculli, 2001:245; Wu *et al.*, 2014:123)). Wu *et al.* (2014:123) emphasise that reciprocity in the supply chain can accentuate the establishments of cooperation and collaboration among partners; therefore, collaborating to purse common supply chain goals. Relationships in a supply chain are therefore formed and maintained when participants offer reciprocal benefits such as strategic data to one another over time.

3.5.5 Results of risk information sharing

A substantial number of studies have investigated the impact of information sharing on firms and their supply chains. In their study of information sharing in retail supply chains, Dominguez, Cannella, Barbosa-Povoa and Framinan (2018:130) establish that information sharing provides

different value to retailers depending on their operational configuration. They suggest that in some instances, partial information sharing is necessary whereas full information sharing is recommended in other cases. Jarrell (1998:58), Lavastre *et al*. (2014:3396) and Ivanor *et al*. (2019:21) contribute to the study of information sharing by concluding that information sharing activities can improve the coordination between the processes of different supply chain members, which lead to improved supply chain integration, delivery accuracy, time-to-market and partnership quality.

Based on the available literature, it is evident that information sharing contributes largely to improved relationships between supply chain participants by facilitating efficient coordination and responsiveness as well as integration of partners' information systems, decision systems resulting in supply chain synergy and superior performance (Hsu, Kannan, Tan & Leong, 2008:298; Ivanor *et al*., 2019:21).

3.5.6 Significance of information sharing

It is established by Piderit, Flowerday and Von Solms (2011:4); and Okoumba (2015:56) that when supply chain risk information is effectively shared among supply chain partners, it creates mutual competitive advantages through increasing a customer's derived benefits and reducing supply chain costs. It aids in reducing inventory levels, improves product availability and shortens delivery lead times. Hsu, Lin, Zheng and Hung (2012:27) describe information sharing as a vital factor in improving a firm's innovation and creativity abilities. When sensitive data and knowledge is shared, it enhances research and development activities which further enables firms to stay in tune with the latest market developments and trends. Paulraj, Lado and Chen (2008:45) in their study of inter-organisational communication, supported by Lavastre *et al*. (2014:3397) posit that information sharing between organisation in a supply chain will activate efficiency in procurement activities leading to quality products and services, reduced customers lead time, increase cost savings as well as other operational efficiencies.

There is consistency in the literature provided by Christopher and Lee (2004:389), and Chen, Sohal and Prajogo (2013:2195) that sharing information creates a collaborative relationship between supply chain partners which reduces uncertainty. It proves to show that sharing relevant information reduces the extent of uncertainty in the supply chain. Christopher and Lee (2004:389)

state that uncertainty results from lacking sufficient information that aids in decision making. They determine this through the risk spiral which describes how lack of information leads to a self-perpetuating descent into chaos. Therefore, risk-sharing in the supply chain along with operational and strategic information sharing creates better visibility which ultimately reduces potential risk, thus improving operational performance.

3.5.7 Measurements of information sharing

In measuring information sharing among supply chain partnering firms, Okoumba (2015:83) used a six-item scale adapted from Li, Ragu-Nathan, Ragu-Nathan and Rao (2006:107). Li and Lin (2006:1654) used three items to measure the impact of information sharing in SCM. Hove (2015:100) categorised information sharing into two categories: strategic information sharing with suppliers, and strategic information sharing with customers. The study then used 10 items adopted and adapted from the instruments used by Eng (2006:771), Sezen (2008:236), and Kocoglu, Imamoglu, Ince and Keskin (2011:1639).

3.6 SUPPLY CHAIN RISK ANALYSIS AND ASSESSMENT

This section explores the literature on the second mediating variable, SCRAA, by deliberating on the conceptualisations of the variable to present an understanding of what it means in context. Also to be presented are the drivers/antecedents, significance, measurements and results as reported in previous literature.

3.6.1 Conceptualisation of supply chain risk analysis and assessment

Risk is inherent in every link within a firm's supply chain, as such, all purchasing organisations are exposed to some degree of supply risk (Svensson, 2000:731; Olsson & De Verdier, 2017:2). By investigating the processing of risk information through risk analysis and assessment, purchasing firms can take a proactive, long-term view for reducing and managing risks.

Risk analysis and assessment involves the identification of potential losses, establishing the extent of losses, understanding the likelihood of potential losses, assigning significance to potential losses, and appraising overall risk (Zsidin, Ellram, Carter & Cavinato, 2004:398; SCRLC, 2011:12).

Haimes (2008:14) and Olsson and De Verdier (2017:2) denote that SCRAA involves the evaluation of the likelihoods and consequences of prospective exposures, either using frequency data or based on expert judgments, scenarios and subjective probabilities. Sodhi and Tang (2012:48) highlight that risk analysis and assessment is a rational process conducted by SCRM experts, which provides clear and specific knowledge on the nature of threats existing within a supply chain. According to Tang (2006:33), risk analysis and assessment has four main aims which are: to identify different types of risks; estimate the likelihood of each type of major disruption occurring; assess the potential loss due to a major disruption; and identify strategies for reducing the identified risks.

For a firm or supply chain to have an effective and solid risk management programme from initial deployment to sustainable operation, it should include robust and ongoing risk identification and assessment process. This means it should ensure it includes a risk-assessment process that can evaluate a wide variety of risks over time (SCRLC, 2011:12). Before impending risks can be analysed and assessed, they first must be identified. Identifying risks is the first step in developing an efficient risk management procedure (Ghadge *et al*., 2013:524). Firms often employ resources towards protecting themselves from the wrong threats, fail to anticipate important threats or fail to recognise the consequences some threats may have because they fail to develop an initial risk register to identify baseline risks that may affect an organisation. It is important for firms to know and establish the threats that a firm may face and the likely consequences such disruptions would have (SCRLC, 2011:12).

Risk identification may commence with brainstorming sessions, previous risk assessments, surveys, or other efforts to identify and list potential risks within supply-chain processes. Firms in different supply chains face different risks, so the risk analysis process should estimate the likelihood and consequence of risks facing each firm and accordingly prioritise them for mitigation. After potential risks have been identified, risk analysis and assessment will aid firms to understand better the point of occurrence of each type of risk and its consequences, which in turn enable them to develop shared awareness of diverse types of risks and their potential effects on different supply chain partners (Sodhi & Tang, 2012:49; Olsson & De Verdier, 2017:2; Ivanor *et al*., 2019:20). Thus, it is more likely to facilitate firms to design better SCRSM.

Firms can use methods such as the bow-tie risk analysis method or the DRK supply chain risk model to fully understand the nature of the risks as well as to rate the likelihood and consequences of risks. Figure 3.4 shows a diagrammatic depiction of the bow-tie risk analysis method.
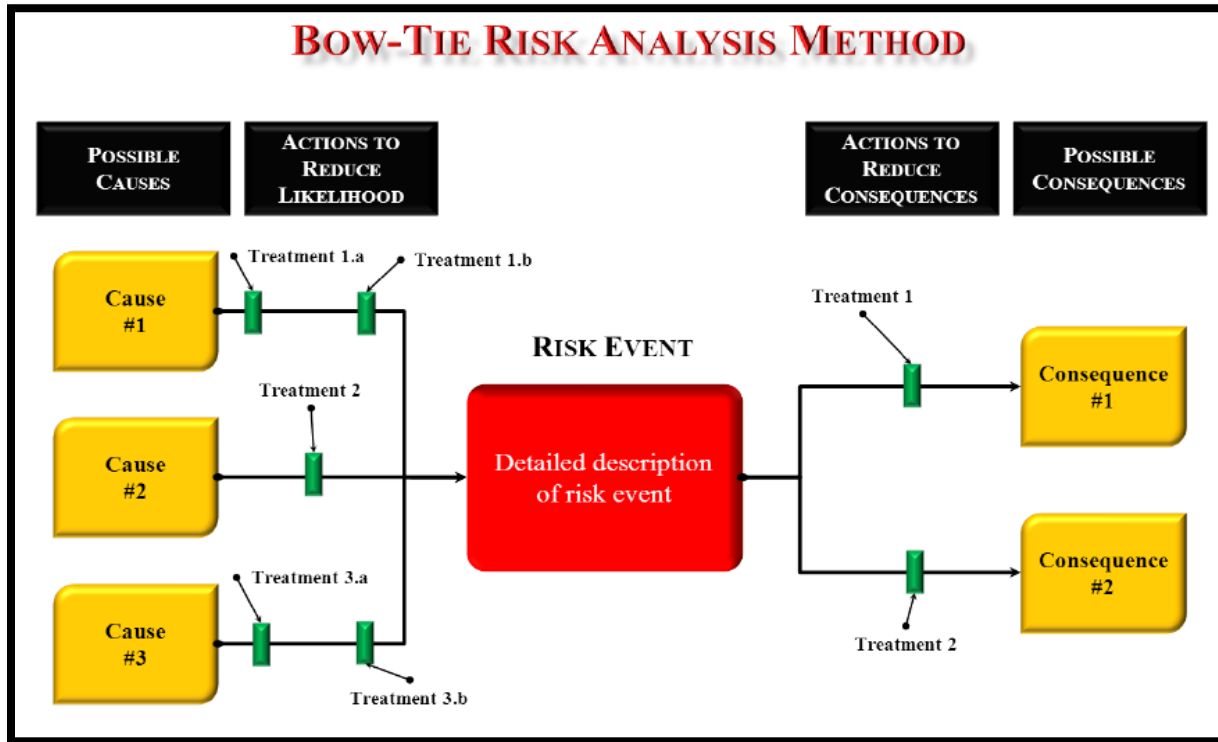
Figure 3.4: The bow-tie risk analysis method

Source: Zipp (2015:8)

The bow-tie risk analysis method and DRK supply chain risk model are a form of Cause and Consequence analysis which are the two dimensions of risk events, and they link treatment actions against each dimension of a risk event. The bow-tie risk analysis shows a visualisation of the relationship between undesirable event, its causes, accidental scenarios, the preventive and mitigation measures to limit their consequences (Zipp, 2015:8).

3.6.2 Antecedents of supply chain risk analysis and assessment

The driving factors or antecedents of SCRAA as provided by Fan *et al*. (Fan *et al*. 2017:64) are depicted in Figure 3.5 and elaborated on after that.
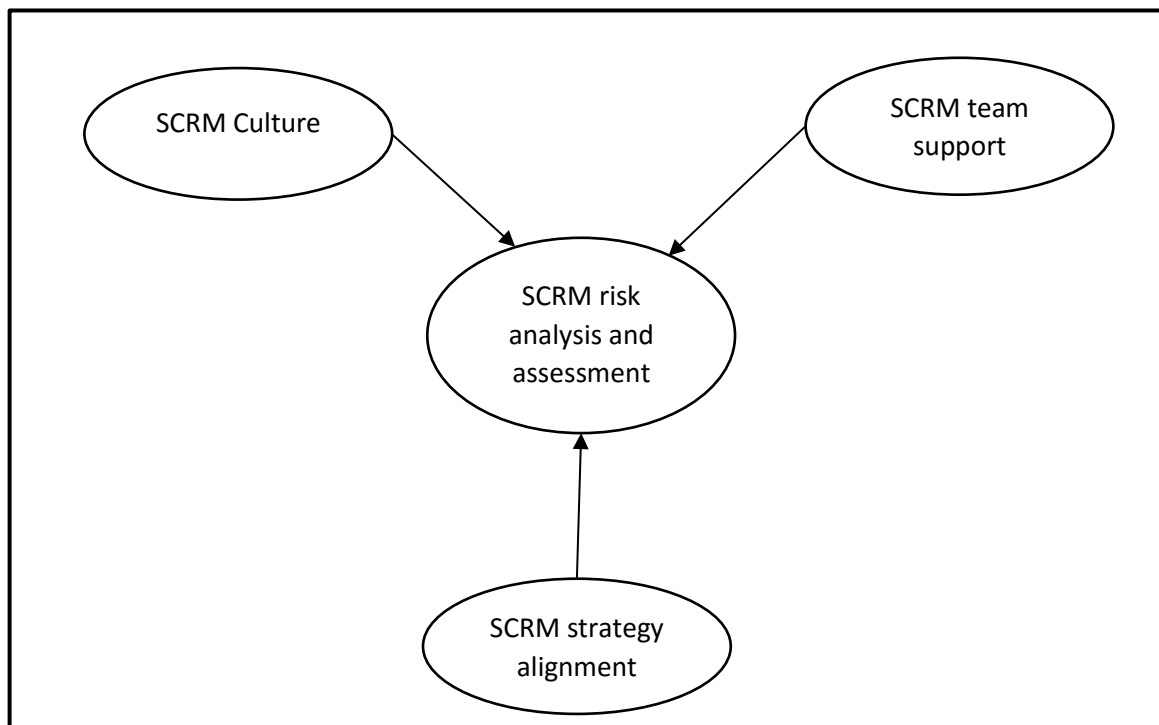
Figure 3.5: Antecedents of SCRAA

Source: Fan *et al*. (2017:64)

A culture of SCRM involves the fostering and sharing values and beliefs concerning SCRM in the organisation and among supply chains (Fan *et al*., 2017:65). The perception of risk is strongly influenced by psychological and cultural factors, and the way risk is perceived can affect how people execute certain practices. Introducing an SCRM culture within a firm can enhance employees' risk awareness thus making them act as the eyes and ears of the firm in recognising and reporting suspicious activities (Christopher & Peck, 2004:7; Zsidisin & Ritchie, 2008:399; APICS, 2015:9). Top management involvement, as well as constant dedication and support towards fostering a culture of SCRM, is of vital importance as it can facilitate an effective exchange of information and its analysis (Li & Lin 2006:1641; Akbulut *et al*., 2009:143; APICS, 2015:9).

In relation to SCRM team support, Khan, Christopher and Burnes (2008:418) explain it as the formal or informal cross-functional and cross-boundary teams and organisations that facilitate and support SCRM activities within a firm and across the supply chain. Zsidisin and Ritchie (2008:21) argue that a team comprised of different internal functions and external supply chain partners, members from different backgrounds with the necessary expertise in SCRM and are familiar with the situations, methods, and techniques of risk analysis can effectively conduct risk analysis and

assessment (Knemeyer *et al.* 2009:142). By integrating and synthesising SCR knowledge, the team can decide on the best course of action.

Lastly, Pfohl *et al.* (2010:34) confer that SCRM strategy alignment refers to the alignment and integration of SCRM strategies with the firms and supply chains strategies. Manuj and Mentzer (2008:193) and Pfohl *et al.* (2010:34) posit that when risk strategy is well aligned with supply chain strategy, it can help managers reach a coherent standard of risk evaluation and facilitate the process of risk analysis and assessment. Aligning risk strategy with other supply chain partners external to the boundaries of a firm encourages supply chain partners to work together and communicate openly (Chen *et al.*, 2013:2187), for instance, firms could define common risk categories and have similar protocols for SCRIS.

3.6.3 Results of risk analysis and assessment

Fan *et al.* (2017:71) alluded that failure of a firm to collect, process and apply supply chain risk information effectively will impact negatively on the firm's ability to anticipate, analyse, and respond to supply chain risks. Consequently, it will be difficult for the entire supply chain to manage risks which will eventually constrain the operational performance of all other related firms and the supply chain concerned.

3.6.4 Significance of risk analysis and assessment

Supply chain risk assessment involves proactive approaches by the purchasing firm for understanding the impact and likelihood that detrimental events can have on inbound supply (Zsidin *et al.*, 2004:420). This, in turn, provides firms with insight for best managing the anticipated risks. They also discover that supply risk assessment leads firms to the implementation of proactive supply management tools, particularly those that focus on addressing supplier quality issues, improving supplier performance, and preventing supply interruptions. Fan *et al.* (2017:64) also support this notion in their study of information processing in SCRM. They posit that the implementation of a supply chain risk information processing system helps firms respond to supply chain risk promptly and also enables firms to mitigate the effects of information uncertainty and ambiguity on firm performance. The effective implementation of such as a system does, however, require a significant input in time and effort from both intra-firm functions and inter-firm processes (Ivanor *et al.*, 2019:21).

3.6.5 Measurement of risk analysis and assessment

To measure the impact of SCRIS, Fan, Li, Sun and Cheng (2018:73) used an eight-item scale derived from Hallikas *et al*. (2002:45); Juttner *et al*. (2003:200); Zsidisin *et al*., (2004:399); Juttner (2005:136); Kleindorfer and Saad (2005:68); Knemeyer *et al*. (2009:144); Neiger *et al*. (2009:162) and Waters (2011:127). The different measurement scales used by these authors were developed and reused over time, with some of the measurement instruments further implemented on the scale for this current study.

3.7 SUPPLY CHAIN RISK-SHARING MECHANISMS

Supply chain philosophies such as the rippling and network effects suggest that supply chain risks are less likely to affect a single firm but all the firms within a supply chain. As a result, one of the challenges that exist in the supply chain environment is the blurring boundaries of responsibility of a risk event. Supply chain risk-sharing mechanism addresses this predicament by offering solutions to managing risk in a collaborative manner. This section analyses literature and discusses the concept of supply chain risk-sharing mechanism.

3.7.1 The conceptualisation of risk-sharing mechanisms

Ellinger *et al.* (2012:249) suggest that SCRSM are approaches to management in which the cost of the consequences of risk are distributed amongst the players in that supply chain, instead of letting one firm bear them alone. InvestorWords (2018:np) defines SCRSM as self-insurance methods of managing or reducing exposure to risk by spreading the burden of loss among several units of an enterprise or business syndicate. According to Juttner (2005: 121) and, Kleindofer and Saad (2005:54), SCRSM refers to a situation in which a firm aligns the incentives and obligations among supply chain members regarding how they share the duties to mitigate supply chain risks and face the consequences thereof in their supply chain.

The success of supply networks is largely based on the long-term commitment of the partners and their ability to share benefits and risks (Harland, Brencheley & Walker, 2003:53; Grotsch *et al*., 2013:2843). Risk and benefit-sharing are relevant to the joint product/service design, process design, and supply chain innovation. It is consequently evident that the notion of spreading risk losses among several players of a supply chain vastly affects supply chain performance as no

individual firm is isolated with the costly burden of a risk event (Grostch *et al*., 2013:2843; Ivanov *et al*., 2019:19).

Essentially, SCRSM comes in different methods such as direct investments in capital, fixtures, capacity options, and mixed ownership of inventory. These other methods are nevertheless rare and normally not used. Narayanan and Raman (2004:99); Faisal, Banwet and Shankar (2006:538) argue that firms explore contract-based solutions to coordinate the relevant SCRM activities before they turn to other approaches because contracts are quick and easy to implement. More so, several articles in the field of SCRM are found to model literature and concentrate on a theoretical analysis of contract-oriented mechanisms, for example. Tsay, Nahmias and Agrawal, (1998:299); Cachon, (2002:229); Liu, (2005:7); Knoblich, Heavey and Williams, (2015:395). The literature further classifies supply chain contracts into eight streams based on different contract clauses such as pricing, minimum purchase commitments, and quantity flexibility or lead times.

Supply chain contracts are coordination mechanisms to integrate supply chain partners that lead to the partners benefiting from improved operational performance (Knoblich *et al*., 2015:395). These supply chain contractual processes address demand uncertainty and buy-back clauses, quantity flexibility, revenue and profit sharing and also product returns (Laeequddin, Waheed, & Sahay, 2009:280; Jeong, 2012:110).

Demand uncertainty, for example, incurs a cost risk to the supplier whereas price volatility incurs a cost risk to the buyer, therefore contractual negotiations with supply chain partners are vital to establish visibility and risk control through agreed contractual processes that manage fluctuations in demand and price volatility (Ghadge, Dani, Ojha & Caldwell, 2017:263). Risk-sharing is becoming a primary motive behind all contractual agreements and is believed to be beneficial for the complete supply chain network (Xiao & Yang, 2009:1076). Collaborative supply chain players should develop robust contractual mechanisms to manage and mitigate supply chain uncertainties (Ghadge *et al*., 2017:263).

Food retailers have high procurement costs over various purchases made from different suppliers for the optimum availability of products on the shelves. Suppliers, on the other hand, face demand uncertainty in the retail industry since competition is full of strife, leading to variable and

unpredictable demand. The objective of risk-sharing contracts in such a case would be to provide a stable procurement cost for the buyer and a committed order quantity for the supplier.

Given the difficulties of demand forecasting environments, challenges of fluctuating prices of products in modern global markets along with other unsuspected risks and uncertainties, SCRSM are increasingly expected to provide one form of trade-off solution for these uncertainties. Risk-sharing partners can obtain significant benefits for their supply chain networks (Buzacott & Peng, 2012:365). As such, SCRSM could prove to be strategic manoeuvres to keep a firm competitive and continuously improving operational performance both within individual firms and the supply chain at large.

3.7.2 Antecedents of risk-sharing mechanism

Figure 3.6 shows a diagram depicting the three antecedents of SCRSM, as proposed by Li *et al*. (2015:86). These include the length of the relationship between partnering firms, the level or extent of supplier trust and lastly, the shared SCRM understanding and beliefs that exists between the supply chain partnering firms.
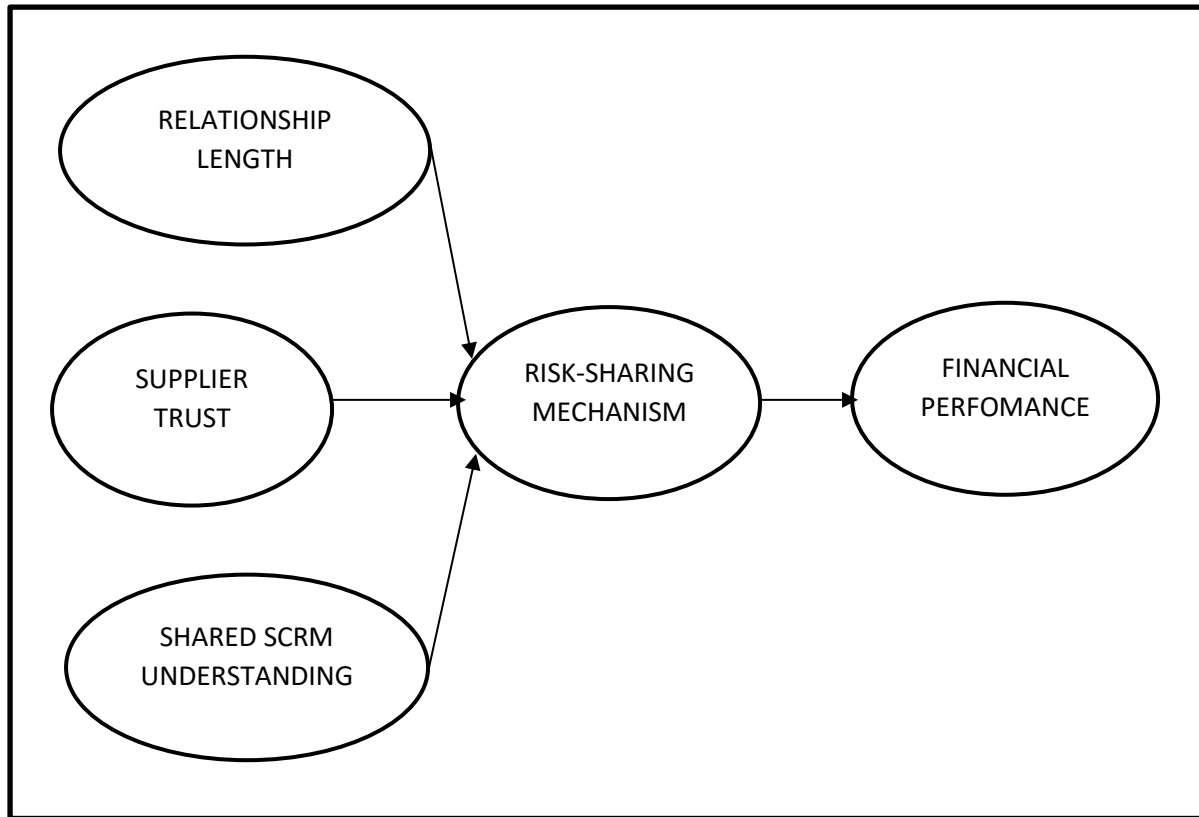
Figure 3.6: Antecedents of risk-sharing mechanism

Source: Li, Fan, Lee and Cheng (2015:86)

Relationship length is the average lifetime of a relationship between a firm and its major suppliers Tang and Rai (2012:86). When supply chain members have a long-term business relationship, organisational routines such as risk-sharing mechanism and information sharing can be established among them with relative ease. As such, long term supply chain partners tend to use explicit contractual governance methods to manage their joint activities (Lee & Johnson, 2010:279). This implies that a long-term business relationship provides a favourable environment for supply chain members to use formal SCRSM to manage their activities and resources in SCRM (Li *et al*., 2015:86).

Supplier trust refers to the extent to which a firm trusts its most significant suppliers (Li *et al*., 2015:86). Trust plays a key role in any organisational relationship because it facilitates motivation to open communication and willingness to take risks between partner firms. In supply chain relationships where partners may assume opportunistic behaviour, trust amongst them is an

essential tool for generating collaborative buyer-supplier relationships whereby partners will not act opportunistically even if short-term incentives exist (Li *et al*., 2015:86). Since supply chain risk-sharing mechanism is concerned with supply chain partnering firms coming together to create mechanisms whereby risks are distributed among the buyer and supplier equitably, trust enables those firms to create viable SCRSM without the need to act unscrupulously.

Another antecedent of supply chain risk-sharing mechanism as advised by Li *et al*. (2015:86) is a shared understanding of SCRM between the buying and supplying firm. They further define shared SCRM understanding as a commonality in beliefs, expectations, and perceptions about SCRM themes. When business partners share a similar vision and goal, they are more likely to make relationship-specific investments in the relationship (Henke & Zhang, 2010:44). As such, shared SCRM understanding may influence the firms involved to invest more resources in the adoption and practice of the risk-sharing mechanism. Moreover, shared understanding between firms helps to reduce potential problems that may come with the implementation of new processes. Problems involving errors, frustration and conflicts are reduced when firms' SCRM policies and views are aligned. This, therefore, implies that risk-sharing mechanism practices are institutionalised with lesser constraints.

3.7.3 Results of risk-sharing mechanisms

Research by Tang (2006:451) suggests that supply chain contracts can improve both operational efficiency and coordination hence improved OP. Moreover, results of Fan *et al*. (2017:71) indicate that SCRSM has a positive and significant impact on OP. Norman (2008:390) concludes that risk-sharing contracts sometimes perceived to be negative for relationships or to have their main value for lawsuits, could be seen as a vehicle to signal information and commitment. Risk-and gain-sharing mechanisms imply a new culture for purchasers previously used only for pushing risk onto suppliers. This increases trust and improves relations of buyers and suppliers, potentially resulting in the supplier giving guaranteed supply in allocation situations as well as lower unit prices. In the study, the experience was that these contract-based mechanisms worked well in handling uncertain demand and supply. In addition, the process of defining and implementing the structured contract might strengthen the trust in the relation, as a lot of issues must be discussed proactively and explicitly.

3.7.4 Significance of risk-sharing mechanism

Risk and gain-sharing contracts have been said to be key factors for the successful implementation of SCRM (Norman, 2008:372). Implementing transparent and formalised risk and gain sharing contracts to spread the risks across supply chain partners with similar interests aligns the supply chain to reach the full effect of different inter-organisational SCRM concepts, improve supply chain coordination and also supply chain collaboration (Narayanan & Raman, 2004:98; Simatupang & Ramaswami, 2005: 260; Fugate, Sahin & Mentzer, 2006:129; Habermann, Blackhurst & Metcalf, 2015:494; Ivanov *et al.*, 2019:20). Because of the empirical evidence, it could be seen that a supply chain risk-sharing mechanism has a significant impact on the success of firms' supply chain.

The process of SCRSM constitutes the information application stage of the SCR information processing system. The effectiveness of the overall SCR information processing system depends on whether firms can achieve positive outcomes with the risk-sharing mechanism. By effectively applying the collected and processed risk information, SCRSM can improve a firm's operational performance in several ways. Firstly, SCRSM helps to resolve conflicting objectives and align incentives (Narayanan & Raman, 2004:99; Yan & Dooley, 2013:523). This allows for the facilitation of joint efforts when institutionalising activities that respond to potential risks. These activities include collaborative planning forecasting and replenishment (CPFR), supply chain planning and new product development, which contribute towards improved operational performance (Yan & Dooley, 2013:523; Meyer *et al.*, 2019:7).

Moreover, SCRSM assists supply chain partners better anticipate and coordinate their supply and demand. Such effective coordination is recognised as being essential for improving performance and quickly responding to changing market needs (Wong, Boon-Itt & Wong, 2011:608). Moreover, SCRSM can help to partner firms appropriately allocate costs and benefits related to risk events. Lastly, it catalyses the integration of supply chain networks to achieve better performance (Li *et al.*, 2014:380).

Supply chain contracts could offer robust strategies that will increase supply chain resilience through mitigating uncertainties and risks in addition to making supply chains more efficient, hence improved operational performance (Ghadge, 2017: 262). Seminal and recent research by

(Harland *et al*. 2003:53; Ojala & Hallikas, 2006:202; Kouvelis, Chambers & Wang, 2006:449; Krueger & Uhlig 2006:1682, He & Zhang 2008:770; Kim, 2013:1139; Habermann *et al*., 2015:493) all suggest that firms should use risk-sharing contracts to handle risk in supply chains .

3.7.5 Measurement of risk-sharing mechanisms

In assessing the impact of SCRSM on OP, Fan *et al*. (2017:73) used a 5-item measurement scale. The measurement scales for their study was adapted from; Waters (2011:127); Norrman (2008:389); Faisal (2006:545) and, Menzter *et al*. (2001:17). A study by Li *et al*. (2015:92) also used a five-item measurement scale to measure the risk-sharing mechanism. These were adapted from Cavinato (2004:386); Faisal (2006:545); Norrman (2008:389) and Waters (2011:127). The measurement scales developed and used by these authors were further assimilated in recent studies by Flynn *et al*. (2010:69) and Fan *et al*. (2017:73), which this study adopted.

Discussed above are the three mediating variables that this study is investigating. The explored variables, SCRIS, SCRAA and SCRSM were established to be a very important aspect of processing risk information. The SCR information processing system aids firms to respond to SCR information in a timely manner and mitigate the effects of information uncertainty on firm performance. The system requires significant input, time and effort from both the internal business functions and external supply chain partners. Furthermore, the section disclosed the antecedents and drivers of the variables as well as the significance of the variables in addressing the subject of SCRM. Certain characteristics such as management support, supplier trust, organisational culture, forging partnerships, and calibration of business strategies are some of the drivers shown to be imperative in the supply chain risk information processing system. Measurement scales that were used in previous studies and their results were also displayed.

3.8 OPERATIONAL PERFORMANCE

This section analyses the literature on OP, which is the outcome variable in this study. In essence, optimum performance is the bottom line of any operational firm, whether it is for-profit or non-profit. The section will commence with a breakdown of the conceptualisation and definitions of operational performance. After that, the dimensions will be highlighted since OP is a multi-dimensional concept. Also, to be explored is the significance, measurement and outcomes of OP.

3.8.1 Conceptualisation of operational performance

Operational performance is the degree to which a firm's operations can achieve the goals of being right, fast to market, on time, optimum productivity and agility (Slack *et al*., 2010:32). It should be noted, however, that there is no consensus when it comes to the definition of such a broad concept. Sobczyk and Koch (2008:152) and Andersen (2010:14) argue that firms have their own metrics which they use to measure performance although there may be some metrics or measurement scales that are common across the business environment.

Firms in this modern competitive business world are constantly in search of new ways to improve the performance of their supply chains (Sezen 2008:233), and as such, they have to strengthen their coordination and collaboration mechanisms to stay competitive (Kocoglu, Imamoglu, Ince, & Keskin, 2011:1634). A firm's success is explained by its performance over a certain period. Researchers have extended efforts to determine measures for the concept of performance as a crucial notion. Finding a measurement for the performance of the firm enables the comparison of performances over different periods. Nevertheless, there is no specific measure with the ability to measure every performance aspect Al- Matari *et al*. (2014:25).

Performance measurements, according to Al-Matari, *et al*. (2014:25), are classified into accounting-based and market-based indicators. Santos and Brito (2012:101) also identify firm operational performance and a multi-dimensional construct in which performance would have two second-order dimensions: the financial one shown by measures such as profitability and market value, and the operational or strategic realm that includes non-financial competitive aspects such as customer satisfaction, quality, and reputation. Figure 3.7 illustrates the multi-dimensional nature of firm performance.

3.8.2 Operational performance dimensions
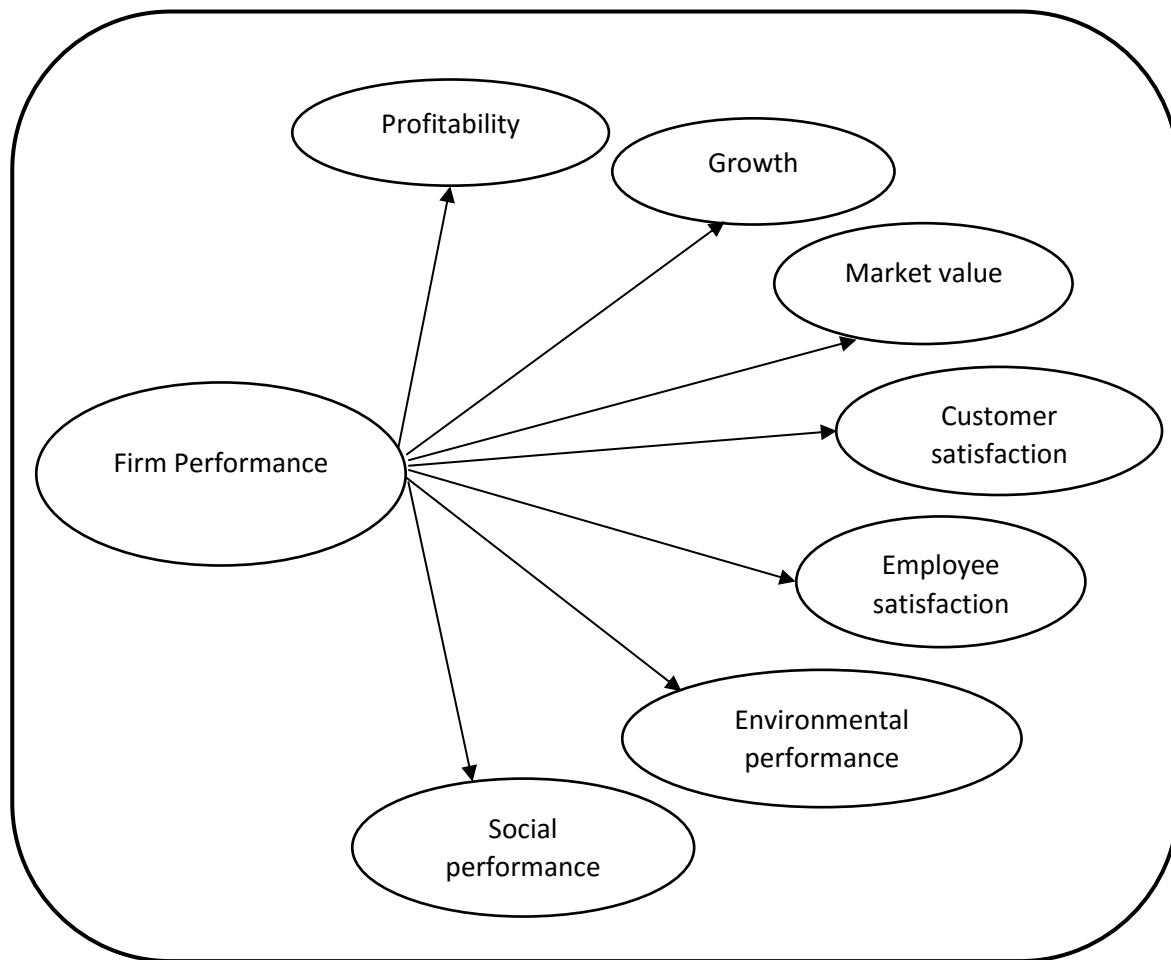
Figure 3.7: Dimensions of operational performance

Source: Santos and Brito (2012:101)

3.8.3 Definitions of firm performance constructs/dimensions

Performance measurement has great significance in the effective management of an organisation and the enhancement of the processes since only measurable things are manageable (Santos & Brito, 2012:101). Below are the empirical definitions of the dimensions used to measure operational performance.

3.8.3.1 Profitability

Profitability is the ability of a given investment to earn a return from its use. Indicators such as return on assets, EBTIDA (earnings before taxes, interest, depreciation and amortisation) margin,

return on investment, net income/revenues, return on equity, and ratios can be calculated to show the profitability of a firm. Profitability analysis is considered as one of the best techniques used to measure operational efficiency (Tulsian, 2014:19).

3.8.3.2 Growth

The growth of a firm, according to Santos and Brito (2012:101), can be measured by analysing the relative market-share growth, asset growth, net revenue growth, net income growth, and level of employee growth. Anyadike-Danes, Bonner, Hart and Mason (2009:9) provide a definition of a high-growth firm in the context of employee growth. They define it as a firm with an average employment growth rate exceeding 20 per cent per annum over three years and with ten or more employees at the start of the period.

3.8.3.3 Market Value

These refer to earnings per share, stock price improvement, dividend yield, stock price volatility; market value added (market value/ equity) (Santos & Brito, 2012:101). It is important to measure the market value of a firm because it helps to identify sources of economic value creation and also identify sources of vulnerability within the firm (Fernandez, 2007:1).

3.8.3.4 Customer Satisfaction

Customer satisfaction, according to Gronholdt, Martensen and Kristensen (2000:510) and, Biesok and Wyrod-Wrobel (2017:26), is the outcome or assessment of what the customer initially expected and what they actually experienced during use and consumption of the product/service. Chang, Wang, and Yang (2009:423) observe customer satisfaction as a psychological response or an evaluation of emotions from the customer. Giese and Cote (2002:4) state that there is no collective classification of customer satisfaction, hence they view it as a recognised form of response that relates to a particular context, for example, purchase experience and the related product, and it arises at a certain time, either post-purchase or post-consumption.

3.8.3.5 Employee Satisfaction

Employee satisfaction is a measure of how happy workers are with their job and working environment (Sageer, Rafat & Argawal, 2012:32). Employee loyalty, productivity and customer satisfaction are directly linked to the level of satisfaction employees derive from their work and

working environment. Employee satisfaction is used to describe whether employees are happy, contented and fulfilling their desires and needs at work (Sageer, Rafat & Argawal, 2012:32).

3.8.3.6 Environmental performance

Environmental management includes all technical and organisational activities undertaken by a firm to reduce its environmental impacts and minimise their effects on the natural environment (Cramer, 1998:162). The literature on environmental management state that the adoption of environmental practices generally leads to an improvement of firm environmental performance, which has the potential to play a key role in the improvement of firm performance (Dangelico, 2015:737).

3.8.3.7 Social performance

Social performance is defined as the effective translation of an institution's mission into practise in line with accepted social values (Taskforce, 2018:1). Social performance can be measured by analysing factors such as employment of minorities, number of social and cultural projects, number of lawsuits filed by employees, customers and regulatory agencies (Santos & Brito, 2012:101).

3.8.4 Significance of operational performance

The significance of performance is clear through the many prescriptions provided for performance enhancement and measurement. Measurement of firm performance and supply chain performance offers significant information that allows management to monitor performance, improve motivation and communication and also allows the firm to identify problems (Al-Matari, Al- Swidi & Fadzil, 2014:25). A firm's success or lack of it is shown by its operational performance indicators over a certain period of time. Measurement of firm performance enables the comparison of performances over different time periods (Al- Matari *et al*., 2014:25). This goes to show that knowledge of a firm's operational performance indicates how well a firm is doing and can also be used as a measure of performance over time. This would assist managers to make informed decisions in areas that need attention and also aids in continuous improvement in areas that are doing well.

3.8.5 Results of operational performance

Several authors agree on the notion that outcomes of firm OP measures can vary widely (Kleindorfer & Saad, 2005:58; Olson & Wu, 2010:696). Every organisation irrespective of its orientation, private or public, for-profit or non-profit are bound by the need for efficiency, effectiveness and overall superior operational performance. Kleindorfer and Saad (2005:58) gave eight key outcomes of supply chain disruption/risk management; corporate image, liability, employee health and safety, cost reduction, regulatory compliance, community relations, customer relations and, product improvement.

3.8.6 Measurements of operational performance

In measuring OP, Devaraj, Krajewski and Wei (2007:1201) adopted an 8-item measurement scale to measure OP. These measurement scales were derived from Frohlich and Westbrook (2001:745); Poirier and Quinn (2003:47); Rosenzweig, Roth and Dean (2003:456); Chen and Paulraj (2004:136); Ranganathan, Dhaliwal and Teo (2004:158), and Poirier and Quinn (2003:45). To measure supply chain performance, Chen, Sohal and Prajogo (2013:2193) used a five-item measurement scale adapted from Wagner and Bode (2008:324). Also measuring OP, Fan *et al*. (2017:73) used a 6-item scale adapted from Cavinato (2004:384) and Flynn *et al*. (2010:69). For this study, a 7-item measurement scale will be used to measure OP. The measurement scales were adopted from Flynn *et al*. (2010:69), Ward and Duray (2000:307), and Boyer and Lewis (2002:9).

In light of the aforementioned, OP is measured through several dimensions. It will be of benefit to a firm if it achieves operational performance through more dimensions as it proves to show its effectiveness and efficiency in its operations. Some of the identified operational performance dimensions include profitability, market value and environmental performance. Literature also shows that operational performance is a widely researched topic judging from the measurement scales that have been adapted by many scholars.

3.9 CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT

This section provides the conceptual model of the study, which highlights the direct and indirect causal relationships under investigation. The conceptual model for this study shown in Figure 3.8 consists of one predictor variable; SCRM, three mediating constructs SCRIS, SCRAA and

SCRSM and one outcome, OP. This section also provides a detailed explanation of the development of hypotheses that are drawn from the framework.

3.9.1 Conceptual model
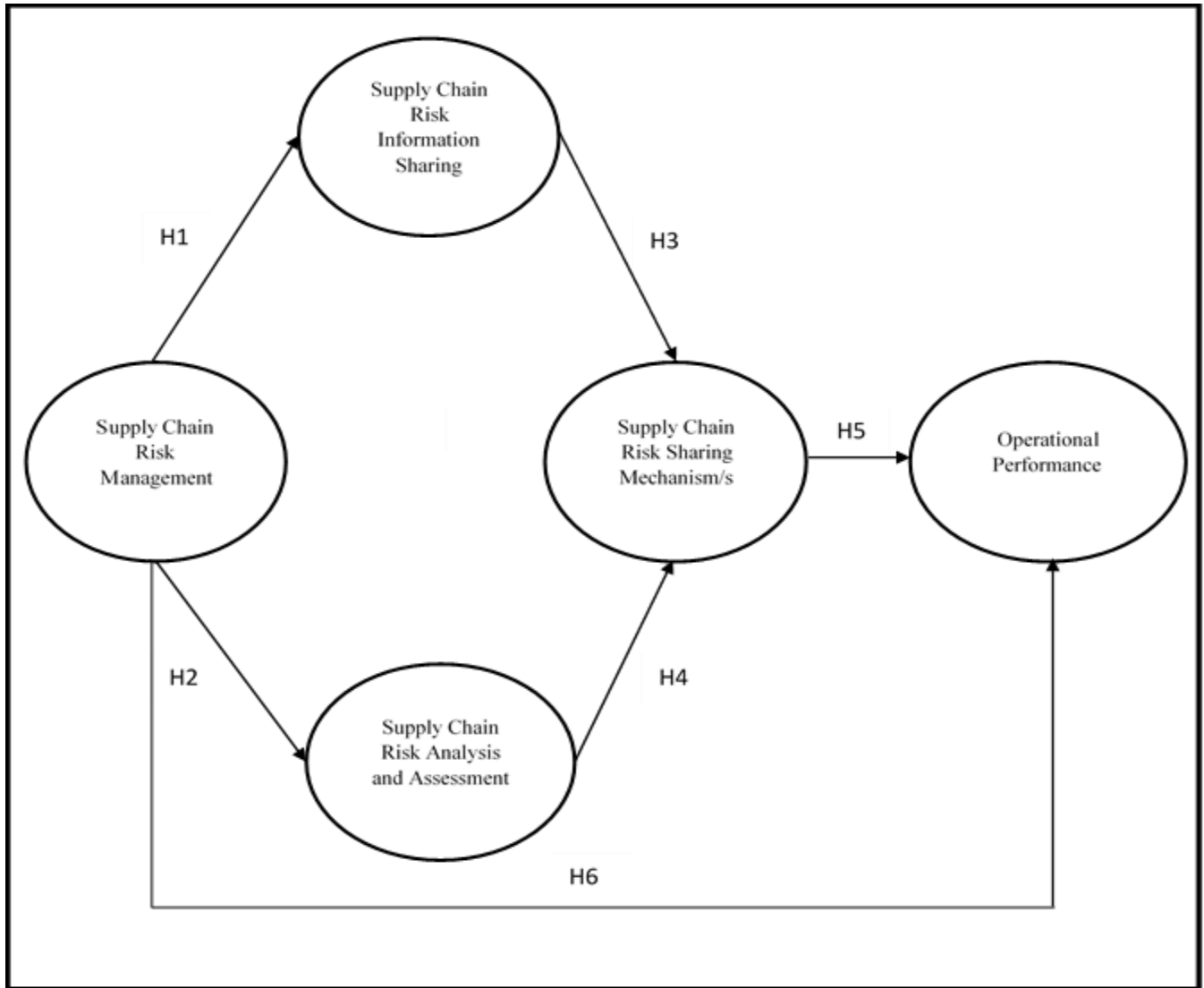
Figure 3.8: Conceptual framework

Source: Author's own compilation

3.9.2 HYPOTHESIS DEVELOPMENT

3.9.2.1 Supply chain risk management and risk information sharing

When SCRM is adopted and institutionalised as part of organisational culture, it improves risk awareness amongst employees, thereby helping them to recognise and report suspicious activities

that threaten the success of the organisation (Chen, Sohal & Prajogo, 2013:2188). This implies that adopting and establishing SCRM as part of organisational and business culture creates an environment whereby potential and anticipated risks are communicated. This information after being assessed can be communicated to other stakeholders in the supply chain so that appropriate action can be taken, which ultimately limits the impact of the potential risk (Ritchie & Brindley, 2007:1402; Zsidisin & Ritchie, 2008:16). This makes SCRM a critical activity for enabling inter-firm and intra-firm communication. Based on the presented literature, this study postulates that:

H1: There is a positive and significant relationship between SCRM and SCRIS in the food retail industry in Zimbabwe.

3.9.2.2 Supply chain risk management and risk analysis and assessment

Several authors including Christopher and Peck (2004:212) and Fan *et al*. (2017:66) agree that instilling a culture of SCRM within the borders of a firm has the ability to enhance employees' risk awareness, thus making them act as the eyes and ears of the firm in recognising and reporting suspicious activities (Zsidisin & Ritchie, 2008:18). Beyond the boundaries of the firm, shared norms and beliefs regarding SCRM encourages supply chain partners to work together and communicate openly (Chen *et al*., 2013:2188). A shared understanding of SCRM can also help firms define the scope and depth of SCRIS and also enhancing the accuracy and reliability of the shared risk information (Spekman & Davis, 2004:422). Furthermore, a common understanding of SCRM among supply chain partners can help them reach a coherent standard of risk evaluation and facilitate the process of SCRIS (Pfohl *et al*., 2010). Khan *et al*. (2008:) claimed that SCRIS initiatives are needed to embed the risk management process into a firm's culture. Thus, before implementing the SCRM process, a risk management culture needs to be fostered within and beyond the firm (Christopher and Peck, 2004:12). As a result of the literature provided, this study suggests that:

H2: SCRM has a significant and positive relationship with SCRAA in the food retail industry in Zimbabwe.

3.9.2.3 Supply chain risk information sharing and risk-sharing mechanism

It is established by Fan *et al*. (2017:66) that SCRIS helps remove information asymmetry among departments and partner firms. In turn, partner firms are more likely to trust one another and are

more knowledgeable about potential supply chain risks and the relevant potential losses. Thus, this creates an environment whereby risk-sharing mechanism designs are considered for the benefit and interest of all partners involved. Fan *et al.* (2017:67) cited an example of Foxconn, which shares predictive demand information with its upstream partners. When Foxconn has to reduce its demand to suppliers due to a decline in market demand, it has a contractual agreement to share the surplus inventory cost with its suppliers.

Moreover, SCRIS acts as an effective way to monitor opportunistic behaviours when implementing SCRSM. If there is no effective SCRIS, the risk-sharing mechanism will fail because some firms may take advantage of certain private risk information to satisfy their own interests (Huan *et al.*, 2017:67). Opportunistic behaviour among supply chain partnering firms is therefore difficult to practise when all related firms share risk information with one another. Furthermore, the constant sharing of supply chain risk information helps firms scan the safety status of the entire supply chain system, enabling them to become aware of and prepare for certain threats. Kleindorfer and Saad (2005:66) added to this hypothesis by stating that in the event of a supply chain risk occurring, the sharing of SCR information can facilitate effective crisis management. Thus, SCRIS can help firms design and implement effective SCRSM. Therefore, this study suggests that:

H3: There is a positive and significant relationship between SCRIS and SCRSM in the food retail industry in Zimbabwe.

3.9.2.4 Supply chain risk analysis and assessment and risk-sharing mechanism

The process of SCRIS is a rational process which is conducted by SCRM experts to provide clear and specific knowledge on the nature of supply chain risks (Fan *et al.*, 2017:68). Moreover, SCRAA aids in understanding the point of occurrence of each type of risk and its consequences, which in turn helps firms to develop shared awareness of different types of risk and their potential effects on different supply chain partners (Sodhi & Tang, 2012:48); thus, it is more likely to facilitate firms to design better SCRSM. Based on their mutual understanding and shared awareness about the supply chain risks, partners can better define their roles and responsibilities, thereby developing a fair and effective risk-sharing mechanism. In the event of a supply chain risk

occurring, supply chain partners may invoke the risk-sharing mechanism contracts as agreed upon (Sodhi & Tang, 2012:48).

The effective application of information depends on whether firms have processed relevant risk-related data into useful knowledge (Fan *et al.*, 2017:68). Without effective SCRIS, firms in the supply chain will not know the exact risks as well as the related potential losses they face, so they are unable to design reasonable SCRSM. Therefore, an effective risk-sharing mechanism is predicated on an effective informative risk assessment process (Kleindorfer & Saad, 2005). In light of the provided literature, this study proposes that:

H4: SCRAA has a positive and significant relationship with SCRSM in the food retail industry in Zimbabwe.

3.9.2.5 Supply chain risk-sharing mechanisms and operational performance

With the increasing threat of SCR, SCRM strategies irrespective of how effective they are, cannot mitigate supply chain risks if they are concentrated on one firm. It is of marginal importance to create appropriate contracting options and applying governance models to implement these strategies along the entire supply chain (Cohen & Kunreuther, 2007; Faisal *et al.*, 2006:538). Ghadge *et al.* (2017:262) further state that supply chain contracts offer robust strategies that may increase supply chain resilience through mitigating uncertainties and risks in addition to making supply chains more efficient, hence, improved operational performance. However, it is difficult to align interests when one firm has information that others in the supply chain do not have (Narayanan & Raman, 2004:). Thus, SCRSM contracts align the interests and incentives among supply chain partners enabling them to share proprietary risk data, thereby limiting uncertainties which have been shown by Salman, (2014: 317); Ghadge *et al.* (2017:262) and, Buzacott and Peng (2012:365) to positively impact operational performance. In light of the evidence mentioned above, the present study hypothesises that:

H5: There is a positive and significant relationship between SCRSM and OP in the food retail industry in Zimbabwe.

3.9.2.6 Supply chain risk management and operational performance

Supply chain risks generate inaccurate and unreliable information which can render supply chains ineffective, inefficient, and thus operationally incapacitated (Zhao, Huo, Sun, & Zhao, 2013:116). Consistent with literature, effective management of supply chain risks may actually provide end-to-end visibility, address the problem of inaccurate and unreliable information, create complementary policies to mitigate risks, thereby improving a firm's performance (Christopher & Lee, 2004:389; Derrouiche, Neubert, & Bouras, 2008:427; Wong & Boon-itt, 2008:605; Riley, Klein, Miller, & Sridharan, 2016:694). With respect to the literature provided, this study suggests that:

H6: SCRM has a positive and significant relationship with OP in the food retail industry in Zimbabwe.

This section discussed literature related to research constructs that are under investigation in this study as well as the development of its hypotheses. A graphical depiction of the relationships of the variables was presented, and the stated hypothesis was justified through extensive literature.

3.10 CHAPTER SUMMARY

This chapter first presented a discussion of SCM as a foundation of SCRM. The history and origins of SCRM were provided up to its current state. Sources of risk were outlined and explained to provide a clearer understanding of what supply chain risk is. Literature provided evidence that SCRM to be successfully institutionalised and operationalised with firms and across supply chains, there should be major organisational and inter-organisational changes such as building trust, forging partnerships and calibration of business. Every organisation strives for excellence and uninterrupted operations; therefore, efficient SCRM is of paramount importance. As such, a firm that makes use of SCRM generates the ability to achieve a competitive advantage where a risk is identified, estimated, managed and controlled.

All five research variables pertaining to this study including their conceptualisations, definitions, antecedents and measurements were analysed and discussed. These variables are SCRM, SCRIS, SCRAA, SCRSM and OP. Moreover, the hypothesis development for this study was presented with all the hypothesis backed by literature.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 CHAPTER OVERVIEW

This chapter describes the methodology undertaken to perform the research and analyse the results gathered. It provides a detailed summary of the philosophical underpinnings of research methodology, along with the relevant types of research reasoning used in this study. Subsequently, the chapter discusses in detail the research paradigms, research approaches, research designs, sampling designs, data collection methods, statistical techniques as well as data analysis procedures available, and the ones applied in the context of the study. The chapter concludes with a discussion of research constructs, reliability and validity issues as well as ethical considerations. The deliberations presented in this chapter are important because they assure that the research was conducted as per the proper data collection guidelines and the presented results are authentic and not fabricated. This guarantees the credibility of the study and the further use and application of its findings.

4.2 RESEARCH REASONING

Research reasoning, according to Soiferman (2010:5) and Neuman (2014:70), takes the form of either two approaches, deductive approach or inductive approach. The major difference between inductive and deductive approaches to research is that while a deductive approach is aimed and testing theory, an inductive approach is concerned with the generation of new theory emerging from the data (Gabriel, 2013:1). Neuman (2014:70) supports the notion by stating that the deductive reasoning approach is concerned with developing or confirming a theory based on acknowledged empirical evidence and then extending the logic towards creating more abstract concepts and establishing other theoretical relationships. The inductive reasoning approach, on the other hand, analyses current evidence before formulating new theories (Creswell & Plano-Clark, 2007:23; Soiferman, 2010:5).

In this study, deductive reasoning stands to be more appropriate as it merges well with the specifications of the study. This study presents six hypotheses that should be tested against empirical evidence to either approve or disapprove them. It identifies the construct of SCRM as less developed and less researched in the context of the Zimbabwe food retail industry and

therefore seeks to test the causal relationships of the stated variables in the industry as hypothesised. The hypotheses are founded and based upon literature reviews of scholar research on the subject of SCRM in various regions. Moreover, through the statistical analysis of the data collected, concrete empirical evidence can then be presented. Drawing from these deliberated sentiments, this study assumed the deductive reasoning approach.

4.3 RESEARCH PARADIGMS/PHILOSOPHY

The term paradigm originated from the Greek word *paradeigma,* which means pattern (Kuhn, 1962:xxi; Thomas, 2010:292). An earlier definition by Kuhn (1962:xxi) denotes a paradigm as an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools. Thomas (2010:292) describes a paradigm as a conceptual framework shared by a community of scientists which provides them with a convenient model for examining problems and finding solutions. Wilson (2010:9) further asserts that research philosophy is a set of beliefs, values, and assumptions that researchers have in common regarding the nature of how research is conducted.

It was further noted by Candy (1989:96) and, Kivunja and Kuyini (2017:27) that paradigms, as applied in the context of research, can be grouped into three classifications, namely: positivism, post-positivism and phenomenological (interpretivism) paradigms. Other researchers such as Tashakkori and Teddlie (2003:12), Babbie and Mouton (2010:79), and Engel and Schutt (2013:18) propose a fourth paradigm that borrows elements from the other three and is known as the pragmatic paradigm. Each of these elements holds basic assumptions, beliefs, norms and values that each paradigm has. Therefore, in placing a research study into a certain research paradigm, the understanding is that the research will uphold, and be guided by the assumptions, beliefs, norms and values of the chosen paradigm.

Phenomenology generally focuses on observing and understanding how individuals live and behave in their respective environments (Lopez & Willis 2004:726; Koopman, 2015:3). It can, therefore, be stated that the phenomenological paradigm is designed to provide significant comprehension of the life experiences of people and how they interact in their chosen environments. The pragmatism research philosophy accepts concepts to be relevant only if they are supported by the action (Saunders, Lewis & Thornhill, 2012:18). Pragmatics acknowledge the different ways of interpreting the world and undertaking research. Thus, the philosophy holds the

assumption that there is no single point of view that can give the entire picture and that there may be multiple realities (Saunders *et al*., 2012:18). Both pragmatism and phenomenology paradigms are usually associated with qualitative research (Goldkuhl, 2012:1). According to Kaluwich (2012:7), post-positivism or logical empiricism it described as a less strict form of positivism. In this view, scientists are portrayed as the ones who construct knowledge instead of just passively noting the laws of nature. She argues that no matter how faithfully the scientist adheres to scientific method research, research outcomes are neither totally objective nor unquestionably certain.

The positivist paradigm follows empirical research methods with an objective view in which the researcher is independent of or is not influenced by what is being investigated (Wilson, 2010:10). Some authors (Hussey & Hussey, 1997:51; Creswell, 2009:6; Zou, Sunindijo & Dainty 2014:318) further assert that the positivist paradigm is a concept that calls for the use or application of scientific methodologies to investigate social problems, issues or phenomena.

The positivist paradigm seeks to establish explanations which comprise causal relationships between research variables (Hove, 2015:88). Mangan (2004:567), and Neuman (2014:97) further asserts that the positivist paradigm emphasises on testing for causality between variables and the scientific formulation of hypotheses. More so, the positivist paradigm uses deductive reasoning, which applies a well-known theory to develop research hypotheses that can be tested (Krauss, 2005:760; Neuman, 2014:97). The positivist paradigm is, therefore, commonly associated with quantitative methods of data collection and analysis, which allows it to generalise its findings to the entire population (Wilson 2010:10).

For the purposes of this study, the positivist paradigm was selected due to its emphasis on testing for causality and the scientific formulation of hypotheses (Neuman, 2014:96). This study is structured on testing for the causality between the dependent and independent variables. It also makes use of hypotheses to examine the influence of Supply Chain Risk Management and other antecedent factors (SCRIS, SCRAA and SCRSM) on OP which accordingly aligns the study with the positivist view.

4.4 RESEARCH APPROACH

There are three research approaches that are applicable to researchers which are: qualitative, quantitative and mixed-method approaches (Creswell & Clarke, 2011:12; Zou, Sunindijo &

Dainty, 2014:318). Onwuegbuzie and Leech (2005:270), Creswell and Clarke (2011:12) and Creswell (2014:4) establish that the different methods differ on how they each view the nature of reality. The quantitative theory is based on the belief of a single reality that can be measured reliably and validly using scientific principles. The qualitative theory, on the other hand, believes in multiple constructed realities that generate different meanings for different individuals, and whose interpretations depend on the researcher's perceptions.

Quantitative research approach relates to studies that employ the measurements and analysis of causal relationships between variables and predominantly makes uses of statistical analysis to make the connection between what is known and what can be learned through research (Wilson 2010:13). Gathering and analysing data using quantitative strategies is closely associated with the testing of relationships among variables using either inferential statistics or descriptive statistics.

Contrarily, qualitative research is conducted in a natural set up. Creswell (2014:4) defines qualitative research as a type of educational research in which the researcher relies on the views of respondents, asks broad and general questions, collects data consisting largely of words (or texts) from respondents, describes and analyses these words for themes, and conducts the inquiry in a subjective, biased manner. The researcher is, in effect, an important instrument in the data collection and analysis process. The researcher gathers data then interprets and analyses the words of the respondents by identifying common themes and also focusing on the explanations provided by the respondents (Creswell, 2009:40; Soiferman, 2010:5).

Further assertions by Creswell and Plano-Clark (2007:11) and, Soiferman (2010:5) advocate that the differences in the two approaches are not opposites but are rather differences on a continuum. They operate on the assumption that both qualitative research and quantitative research address the same elements in the research process but with differences that arise due to the way the researchers implement each step. As a result of this conclusion, it can be agreed upon that no approach has superiority over the other, but both are equally important and dependant on the context and the requirements of the research study in question (Soiferman, 2010:5).

The third research approach is known as the mixed methods approach. This approach interlinks both qualitative and quantitative research approaches into one research approach (Zhang & Creswell, 2013:52). Wisdom, Cavaleri, Onwuegbuzie and Green (2012:723) suggest that combining qualitative and quantitative data collection methods capitalises on the strengths of both

approaches while restricting their weaknesses to provide an integrated and comprehensive understanding of the topic under investigation. Examples of mixed method designs include triangulation, facilitation and complementarity (Bryman 2008:607; Palinkas, Aarons, Horwitz, Chamberlain, Hurlburt & Landsverk, 2011:45).

This research study adopted the use of a quantitative research approach due to a number of reasons. Firstly, the quantitative approach is used for testing theories by examining the relationship between variables (Cresswell, 2014:32). This study contains five variables whose relationships are under investigation. Quantitative research is linked with the deductive reasoning process that the study has already adopted due to its suitability for studies seeking to test specific hypotheses related to attitudes and beliefs about specific phenomena. This study developed six hypotheses. Moreover, the quantitative approach addresses aspects that are important to the nature of this study. These include the use of a structured close-ended questionnaire, facilitating the adequate assessment of causal or correlational relationships and also the requirements to use statistical techniques for data screening. These aspects are all associated with the quantitative research approach. Hence its selection for this study.

4.5 RESEARCH DESIGN

A research design is defined as a detailed framework or plan that helps to guide the researcher through the research process (Wilson, 2010:102). Creswell (2014:5) defines research design as a plan of action for research that span from the broad assumptions to detailed methods of data collection and analysis. The research design, according to Creswell (2009:4), Sekeran and Bougie (2009:2) clarifies the purpose of the study, outlines the type of data to be collected, describes the methods to be used to gather and analyse data, the extent to which it is manipulated and controlled by the researcher and also the justifications for using the data collection methods selected. Malhotra (2010:4) and Walliman (2011:9) postulate that there are various frameworks of research designs with each type of research design having a range of research methods that are commonly used to collect and analyse data. These frameworks can be classified into three categories, namely: exploratory, descriptive and causal. Figure 4.1 shows the structure of a research design framework.
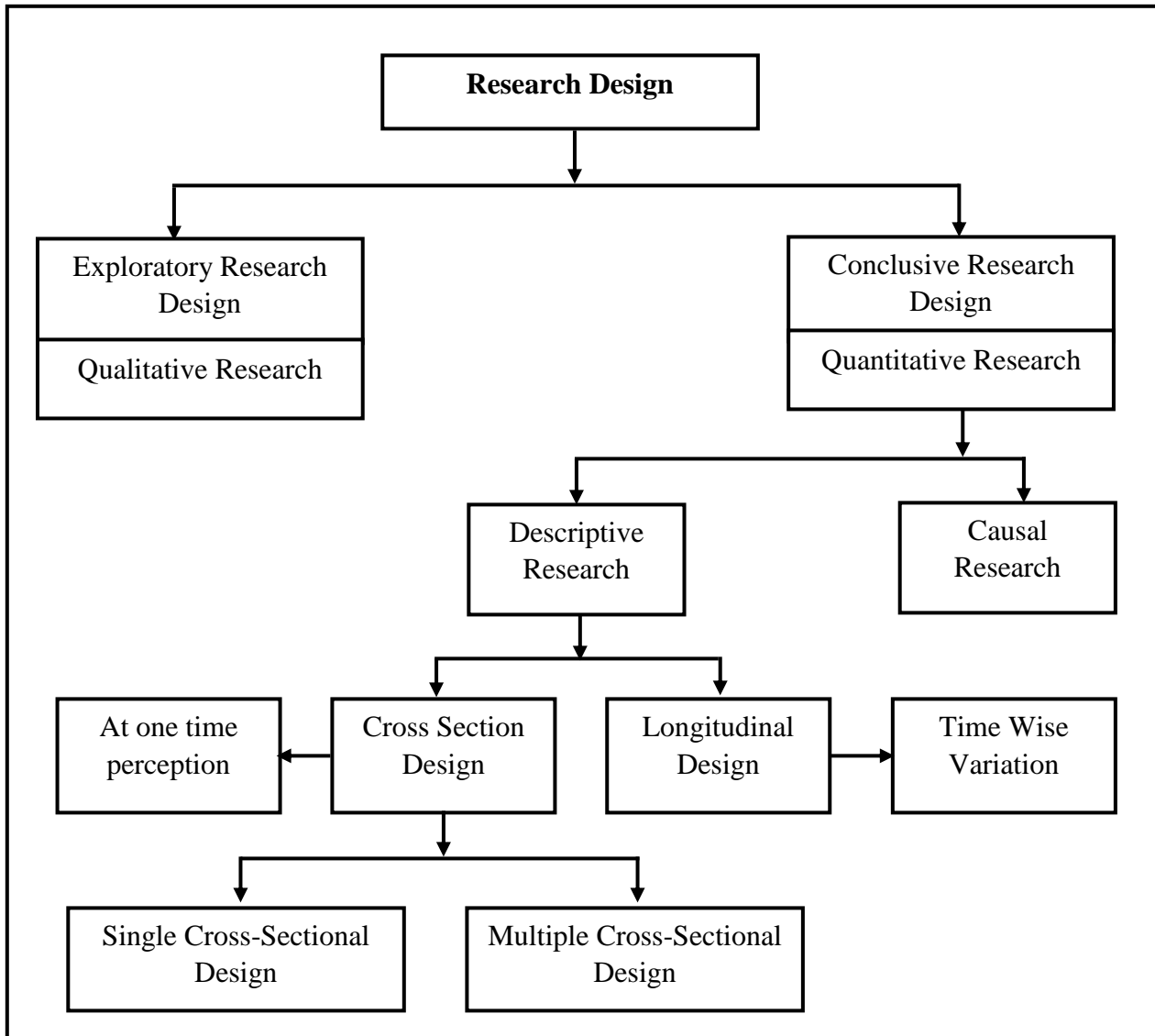
Figure 4.1: Research Design Concept

Source: Marketing Research (2008:30); Malhotra (2010:4)

Exploratory research is defined by Shubham (2017:3) as research conducted to gain new insights, discover new ideas, and increase knowledge of a phenomenon. He further notes that exploratory research is most commonly unstructured, informal research that is undertaken to gain background information about the general nature of the research problem. Methods of conducting exploratory research include focus groups, projective techniques, experience surveys and secondary data analysis (Shubham, 2017:3). It seems to show that exploratory research is to a large degree, flexible and is qualitative in nature.

A descriptive study, according to Sekeran and Bougie (2009:105) and Kim, Sefcik and Bradway (2017:24), is conducted in order to ascertain and be able to describe the characteristics of the variables of interest in a situation. Descriptive research studies are quantitative in nature. Wilson (2010:104) points out that a descriptive research design does not determine cause-effect relationships but nonetheless provides accurate information and helps form the basis of simple decision making by setting out to provide answers to what, how and who questions.

Causal research helps to understand which variables are causal (independent variables) and which ones are the effect (dependent variables) of a phenomenon (Malhotra, 2010:18). They also help to determine the nature of the relationship between the causal variables and the effect to be predicted. Dick, Herass and Casadesus (2008:695) state that causal research requires three conditions to be validated, which are:

1. There is an association between variables that logically might influence one another.

2. The causal variable must produce its influence before the outcome occurs.

3. Other possible explanations must be eliminated, such as a third variable that influences both variables.

Causal research is conducted through various controlled experiments to allow for the testing of the effect of one variable to another. As such, this study uses causal research to determine the cause-effect relationships between SCRM, SCRIS, SCRAA, SCRSM and OP. Considering the reasons provided, this study adopted the causal research design.

4.6 RESEARCH STRATEGY

A research strategy enables a researcher to collect data using methods consistent with the requirements of the study (Hakansson, 2013:6). This paper has already stated that it adopted the quantitative research approach. Hakansson (2013:6) provides four types of data collection strategies relevant for a quantitative study. These include case study, longitudinal, cross-sectional and ex-post-facto.

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between a phenomenon and context are not evident, and in which multiple sources of evidence are used (Runeson, 2014:1). Case studies enable researchers to

examine the data within a specific context closely. In most cases, a case study selects a small geographical area or a very limited number of individuals as the subjects of a study (Nueman, 2014:44). It is often used in qualitative research (Kemanusiaan, 2007:3), but not limited to it (Nueman, 2014:44). According to Salkind (2010:1) and Simon and Goes (2013:1), ex post facto studies or after-the-fact research is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher. Ex post facto research is most common where it is not possible or acceptable to manipulate the characteristics of human respondents.

Longitudinal studies deal with the same sample units of a population over some time (Ployhart & Vandenberg, 2010:97). Information is gathered from the same respondents more than once over a particular time. Inversely, a cross-sectional survey collects data to make inferences about a population of interest at one point in time (Lavrakas, 2008:2). The cross-sectional design makes use of large samples which makes the results statistically significant (Alan, 2015:148).

In this study, the cross-sectional strategy was followed. The study does not seek to investigate trends as is the case of a longitudinal study. It does not aim to examine the cause and effect after the occurrence of an event as in the case of ex-post-facto, and neither is it premised in the context of a case study. This study is cross-sectional since all primary data were collected from respondents at one point in time. Moreover, a cross-sectional strategy applies to a large sample size (Alan, 2015:148), which makes it more suitable for the study.

4.7 4.7 LITERATURE REVIEW

Fink (2014:3) describes a literature review as an in-depth analysis into sources of information that are relevant to an area of research or theory which by so doing, provides a description, summary and critical evaluation of the data in relation to the research problem under investigation. A literature review traces the intellectual progression of a theory or area of research by presenting the discoveries made in the field; the major debates posed and pertinent issues concerning the field (Fink, 2014:5). It also facilitates the identification of gaps between what is known and what is not known. Jesson (2011:7) and Ridley (2012:12) further highlight that a literature review provides an overview of sources the researcher has explored, points the way in fulfilling a need for additional research and more importantly, it positions the current research within the context of existing literature.

In view of the above, a review of the literature was conducted with the aim of understanding various aspects of this study from the viewpoint of other authors. This was presented in chapters 1, 2, 3 and 4. In Chapter 1, a preliminary review of literature was conducted which provided a synoptic review of the introduction and background of the study, the problem statement, research objectives and the conceptual model. In chapter 2, the research delivered an in-depth analysis of the food retail industry from a global perspective up to the Zimbabwean setup. It provided the characterisation of the industry, factors influencing the industry, the contributions as well as the challenges existing in the industry. Chapter 3 focused on the exploration of literature on the key theories, research constructs and concluded with a presentation of the hypothesis development. Chapter 4 engaged the research methodology aspects with a discussion of topics such as research paradigms, research approaches, research designs, sampling designs, data collection methods, statistical techniques as well as data analysis procedures available and those selected for the purposes of this study.

This research study made use of a range of sources to collect a literature review. These included newspapers, academic journals, online articles, organisational newsletters, websites, books, YouTube, as well as dissertations and theses.

4.8 SAMPLING DESIGN

Sampling design is the researcher's provisional plan for a quantitative description of trends, attitudes or opinion of a population by studying a sample of that population (Creswell, 2013:235; Alison & Gass, 2015:11). According to Wilson (2010:190), a sampling design involves defining the target population, selecting a sample frame, choosing sampling techniques, determining sample size, collection of data and assessing the response rate. The following sections will discuss the sampling design executed for this study.

4.8.1 Population

A population refers to the entire group or set of individuals from which research data is to be collected (Neil, 2015:3). This study utilised managers and supply management professionals in food retail firms in Harare, Zimbabwe, as its population. This study focused on Harare because it is the capital city and the economic hub of Zimbabwe. Moreover, since it is the most developed

and populated city with many commercial activities, a study in Harare would fairly represent the activities of other cities and towns in Zimbabwe.

4.8.1.1 Target population

A target population refers to all the members who meet the criterion specified for a research investigation (Alvi, 2016:10). In this study, the target population comprised of SCM professionals employed by food retail firms in Harare. The SCM professionals may range from demand planners, purchasing managers, procurement managers, logistics engineers, logistics managers, supply chain managers and owners or managers of small and medium enterprises in the food retail industry. They qualify as the target population because of their association, experience and wider knowledge in terms of the SCM issues investigated in this study.

4.8.2 Sampling Frame

A sampling frame is described by Alvi (2016:11) as a list of all the items/ individuals selected from a population for investigation purposes. Zikmund, Babin, Carr and Griffin (2013:388) define a sampling frame as a list of elements from which the sample may be drawn. In this study, a list of registered firms operating in the food retail industry in Harare as provided by the Ministry of Industry and Commerce in Zimbabwe was used as the sampling frame.

4.8.3 Sample Size

Sampling size refers to the number of respondents from which the required information is obtained (Kumar, 2014:45). Kumar (2014:46) highlights that it is of utmost importance to determine the most appropriate sample size because if a sample size is too large it equates to unnecessary wastage of resources, while a sample that is too small may affect the accuracy of sample estimates and thus, in turn, the very utility of a sampling plan. Determining the minimum required sample size that is representative of the general population is an important part of quantitative research for achieving the main objectives of the study (Omair, 2014:143). It is generally the norm that larger samples result in accurate and robust statistical findings while smaller ones are less accurate. In this study, the sample size was determined by benchmarking with previous research which is related to the current study. Evidence of sample sizes used in previous related studies is indicated in Table 4.1.

Table 4.1: Basis for sample size used for the study

Construct	Source	Sample size	Region
Supply Chain Risk Management	Fan, Li, Sung and Cheng (2017:69)	350	China
	Juttner (2005:124)	137	England
	Lavastre, Gunasekaran and Spalanzani (2014:833)	142	France
	Mhelembe and Mafini (2019:6)	307	South Africa
Supply Chain Risk Information Sharing	Li and Lin (2006:1648)	196	USA
	Nadia Zaheer and Peter Trkman (2017:425)	387	Pakistan
Supply Chain Risk Analysis and Assessment	Ohlhausen (2007:2)	215	USA
	Fan, Li, Sung and Cheng (2017:73)	350	China
Supply Chain Risk-sharing Mechanism	Joshi, Kathuria and Porth (2003:353)	98	USA
	Chen and Paulraj (2004:119)	400	USA
	Li, Fan, Lee and Cheng (2015:92)	510	China
	Chari and Ngcamu (2017:433)	122	Zimbabwe
Operational Performance	Flynn, Huo and Zhao (2010:62)	617	America, Asia-Pacific and Europe.
	Schoenherr and Swink (2011:102)	405	
	Kwamega, Li and Abrokwah (2018:317)	320	Ghana

Source: Compiled by Author

As indicated in Table 4.1, the least sample size used is 98 and the highest used is 617. Based on this guideline and considering that this study used a quantitative approach, the sample size was pegged at n=350. In determining the sample size, Muthen and Muthen (2002:2), and Tabachnick and Fidel (2007:11) state that there is no rule of thumb that applies to all situations. The sample size needed for a study depends on several factors. However, both authors recommend a minimum sample size of n = 150 when using structural equation modelling (SEM). Based on this, the sample size used in this study meets the recommended minimum cut-off values.

4.8.4 Sampling Technique

Sampling is the process of selecting a suitable representative part of a population for determining parameters or characteristics of the entire population (Gentles, Charles, Ploeg & McKibbon, 2015:1172). There are two main types of sampling techniques, which are probability and non-probability sampling (Zikmund *et al*., 2013:392; Alvi, 2016:12). A non-probability sampling approach calls for the selection of a sample of a study based on personal judgment or convenience

(Gentles *et al*., 2015:1172). It is characterised by the unknown selection of any member of a study's target population. Methods that fall under non-probability sampling include convenience sampling, purposive sampling, judgment sampling, quota sampling and snowball sampling (Zikmund *et al.,* 2013:392; Alvi, 2016:12). In contrast, probability sampling, according to Wilson (2010:194) and Gentles *et al*. (2015:1172), is a sampling technique in which every item in the population has an equal and known chance of being selected and included in the sample. Typical examples of probability sampling techniques are simple random, systematic, stratified, cluster and multistage sampling techniques (Zikmund *et al.,* 2010:398).

Selecting a sample that is representative of the general population is an important part of quantitative research (Hove, 2015:94). Therefore, this study pursued to choose respondents who are expected to have the best knowledge about SCRM and supply chain issues in their firms. Since a sampling frame for food retail firms operating in Harare is available, the sample of managers and supply management professionals in these firms was selected using a non-probability, purposive sampling technique. In a purposive or judgement sampling technique, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. It is a technique that does not need underlying theories or a set number of respondents (Etikan, Musa & Alkassim, 2015:2). As such, purposive sampling was employed because it is effective when one needs to study a certain cultural domain with knowledgeable experts within. More so, it is useful because it makes it easier to make generalisations about a sample compared to other techniques where not all participants have the characteristics necessary for the study. To be included in the study, respondents were expected to possess a knowledge of logistics, operations and SCM and to have been in that position for at least one year. Considering these reasons, a non-probability approach using purposive sampling technique was applied.

4.9 PROCEDURES FOR DATA COLLECTION

Data collection is a research process that describes how the relevant information to address the research problem will be gathered (Sani, 2013:40). This section focuses on the primary methods used by the researcher in order to physically collect the data. In survey research, quantitative data can be collected in several ways, which includes emails, postal, telephone, drop and collect, group-administered and online questionnaires (Quinlan, 2011:221). In this study, data was collected using

a self-administered survey questionnaire distributed in person by the researcher to managers and SCM professionals of food retail firms in Harare, Zimbabwe, over a projected period of four weeks. This study deployed two approaches to collect data: email and drop and collect. The researcher physically distributed the questionnaires by dropping and collecting them once complete, and some were distributed via email. These methods are particularly appropriate because they increase the overall response rate (Quinlan, 2011:223).

The funds used in the preparation and administration of the questionnaire were provided by the research office at the Vaal University of Technology, and a grant was also offered to the researcher by the National Research Foundation (NRF). Initially, 350 questionnaires were prepared and distributed to respondents. Out of the 350 distributed questionnaires, 264 were returned. Only 227 from the 350 were properly completed by respondents after the screening process to ascertain the effectiveness and efficiency of the responses were done. A total of 37 were found to either be incomplete or not accurately completed and were eliminated from the data analysis process. After completion of the screening process, the response rate was calculated to be 75.4 per cent. A further discussion of the response rate is provided in Chapter 5.3.1.

4.9.1 Questionnaire cover letter

Questionnaires generally have a cover letter attached to them which serves to briefly introduce and clearly define the purpose of the study. Cover letters play a significant role in questionnaire surveys as they seek informed consent from the targeted respondents and clarifies whether or not a participation in a study is voluntary. It also highlights the significance of the study, the importance of the respondents' assistance, and the assurance of confidentiality along with the anonymity of their responses. As a result, a cover letter may improve the response rate. A template adapted from Notre Dame de Namur University (2019:1) was used as guidance on cover letter contents for this study. The cover letter was designed and attached to the research questionnaire (refer to Appendix A).

4.9.2 Questionnaire design

A questionnaire is a set of questions to be asked to respondents in an interview, with appropriate instructions indicating which questions are to be asked, and in what order (Sreejesh, Sanjay & Anusreeh, 2014:143). It enables data collection from respondents, lends a structure to interviews

and helps in processing collected data**.** The effectiveness of a questionnaire is dependent on its design. A well-designed questionnaire is one that is structured in a manner that is easily understandable for both the interviewer and the interviewee (Sreejesh *et al*., 2014:143).

The questionnaire for this study was divided into seven sections. Section A consists of demographic information of the respondents and their firms. Sections B to F contains segmented questions about the five constructs under consideration in this study. Response options in sections B to F of the questionnaire were presented in a seven-point Likert-type scale (ranging from 1= "strongly disagree" to 7= "strongly agree"). A Likert-type scale on questions is necessary and important because it reduces the development of response bias amongst the respondents, it facilitates the standardisation and comparability of questions amongst the respondents, and Likert-type questions are easy to code and analyse directly from the questionnaires (Wegner, 2012:86).

The questionnaire in this study was developed primarily based on instruments used in other studies; however, not all questions were extrapolated in their original format but were adjusted to fit the context of this study without changing their value or meaning. Since this study used a quantitative approach, all questions were close-ended. A questionnaire containing 32 measurement items was designed, based on previous works. The questionnaire contains five constructs, namely: SCRM (five measurement items); SCRIS (seven measurement items); SCRAA (eight measurement items); SCRSM (five measurement items); and OP (seven measurement items). Measurement scale items are presented in a questionnaire in Appendix A. The construct items, their sources and reliability are presented in this section with the use of Tables 4.1 – 4.5.

4.9.2.1 Section B construct items

Section B elicited responses on SCRM using nine measurement items. The items were obtained from a previous study conducted by Florio (2017:149). However, the same scale was used and validated in another study conducted by Fan, Li, Sun and Cheng (2017:73). Further details regarding this scale are provided in Table 4.2.

Table 4.2: Scale development and reliability for SCRM

Item Code	Code description	Author(s) and Year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) (α)
SCRM1	Supply chain risk management is built into our organisational planning process.	Florio (2017)	Various industries in the United States of America	0.93
SCRM2	Supply chain risk management is an ad hoc process for us that occurs informally on an as-needed basis.			
SCRM3	Top-level management is involved in our risk management process.			
SCRM4	We prioritise risk events based on severity of impact on our organisation.			
SCRM 5	We involve our suppliers in the identification and mitigation of potential supply chain risks.			
SCRM6	We encourage our suppliers to use a structured supply chain risk management process			
SCRM7	We work with our supply chain members to identify and mitigate potential supply chain risks			
SCRM8	We have a process in place for corrective feedback to our risk management process.			

Source: Adapted from Florio (2017)

As shown in Table 4.2, the SCRM scale used in this study attained a Cronbach alpha value of 0.93 in the study by Florio (2017:1492). This confirms that the scale is reliable and suitable for use in this study.

4.9.2.2 . Section C construct items

Section C sought responses on SCRIS using seven measurement items. These items were first utilised by Schoenherr and Swink (2012:113) then adopted, developed and supported by Li *et al*. (2015:92) and Fan *et al*. (2017:73). This study utilised the measurement scale that was adopted and adjusted by Fan *et al*. (2017:73).

Table 4.3: Scale development and reliability for SCRIS

Item Code	Item Description	Author(s) and Year	Industry and Region where the scale was applied	Reliability (Cronbach's Alpha) (α)
SCRIS 1	Our partners share proprietary information with us.	Fan *et al*. (2017)	The manufacturing sector in China	0.92
SCRIS 2	We share accurate risk-related information with our supply chain members.			
SCRIS 3	We are willing to share real-time information on-demand with our suppliers.			
SCRIS 4	Information is actively shared between functional teams in our firm.			
SCRIS 5	It is expected that members in the supply chain keep each other informed about events or changes that may affect the other party.			
SCRIS 6	Our partners keep us fully informed about issues that affect our business.			
SCRIS 7	We have closely integrated information systems with key suppliers and logistics providers.			

Source: Adapted from Fan *et al*. (2017)

As shown in the diagram above, Fan *et al*. (2017:73) achieved a Cronbachs alpha above the minimum threshold of 0.7, thereby authenticating the reliability of scales used. Other previous sources such as Schoenherr and Swink (2012:113) and Li *et al.* (2015:92) that used the measurement items adopted in this study also achieved Cronbach's alphas of acceptable proportions.

4.9.2.3 . Section D construct items

Section D gathered information on SCRAA using seven measurement items adapted from Fan *et al*. (2017:73).

Table 4.4: Scale development and reliability for SCRAA

Item code	Item description	Author(s) and Year	Industry and region were the scale was applied	Reliability (Cronbach's Alpha) (α)
SCRAA 1	Our firm has a clear process of risk assessment in place.			
SCRAA 2	Our firm continuously uses tools/processes to assess supply			

Item code	Item description	Author(s) and Year	Industry and region were the scale was applied	Reliability (Cronbach's Alpha) (α)
	chain level risks (e.g., supply chain mapping, critical path analysis).	Fan *et al.* (2017)	The manufacturing sector in China	0.90
SCRAA 3	Our firm often uses past and current information to identify potential risk.			
SCRAA 4	Our firm periodically identifies risk.			
SCRAA 5	Our firm continuously identifies and assesses the potential risk in our supply chain.			
SCRAA 6	Appropriate processes are in place for identifying, analysing, and dealing with risks.			
SCRAA 7	Our firm often uses tools/processes to assess internal process risks (e.g., process mapping, brain-storming, six sigma method, and risk likelihood /impact analysis).			

Source: Adapted from Fan *et al*. (2017)

The measurement items utilised by Fan *et al*. (2017:73) achieved a Cronbach's alpha of 0.95, meeting and surpassing the minimum of 0.7. This proves that the scale is highly reliable hence its adoption for this study.

4.9.2.4 . Section E construct items

Section E contained five measurement items on supply chain risk-sharing mechanism adopted from Li *et al*. (2015:92). Similar instruments were utilised by Sharma and Bhat (2016:803) and supported by Fan *et al*. (2017:73). Table 4.5 shows this information in detail.

Table 4.5: Scale development and reliability for SCRSM

Item Code	Item description	Author(s) and Year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) (α)
SCRSM1	Our firm utilises a strategy of sharing supply chain risk with our supply chain partners.	Fan *et al.* (2017)		0.90
SCRSM2	There are risk management policies defining responsibilities for each party of the supply chain member.			

Item Code	Item description	Author(s) and Year	Industry and region where the scale was applied	Reliability (Cronbach's Alpha) (α)
SCRSM3	There are clear risk and revenue sharing rules between the members of the supply chain.	Sharma and Bhat (2016)	The manufacturing sector in China	0.86
SCRSM4	We have formal mechanisms (e.g., buy-back agreement) and informal mechanisms (e.g., verbal commitment) to share risk with supply chain partners.			
SCRSM5	There are wildly acknowledged and accepted risk/revenue sharing mechanisms in our supply chain.		Automotive industry in India	

Source: Adapted from Fan *et al*. (2017) and Sharma and Bhat (2016)

As shown in Table 4.5, both sources that used the measurement items adapted in this study attained a Cronbach's alpha of the minimum 0.7 threshold. It makes the measurement instruments for supply chain risk-sharing mechanism reliable to be used for this study.

4.9.2.5 . Section F construct items

Section F elicited responses on OP using a seven-item measurement scale adapted from Flynn *et al*. (2010:69), and Fan *et al*. (2017:73). The items on OP measured three dimensions, namely, operational flexibility (three items,) quality (two items), and cost (two items).

Table 4.6: Scale development and reliability for OP

Item Code	Item description	Author and Year	Industry and region where scale was applied	Reliability (Cronbach's Alpha) (α)
OP1	Our firm can quickly modify products to meet our major customer's requirements.		China	0.86
OP2	Our firm can quickly introduce new products into the markets.			

Item Code	Item description	Author and Year	Industry and region where scale was applied	Reliability (Cronbach's Alpha) (α)
OP3	Our firm can quickly respond to changes in market demand.	Flynn *et al*. (2010)		
OP4	Our firm provides a high level of customer service to our major customers.		Manufacturing sector in China	0.93
OP5	Our firm provides consistent quality products with low defects.	Fan *et al*. (2017)		
OP6	Our firm is able to obtain and maintain low inventory costs.			
OP7	Our firm offers prices as low as or lower than our competitors.			

Source: Adapted from Flynn *et al*. (2010) and Fan *et al*. (2017)

Flynn *et al*. (2010:69) and Fan *et al*. (2017:73) have a Cronbach's alpha of 0.86 and 0.93 respectively for their measurement scales. The same scales were adapted for the purposes of this study.

As already stated, the measurement scales applied are not new but have already been used before this study. The use of validated measurement instruments from past studies that also measure the same constructs allows for a more precise and adequate adaptation of the respective measurement instruments (Okoumba, 2015:83). Laake, Olsen and Benestad (2007:1) also support that adapting validated instruments is vital in obtaining consistent results, as these items may yield accurate findings and assess what they are supposed to measure. Tables 4.2 - 4.6 show the measurement instruments used in previous studies, which all achieved the required reliability (Cronbach's alpha) that meet and exceed the benchmark of 0.7, making them highly reliable.

4.10 DATA ANALYSIS AND STATISTICAL APPROACHES

Data analysis is a process that involves inspecting, modelling and transforming data using a wide range of statistical techniques to discover useful information and well-informed conclusions (Xia & Gong, 2014: 301). The process of data analysis takes different facets and approaches encompassing a range of techniques. In the study, data analysis was composed of tests for the

normality of data, descriptive statistics and inferential statistics. The first step in data analysis was to code the data in a Microsoft Excel Spreadsheet to subject it to a data cleansing process to identify any missing entries. After that, the data were analysed using a combination of tools such as Statistical Packages for the Social Sciences (SPSS version 26.0) and the Analysis of Moment Structures (AMOS version 26.0) software.

4.10.1 Data Normality Tests

Data normality tests determine if a set of data is well-modelled by a normal distribution (Ghasemi & Zahediasl, 2012:487). These tests establish whether data is normally distributed or not normally distributed. Among a variety of normality tests that can be conducted in the SPSS Explore procedure, this studies' normality tests were conducted using the skewness and kurtosis tests.

4.10.2 Descriptive statistics

Descriptive statistics are described by Zikmund, Babin, Carr and Griffin (2010:486) as the basic transformation of raw data to represent characteristics such as central tendency, distribution, and variability. Descriptive statistics provide numeral and graphic procedures to summarise a collection of data in a clear and understandable manner (Soiferman, 2010:5). The descriptive analysis of this study is premised on determining the profiles of targeted retail outlets along with the demographic elements of respondents. Therefore, data from section A of the questionnaire which seeks to establish the demographic details of respondents were analysed using descriptive statistics. The study used descriptive statistics such as frequency tables, standard deviations and mean scores.

4.10.3 Inferential statistics

Inferential statistics is the process of using data analysis to deduce the properties of an underlying probability (Upton & Cook, 2014:7). Inferential statistics infer properties of a population by testing hypothesis and deriving estimates, leading to assumptions that generalise a population from a selected sample (Soiferman, 2010:5). Data gathered from sections B-F that seek to test the hypotheses were analysed using inferential statistics. Inferential statistics were analysed using the Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM) procedures.

4.10.3.1 Structural Equation Modelling

Structural Equation Modelling (SEM) as a multivariate statistical framework that is used to model complex relationships between directly and indirectly observed (latent) variables (Stein, Morris & Nock, 2012:495). It enables the testing of a set of regression equations simultaneously and encompasses diverse statistical techniques such as path analysis, confirmatory factor analysis (CFA) and, multiple linear regression (University of Texas, 2012:5). Sturgis (2016:1) further states that SEM is particularly useful when measuring causal relationships between variables. Yuan (2005:142) further advocates that one of the most important steps of SEM is the assessment of whether a specified model is a good fit. It also applies well in instances where research questions are centred on indirect (mediated) and direct effects of variables on other variables (Cangur & Ercan, 2015:152); for example, the indirect impact of SCRM on OP using mediating variables: SCRIS, SCRAA and SCRSM. Based on this, relationships between research constructs in this study were tested using Structural Equation Modelling (SEM). SEM is mainly composed of two techniques, namely, the CFA and the Path Analysis Techniques (Pearl & Mckenzie, 2018:6), which were conducted sequentially.

4.10.3.1.1 Confirmatory Factor Analysis

A (CFA) is a measurement model that focuses exclusively on the link between factors and their measurement variables (Cramer, 2006:28; Ozkok, Zyphur, Barsky, Theilacker, Donnellan & Oswald, 2019:2). It allows the researcher to test the hypothesis between observed variables and their underlying latent constructs. Harrington (2009:1) and Ozlok *et al*. (2019:2) state that CFA is used to test the psychometric evaluation of measures, construct validation and measurement invariance such as across groups or populations. The measurement scales used in this study were adopted from previous literature, therefore, a CFA was conducted to test the psychometric properties of measurement scales in terms of validity, reliability and model fit.

4.10.3.1.2 Path Analysis Modelling

Path analysis is defined by Crossman (2017:2) as a form of multiple regression statistical analysis used to evaluate causal models by examining the relationships between a dependent variable and two or more independent variables. Using this method, one can estimate both the magnitude and significance of causal connections between variables. Crossman (2017:2) further

states that for path analysis to be considered for use, all causal relationships between variables must go in one direction only, as one cannot have a pair of variables that have a causal effect on each other. For this study, the path analysis modelling and hypotheses testing were done using the Analysis for Moment Structures (AMOS version 26.0) software.

4.10.4 Model Fit Assessment

McDonald (2014:53) and Liu, Lee and Jordan (2016:276) define model fit as a statistical model that describes how well a set of observations that fit a theoretical expectation. A research model fit is regarded as the determination of the interaction that exists between latent constructs of a research model and the analysis of the relevant hypothesised relationships and covariance with the identified latent constructs (Schreiber, Stage, King, Nora & Barlow 2006:330; Liu *et al.*, 2016:276). The assessment of a study model fit is dependent on several indices. In order to establish whether collected data supports the conceptualised model, several model fit indices were used in this study, which include the Chi-square test χ^2, Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Incremental Fit Index (IFI), Normed Fit Index (NFI) and Random Measure of Standard Error Approximation (RMSEA) (Hooper, Coughlan & Mullen 2008:53). Model fit will also be tested in a similar manner for the structural model, using the same fit indices.

4.10.4.1 The Chi-Square Test: χ2

The chi-square test indicates the difference between observed and expected covariance metrics (Gatignon, 2010:8). For models with more than 400 cases, the chi-square is almost always statistically significant whereas, for models with smaller samples, the chi-square test remains a generally reasonable measure of fit but not as significant as it is for higher samples (Gatignon, 2010:8). Chi-square is also affected by the size of the correlations in the model, that is, the larger the correlations, the poorer the fit. For these reasons, alternative measures of fit have been developed (Kenny, 2015:2). Tabachnick and Fidell (2007:6) indicate an acceptable ratio ranging between 2 and not more than 5 whereas Schreiber *et al.* (2006:330) posit that the Chi-square value equal to 2 or no higher than 3 is acceptable.

4.10.4.2 Comparative Fit Index (CFI)

Comparative Fit Index (CFI) compares the absolute fit of the specified model to the absolute fit of the independent model. The greater the discrepancy between the overall fit of the two models, the

larger the values of the descriptive statistics (University of Texas, 2012:36). A comparative fit index, as explained by Kenny (2015:2) is used to differentiate the covariance matrix anticipated by the model to the observed covariance matrix and further compares the null model with the observed covariance matrix. This measure of fit is only interpretable when comparing two different models (Kenny, 2015:2).

4.10.4.3 Goodness of Fit Index (GFI)

A goodness-of-fit test refers to measuring how well the observed data corresponds to the fitted/assumed model (Pennsylvania State University, 2018:1). The measures summarise the discrepancy between observed variables and assumed values under the model in question.

4.10.4.4 Incremental Fit Index (IFI)

The use of incremental fit index assesses goodness of fit along a 0-1 continuum in which the zero point represents the worst possible fit and 1 represents an optimum fit (Marcoulides & Schumacker, 1996:315).

4.10.4.5 Normed Fit Index (NFI)/ Bentler-Bonnet Index

NFI analyses the model through the evaluation of the Chi-square values for both the null and alternative models (Bentler & Bonnet 1980:588). The acceptable threshold for a good fitting model for the respective indices is estimated at between 0.9 to 1 (Hu & Bentler, 1998:5; Kenny, 2015:5).

4.10.4.6 Root Mean Square Error of Approximation (RMSEA)

Root Mean Square Error of Approximation (RMSEA) is an index of the difference between the observed covariance matrix per degree of freedom and the hypothesised covariance matrix which denotes the model (Chen, 2007:464). Bryne (1998:10) similarly describes RMSEA as a measure that analyses the fitness of the model about selected parameters and covariance matrices. Kaplan (2000:3) further states that it is a measure of goodness of fit for statistical models where the goal for the population is to have an approximate or close fit with the model. Kenny (2015:6) states that RMSEA is the most popular measure of model fit, reported in virtually all papers that use CFA or SEM. Browne and Cudeck (1993:137) report that the benchmark value of RMSEA should be equal to or no greater than 0.08.

4.11 RELIABILITY

Reliability refers to the consistency of a measure (Kumar, 2014:218). Tavakol and Dennick (2011:447) define the reliability of research as to how closely the same constructs in a research instrument replicate a similar result. They further state that reliability estimates show the amount of measurement error in a test. Chakrabartty (2013:2) posit that reliability measures consistency, precision, repeatability, and trustworthiness of a research study. Assessing the reliability of study findings requires research professionals to make judgments about the 'soundness' of the research in relation to the application and appropriateness of the methods undertaken and the integrity of the final conclusions (Noble & Smith, 2015:1). Reliability for each of the questionnaires used in this study was determined through three reliability measures, namely, Cronbach Alpha coefficient, Composite Reliability, and Item total correlations (Hair, Black, Babin & Anderson, 2010:86).

4.11.1 Cronbach's Alpha Coefficient (α)

The Cronbach alpha (α) coefficient is a measure of internal consistency which determines how closely related a set of items are as a group. Internal consistency describes the extent to which all the items in a test measure the same construct. Cronbach's alpha is stated in values confined between 0 and 1 (Tavakol & Dennick, 2011:53) and the recommended value for Cronbach's alpha is 0.7 or higher (Hair, Black, Babin & Anderson, 2010:86). Cronbach alpha as a reliability psychometric test is prominent for its level of objectivity, especially in providing statistical references that are subjected to very few questions (Yang & Green 2011:377).

4.11.2 Composite Reliability

Composite reliability is the sum of the reliability of all measured variables, which reveals the internal consistency among all indices (Hair *et al*., 2010:84). Higher composite reliability signifies a higher internal consistency among those indices. Composite reliability is an alternative tool also aimed at examining the internal consistency of research constructs (Peterson & Kim 2013:6). The recommended value for Composite reliability is 0.7 (Hair *et al*., 2012:86).

4.11.2.1 Item total correlation

Both Churchill (1979:64), and Flom (2017:1) provide a similar definition of item-total correlation; it is as a measure of the reliability and consistency of a multi-item measurement scale and a tool for improving such scales. Additionally, it is the correlation between an individual item and the

total score without that particular item. According to Hair, Black, Babin and Anderson (2010:86), the threshold for item-total correlations should be 0.5.

A measure that has good test-retest reliability and internal consistency provide researchers with confidence that the scores represent what they are supposed to. However, a measure can be extremely reliable but have no validity (Price, Jhangiani & Chiang, 2011:7). Thus, validity is another way to show evidence in addition to reliability that the instruments being used are dependable. The next section will consider validity and the types of methods used to measure it.

4.12 VALIDITY

Validity refers to the ability of an instrument to measure what it is supposed to measure (Kumar, 2014:386; Mohajan, 2017:2). Altheide and Johnson (1994:487), and Mohajan (2017:2) state that validity also represents the truthfulness of findings. Validity increases transparency and decreases the chances of researcher bias (Mohajan, 2017:2). This helps in determining whether an instrument addresses what it is purposed for or not. Similarly, validity ensures that the research instruments correctly measures the concepts that are being investigated in the study (Pallant, 2011:88). The three types of validity measures as prescribed by Kumar (2014:386) are: face validity, content validity, and construct validity.

4.12.1 Face validity

Face validity is the extent to which a measurement method appears on face value to measure the construct of interest (Petty, Briñol, Loersch & McCaslin, 2009:321). Leedy and Ormrod (2013:27) similarly define face validity as the degree to which a test appears to measure what it claims to measure. Face validity assumes the validity of a study without empirical testing and is the simplest and least precise method of determining validity, which relies entirely on the expertise and familiarity of the assessor concerning the subject matter (Cook & Beckman, 2006:145; Nwana, 2007:25). Face validity for this study was determined through a review of the questionnaire by a panel of academics who are experts in SCM.

4.12.2 Content validity

Content validity is the extent to which the measurement instruments and the scores from those questions represent all possible questions that could be asked about the concept (Creswell, 2014:69). It ensures that the measurement instruments have adequate items that address the

concept. It can also refer to the extent to which a measure addresses the construct of interest (Brown, 2000:8). Content validity is not assessed quantitatively but is determined through the judgement of experts in the field by carefully checking the measurement method against the conceptual definition of the construct (Petty *et al*., 2009:321; Mohajan, 2017:15). Content validity was ascertained through a pilot study of the questionnaire by using a convenient sample of 50 respondents that have knowledge of SCM in food retail firms.

4.12.3 Construct validity

A construct, according to Price *et al*. (2011:9), can be any variable that a researcher may correlate with another construct being measured. As such, construct validity can be defined as the experimental demonstration that a test is measuring the construct it claims to be measuring (Brown, 2000:9). Moutinho and Hutcheson (2011:327) and Flanagan (2014:np) further state that construct validity is statistically assessed through two approaches, namely, convergent validity and discriminant validity.

4.12.3.1 Convergent validity

Convergent validity measures constructs that are theoretically observed to be related to each other (Flanagan, 2014:1). In this study, convergent validity was checked using factor loadings (≥ 0.5) and the Average Variance Extracted (AVE ≥ 0.5) as prescribed by Hair *et al.* (2010:87).

4.12.3.2 Discriminant validity

Discriminant validity is the measurement of constructs that are theoretically observed to not be related to one another (Flanagan, 2014:np). Malhotra (1996:1) further defines discriminant validity as the extent to which a measure is distinct from other measures. It ensures that measures of different constructs should load on separate constructs. Discriminant validity was assessed using inter-factor correlations (Hair *et al.*, 2006:87).

Much emphasis was put by Mahojan (2017:1) in advocating that validity and reliability are important fundamentals in the evaluation of any measurement instruments for the attainment of a credible research study. They also enhance the accuracy of the assessment and evaluation of the research study (Tavakol & Dennick, 2011:54). Additionally, reliability and validity describe the effects of measurement errors on theoretical relationships that are under investigation (Mohajan, 2017:2). The next section discusses the ethical considerations followed in the study.

4.13 ETHICAL CONSIDERATIONS

Research ethics refers to the moral principles guiding research from its inception through to completion and publication of results (British Psychological Society, 2014:5). In this study, the following ethical considerations were followed during the administration of the questionnaire:

4.13.1 Informed consent

According to Armiger (1997:330), informed consent denotes that the researcher must accurately inform respondents about the nature of the research study for them to participate in the study with their full knowledge. Consent can be written or verbal in order to participate in the research. In relation to this study, participants were notified about the nature of the research, its purpose and their rights in the cover letter which was attached to the questionnaire.

4.13.2 Voluntary Participation

The dignity, rights, safety and well-being of respondents must be the primary consideration in any research study (Stevens, 2013:11). Participation in the study was voluntary, and respondents were not coerced in any way to participate. Respondents were fully informed in the cover letter about the voluntary nature of the study's questionnaire and that their participation may be terminated at any given time with no consequences.

4.13.3 Confidentiality and anonymity

Information provided by respondents was not ascribed to any individual but was treated with confidentiality, and the anonymity of all respondents was fully guaranteed. In this study, the identities of the subjects were not linked to personal responses. Only a signature and date of participation were required to be filled in on the questionnaire without the need to populate any further details such as names or details of their organisation. The details in the demographics section of the questionnaire, therefore, did not align directly to any of the respondents but only contributed to the overall statistics.

4.13.4 Permission to conduct the study

It was of paramount importance to seek permission to conduct the study from the management of the firms in question to avoid any ethical breaches. Permission to undertake this study was granted by the management of food retail firms that participated in this study. Head offices were

approached in which emails were sent to the managers of the different branches, which the researcher approached with questionnaires. For some firms, the researcher sought permission directly from the branch managers, which was granted in some instances.

4.14 CHAPTER SUMMARY

This chapter described and discussed the research methodology that was utilised to gather and analyse data for this study. Some of the key subjects that constituted the deliberations of this chapter were research reasoning in which deductive reasoning was found as the most applicable due to its association with the quantitative research approach. The research philosophies were also discussed, and the study followed a positivist paradigm because it also requires the use of a quantitative research model. The quantitative research approach was identified as suitable for the study because the investigations are grounded on the deductive reasoning and post-positivism paradigms. Moreover, the study makes use of the causal research design due to its affinity for establishing cause-effect relationships between variables and a cross-sectional analysis proved to be the most appropriate strategy suitable for conducting the research. In addition, the target population (SCM professionals employed by food retail firms in Harare), sample frame (food retail firms operating in Harare), and the sample size (n= 350) were established. The technique deemed to best suit the study was determined to be non-probability, purposive sampling technique. The data analysis techniques and statistical approaches used to analyse the collected data were also explored. The chapter summed up with a presentation of ethical considerations that guided this research study. The next chapter presents the research results.

CHAPTER 5

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF EMPIRICAL RESULTS

5.1 CHAPTER OVERVIEW

The previous chapter methodically outlined the nature of the research design and methodology undertaken in this study. Research philosophies, sample selection and composition, questionnaire development, as well as procedures used to collect, process, and analyse the data were presented. It further explored the statistical techniques applied to determine the reliability and validity of the research instruments.

The purpose of this chapter is to present the final results from the collected data as well as the analysis and interpretations of those results. It commences with a brief presentation and analysis of the pilot data set that was collected from SCM professionals, managers and owners of firms in the food retail industry in Vaal Triangle, Gauteng province. Thereafter, the results for the primary data set collected in Harare, Zimbabwe, are presented and analysed in greater detail, indicating the response rate and demographic details of respondents. The analysis of the data was split into two procedures, namely, descriptive and inferential statistics. Subsequently, the application of mean scores to show the perceptions of respondents towards each measurement item in each construct, followed by the reliability and validity of measurement scales are revealed. A discussion of the results of the correlation analysis between the constructs is also provided using correlation matrixes to show the relationships between the research constructs. As a result, the hypotheses are approved or disapproved, based on these results.

5.2 RESULTS OF THE PILOT STUDY

Prior to the primary survey, the research questionnaire was subjected to a panel review and a pilot study. As such, the author describes a panel review of a prequestionnaire as a group of experts that examine the detailed plan and structure of a questionnaire cause roll out to establish scientific quality. It facilitates a better understanding of the context of the study, and the quality of the questionnaire to ensure that the required information from the survey is clearly presented and understood without the risk of ambiguity (Burns & Kho 2015:199). The panel consisted of three academics in the department of Logistics at a selected university of technology who possess the

necessary expertise in the field of SCM. The input from the academics was used to revise the questionnaire, which aided the testing of face validity by ensuring that the questionnaire used in the primary survey was appropriately constructed and that the variables contain the appropriate measurement instruments (cf., chapter 4.12.1).

After the panel review, the pilot study was instigated, which test for content validity and reliability of the questionnaire as prescribed by Mohajan (2017:15). In the pilot study, 60 SCM personnel (n=60) in the Vaal Triangle region were conveniently selected. A total of 47 (n=47) usable questionnaires were used in the analysis of the pilot data. The results of the pilot study are reported in Table 5.1 and briefly analysed after.

Table 5.1: Results of the Pilot test

Scale	Sample No	Average Mean	Standard Deviation	Average item-total correlation	Number of items	Number of items deleted	Cronbach Alpha
SCRM	47	5.91	0.78	0.654	8	0	0.826
SCRIS	47	5.76	1.09	0.886	7	0	0.966
SCRAA	47	6.02	0.66	0.769	7	0	0.922
SCRSM	47	6.01	0.96	0.937	5	0	0.978
OP	47	6.39	0.79	0.818	7	0	0.940
SCRM= Supply chain risk management; SCRIS= supply chain risk information sharing; SCRAA= Supply chain risk analysis and assessment; SCRSM= Supply chain risk-sharing mechanism; OP= Operational performance. Scale: 1=Strongly disagree; 2= disagree; 3=somewhat disagree; 4=neutral; 5=somewhat agree; 6= agree; 7- strongly agree							

Source: Author's own compilation

The average mean score for all scales was 6.02, which indicated that the respondents agreed with the measurement instruments used in the survey. With respect to the standard deviation, SCRM, SCRIS, SCRAA, SCRSM and OP scored 0.78, 1.09, 0.66, 0.96 and 0.79 respectively, which signified that the data were normally distributed. According to Kauffman (2014:1), standard deviations only indicate how spread out the data is and are neither good nor bad. A low standard deviation (CV<1) indicates that the data points tend to be close to the mean of the set while a high

standard deviation (CV>/=1) indicates that the data points are spread out over a wider range of values (Bland & Altman, 1996:312; Kauffman, 2014:1). Regarding the average item-total-correlation, the results found that scores for all scales exceeded the 0.3 minimum cut off value recommended by Hair *et al*. (2010:86). Measurement scales B, C, D, E, and F registered values of 0.654, 0.886, 0.769, 0.937, and 0.818 respectively. The Cronbach alpha results were as follows: Section B (SCRM): 0.826, Section C (SCRIS): 0.966, Section D (SCRAA): 0.922, Section E (SCRSM): 0.978, and Section F (OP): 0.940. The reliability values were above the accepted benchmark of 0.70, as prescribed by Hair *et al*. (2010:86) and Pallant (2010:97). The high internal reliability could be attributed to the fact that the measurement instruments were adapted from pre-validated instruments. As such, the results obtained indicated acceptable reliability scores.

It should be noted that none of the measurement scales was removed and the results were reported in their entirety for both the pilot and primary studies. Lastly, values were rounded off to either two or three decimal places.

5.3 RESULTS OF THE PRIMARY SURVEY

This section provides an in-depth analysis of the results accumulated from the main survey.

5.3.1 Response Rate

A response rate is defined as the total number of completed interviews/distributed questionnaires divided by the total number of respondents with whom contact was made (Association for Public Opinion Research (AAPOR) (2011:3). The response rate for this study is presented in Table 5.2.

Table 5.2: Response rate

Description	Frequency
Total number of questionnaires distributed	350
Total number of questionnaires returned	264
Unusable responses discarded	37
Valid questionnaires retained	227
Response rate (%)	75.4

Source: Author's own compilation

Table 5.2 highlights the portion of the questionnaires distributed, discarded and retained during the survey. A total of 350 questionnaires were distributed to food retail firms situated in the Harare Province of Zimbabwe. From the initial 350 questionnaires, 264 were returned, which depicted a response rate of 75.4%. From the returned total, 37 were found to be unusable as several items had double markings, and some were not answered in full. The final number of valid responses available for analysis rested on 227 questionnaires.

It is suggested by Morton, Bandara, Robinson and Atatoa-Carr (2012:107) that there is no set-in-stone minimum response rate for sampling elements as no rate is automatically indicative of greater or lesser accuracy and utility. However, assertions from seminal authors such as Babbie (1990:28), Roth and BeVier (1998:100), and Dillman (2000:22) suggest 50% as the minimal level. Additionally, Fincham (2008:43) expresses that a response rate that meets a minimum criterion of 60% is desirable. As such, although there appears to be a lack of consistency across the literature when it comes to the benchmark for response rates, this study satisfies all criteria when the recommendations above are considered.

5.4 5.4 DESCRIPTIVE ANALYSIS RESULTS

In this section, the received data for Section A of the questionnaire which seeks to establish the demographic details of respondents were analysed using descriptive statistics. The descriptive analysis of this section is premised on determining the gender, age, highest qualification, race, employment period, type of contract, occupational area and occupational position of the respondents. The first four demographic categories of gender, age, highest qualification and race were grouped in one table (Table 5.3) along with the graphical representations and explanations after that. The same was implemented for the demographic details that elicited information about the respondents' employment status (employment period, type of contract, occupational area and occupational position). These were presented in Table 5.4.

5.4.1 Demographic analysis of results

The percentages and frequencies of results related to gender, age, race and highest academic qualification are presented in Table 5.3.

Table 5.3: Descriptive statistics results

VARIABLE	CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
(A1) Gender	Male	137	60.4
	Female	90	39.6
Total		N= 227	100
(A2) Age	Under 30 years	50	22
	30-39 years	90	39.6
	40-49 years	68	30
	50-59 years	18	7.9
	Above 60 years	1	0.4
Total		N= 227	100
(A3) Highest qualification	Below ordinary level	13	5.7
	Advanced level	13	5.7
	Certificate	51	22.5
	Diploma	50	22
	Degree	89	39.2
	Postgraduate	11	4.8
	Other	0	0
Total		N= 227	100
(A4) Race	African	196	86.3
	White	17	7.5
	Indian/Asian	2	0.9
	Coloured	12	5.3
	Other	0	0
Total		N= 227	100

The discussions of each specific category are provided in sections 5.4.1.1 up to 5.4.1.4.

5.4.1.1 Gender distribution of respondents
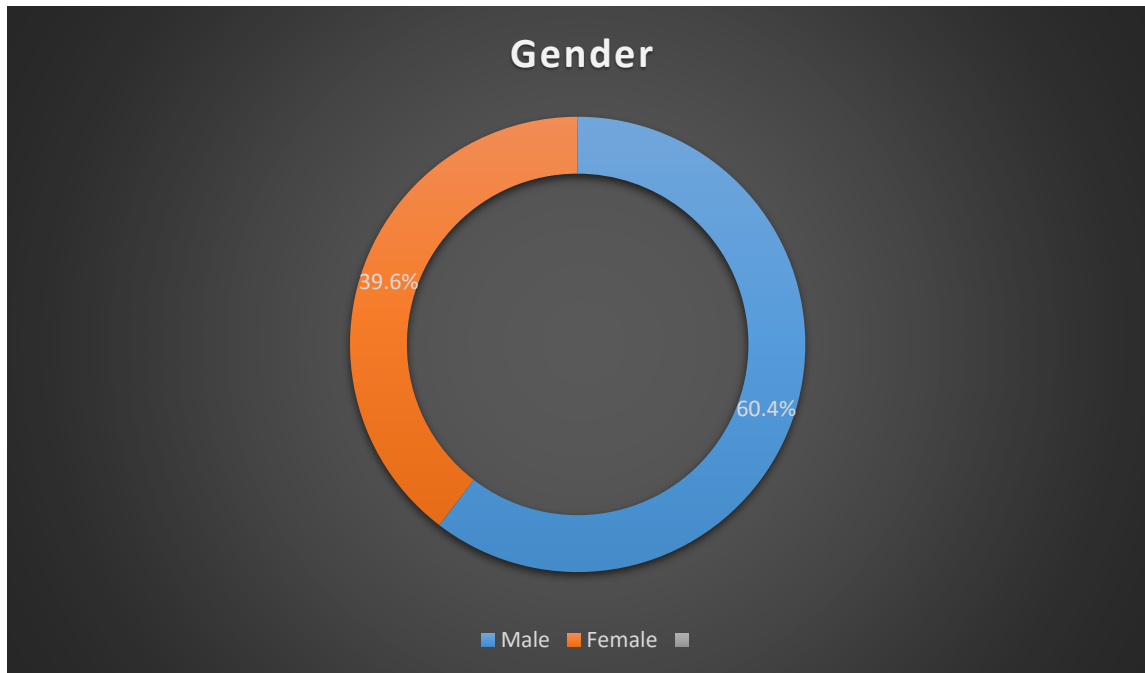
Figure 5.1: Gender distribution of respondents

Source: Author's own compilation

Figure 5.1 provides a graphical illustration of the gender structure of the surveyed respondents. The male population has the principal population of 60.4 per cent whereas the female population registered 39.6 per cent of the total N= 227 respondents. This equates to frequencies of (n=137) for males and (n= 90) for females. The gender disparity of the survey is not representative of the economy, considering that 52% of the Zimbabwe labour force is female (Zimbabwe Statistics, 2016:15).

5.4.1.2 Age distribution of respondents
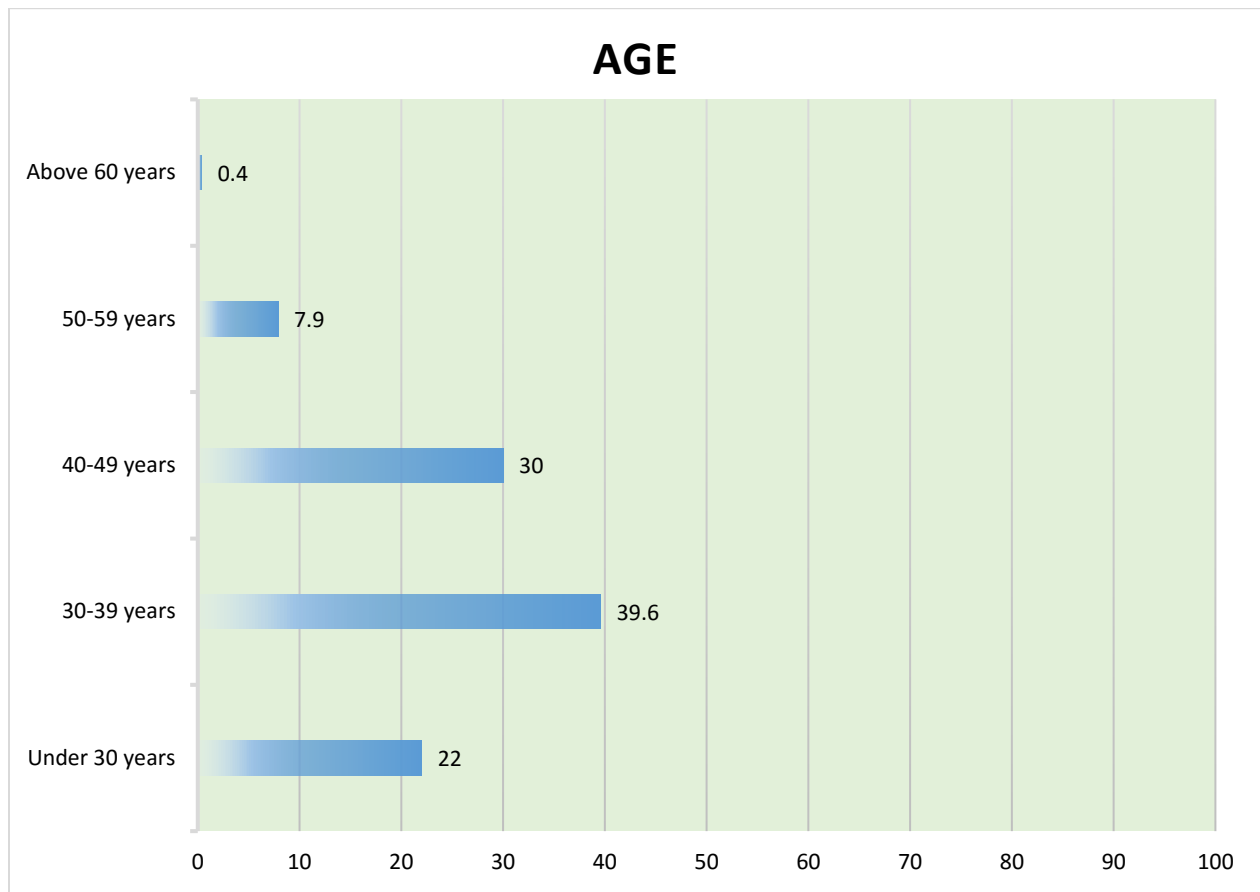
Figure 5.2: Age distribution of respondents

Source: Author's own compilation

In relation to the age distribution of the respondents as depicted diagrammatically in Figure 5.2, the data proves that the majority of the food retail industry survey respondents are young. Approximately two-thirds of the total survey population is accounted for by the under 40s with figures standing at (n= 50) 22 per cent for under 30 years and (90) 39.6 per cent for those between 30-39 years of age. About 30 per cent (n= 68) is accredited to the group between 40-49 years who are usually some of the most experienced personnel. Smaller percentages of 7.9 (n= 18) and 0.4 per cent (n= 1) belong to the older groups of 50-59 and above 60 years of age.

5.4.1.3 Highest qualification distribution of respondents
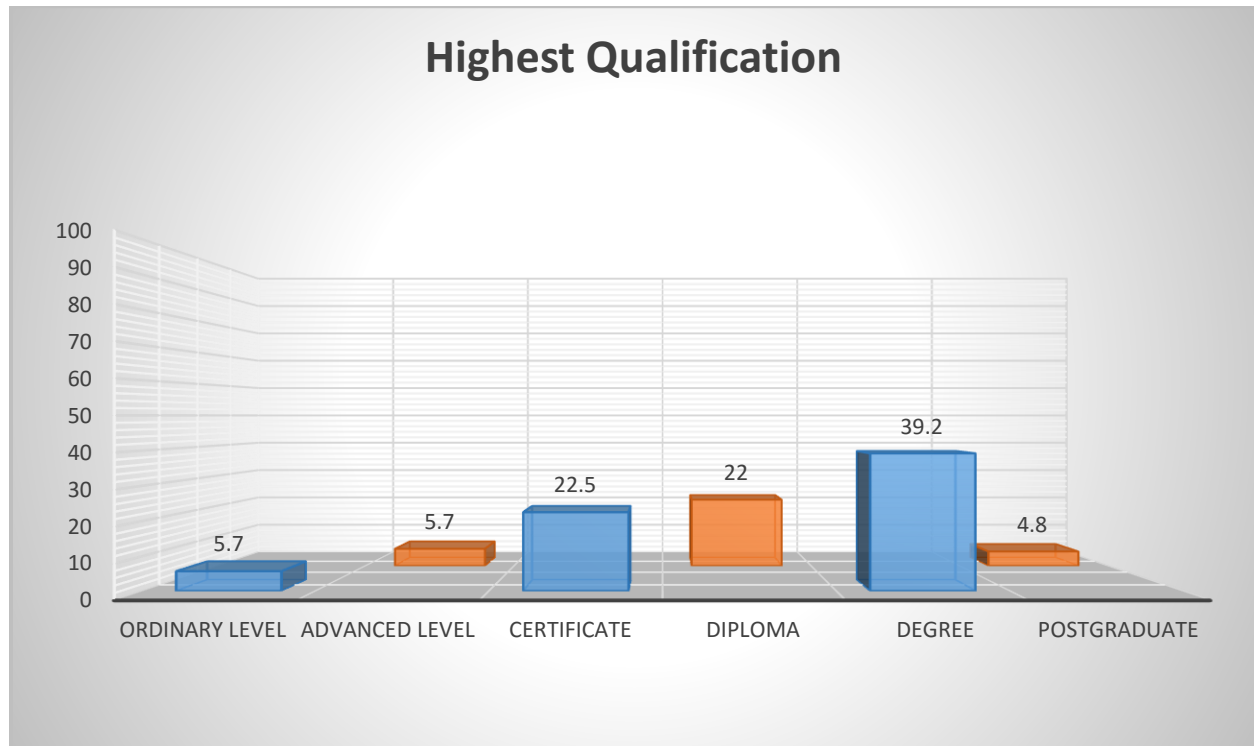
Figure 5.3: Highest qualification distribution of respondents

Source: Author's own compilation

Among the N= 227 respondents, the results show that 39.2 per cent (n= 89) of them hold an academic degree. About 22.5 per cent (n= 51) have academic certificates with 22 per cent (n= 50) having diplomas. At least 4.8 per cent (n= 11) are in possession of postgraduate certificates while Ordinary level and Advanced level certificate holders have 5.7 per cent (n= 13) each. The statistics from the highest qualification distribution adds credibility to the responses provided considering that all the respondents held at least a high school certificate, with the majority being in possession of a graduate degree.

5.4.1.4 . Race distribution of respondents
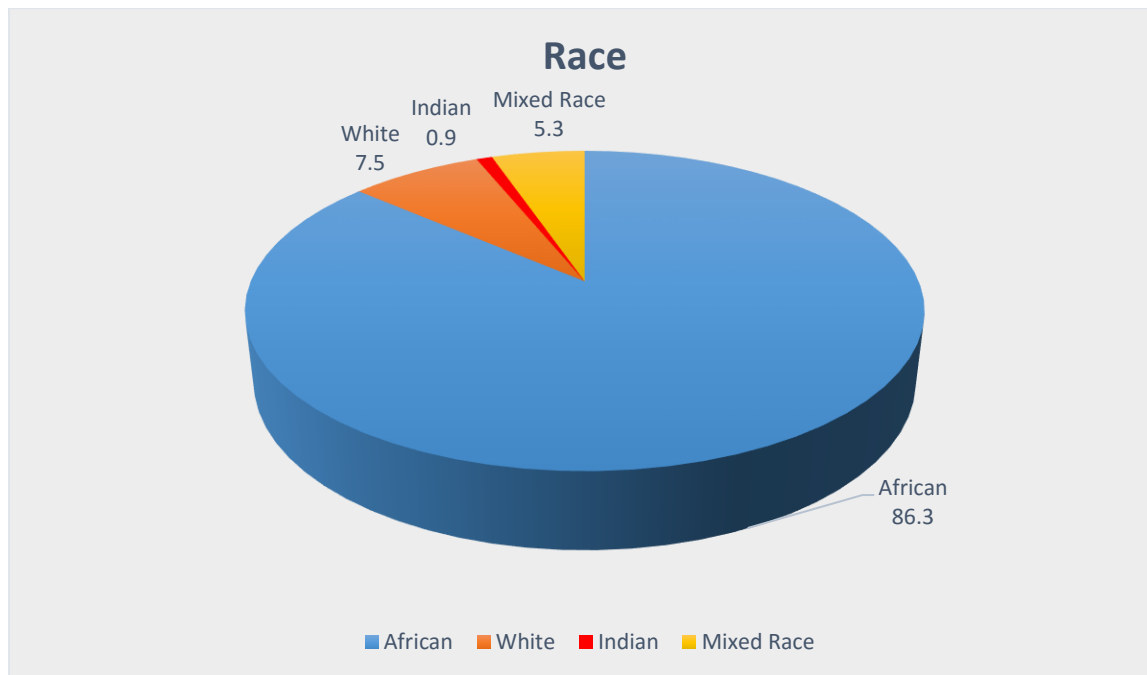
Figure 5.4: Race distribution of respondents

Source: Compiled by author

In Figure 5.4, a representation of racial profiles is presented. The highest percentage belonged to Africans/ Black people who constituted 86.3 per cent (n= 196). This concludes that the surveyed population is predominantly Africans. The white, Indian and mixed-race minorities amassed 7.5 per cent (n= 17), 0.9 per cent (n= 2), and 5.3 per cent (n= 12) in that similar order.

5.4.2 Demographic analysis of results (Employee status)

The percentages and frequencies of findings related to the respondents' employment period, type of contract, occupational area and occupational position are presented in Table 5.4. Sections 5.2.2.1 up to 5.2.2.4 shall provide discussions for each specific category.

Table 5.4: Descriptive statistics of results

VARIABLE	CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
(A5) Employment period	1-5 years	50	22.0
	5-10 years	71	31.3

VARIABLE	CATEGORY	FREQUENCY (n)	PERCENTAGE (%)
	10-15 years	50	22.0
	15-25 years	40	17.6
	Over 25 years	16	7.0
Total		N=227	100
(A6) Contract type	Trainee	11	4.8
	Contract	39	17.2
	Part-Time	2	0.9
	Permanent	175	77.1
Total		N=227	100
(A7) Occupational area	Procurement	51	22.5
	Transportation	23	10.1
	Customer services	29	12.8
	Warehousing	59	26.0
	Other	65	28.6
Total		N=227	100
(A8) Occupational position	Executive	6	2.6
	Senior Manager	57	25.1
	Supervisor	48	21.1
	Specialist	55	24.2
	Operator/Clerk	32	14.1
	Other	29	12.8
Total		N=227	100

5.4.2.1 Employment Period of respondents

Figure 5.5: Distribution of employment periods of respondents

Source: Author's own compilation

The results showed that 22 per cent (n= 50) of the surveyed individuals had been employed in their organisations for less than five years. Those employed between 11-15 years share the same proportion of 22 per cent (n= 50). The largest denomination of 31.3 per cent (n= 71) was attributed to respondents who have held employment for 6-10 years. Respondents who have been employed for longer periods have relatively lower percentiles. Those employed between 16-25 years account for 18 per cent and the over 25 years account for the least total of 7 per cent. From the results in Figure 5.4, it was observed that a majority of the surveyed respondents have been working in their respective firms for less than 10 years. Needless to say, 78% of the respondents possess more than five years' work experience, which implies a potential high level of knowledge on the aspects related to this study.

5.4.2.2 Contract type distribution
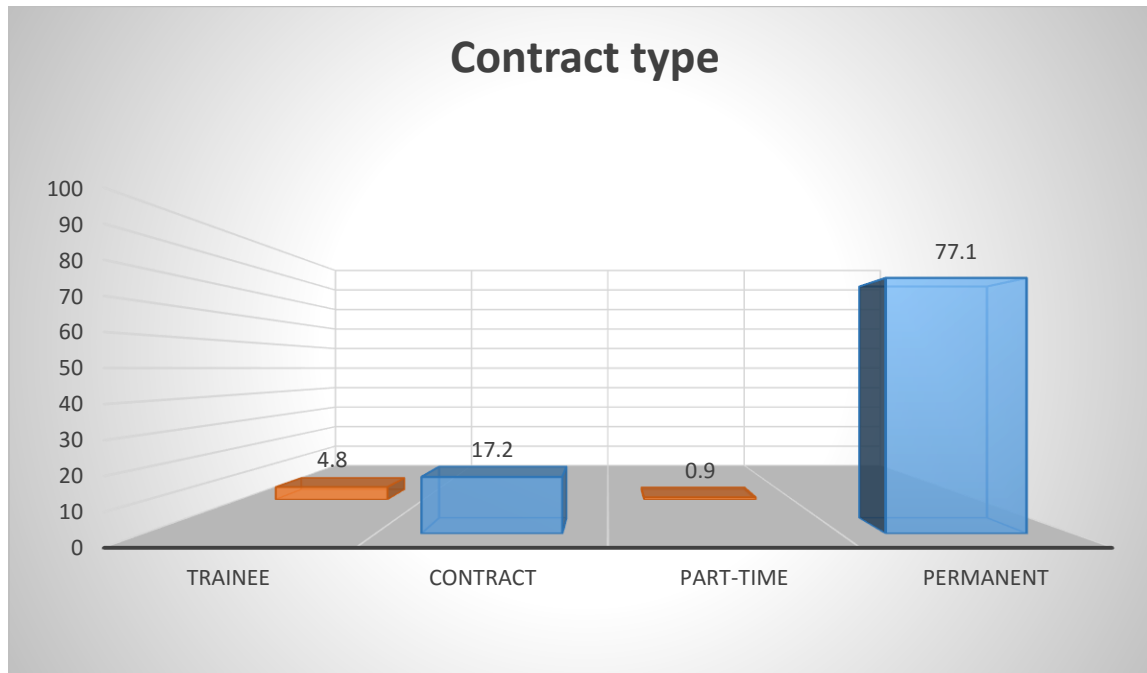
Figure 5.6: Contract type distribution of respondents

Source: Author's own compilation

The results presented in Figure 5.6 determine the nature of contractual agreements that exist between the firms in question and their surveyed respondents. Most of the respondents are employed on a permanent basis, as shown by the 77.1 percentage (n= 175). This to some extent signifies the extent to which firms are willing to retain young and educated human capital as already shown in the age and highest qualification categories (c.f., Chapter 5.4.1.2 & 5.4.1.3). Respondents on contracts held a percentage of 17.2 per cent (n= 39) out of the total n=227 total. Trainees and part-time employees constituted minor totals of 4.8 (n= 11) and 0.9 per cent (n= 2) respectively.

5.4.2.3 Occupational area distribution
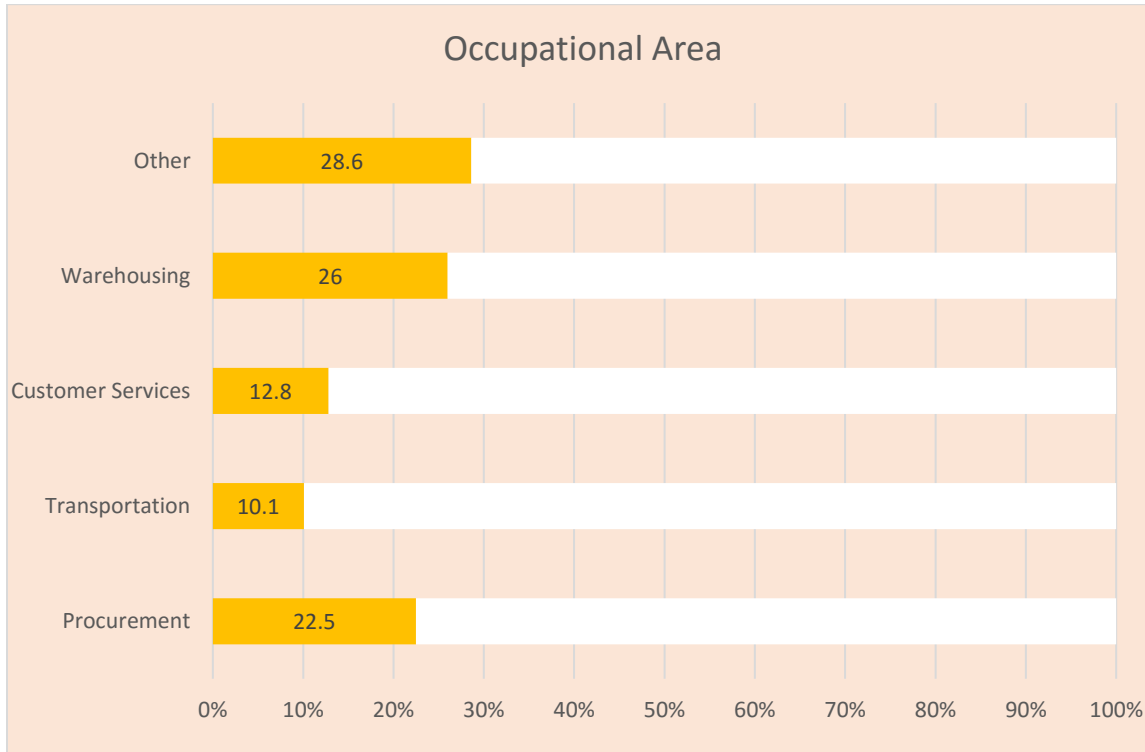
Figure 5.7: Occupational area distribution of respondents

Source: Compiled by author

Pertaining to the category of occupational area, the study managed to capture the supply chain professionals it intended to solicit responses from. This is because the SCM areas of Procurement, Transportation and Warehousing had respective totals of (n= 51) 22.5, (n= 23)10.1 and (n= 59) 26 per cent which totalled 58.6 per cent. Respondents who fell under the 'Other' category included finance, marketing, and operations. These constituted 28.6 per cent (n= 65) of the population whereas customer services contributed 12.8 per cent (n= 29). The fact that warehousing had the highest distribution percentage could be attributed to the heavy reliance on imports. To benefit from economies of scale, retailers purchase products in large quantities which are then warehoused and released onto retail shelves on demand. Warehousing therefore seems to play a critical role in the Zimbabwean food retail supply chain systems.

5.4.2.4 Occupational Position distribution
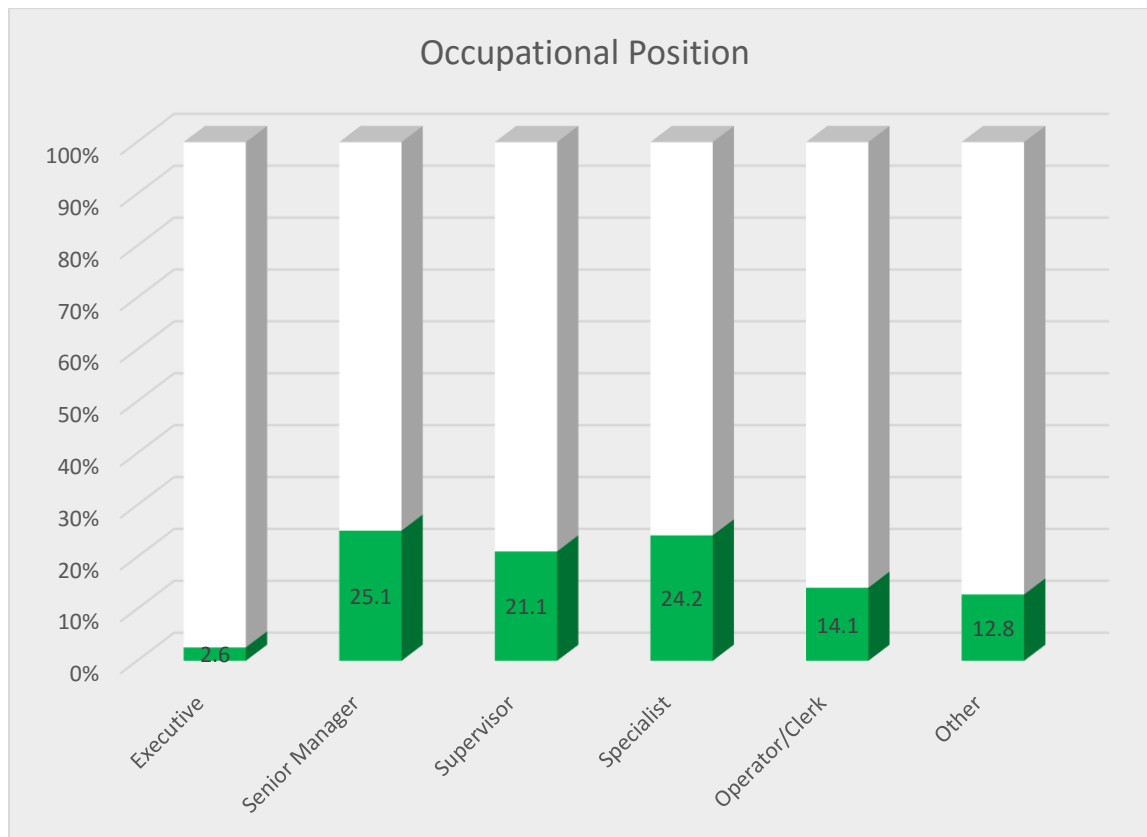
Figure 5.8: Occupational position distribution of respondents

Source: Author's own compilation

Figure 5.8 resembles the percentage distribution of occupational positions of the respondents. The executives had the least percentage of 2.6 per cent (n= 6). The senior management and specialist positions had the two highest percentages of 25.1 (n=57) per cent and 24.2 (n= 55) per cent respectively. This formed the highest pools of professionals that participated in the study, followed by supervisors who amassed 21.1 (n= 48) per cent of the total figure. Operational employees summed up to 14.1 per cent. Lastly, 'Other' positions such as dispatch officers, receiving and stock control personnel contributed 12.8 per cent (n= 29) of the total sample population.

5.5 EXPLORATORY FACTOR ANALYSIS

An Exploratory Factor Analysis (EFA) procedure was performed to ascertain the factor structure of the collected data. The EFA procedure is an analytic method used for the development of

psychometrically sound instruments (Chumney, 2016:1). Williams, Onsman and Brown (2010:2) highlight the following as the objectives of EFA:

- reduces the number of variables;
- examines the structure or relationship between variables;
- detects and assesses the uni-dimensionality of a theoretical construct;
- evaluates the construct validity of a scale, or instruments;
- facilitates easier analysis and interpretations;
- addresses multicollinearity (two or more variables that are correlated);
- Develops theoretical constructs; and
- proves/disproves proposed theories.

Prior to the EFA procedure being performed, the Kaiser-Meyer-Olkin Test had to be performed to ensure that the collected data were suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) statistic is a measure of the proportion of variance among variables that might be common variance. A Kaiser-Meyer Olkin (KMO) test of sampling adequacy and Bartlett's test of variance homogeneity were both performed to ascertain the suitability of captured data for EFA. The minimum threshold for KMO, as suggested by the originator Kaiser (1974:31), should be 0.5. The Bartlett's test, on the other hand, should yield a significance cut-off of no greater than 0.001. The test measures sampling adequacy for each variable in the model and for the complete model (Kaiser, 1974: 31; Glen, 2016:2). The results of the Bartlett's and the KMO tests are presented in Table 5.5.

Table 5.5: The KMO measure and the Bartlett Test Results

CONSTRUCTS	KMO MEASURE	BARTLETT'S TEST		
		Approximate Chi-Square	Degrees of freedom	Significance level
SCRM	0.834	661.475	28	0.000
SCRIS	0.892	1016.256	21	0.000

CONSTRUCTS	KMO MEASURE	BARTLETT'S TEST		
		Approximate Chi-Square	Degrees of freedom	Significance level
SCRAA	0.888	958.668	21	0.000
SCRSM	0.879	778.387	10	0.000
OP	0.870	810.576	21	0.000
SCRM= supply chain risk management; SCRIS= supply chain risk information sharing; SCRAA= supply chain risk analysis and assessment; SCRSM= supply chain risk-sharing mechanism; OP= operational performance.				

Source: Authors own compilation

These test results were all significant at p=0.000; for the Bartlett's test and < 0.05 for KMO. Since the results of the Bartlett's and the KMO tests were all within the recommended thresholds, it was determined that the collected data were factorable; hence, EFA could be performed. The upcoming sections show the results of the EFA procedure performed on SCRM, SCRIS, SCRAA, SCRSM and OP, respectively.

5.5.1 Exploratory Factor Analysis for the Supply Chain Risk Management Scale

In line with the EFA procedure recommended by Glen (2016:2), the retained measures should have items with factor loadings greater than or equal to 0.50, with an eigenvalue either equal to or greater than 1. The percentage of variance will also be provided. This will further be substantiated by a scree plot, which will be provided to further show the fraction of total variance in the data as represented by each component. A scree plot shows the distribution of factors by their eigenvalues. The eigenvalues of the unrotated factors display a bend of the plot, which is the point on the curve which represents the threshold chosen for retention of the initial factors extracted from the observed variables and which maximise the variance accounted for (Woods & Edwards, 2011:3).

The EFA procedure for the SCRM scale produced a two-factor structure, indicated in Table 5.6.

Table 5.6: Two-factor rotated structure for the SCRM scale

ITEM CODE	Description	Factor	
		1	**2**
SCRM1	Supply chain risk management is built into our organisational planning process.	**.720**	.161
SCRM3	Top level management is involved in our risk management process.	**.598**	-.120
SCRM5	We involve our suppliers in the identification and mitigation of potential supply chain risks.	**.837**	-.008
SCRM6	We encourage our suppliers to use a structured supply chain risk management process	**.810**	.102
SCRM7	We work with our supply chain members to identify and mitigate potential supply chain risks	**.840**	-.002
SCRM8	We have a process in place for corrective feedback to our risk management process.	**.751**	.184
SCRM2	Supply chain risk management is an ad hoc process for us that occurs informally on an as needed basis	-.080	**.890**
SCRM4	We prioritise risk events based on severity of impact to our organisation.	.274	**.572**
Eigenvalue		3.680	1.109
Total variance explained		46.000	13.859
Cumulative variance explained		46.000	59.860

Source: Authors own compilation

As revealed in Table 5.6, two factors were extracted from the SCRM scale as they did not fall under the same factor when component matrix loading was completed. However, the second factor was made of two items (SCRM 2 & 4) and was discarded from the study because it had an unsatisfactory Cronbach alpha value of 0.268. This means that this factor did not measure what it was intended to measure, hence its exclusion. Thus, the final construct representing SCRM was composed of six items, had an eigenvalue of 3.680 and contributed 46% of the variance of SCRM.
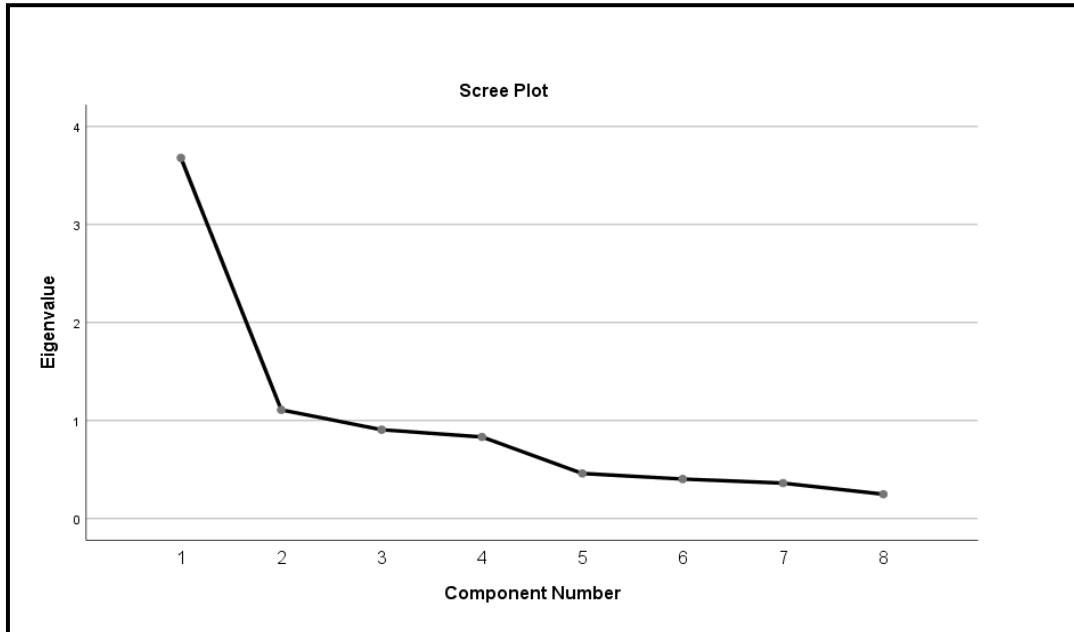
Figure 5.9: Scree Plot for SCRM values

Source: Authors own compilation

The scree plot for SCRM plots two factors (1 & 2) which had eigenvalues over 1.00. Together, these two factors explained over 59 per cent of the total variability in the data. However, only one factor is considered in which the total variability in the data is 46 per cent.

5.5.2 Exploratory Factor Analysis for the Supply Chain Risk Information Sharing Scale

The EFA was also conducted for the SCRIS scale. The resultant factor solution from this process is presented in Table 5.7.

Table 5.7: Uni-dimensional Factor Structure of the SCRIS Scale

Item Code	Description	Factor 1
SCRIS1	Our partners share proprietary information with us.	.794
SCRIS2	We share accurate risk-related information with our supply chain members.	.836
SCRIS3	We are willing to share real-time information on demand with our suppliers.	.839
SCRIS4	Information is actively shared between functional teams in our firm.	.784
SCRIS5	It is expected that members in the supply chain keep each other informed about events or changes that may affect the other party.	.819
SCRIS6	Our partners keep us fully informed about issues that affect our business.	.811
SCRIS7	We have closely integrated information systems with key suppliers and logistic providers.	.842
Eigenvalue		**4.684**
Total variance explained		**66.918**
Common variance explained		**66.918**

Source: Authors own compilation

Table 5.7 shows that only one-factor representing SCRIS was extracted. The factor was composed of seven items, had an eigenvalue of 4.684 and contributed 66.9 per cent of the variance of SCRIS.
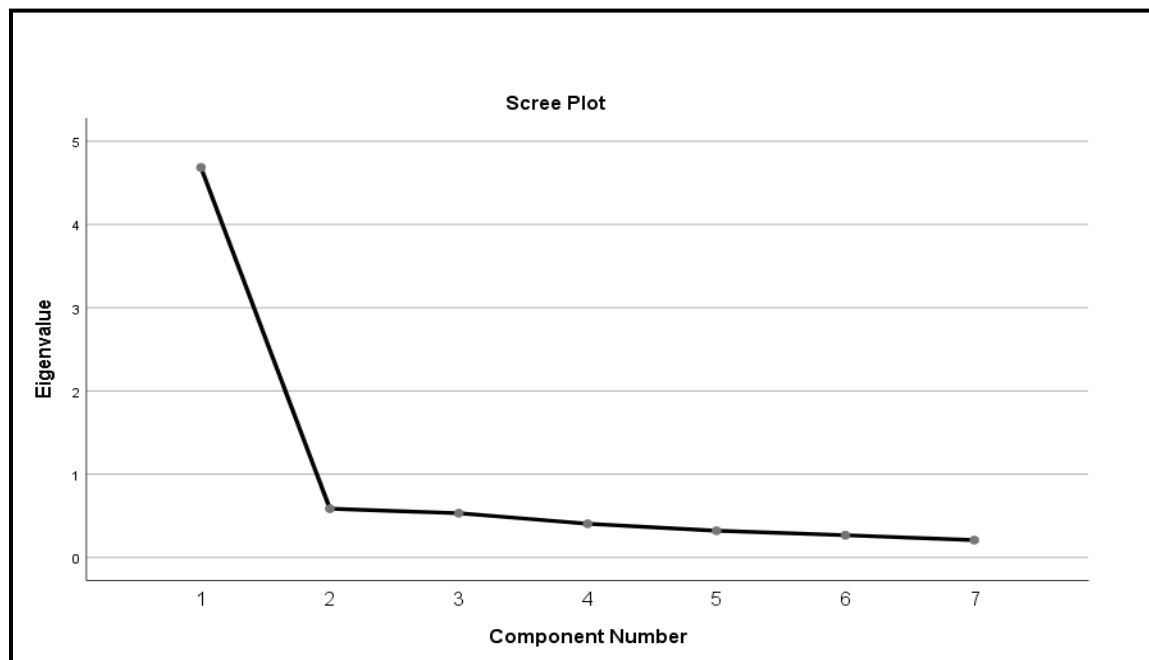
Figure 5.10: Scree plot for SCRIS

Source: Authors own compilation

Figure 5.10 represents the scree plot for SCRIS, further supporting the eigenvalues shown in Table 5.8. The point of the curve represents the threshold chosen for retention, and it indicates that a one-factor threshold is adequate.

5.5.3 Exploratory Factor Analysis for the Supply Chain Risk Analysis and Assessment Scale

This section provides the EFA conducted for the SCRIS scale. The resultant factor solution from this process is presented in Table 5.8.

Table 5.8: Uni-dimensional factor structure for the SCRAA Construct

Item Code	Description	Factor 1
SCRAA1	Our firm has a clear process of risk assessment in place.	.780
SCRAA2	Our firm continuously uses tools/processes to assess supply chain level risks (e.g., supply chain mapping, critical path analysis).	.826
SCRAA3	Our firm often uses past and current information to identify potential risk.	.783
SCRAA4	Our firm periodically identifies risk.	.634

SCRAA5	Our firm continuously identifies and assesses the potential risk in our supply chain.	.848
SCRAA6	Appropriate processes are in place for identifying, analysing, and dealing with risks.	.843
SCRAA7	Our firm often uses tools/processes to assess internal process risks (e.g., process mapping, brain storming, six sigma method, and risk likelihood /impact analysis).	.858
Eigenvalue		**4.470**
Total variance explained		**63.835**
Common variance explained		**63.853**

Source: Authors own compilation

The EFA process illustrated that only one factor was appropriate to capture all the dimensions of SCRAA. All measurement items loaded above the recommended 0.5, with an eigenvalue of 4.470. The total variance explained for the SCRAA factor was 63.8 per cent.
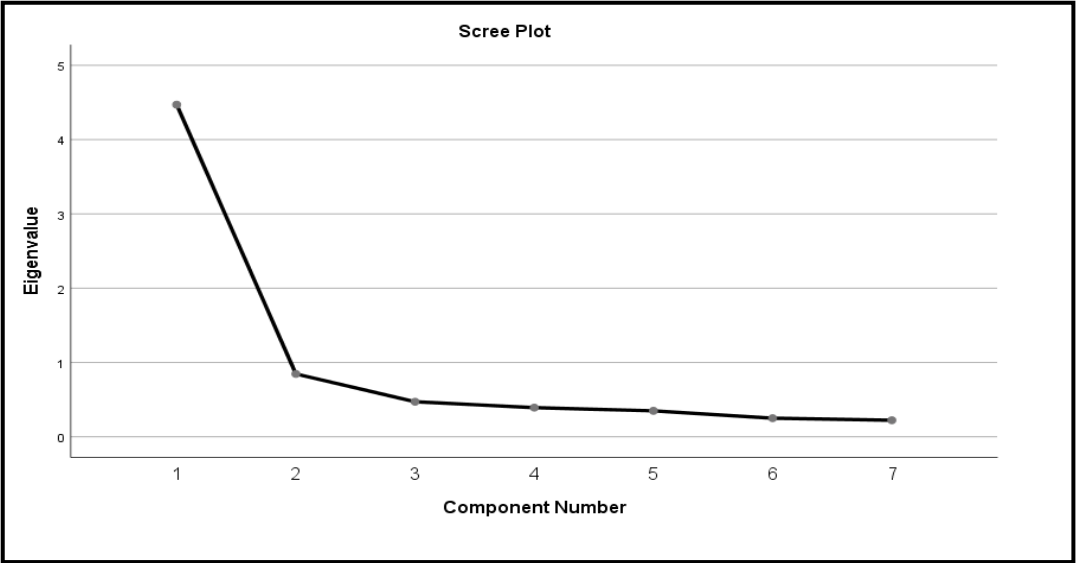
Figure 5.11: Scree plot of SCRAA

Source: Authors own compilation

The conclusions in Table 5.8 are supported by the scree plot in Figure 5.11, which shows a one-factor structure for the SCRAA scale in which the eigenvalue is 4.470.

5.5.4 Exploratory Factor Analysis for the Supply Chain Risk-sharing Mechanisms Scale

The EFA procedure was also conducted for the SCRSM scale. The resultant factor solution from this process is presented in Table 5.9.

Table 5.9: Uni-dimensional factor structure for the SCRSM Construct

Item Code	Description	Factor 1
SCRSM1	Our firm utilises a strategy of sharing supply chain risk with our supply chain partners.	.871
SCRSM2	There are risk management policies defining responsibilities for each party of the supply chain member.	.894
SCRSM3	There are clear risk and revenue sharing rules between the members of the supply chain.	.876
SCRSM4	We have formal mechanisms (e.g., buy-back agreement) and informal mechanisms (e.g., verbal commitment) to share risk with supply chain partners.	.816
SCRSM5	There are widely acknowledged and accepted risk/revenue sharing mechanisms in our supply chain.	.873
Eigenvalue		**3.753**
Total variance explained		**75.068**
Common variance explained		**75.068**

Source: Authors own compilation

As shown is Table 5.9, the EFA procedure for SCRSM produced 1 factor. This means that all measurement items are correlated and measure the same thing. All measurement items loaded above the recommended 0.5, and an eigenvalue of 3.753 was attained for the factor. The total variance explained for the SCRSM factor was 75 per cent.
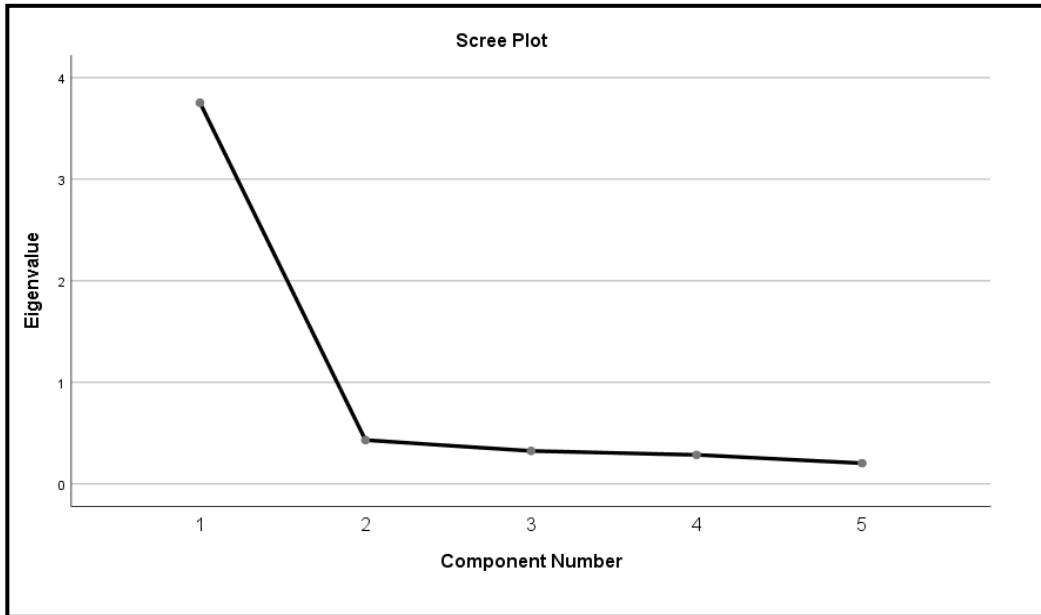
Figure 5.12: Scree plot for SCRSM

Source: Authors own compilation

Figure 5.12 depicts the total eigenvalues for the SCRSM scale. The uni-dimensionality of the scale presented one component above the chosen threshold for retention, which proves that only one factor was adequate to measure the SCRSM scale.

5.5.5 Exploratory Factor Analysis for the Operational Performance Scale

The EFA procedure concluded with the OP scale. The resultant factor solution from this process is presented in Table 5.10.

Table 5.10: Unidimensional Factor Structure for Operational Performance

Item Code	Description	Factor 1
OP1	Our firm can quickly modify products to meet our major customers' requirements.	.793
OP2	Our firm can quickly introduce new products into the markets.	.771
OP3	Our firm can quickly respond to changes in market demand.	.843
OP4	Our firm provides a high level of customer service to our major customers.	.688
OP5	Our firm provides consistent quality products with low defects.	.783

OP6	Our firm is able to obtain and maintain low inventory costs.	.839
OP7	Our firm offers prices as low as or lower than our competitors.	.664
Eigenvalue		**4.166**
Total variance explained		**59.512**
Common variance explained		**59.512**

Source: Authors own compilation

As shown in Table 5.10, the factor loading for SCRSM also produced 1 factor. This means all measurement items are correlated and measure the same construct. All measurement items loaded above the recommended 0.5, with an eigenvalue of 4.166. The total variance explained for the SCRSM factor was 59.5 per cent.
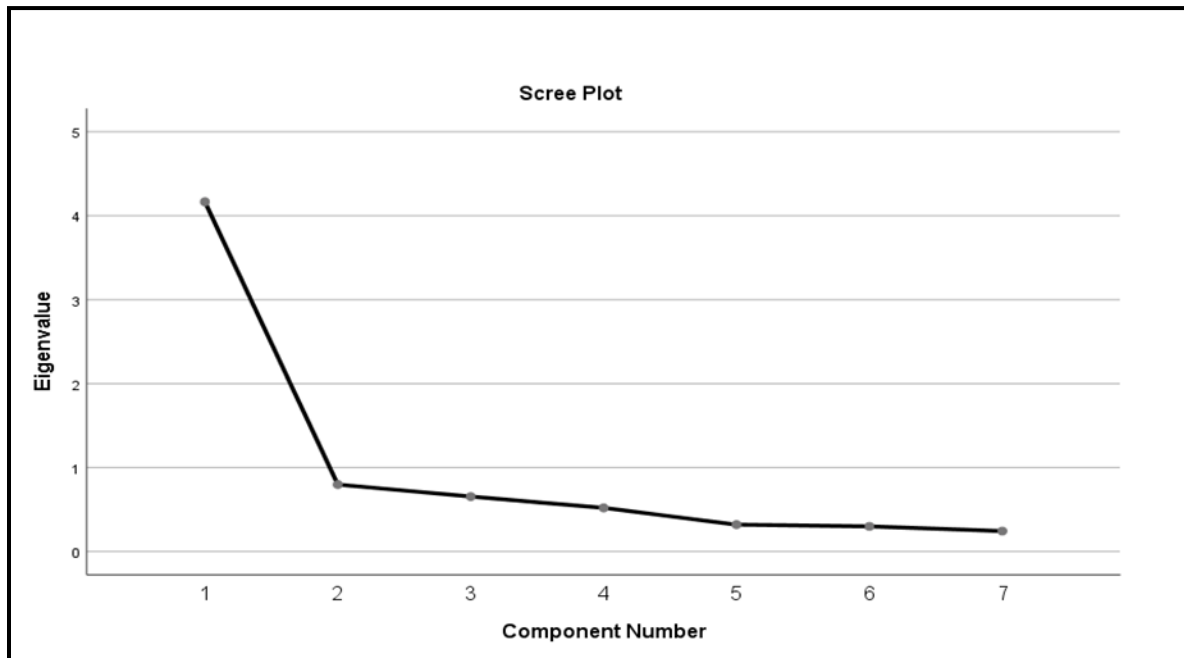
Figure 5.13: Scree Plot for OP
Source: Authors own compilation

The scree plot presented in Figure 5.13 further substantiates the results presented in the EFA for operational performance. A one-factor structure was chosen for retention through factor analysis, which had an eigenvalue of 4.166.

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Woods and Edwards (2017:2) state that in a scree plot, it is desirable to find a sharp reduction in the size of the eigenvalues with the rest of the smaller eigenvalues constituting rubble. When the eigenvalues drop dramatically in size, an additional factor would add relatively little to the information already extracted. As such, all five scree plots presented in this section to substantiate the EFA of scales presented eigenvalues dropping in sequence, thereby indicating and emphasising the validity of a one-factor structure for all the scales.

Factor analysis comprises two main techniques, namely, EFA and CFA. As already presented in this section, EFA attempts to uncover complex patterns by exploring the dataset and testing predictions, whereas CFA assesses scale accuracy by testing for the psychometric properties. This is presented in section 5.6. EFA and CFA can be used together to strengthen research instruments and outcomes (Glen, 2016:2).

5.6 5.6 DESCRIPTIVE STATISTICS FOR CONSTRUCTS

This study tested relationships between five constructs which are: SCRM, SCRIS, SCRAA, SCRSM and OP. Descriptive statistics were then used to explore the perceptions of respondents towards the constructs. It is essential to establish the perceptions of respondents towards these constructs to obtain a clear indication of their degree of affirmation (strongly agree) or disapproval (strongly disagree) with the items in the measurement scales. Statistics such as the minimum and maximum values, mean score, standard deviation, skewness and kurtosis were considered.

Minimum and maximum values represent the degree of strongly disagree or strongly agree as provided on the Likert scale. The standard deviation was applied to determine how dispersed the data values were. Skewness and kurtosis were applied to establish the normality of data distribution. Skewness is a representation of the asymmetry from the mean of data distribution (Jain, 2018:4). Skewed data distribution can either be negative or positive. Positive skew means that the extreme data results are larger, thus bringing the mean average up. In a negative skew distribution, the extreme results are smaller than the median, thereby bringing the mean result down (Gonzalez, 2019:1). Kurtosis, on the other hand, is a measure of the combined weight of the tails relative to the rest of the distribution (Wheeler, 2011:9). Skewness close to 0 and Kurtosis close to 3 is favourable (Jain, 2018:4). Wheeler (2011:9) emphasises that skewness and kurtosis are indicators of how balanced the data set is against the median but does not offer anything more

than that. Therefore, there is minimal need to put much emphasis on skewness and Kurtosis statistics (Mcneese, 2016:9).

5.6.1 Descriptive Statistics for SCRM

The Descriptive Statistics for SCRM are presented in Table 5.11.

Table 5.11: Descriptive statistics for supply chain risk management

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRM1	Supply chain risk management is built into our organisational planning process.	1	7	5.98	1.089	-1.646	3.574
SCRM3	Top level management is involved in our risk management process.	1	7	**6.18**	0.977	-1.836	5.894
SCRM5	We involve our suppliers in the identification and mitigation of potential supply chain risks.	1	7	6.00	0.964	-1.495	4.001
SCRM6	We encourage our suppliers to use a structured supply chain risk management process	1	7	5.93	1.188	-1.413	2.175
SCRM7	We work with our supply chain members to identify and mitigate potential supply chain risks	2	7	**5.92**	1.067	-1.264	1.839
SCRM8	We have a process in place for corrective feedback to our risk management process.	1	7	5.95	1.245	-1.544	2.267

Source: Author's own compilation

The six measurement items in Table 5.11 tested the perception of SCRM in the food retail industry. Supported by an average mean value and standard deviation of ($\bar{x}$=5.99: SD ± 1.088), it shows that respondents agree with the sentiments presented through the measurement instruments. The highest mean value was obtained from SCRM3 (top-level management is involved in our risk management process) whereby the mean was ($\bar{x}$=6.18: SD ±0.977). This shows the extent to which SCRM is important in these firms. The lowest mean value was obtained from SCRM7, which measured if firms worked with their supply chain members to identify risks. It measured a mean value of ($\bar{x}$=5.92) and standard deviation of SD ± 1.067), thereby producing a range of 0.26.

Average values for skewness and kurtosis were -1.533 and 3.291. The kurtosis produced is close to three, signifying a distribution close to normality. Moreover, the skewness to the right signifies that majority of responses were aligned towards the agreement (right side) of measurement items.

SCRM5, SCRM6 and SCRM7 which measured the extent to which firms involve their supply chain partners in SCRM processes scored means of ($\bar{x}$=6.00: SD ±0.964), ($\bar{x}$=5.93: SD ±1.188) and ($\bar{x}$=5.92: SD ±1.067). This clearly indicates the importance and need to involve supply chain members in the risk management (Wu & Olson, 2009:696). More so, item SCRM8 which measured the perception of processes in place for corrective feedback to our risk management process scored values of ($\bar{x}$=5.95: SD ±1.245) which demonstrates that feedback is crucial in the management of supply chain risk. This is substantiated by the British Standard for Customer Service (2016:4) which advocates that corrective feedback helps to identify common problems at an early stage, thereby ensuring that appropriate action is taken to resolve problems and prevent a recurrence.

5.6.2 Descriptive Statistics for SCRM

The Descriptive Statistics for SCRIS are presented in Table 5.12.

Table 5.12: Descriptive statistics for supply chain risk information sharing

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRIS1	Our partners share proprietary information with us.	1	7	**5.32**	1.397	-0.935	0.318
SCRIS2	We share accurate risk related information with our supply chain members.	2	7	5.77	1.125	-1.231	1.767
SCRIS3	We are willing to share real time information on demand with our suppliers.	2	7	6.02	1.006	-0.833	0.147
SCRIS4	Information is actively shared between functional teams in our firm.	2	7	**6.05**	0.942	-0.963	0.870
SCRIS5	It is expected that members in the supply chain keep each other informed about events or changes that may affect the other party.	2	7	5.95	1.050	-1.026	0.936

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRIS6	Our partners keep us fully informed about issues that affect our business.	2	7	5.53	1.130	-0.473	0.329
SCRIS7	We have closely integrated information systems with key suppliers and logistic providers.	1	7	5.65	1.218	-1.217	2.290

Source: Author's own compilation

Table 5.12 details the results of the analysis of respondents' perceptions of SCRIS. Items SCRIS1, SCRIS2 and SCRIS3 indicate mean and standard deviation values of ($\bar{x}$=5.32: SD ±1.397), ($\bar{x}$=5.77: SD ±1.125) and ($\bar{x}$=6.02: SD ±1.006), which shows that they agreed with the view that their suppliers share proprietary information with them and inversely, they are willing to and do share risk related information with their supply chain partners. SCRIS4 (Information is actively shared between functional teams in our firm) achieved the highest mean of ($\bar{x}$=6.05: SD ±0.942). This is a clear indicator that respondents agree the most with the notion that risk related information is actively shared within the organisation.

Items SCRIS5 and SCRIS6 which look at the focal firms' expectation of their suppliers sharing information about changes that may affect them and whether their suppliers keep them fully informed on those issues scored values of ($\bar{x}$=5.95: SD ±1.050) and ($\bar{x}$=5.53: SD ±1.130) correspondingly. Concerning the statement about whether firms have closely integrated information systems with key suppliers and logistic provider (item SCRIS 7), a mean score of $\bar{x}$=5.65; SD±1.218 was found. The averages for skewness and kurtosis where -0.954 and 0.951, thereby establishing that the data was almost symmetrical given that the skewness is close to the 0.

The above results support the findings made by Hsu *et al.* (2008:298) and Dominguez *et al.* (2018:130), which report that information sharing contributes immensely to the relationships between supply chain partners through the facilitation of coordination, responsiveness as well as the integration of information systems. It could further be contended that absolute sharing of risk information among supply chain partners is key in enabling and enhancing productivity.

5.6.3 Descriptive Statistics for SCRAA

The Descriptive Statistics for SCRAA are presented in Table 5.13.

Table 5.13: Descriptive statistics for supply chain risk analysis and assessment

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRAA1	Our firm has a clear process of risk assessment in place.	1	7	5.94	1.063	-1.752	4.197
SCRAA2	Our firm continuously uses tools/processes to assess supply chain level risks (e.g., supply chain mapping, critical path analysis).	2	7	**5.69**	1.119	-1.099	1.225
SCRAA3	Our firm often uses past and current information to identify potential risk.	2	7	**5.98**	0.947	-1.278	2.716
SCRAA4	Our firm periodically identifies risk.	1	7	5.71	1.024	-1.140	2.455
SCRAA5	Our firm continuously identifies and assesses the potential risk in our supply chain.	1	7	5.89	1.025	-1.726	4.763
SCRAA6	Appropriate processes are in place for identifying, analysing, and dealing with risks.	2	7	5.81	1.032	-1.293	2.206
SCRAA7	Our firm often uses tools/processes to assess internal process risks (e.g., process mapping, brain storming, six sigma method, and risk likelihood /impact analysis).	1	7	5.74	1.044	-1.220	2.328

Source: Author's own compilation

The highest mean value for SCRAA was obtained from item SCRAA3 ($\bar{x}$=5.98: SD ±0.947) with the following statement: our firm often uses past and current information to identify potential risk. This shows that risk management and the analysis of those risks is a timeless process in which past and current risks are used to provide a forecast for future supply chain risks. The lowest mean value was obtained from SCRAA2 ($\bar{x}$=5.69: SD ±1.119), which had the following statement: our firm continuously uses tools/processes to assess supply chain level risks (e.g., supply chain

mapping, critical path analysis). Regardless of it having the smallest mean statistic, it still reflects a positive outlook that retailers do have SCRIS measures in place.

The overall mean for the scale was ($\bar{x}$=5.82), with a range of 0.29, thus representing an agreeable perception towards items measuring SCRAA. The normality of distribution was further tested using skewness and kurtosis, which had values of -1.358 and 2.841. As such, the kurtosis value of 2.841 is very close to the recommended value of 3, thereby signifying normally distributed data. The positive skewness shows that the data set weighed more to the right, resembling a general agreement of the presented measurement items for SCRAA.

The results presented in Table 5.13 affirm that respondents agree that their firms have established techniques and processes that enable them to consistently analyse and assess the potential supply chain risks that could deter their operations. Tummala and Schoenherr (2011:474) advocate the importance of firms in analysing and monitoring possible unexpected problems in the supply chain. This further leads to the creation of contingency plans to prepare the firm to deal with and handle the unpredictability of supply chain dynamics. The effectiveness of firms in managing potential challenges has been regarded as critical in improving the seamless flow of operations and ultimately in achieving optimal operational performance that delivers competitive advantage (Colicchia & Strozzi 2012:403).

5.6.4 Descriptive Statistics for SCRSM

The Descriptive Statistics for SCRSM are presented in Table 5.14.

Table 5.14: Descriptive statistics for supply chain risk-sharing mechanism

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRSM1	Our firm utilises a strategy of sharing supply chain risk with our supply chain partners.	2	7	5.71	1.126	-1.069	1.066
SCRSM2	There are risk management policies defining responsibilities for each party of the supply chain member.	2	7	5.84	1.081	-1.014	0.986
SCRSM3	There are clear risk and revenue sharing rules between the members of the supply chain.	2	7	5.87	1.117	-1.139	1.046

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
SCRSM4	We have formal mechanisms (e.g., buy back agreement) and informal mechanisms (e.g., verbal commitment) to share risk with supply chain partners.	3	7	**5.93**	0.945	-0.802	0.284
SCRSM5	There are widely acknowledged and accepted risk/revenue sharing mechanisms in our supply chain.	1	7	**5.63**	1.169	-0.921	0.992

Source: Author's own compilation

Section E measured the perception of SCRSM. Item SCRSM4 had the highest mean score of ($\bar{x}$=5.93: SD ±0.945) and the lowest mean score was $\bar{x}$=5.63: SD ±1.169 (Item SCRMS 5) giving a range of 0.3. The respondents rated SCRSM1 (risk-sharing strategies) with a mean score of 5.71. This indicated that respondents value the utility of creating appropriate risk-sharing strategies that cushion their risk of losses with their supply chain partners. The respondents rated SCRSM 2 (risk management policies) with a mean score of ($\bar{x}$=5.84: SD ±1.081). It proves that the respondents' firms have designed clear guidelines on the responsibilities of every player of their supply chain.

The respondents rated SCRM 3 (risk and revenue sharing rules) with a mean score of ($\bar{x}$=5.87: SD ±1.117), clearly indicating that firms do not leave risk and revenue sharing to chance but have pre-set standards and rules of sharing risks and revenues emanating from risks. A case in point: suppliers and retailers have an obligation to ensure that products that are nearing expiration date are marketed through mechanisms such as discounts in which the discount is first agreed upon by both parties to ensure that losses are minimal to both parties.

SCRM 4 (formal and informal mechanisms) achieved a mean score of ($\bar{x}$=5.93: SD ±0.945). This clearly shows the extent firms have gone to ensure that risks are not centralised on the retailer but are spread out with the suppliers, further strengthening the sentiments advocated for by Wong, Boon-Itt and Wong (2011:608), and Li *et al*. (2014:380) that through supplier integration in sharing and managing risk, firms share inventory levels, demand forecasts and other relevant data with their major suppliers. This makes it clear that strong supplier relationships are key to firm performance.

The respondents rated SCRSM 5 (widely acknowledged SCRSM) with a mean score of ($\bar{x}$=5.63: SD ±1.169). It further asserts that retail firms consider SCRSM as a vital tool in mitigating against supply chain risks that could impact on their firms negatively. Respondents seemed to agree that their respective organisations utilise different strategies to share risks with their supply chain partners to minimise and manage the impact of risks occurring within their supply chains.

5.6.5 Descriptive Statistics for OP

The Descriptive Statistics for OP are presented in Table 5.15.

Table 5.15: Descriptive statistics for operational performance

Item	Description Valid: (N=227)	Minimum	Maximum	Mean	Standard deviation	Skewness	Kurtosis
OP1	Our firm can quickly modify products to meet our major customers' requirements.	1	7	**5.23**	1.608	-0.881	0.045
OP2	Our firm can quickly introduce new products into the markets.	2	7	5.57	1.376	-1.121	0.744
OP3	Our firm can quickly respond to changes in market demand.	3	7	5.93	1.041	-0.879	0.289
OP4	Our firm provides a high level of customer service to our major customers.	2	7	**6.30**	0.856	-1.771	4.652
OP5	Our firm provides consistent quality products with low defects.	2	7	6.05	1.012	-1.477	2.893
OP6	Our firm is able to obtain and maintain low inventory costs.	1	7	5.96	1.116	-1.643	3.848
OP7	Our firm offers prices as low as or lower than our competitors.	2	7	5.80	1.223	-1.240	1.337

Source: Author's own compilation

Table 5.15 represents the descriptive statistics for OP in which item OP1 (modification of products to meet customer requirements) had the lowest mean of ($\bar{x}$=5.23: SD ±1.602), which represents a 'somewhat agree' on the Likert scale. This could be due to the Public Health Act and the Food and Food Standards regulatory instrument in which the modification of finished products is governed by new laws, which may potentially prove as constraints for the retailers (Food and Food

Standards, 2015:7). Item OP2 (quick to introduce new products into the market) scored a mean value of ($\bar{x}$=5.57: SD ±1.376). This suggests that food retail stores are competitive and put emphasis on introducing new products into the market. When it comes to firms being quick to respond to customer demand, item OP3, the values stand at ($\bar{x}$=5.93: SD ±1.041), signalling a positive stance towards that perspective.

The highest mean of ($\bar{x}$=6.30: SD ±0.856) was derived from OP4 (the ability to provide high levels of customer service). It is important for retailers to maintain a high level of customer service because it leads to customer retention and customer loyalty which ultimately benefits the bottom-line of organisations. Items OP5, OP6 and OP7 achieved mean values of ($\bar{x}$=6.05: SD ±1.012) ($\bar{x}$=5.96: SD ±1.116) and ($\bar{x}$=5.80: SD ±1.223) respectively, signalling that respondents generally agreed that their firms provide quality products with low defects, can maintain low inventory costs, and they also offer products of competitively low prices. The average values for skewness and kurtosis were reported to be -1.287 and 1.972 individually. As such, according to Gonzalez (2019:1, this indicates that the data is tailed to the right side/skewed to the right, meaning most of the data set is populated on the right side of the scale.

5.7 5.7 INFERENTIAL STATISTICS

Inferential statistics deduce properties of a population by testing hypothesis and deriving estimates, leading to assumptions that generalise a population from a selected sample (Soiferman, 2010:5). Data gathered from sections B-F were analysed using inferential statistics. Inferential statistics were analysed using the Structural Equation Modelling (SEM) procedure, which aims to test relationships between research constructs. The SEM procedure is composed of two techniques, namely the CFA and the Path Analysis Techniques (Pearl & Mckenzie, 2018:6), which were conducted sequentially.

5.7.1 RESULTS OF THE CONFIRMATORY FACTOR ANALYSIS

The CFA focuses on the establishment of links between factors and their measurement (latent) constructs. It further aids in the testing of hypothesis between observed variables and their underlying latent constructs (Harrington, 2009:1). This section provides results of the CFA, which was designed to assess the psychometric properties of the measurement scales used in this study.

These properties consist of reliability, validity, and model fit. The results of the analysis are presented in Table 5.16.

The CFA model is the next step after EFA in determining the factor structure of the dataset. The EFA procedure explored the factor structure, how the constructs relate and group, based on inter-correlations. The CFA process confirms the factor structure that was extracted from the EFA. Table 5.16 and Figure 5.14 provide this analysis in detail.

Figure 5.16 is a diagrammatic depiction of the CFA model. Latent constructs are signified by the oval shape while observed constructs are represented by the rectangular shapes. Adjacent to the observed variables are measurement errors, which are also represented circular shapes. The bi-directional arrows denote the relationship between the latent constructs.
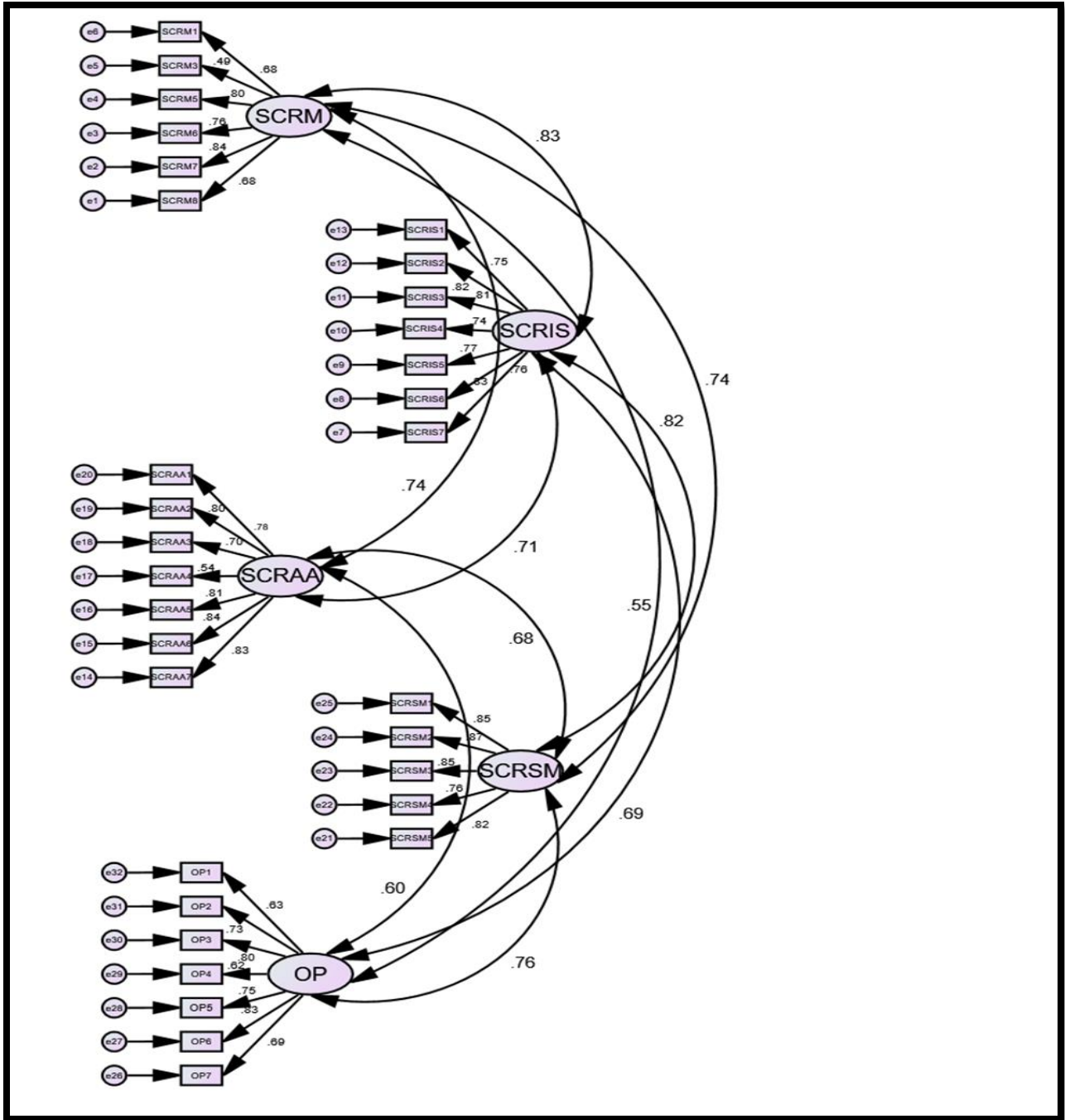
Figure 5.14: Confirmatory Factor Analysis Model

Source: Author's own compilation

Standardised estimates and factor correlations are shown in Figure 5.14. The results indicate an adequate model fit for the five-factor model because most factor loads were above 0.6, showing a strong relationship with each factor as suggested by De Paula *et al*. (2016:235).

5.7.1.1 RELIABILITY

Reliability, or internal consistency, measures precision, consistency, repeatability and trustworthiness of a research study (Tavakol & Dennick, 2011:447). The reliability for this study was tested using three methods, which are Cronbach's alpha test (Cronbach α), Composite Reliability test (CR) and Average Value Extracted (AVE). These results are reported in Table 5.14.

Table 5.16: Accuracy analysis statistics

Research Constructs		Descriptive Statistics		Cronbach's Test		C.R.	AVE	Factor Loading
		Mean	SD	Item-total	α Value			
Supply chain risk management	scrm-1	5.993	1.088	0.628	0.860	0.97	0.85	0.679
	scrm-3			0.484				0.493
	scrm-5			0.712				0.803
	scrm-6			0.722				0.759
	scrm-7			0.720				0.839
	scrm-8			0.662				0.684
Supply chain risk information sharing	scris-1	5.756	1.124	0.719	0.914	0.99	0.93	0.746
	scris-2			0.769				0.816
	scris-3			0.767				0.812
	scris-4			0.698				0.743
	scris-5			0.743				0.767
	scris-6			0.743				0.757
	scris-7			0.775				0.834
Supply chain risk analysis and assessment	scraa-1	5.822	1.036	0.691	0.904	0.98	0.90	0.782
	scraa-2			0.749				0.797
	scraa-3			0.702				0.698
	scraa-4			0.533				0.540
	scraa-5			0.776				0.811
	scraa-6			0.768				0.837
	scraa-7			0.790				0.825
Supply chain risk-sharing mechanism	scrsm-1	5.796	1.088	0.794	0.916	0.98	0.92	0.845
	scrsm2			0.826				0.867
	scrsm3			0.801				0.854

Research Constructs		Descriptive Statistics		Cronbach's Test		C.R.	AVE	Factor Loading
		Mean	SD	Item-total	α Value			
	scrsm₄			0.719				0.760
	scrsm₅			0.796				0.821
Operational performance	Op-1	5.836	1.176	0.710	0.876	0.98	0.86	0.834
	Op-2			0.676				0.679
	Op-3			0.774				0.493
	Op-4			0.577				0.803
	Op-5			0.678				0.759
	Op-6			0.749				0.839
	Op-7			0.556				0.684
SCRM= supply chain risk management; **SCRIS**= supply chain risk information sharing; **SCRAA**= supply chain risk analysis and assessment; **SCRSM**= supply chain risk-sharing mechanism; **OP**= operational performance. **C.R**= Composite Reliability; **AVE**= Average Variance Reliability.								

Source: Author's own compilation

5.7.1.1.1 Cronbach's alpha test

All five constructs pertaining to this study were measured for reliability using the Cronbach's alpha coefficient. The reliability of a construct is fortified by the greater level of Cronbach's coefficient alpha. The results of the reliability are revealed in Table 5.16, in which all constructs achieved a Cronbach alpha above the recommended threshold of 0.7. All the constructs are confined within 0.860 and 0.916 (with SCRM=0.860; SCRIS=0.914; SCRAA=0.904; SCRSM=0.916 and OP=0.876). Regarding the item total correlation, it can be observed that all the values related to all the latent constructs (SCRM to OP), are well above 0.3 as prescribed by Field (2005:40) that item-total correlations below 0.3 signifiy that corresponding items do not correlate well within the scale and that the item is not measuring the same construct being measured by other items. This, therefore, suggests that all the constructs are reliable as their values are above the recommended thresholds for both Cronbach alpha and item total correlation.

5.7.1.1.2 Composite reliability (CR)

The internal reliability of each construct was also evaluated using the Composite Reliability (CR) index test. Fornell and Lacker (1981:64) provide the formula for composite reliability as provided below:

(CR): CRη= (Σλyi) 2 / [(Σλyi) 2 + (Σεi)]

Composite Reliability = (square of the summation of the factor loadings) / {(square of the summation of the factor loadings) + (summation of error variances)}.

Similar to Cronbach Alpha, composite reliability is also a measure of internal consistency in scale items (Hair *et al*., 2010:11). Hair *et al*. (2010:11) further state that the CR index value which is equal or higher than 0.7 illustrates adequacy of internal consistency of the construct. The analysis presented in Table 5.14 indicates that CR indexes for the constructs were 0.97 for (SCRM), 0.99 for (SCRIS), 0.98 for (SCRAA), 0.98 for (SCRSM) and 0.98 for (OP) which are well above the required 0.7. It, therefore, implies that the constructs are reliable or internally consistent.

5.7.1.1.3 Average variance extracted (AVE)

Average Variance Extracted (AVE) is the average amount of variance in indicator variables that a construct can explain (Ahmad, Zulkurnain & Khairushalimi,2016:3). It is a measure that assesses convergent validity. It is calculated using the following formulae provided by Fornell and Lacker (1981:65):

Vη=Σλyi2/ (Σλyi2+Σεi)

AVE = {(summation of the squared of factor loadings) / {(summation of the squared of factor loadings) + (summation of error variances)}.

With regards to AVE, Fornell and Lacker (1981:65) and Hair *et al*. (2010:16) postulate that values of the variance extracted estimate should meet or exceed a minimum of 0.5 to be considered acceptable and well representative of the latent construct. Based on the results depicted in Table 5.14, the AVE achieved for the respective constructs are 0.85, 0.99, 0.98, 0.98 and 0.97. It is therefore evident that all (AVE) values exceed the suggested thresholds, thereby indicating that convergent validity is established on the construct level (Fornell & Lacker, 1981:65).

5.7.1.2 CONSTRUCT VALIDITY

Construct validity is described by Drost (2011:116) as an accuracy measure concerned with how well a concept, which is the latent construct, is translated or transformed into a functioning and operational reality. Construct validity is statistically assessed through two indicators, convergent and discriminant validity (Moutinho & Hutcheson, 2011:327), which were both explored in this section.

5.7.1.2.1 Convergent validity

Convergent validity seeks to measure constructs that are theoretically observed to be related to each other (Flanagan, 2014:np). It requires that a measurement item highly correlates with the other measurement items that measure the same latent variable. For instance, convergent validity in this study expects measurement item SCRM1 to have a high correlation with SCRM 3 SCRM 5 SCRM5 SCRM7 AND SCRM8. In contrast, it is expected that these measurement items measuring SCRM, for instance, do not correlate highly with the measurement items which measure other constructs, such as SCRIS, SCRAA, SCRSM and OP.

Convergent validity in this study was determined through factor loadings extracted in the CFA (c.f., Table 5.16). The results of the study indicate that all factor loadings related to the items measuring each construct were all above the recommended minimum threshold of 0.5, as prescribed by Hair *et al*. (2010:87). The exception was with SCRM3 and OP4, which both acquired factor loadings of 0.493, which, rounded-off to two decimal places, do achieve acceptable factor loadings. The results further indicate an acceptable individual item convergent validity as more than 50 per cent of each item's variance was shared with a respective construct (Aldalaigan & Buttle, 2002:369). The results imply that all items converged well on the construct they intended to measure, and hence confirmed the existence of convergent validity.

5.7.1.2.2 Discriminant Validity

Discriminant validity was ascertained in this study through the use of correlations computed during CFA. It was further assessed by determining whether the value score of AVE is higher than the threshold of 0.5, as advised by Hair *et al*. (2010:87).

Table 5.16 shows that all the Average Variance Extracted values are above the recommended threshold of 0.5. SCRM, SCRIS, SCRAA, SCRSM and OP achieved AVE values of 0.85, 0.93, 0.90, 0.92 and 0.96 respectively, thereby confirming the existence of discriminant validity.

Table 5.17: Correlations between constructs

Research Construct	Construct Correlation				
	SCRM	**SCRIS**	**SCRAA**	**SCRSM**	**OP**
Supply chain risk management (SCRM)	**1.000**				
Supply chain risk information sharing (SCRIS)	0.825	**1.000**			
Supply chain analysis and assessment (SCRAA)	0.744	0.712	**1.000**		
Supply chain risk-sharing mechanism (SCRSM)	0.738	0.820	0.683	**1.000**	
Operational performance (OP)	0.552	0.689	0.597	0.764	**1.000**
***Correlation is significant at the 0.001 level (3-tailed)					

Source: Author's own compilation

Table 5.17 represents correlations computed during CFA to assess discriminant validity. It is shown that there are positive correlations across the individual paired constructs which were found

to be below the cut-off value of 1, thus confirming the presence of discriminant validity of the scale items.

Other validity measures including face validity and content validity, which are not measured quantitatively were addressed in the previous chapter (c.f., chapter 4.12), whereby face validity was achieved through a review by an academic panel whereas content validity was ascertained through a pilot study whose results were presented in section 5.2. Therefore, recommended guidelines for content, convergent, construct and discriminant validity were all met in the study.

5.7.1.3 CONCEPTUAL MODEL FIT ASSESSMENTS

The acceptability of the model fit was established by the chi-square value over the degree of freedom ($\chi2/df$), which the value should be between 2 and not more than 5 (Tabachnick & Fidell, 2007:6). Values of Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) should be superior or equal to 0.90 and the Root Mean Square Error of Approximation (RMSEA) value to be equal to or below 0.08 (Hooper, Coughlan & Mullen 2008:53). The results of the model fit assessment for this study are provided below.

Chi-square value over degree-of-freedom was 3.811. The other fit indices achieved the following outcomes: GFI=0.701; IFI=0.781; CFI= 0.779; NFI=0.724; TLI= 0.761; RMSEA=0.11. As a result of the measurement instruments being adopted from several sources and still meeting the thresholds of all other measures such as reliability, validity and correlations, the data fit the model theoretically. The practical model fit was not absolute but close, due to the values being very close to their respective thresholds. Several academics have commented on some of the limitations of fit indices as prescribed below:

5.7.1.3.1 Limitations of Fit Indices

There is considerable controversy and limitations about fit indices that have been presented by researchers. Barrett (2007:821) notes that some researchers do not believe that fit indices add anything to the analysis and only the chi square should be interpreted. Kenny, Kaniskan, and McCoach (2014:2) have argued that fit indices should not even be computed for small degrees of freedom models. Rather for these models, the researcher should only locate the source of specification error. Hayduk, Cummings, Boadu, Pazderka-Robinson, and Boulianne (2007:847)

advocate for the value of fit indices but caution against strict reliance on cut-offs. They argue that cut-offs for a fit index can be misleading and subject to misuse. More so, Kenny (2015:12) highlights that models with more variables tend to have a relatively poor fit. He also states that the normed fit index fails to adjust for sample size; thus, models with larger sample sizes tend to have smaller values. Based on these insights, the model fit indices applied in this study were retained for information purposes only, even though they did not meet the suggested cut-off values by small margins.

5.8 5.8 PATH ANALYSIS RESULTS

Path analysis is a statistical analysis method used to evaluate models by examining the hypothesised dependencies or relationships between an independent variable and two or more dependant variables (Judea, 2018:6). Path analysis was used to test the six hypotheses and establish their validation or non-validation based on the SEM results tabulated in Table 5.18 and Figure 5.15. After the modification of the full conceptual model, results were obtained from it, and detailed analysis was provided thereafter.

5.8.1 HYPOTHESES TESTING RESULTS

The results of the hypotheses tests are reported in Table 5.18.

Table 5.18: Results of Structural Equation Model Analysis

Path Coefficients	Hypothesis	Path Coefficient	Outcome
Supply chain risk management → Supply chain risk information sharing	H_1	0.85***	**Accepted**
Supply chain risk management → Supplier chain analysis and assessment	H_2	0.77***	**Accepted**
Supply chain risk information sharing → Supply chain risk-sharing mechanisms	H_3	0.67***	**Accepted**
Supply chain risk analysis and assessment → Supply chain risk-sharing mechanisms	H_4	0.23***	**Accepted**
Supply chain risk-sharing mechanisms → Operational performance	H_5	0.76***	**Accepted**
Supply chain risk management → Operational performance	H_6	0.01	**Not Accepted**
Structural model fits: χ^2/df=3.811; GFI=0.701; IFI=0.781; CFI= 0.779; NFI=0.724; TLI= 0.761; RMSEA=0.11			

Source: Author's own compilation

As portrayed in Table 5.18, all beta coefficients for the hypothesises paths are significant at a level of $p<0.01$, with the expection of H_6, which was statistically insignificant. The table also shows that five of the hypotheses (H_1, H_2, H_3, H_4 and H_5) were accepted whilst one hypothesis (H_6) was rejected. The discussion of the stated results will be done in the upcoming section.

5.8.1.1 Discussion of Results

In this section, the results of the hypotheses of the current study are discussed in order to address the empirical objectives of the study. Integration of all the results culminated in the structural model illustrated in Figure 5.15. The validation of each hypothesis under SEM depends on two main criteria. The first criterion deals with path coefficients (beta). For a hypothesised positive influence, the path coefficient must be positive and above 0.5; while a negative influence requires a negative path coefficient of -0.5 or above (Hair *et al*., 2006:79). The second requirement being that the tested influence has at least one star (*), two stars (**) or three stars (***). These stars show significance at three different levels, which are: (***) - p-value less than 0.001, (**) - p-value less than 0.05 and (*) - p-value less than 0.1.
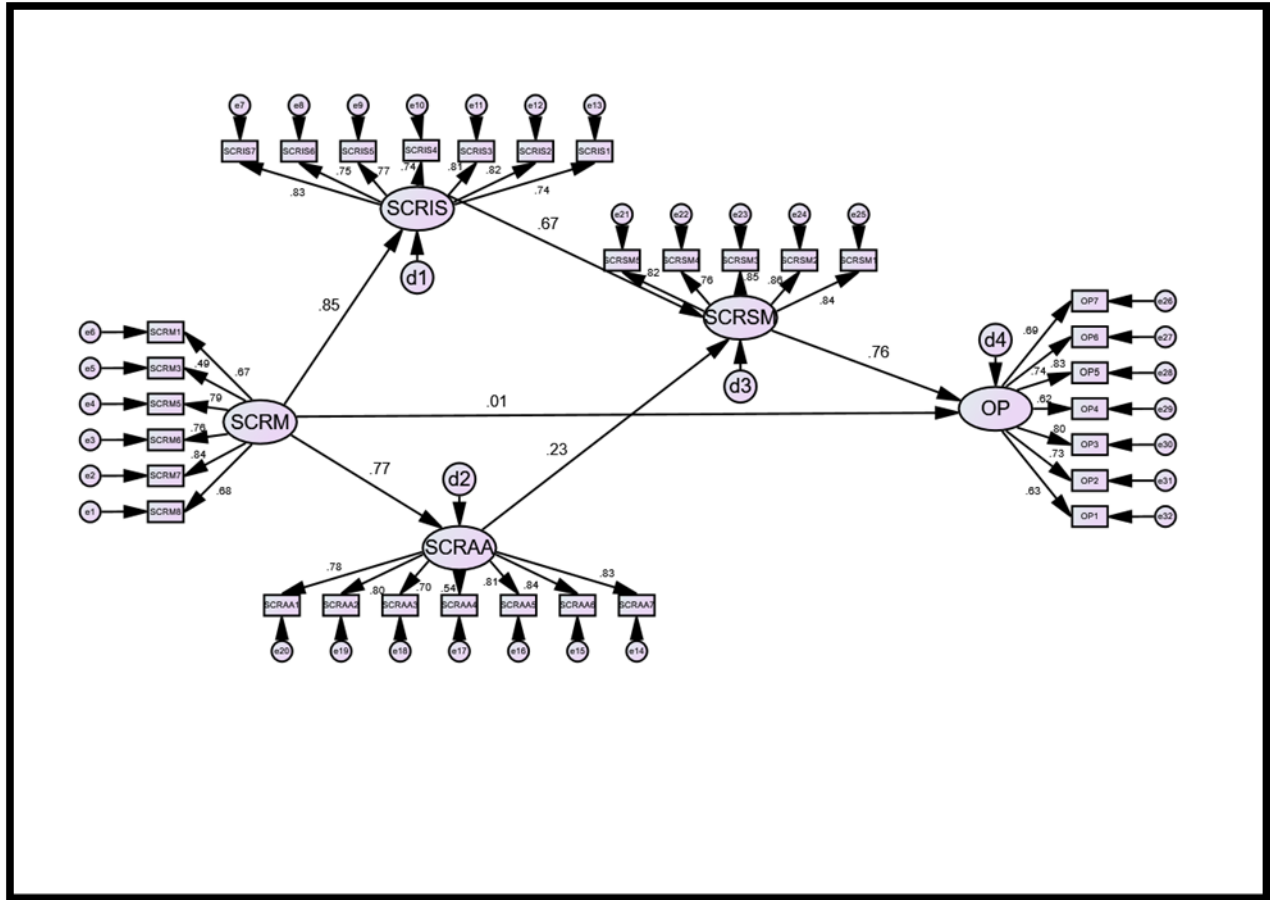
Figure 5.15: Resultant conceptual model

Source: Author's own compilation

The structural model shows the strength of the relationships that exist between each variable, from the independent variable (SCRM), the mediatring variables (SCRIS, SCRAA & SCRSM) up to the outcome variable (operartional performance). SCRM has a strong and significant association ($\beta = 0.85$; $p<0.001$) with SCRIS and also a significant association with SCRIS ($\beta = 0.77$; $p<0.001$). The model also indicates that SCRIS has a strong positive and significant relationship ($\beta= 0.67$; $p<0.001$) with SCRSM. SCRIS also proved to have a moderate but significant association with SCRSM ($\beta= .0.23$; $p<0.001$). Another result reported in the structural model is that SCRSM have a positive and significant relationship ($\beta = 0.76$; $p<0.001$) with OP. However, SCRM showed to have an insignificant relationship ($\beta = 0.01$; $p<0.001$) with OP.

In equating the strengths of the factors relative to each other, the conceptual model shows that SCRM applies a greater influence ($\beta = 0.85$) on SCRIS than on SCRIS($\beta = 0.77$). The influence

exerted on thee two constructs by SCRM have the highest coefficients in the structural model. The model further indicates that SCRIS exerts a stronger influence ($\beta = 0.67$) on SCRSM than what SCRAA has on SCRSM ($\beta = 0.23$). It was also reported that SCRSM provides a substantial impact ($\beta = 0.76$) on OP.

5.8.1.1.1 Results for hypothesis 1

H₁: there is a positive and significant relationship between supply chain risk management and supply chain risk information sharing in the food retail industry in Zimbabwe.

The results provided through the structural equation modelling supported and accepted the stated hypothesis (H₁) that there is a significant relationship between SCRM and SCRIS with a path coefficient of ($\beta = 0.85; p < 0.001$). This means that the adoption of SCRM practices within a firm improves the level of information shared among supply chain partners and also among internal departments. Adopting and establishing SCRM as part of organisational and business culture creates an environment whereby potential and anticipated risks are communicated to other stakeholders in the supply chain so that appropriate action can be taken. This result was supported by previous studies undertaken by several scholars including Ritchie and Brindley (2007:1402) and, Zsidisin and Ritchie (2008:16) who posit that the establishment of SCRM culture is critical for enabling inter-firm and intra-firm communication on matters of risk management.

The relationship between SCRM and SCRIS produced the highest coefficient. Perhaps this result can be linked to the intricate nature of SCRM in which it is only beneficial to the business and its supply chain if risk-related information is shared with the relevant supply chain partners. Organisations seldom share explicit information pertaining, for instance, to human resources and finances, but when it comes to risk information, it is of utmost importance to have it communicated with other supply chain partners. Chen *et al*. (2013:2188) further postulate that when SCRM is adopted and institutionalised as part of organisational culture, it improves risk awareness amongst employees, thereby helping them to recognise and report suspicious activities that threaten the success of the organisation. The nature in which employees are keen to report on risk issues can also be viewed as the same in which supply chain partners are keen to report risk information that may affect supply chain performance to their partners. It suffices to say that withholding risk-

related information which could potentially affect the whole supply chain is detrimental to the functionality of any business, hence the strong relationship between SCRM and SCRIS.

5.8.1.1.2 Results for hypothesis 2

H₂: There is a positive and significant relationship between supply chain risk management and supply chain risk analysis and assessment in the food retail industry in Zimbabwe.

Figure 5.15 revealed that H₂ was found to be supported and acceptable ($\beta = 0.77$; $p < 0.01$). This result illustrates that SCRM has a significant influence on SCRIS, given its strong predictive level. Shared norms and beliefs regarding SCRM encourage supply chain partners to work together and communicate openly (Chen *et al*., 2013:2188). Spekman and Davis (2004:422) further support this notion by suggesting that a shared understanding of SCRM can help firms define the scope and depth of SCRIS, thereby enhancing the accuracy and reliability of the shared risk information. Moreover, Pfohl *et al*. (2010:35) also support the results of hypothesis by conceding that a common understanding of SCRM among supply chain partners can help firms reach a coherent standard of risk evaluation and facilitate the process of SCRIS.

Because of the results above, it can be stated that SCRM is an effective driver of supply chain partners' ability to appropriately align their strategies in assessing, analysing and evaluating risk information that may potentially disrupt OP of the chain. The presented results are also consistent with the Dynamic Capabilities View, which states that an organisation operating in a dynamic environment and facing uncertainties in the supply chain needs to develop capabilities to manage the uncertainties resulting in supply chain risk (Teece, 2007:1320). These capabilities enhance communication, coordination, and joint action with other players in the supply chain to react to impending risks and seize opportunities as well as reconfigure and adapt to the changing environment. These capabilities help the organisation to plan and execute the organisational function and achieve desired outcomes in a robust manner (Williams, Roh, Tokar & Swink, 2013:544).

5.8.1.1.3 Results for hypothesis 3

H₃: There is a positive and significant relationship between supply chain risk information sharing and supply chain risk-sharing mechanism in the food retail industry in Zimbabwe.

SCRIS and SCRSM were found to be positively and significantly correlated ($\beta = 0.67$; $p < 0.001$). This illustrates the fact that effective information sharing on risk related information across the supply chain stimulates the need for SCRSM as the risks and their potential impact become known. The empirical literature has supported the view that sharing of SCR information can facilitate effective crisis/risk management; thus, SCRIS can help firms design and implement effective SCRSM (Kleindorfer & Saad, 2005:66; Huan *et al.*, 2017:67; Fan *et al.*, 2017:67).

It can be suggested with a good measure of certainty that SCRIS helps remove information asymmetry among departments and partner firms. In turn, partner firms are more likely to trust one another and are more knowledgeable about potential supply chain risks and the relevant potential losses. Thus, this creates an environment whereby risk-sharing mechanism designs are considered for the benefit and interest of all partners involved. Additionally, SCRIS acts as an effective way to monitor opportunistic behaviours which may prove detrimental to the supply chains operational capacity. If there is no effective SCRIS, the SCRSM will fail because some firms may take advantage of withholding some risk information to satisfy their own interests (Huan *et al.*, 2017:67). As stated in the previous section (c.f., Section 5.7.1.1.3), effective SCRIS breeds an atmosphere of trust whereby opportunistic behaviour among supply chain partnering firms becomes unfruitful to practice when all related firms share risk information with one another in which the benefits to all members are clarified. Thus, it is rational to posit that SCRIS is indeed a key driver of SCRSM.

5.8.1.1.4 Results for hypothesis 4

H4: There is a positive and significant relationship between supply chain risk analysis and assessment and supply chain risk-sharing mechanisms in the food retail industry in Zimbabwe.

The study found SCRAA to have a weak but significant association with SCRSM ($\beta = 0.23$; $p < 0.001$). The influence is weak because the path coefficient of 0.23 is less than the recommended threshold value of 0.5. The result from the correlation analysis, although weak, shows a statistically significant relationship between the two constructs thereby implying that SCRSM, to a certain degree, relies on effective SCRAA.

Considering the elongated supply chain structure between South African and other foreign suppliers of products sold in Zimbabwe, it makes some logical sense to obtain a weak positive influence of SCRIS on SCRSM. There seems to be little to no risk analysis methodologies between the suppliers and the Zimbabwean retailers since the supplier has far fewer risks compared to the Zimbabwean retailers. Therefore, it is reasonable that suppliers would opt to stay disassociated from any contractual SCRSM with high risk focal firms (Zimbabwean retailers). Perhaps the high political and economic risks associated with Zimbabwe has further fuelled a resistance from suppliers, both local and external, in being involved in any SCRAA on a supply chain level but is rather done as per the firms' discretion.

A study on SCRM compiled by Simba, Niemann, Kotze and Agigi (2017:325) discovered that the risk assessment methods used by firms in the grocery manufacturing industry are not well established and formalised. Risk assessment and analysis efforts and methods are implemented for financial risk but not commonly established for supply chain risks. Some of the respondents in their study claimed that informal methods work for them, while others admitted that formal methods of assessment should be implemented for managing supply chain risks so as to effectively assess risks through internal and external assessments, which further establishes the notion that many firms are not acutely in tune with risk analysis, especially external assessments.

More so, the results could suggest that SCRAA has an indirect influence on SCRSM. Thus, it requires other determinants of risk-sharing mechanisms such as supplier trust, a shared understanding of SCRM as well as sufficient length of time in doing business together. To the researcher's knowledge, weaker positive results also suggest that the supply chain partners have no after sales collaborative or alliance type of relationship with the retailers but rather conduct business on a transactional relationship status.

This can further be validated through a study conducted by Rossouw and Binnekade (2013:4), who found that nearly half of South African firms from the case study never or rarely collaborate with their supply chain partners, while those that collaborate with their supply chain partners are only partially managing to successfully do so. The same view could be likened to the nature of relationships that exists among Zimbabwean firms supply chain partners. This supports how SCRAA is not providing a strong correlation with SCRSM because supply chain members do not analyse and assess these risks collaboratively; hence, SCRSM is not fully dependant on SCRAA.

5.8.1.1.5 Results for hypothesis 5

H5: There is a positive and significant relationship between supply chain risk-sharing mechanisms and operational performance in the food retail industry in Zimbabwe.

A strong positive correlation was observed between SCRSM and OP ($\beta = 0.76$; $p < 0.001$). This highlights the importance of SCRSM as a major driving force in achieving OP for retailers. Ghadge *et al*. (2017:262) solidify this notion by stating that supply chain contracts offer robust strategies that may increase supply chain resilience through mitigating uncertainties and risks in addition to making supply chains more efficient, hence, improved OP. This understanding was further echoed by Salman, (2014: 317), and Ghadge *et al*. (2017:262) who state that SCRSM contracts align the interests and incentives among supply chain partners enabling them to share proprietary risk data and thereby limiting uncertainties, which ultimately improves OP.

This view is in line with the theory of Dynamic Capabilities View, on which this study is grounded. When firms use approaches in which the cost of the consequences of risk are distributed amongst the players in that supply chain, instead of letting one firm bear them alone, it provides an atmosphere that makes operating in a constantly dynamic market manageable in which superior business performance is attainable. Inspired from DCV, it is comprehensible to reason that firms facing supply chain risks seek to enhance supply chain integration and also institutionalise risk-sharing with key elements both inside (internal functional units) and outside the firm (key suppliers and customers) so as to achieve and maintain optimum OP.

This can be supported by a case study cited by Fan *et al*. (2017:67) in which Foxconn, an Asian telecommunications company, shares predictive demand information with its upstream partners such that if there is a reduction in its demand to suppliers due to any reason, it has a contractual agreement to share the surplus inventory cost with its suppliers, thereby keeping all supply chain partners cushioned from the impact of the risks.

5.8.1.1.6 Results for hypothesis 6

H6: Supply chain risk management an insignificant relationship with operational performance in the food retail industry in Zimbabwe.

The results depicted in Table 5.16 represent a lack of correlation between SCRM and OP (β = 0.01; $p<$ 0.001). This shows that the relationship between SCRM and OP was found not to be supported and insignificant. Thus, it could be explored that there is little influence between SCRM and OP in the food retail industry. This appears to oppose the views of several studies such as the ones conducted by Manuj and Mentzer (2008:205), SCRLC (2011:7), Sodhi *et al*. (2012:3), and Mndzebele (2013:2) who describe SCRM as a key component in retaining optimum OP when faced with a disruption occurrence.

The generally perceived knowledge is that SCRM should improve OP of the firm and supply chain as a whole. Given the results for hypothesis six (6) in which a very insignificant result was achieved between SCRM and OP, in seems inconceivable to state that no relationship exists between the two constructs. On the contrary, the results suggest that the predictor variable, SCRM has an indirect influence on the outcome variable, OP. This implies that the influence of SCRM on OP is achieved only with the applicability of the mediating variables (SCRIS, SCRAA & SCRSM). Figure 5.15 clearly illustrates the causal relationship from SCRM to SCRIS and SCRAA. The relationship is also significant with SCRSM up to the outcome, OP.

Furthermore, Vilko (2008:37) denotes that the effective management of risks in supply chains requires an understanding not only of the risks themselves but also of the capabilities and resources that can be utilised in the process. This associates well with Dynamic Capabilities Theory that was stated in chapter 3 as the theory on which this study is premised. The dynamic capabilities view complements the perspective of SCRM in terms of explaining the differences in organisational risk management capabilities and the mutual complementation of the resources and capabilities in the network of supply chain members. It clarifies the differences between the risk-management capabilities of supply chain partners and therefore, can help identify the essential elements on which to focus when developing an effective risk-management strategy, ultimately improving operational performance.

5.9 CHAPTER SUMMARY

Chapter five provided insights into the actual analysis of the collected data. Subjects that were addressed included descriptive analysis, the inferential analysis which divulged practical data on EFA, and SEM. Descriptive statistical analysis deliberated on the demographic nature of the

respondents and their respective organisations. Also, it provided the mean values to show the averages values of the responses form the questionnaire. It showed the skewness and kurtosis to picture the distribution of data. Most of the data represented a positive or right-side skewness, which showed that it was mostly populated towards the 'agree' side of the scale.

Before EFA was conducted, it was necessary to first test the data in order to establish if it was suited for factor analysis. This was done using the KMO and Bartlett's test of sphericity in which it was proven to be well suited. The EFA procedure was intended to ascertain the factor structure of the collected data. It was discovered that SCRM is two factored in which two factors were extracted. However, one of the factors was eliminated from further analysis. The rest of the variables were unidimensional, whereby all measurement items measured the same thing.

The SEM procedure was divided into two processes, namely, CFA and Path Analysis. CFA aimed to test for psychometric properties through reliability, validity and provide confirmation of model fit. CFA produced model fit indices that were just below the recommended thresholds of 0.9 for most of the indices, and logical justifications were provided to substantiate the results. From a reliability and validity viewpoint, all the constructs and measurement instruments were found to be reliable and valid. Path analysis examined the hypothesised dependencies in which, out of the six stated hypotheses, five were found to be supported (H1, H2, H3, H4, H5) and one was not supported (H6). Discussions were presented and articulated to substantiate these results, supported by empirical evidence. The next chapter provides conclusions and recommendations.

CHAPTER 6

CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

6.1 CHAPTER OVERVIEW

This chapter, the final of the study, is intended to provide conclusive remarks on the theoretical and practical implications of the results. The layout presents firstly, the conclusions to each of the objectives stated from the onset of this investigation. Additionally, recommendations are given regarding strategies and approaches that may be institutionalised to ensure operational performance is enhanced in relation to the results. It refers to the limitations encountered in the processes of compiling and completing the study. As a consequence of the limitations identified, it offers possible suggestions on ways that future studies may be executed. Subsequently, the chapter explores the theoretical and practical contributions to the study and its overall conclusion.

6.2 SYNOPSIS OF THE STUDY

The purpose of this study was to determine the influence of SCRM on the OP of food retail outlets in Zimbabwe. The dissertation developed from this study was divided into six chapters. The main purpose of chapter one was to lay out the background of the study, define the problem statement, formulate research objectives and outline the research methods. The proposed conceptual model and hypotheses' development were presented along with the ethical principles adhered to, and an SCRM framework was adopted from various models and developed for this study. The adapted framework consists of five variables: SCRM, which was the predictor/independent variable; three mediating variables, namely: SCRIS, SCRAA and SCRSM; And the output variable, OP.

In the second chapter, a review of literature related to the food retail industry was conducted. The aspects that were deliberated in the chapter included the definitions and characterisation of the food retail industry across many empirical divides, trends impacting the industry, challenges and benefits that are derived from the industry.

Chapter three commenced with the analysis of research theories that seek to explain the fundamentals of the nature of this study. The Dynamic Capabilities View theory was chosen for this. Subsequently, a literature review of the already mentioned constructs/variables as well as the relationships between those constructs were provided. The hypotheses conceptualised from the

conceptual framework were further developed. Chapter four contained a description of the research methodology used for the research study. The study employed a causal research design to determine the cause-effect relationships between SCRM, SCRIS, SCRAA, SCRSM and OP. The quantitative nature favoured a positivist paradigm while a cross-sectional analysis proved to be the most appropriate strategy. The target population was restricted to SCM professionals employed by food retail firms in Harare. The sample frame was established to be food retail firms operating in Harare province, and the sample size (n= 350) was established. The technique deemed to best suit the study was determined to be non-probability, purposive sampling technique. A structured questionnaire that included existing scales was used to gather the required data. The chapter further discussed the various techniques used to report and analyse the collected data. These included descriptive analysis, CFA, reliability and validity, structural equation modelling.

Chapter five dispensed the data analysis and interpretation of the results as blue-printed in the methodology layout of chapter three.

Chapter six provides overall conclusions of each segment discussed throughout the study, notwithstanding its contributions and limitations, possible key recommendations and implications for further research.

6.3 EVALUATION OF THE OBJECTIVES OF THE STUDY

All research objectives had to be addressed, based on the generated data from the study to ensure that the intended purposes were achieved. The theoretical and empirical objectives are revisited in the next section in order to demonstrate the attainment of the objectives within the framework of the study.

The theoretical objectives are listed as follows:

- **to review the literature on the nature and composition of the Zimbabwean food retail industry**

The first theoretical objective is realised in chapter two, whereby the structure and characterisation of the food retail industry were presented. The industry was shown to be composed of different actors ranging from small to medium enterprises to large multinational corporations. Also deliberated on are the trends that are impacting the industry from a global perspective, culminating

to their relevance to Zimbabwe. The chapter further addresses the challenges, economic significance and accomplishment achieved by the industry. The study found that the food retail industry has a massive economic contribution to the country due to high employment levels and taxes towards the government. The industry, however, faces dire constraints spanning from political, infrastructural and economic challenges.

- **to explore the literature on supply chain risk management and its associated dimensions**

This objective is addressed in chapter three in which the origins of the construct was discussed up to its current standing in empirical literature. Different definitions according to different authors were also presented in order to fully capture and understand the different contexts SCRM is viewed. Also discussed was the conceptualisation, types of supply chain risks and their sources, drivers, measurements and results of SCRM.

- **to review the literature on supply chain risk information sharing**

Literature on this objective is presented in section 3.5 of chapter three, showing the different types of risk-sharing structures, different definitions and conceptualisation of the variable. Additionally, the antecedents, measurements and results of SCRIS are presented.

- **to explore the literature on supply chain risk analysis and assessment**

This objective is covered under section 3.6 of chapter 3. It explains the concept of SCRIS along with the techniques of risk analysis. Also, it discusses the antecedents, measurements and results of SCRIS.

- **to review the literature on supply chain risk-sharing mechanism**

Section 3.7 in chapter three provides an in-depth analysis of literature on SCRSM. Factors deliberated to fulfill this objective included the conceptualisation, mechanisms or methodologies of risk-sharing, drivers, measurements and results of SCRSM.

- **to analyse literature on operational performance**

The final theoretical objective of this study is presented and explored in section 3.8 of chapter three.

6.4 CONCLUSIONS ON EMPIRICAL OBJECTIVES

The research was undertaken using an SCRM framework adopted from various models. The extrapolated framework constitutes five main variables: SCRM, SCRIS, SCRAA, SCRSM, and OP. As stated, the purpose of this study was to establish the influence or relationship that exists between those five constructs. To investigate this, secondary (empirical) objectives were stated in the initial chapter. The realisations of those objectives are outlined in this section.

6.4.1 Conclusions on the relationship between supply chain risk management and risk information sharing

The first empirical objective sought to investigate the influence of SCRM on SCRIS in the food retail industry of Harare province. Theoretical aspects of this relationship were provided in chapter three whereby the conceptualisation, types of information sharing structures, drivers, significance and results of SCRIS were addressed. Chapter five fortifies the theory provided in chapter three by statistically demonstrating a positive and significant correlation between the two constructs. This makes SCRM a critical activity for enabling inter-firm and intra-firm communication. Therefore, theoretically and empirically, this study concludes that SCRM has a positive and significant relationship with SCRIS among supply chain partners in the food retail industry in Zimbabwe.

6.4.2 Conclusions on the relationship between supply chain risk management and risk analysis and assessment

The second empirical objective focused on investigating the effect of SCRM on SCRAA in the food retail industry in Harare Province. Chapter three emphasised on the theoretical explanation of the relationship between the two constructs. Chapter five provides the structural equation modelling results through CFA and path analysis to realise this objective. The results show that there is a positive and significant relationship between the two constructs. It is, therefore, concluded that SCRM positively influences SCRAA methodologies in the food retail supply chain in Zimbabwe.

6.4.3 Conclusions on risk information sharing and risk-sharing mechanisms

Chapter three expresses the effective and adequate flow of risk related information between business partners that correlates to the establishment of trust among partnering firms. This is a very crucial antecedent of creating sustainable and effective SCRSM among supply chain partners. It shows the need for and importance of having well-structured SCRIS platforms for the creation of effective SCRSM. This is substantiated by statistical analysis in chapter five in which the CFA and path analysis results showed a very significant and positive correlation between the two variables. Exchange of risk information and knowledge among partnering firms may correlate in both parties being able to freely establish and build an agile and sustainable supply chain that is not prone to weaknesses. It is therefore conclusive that the sharing of supply chain risk information can facilitate effective crisis management; thus, SCRIS can help firms in Zimbabwe design and implement effective SCRSM.

6.4.4 Conclusions on risk analysis and assessment and risk-sharing mechanisms

Theoretically, the influence of SCRAA on SCRSM was discussed in chapter three. The SEM empirical analysis in chapter 5 showed that SCRIS have a positive but weak influence on SCRSM. Based on the above, the primary objective of this study is achieved. The positive correlation shows that an effective risk-sharing mechanism is predicated on an effective informative risk assessment process. This study, therefore, concludes that without effective SCRIS, firms in the Zimbabwean food retail industry will not know the exact risks as well as the related potential losses they face, so they are unable to design reasonable SCRSM.

6.4.5 Conclusions on the relationship between risk-sharing mechanisms and operational performance

In chapter three, the relationship between SCRSM and OP was theoretically proven to be highly significant and positive through empirical literature. The details on the importance of establishing risk-sharing mechanism methods were discussed. It also pointed out supply chain contracts offer robust strategies that may increase supply chain resilience through mitigating uncertainties and risks in addition to making supply chains more efficient, hence, improved OP. Chapter five provides statistical affirmation by showing a path analysis of 0.76. This shows a positive and highly significant relationship between the two constructs. As such, it can be established that

effectiveness of SCRSM in achieving the maximisation of value for the company through better use and distribution of risks across the entire supply chain to limit and spread risks, ultimately improves business performance in the context of Zimbabwean food retailers.

6.4.6 Conclusions on supply chain risk management and operational performance

The final objective aimed to determine the correlation between SCRM and OP. Consistent with the literature, the effective management of supply chain risks may provide end-to-end visibility, address the problem of inaccurate and unreliable information, catalyse an atmosphere of risk-sharing policies, ultimately improving the OP. Chapter three deliberated on the literature that supports this relationship whereas Chapter five provided the statistical correlation results. The SEM results showed a weak but positive influence of SCRM on OP. Based on this, the sixth objective of this study was achieved. Therefore, this study concludes that SCRM among supply chain partners indirectly and positively influences the OP of firms in the food retail industry in Zimbabwe.

6.5 RECOMMENDATIONS

The main objective of this study was to determine the influence of SCRM, SCRIS, SCRAA, SCRSM and OP. In the process of establishing the aforementioned, factors were discovered which serve as recommendations that can be adopted to improve the contribution of supply chains to the national economy. The recommendations are positioned to benefit firms operating in the food retail industry, researchers as well as policy makers.

6.5.1 Recommendations regarding supply chain risk management

6.5.1.1 Promote collaborative and alliance-based relationships in the supply chain

As alluded in the presented literature, supply chain partners must be closely linked in terms of operational information. At this stage, managers anchor the management of their supply chains on inter-firm supply chain practices such as supply chain e-collaboration, which strengthens the sharing of strategic and tacit information thereby improving supply chain competence. This approach encourages managers to fully collaborate with suppliers. This further builds on trust and commitment, which makes the firms to freely share their important and tacit information in a mutually beneficial manner. It is beneficial for partner firms in a supply chain to form an alliance to align their SCRM strategies because firms in such a network have related strategies, share

explicit information, have similar product development and manufacturing processes, and align risk management procedures which help them to manage associated risks efficiently.

6.5.1.2 Create and maintain a culture of risk management

Food retail firms in Zimbabwe should always stay in tune with the latest developments in SCRM practices due to the constant existence of risks that affect the smooth operations of supply chains. This requires managers to effectively ensure that risk management culture and the best supply chain practices are adopted and implemented by all the supply chain partnering firms. The maintenance of a risk management culture throughout the supply chain will limit the adverse impact of risks as all partnering firms are well synced to respond and mitigate those risks.

6.5.1.3 Align business strategies with supply chain risk management

It is critical for supply chain partners to align their business strategies with SCRM. Firms should build their SCRM strategies in accordance with their business strategies and coordinate their organisational structures, business processes, and other internal systems to support SCRM.

6.5.2 Recommendations on supply chain risk information sharing

6.5.2.1 Reward risk information sharing

When there are no incentives for supply chain partners to share their information with the other supply chain partners, they may be hesitant to share their strategic information with each other, especially when the risks and costs of sharing information is solely a burden of the disclosing supply chain partner. This tends to weaken the created supply chain competence as well as the supply chain performance since they are no clear mechanisms of considering costs, risks or profits. There is, therefore, a need for a mechanism that aligns the incentives to the roles for each supply chain partner.

6.5.2.2 Adopt advanced technologies and information sharing structures

Internal departments of a firm should build norms, routines, collaborative mechanisms, and information technology platforms to intensively share risk related information promptly. Due to the volatility of the food retail industry in Zimbabwe, firms should share their inventory information within internal departments as well as external partners on time.

6.5.3 Recommendations on risk analysis and assessment

6.5.3.1 Adopt supply chain risk best practises

Internal departments and external partners should analyse and assess the potential losses of risks and synchronise their behaviours to respond, control, and mitigate those risks. In a supply chain, firms may adopt best practices such as Collaborative Planning, Forecasting and Replenishment (CPFR) and Joint-Managed Inventory (JMI) to work in a synchronised way to collect, analyse and utilise supply chain risk information. Equipped with such capabilities, uncertainties and ambiguities caused by supply chain risks can be effectively managed, resulting in improved responsiveness, flexibility, and time-based performance (Fan *et al*., 2017:73).

6.5.3.2 Creation of individual risk factors

It is of superior importance to establish risk factors that are important to each individual firm. The analysis and assessment of risks help with the prioritisation of risks and provides a proactive view of their causes. With the help of the assessment, firms can focus their resources more efficiently. This is aligned with the dynamic capabilities view theory, which requires not only an understanding of the risks themselves but also the capabilities and resources that can be utilised in the process. It also stands to reason that firms are aware and knowledgeable of risk factors that are close to them; it is therefore recommended that each firm establishes these risk factors and then communicate them with the rest of the supply chain members for the next phase, which is the SCRSM.

6.5.4 Recommendations on risk-sharing mechanisms

6.5.4.1 Advocate for alliance type of relationships

Regarding SCRSM, no partnering firm must face risks and suffer potential losses in isolation. Firms in a supply chain should advocate for a shared ethos of win-win coordination mechanisms across the entire supply chain. The partnering firms should work in a synchronised manner to manage the risks and share potential losses. The focal firm of the supply chain often plays a pivotal role in building this culture. By so doing, norms and incentives are shared, together in an alliance operating under one common operation. Focal firms should develop long-term relationships with their suppliers and assist suppliers to improve their quality, delivery, and cost performance.

6.5.4.2 Establish a risk management committee

For some businesses, especially small to medium enterprises, risk management practices may not be explicitly embedded within the management tactics that are inherent to the operational mode of the firm. Small businesses are owner managed without formalised management structures; therefore, risk management decisions are dependent on the decision-making behaviour of the owner/manager (Sunjka & Emwanu, 2013:640). Hence, developing a risk management committee involving the manager/owner alongside key staff members and their suppliers could provide a basis for understanding how risk would be managed within the supply chain.

6.5.5 Recommendations on Operational Performance

6.5.5.1 Promoting goal congruence

There should be SCRM tools to facilitate goal correspondence at different links within the supply chain. This can be achieved by certifying supplier personnel for those firms to meet quality requirements. The supplier training programme must be well aligned to instruct supplier personnel to the standards set by the focal firm. The process should also integrate supplier personnel into the philosophies, culture and expectations of the focal firm. This can also be done by insisting on quarterly updates from risk managers and suppliers to ensure that management and suppliers are in line with the overall corporate direction. When the suppliers' chain players are aware of the overall corporate direction through involving them in risk training, quality training and linking objectives to have a unanimous supply chain goal, it stands to reason that the operational performance of the firm will undoubtedly improve.

6.6 CONTRIBUTIONS OF THE STUDY

The contributions of this research study are provided both in practical and theoretical provisions. The practical contributions are aligned with the benefits of the results of the study to managers and other SCRM stakeholders. Theoretical contributions relate to the applicability and benefits of the cited literature.

6.6.1 Theoretical Contributions

The developed model in this study will make a positive contribution to the body of knowledge and the growing literature on SCRM, SCRIS, SCRAA, SCRSM and OP. The exclusive, proposed

conceptual model in this study was affirmed and substantiated using SEM and Path Analysis which tested and established the hypothesised linear relationships. This adds to the robustness of the proposed model, and as such, this study proposes the final conceptual model presented for acceptance in research.

The available literature on SCRM is typically related to disruptions or some type of business risk. This study attempts to broaden the perspective by considering both the needs of the supply chain, the focal firm and the security of supply to end customers. The chosen holistic approach gives a wider view than typical studies on SCRM, which tend to concentrate on the focal company. A holistic view requires consideration of the perspectives of the different actors in the supply chain and how the supply chain members can unanimously act and collaborate to mitigate risks.

The study further aids the comprehension of the nature of its stated constructs (SCRM, SCRIS, SCRAA, SCRSM & OP) as well as the relationships that exist between them. This provides a platform for the applicability of theory to industry as suggested through the positive relationships that were discovered between the constructs.

In addition, this study has bridged a gap by contributing empirical scholarly data on a less researched area, especially in the context of a developing country. There is minimal literature and none existent evidence to prove or disapprove the impact of SCRM on OP in the food retail industry in Zimbabwe, therefore, this study stands as one of a kind when the nature of the research in considered. The results obtained from this study would contribute as strategy guidelines for supply chain professionals and to others seeking to understand the applicability and impact of risk management on the food retail industry.

6.6.2 Practical Contributions

The results provided in this study are beneficial to management and supply chain professionals in the food retail industry because they can be used in the diagnostics of OP problems. It shows that having SCRM institutionalised within a supply chain (with the help of the mediating variables), has a positive impact on the performance of the organisation and supply chain as a whole. Therefore, when firms are faced with OP constraints, a diagnostic measure that can be assumed to help with improving performance may be SCRM.

Additionally, the research study helps the managers in the food retail industry to gain a better understanding of the benefits of implementing a supply chain risk management culture and practices such as Collaborative Planning, Forecasting and Replenishment (CPFR) and Joint-Managed Inventory (JMI), to work in a synchronised way to collect, analyse and use supply chain risk information with the ultimate goal of achieving, improving or maintaining optimum OP.

6.7 LIMITATIONS OF THE STUDY AND IMPLICATIONS FOR FURTHER RESEARCH

This study provides valuable contributions to both the development of theory and the provision of pioneering empirical evidence on the influence of SCRM, SCRIS, SCRAA, SCRSM and OP in the food retail industry of a developing African country. However, the development of these contributions is nonetheless constrained by various factors, some unforeseen and some expected. This section discusses those constraints, coupled with the possible implications for future research.

Several scholars (Galea & Tracy, 2007:644; Fan & Yan, 2010:132; Morton, Bnadara, Robinson, & Atatoa-Carr, 2012:107) identified some reasons as to why the response rate has been declining in the 21st century; these include but are not limited to: an increased difficulty in locating eligible respondents; unwillingness of eligible respondents from taking part; a general decrease social participation generally; disillusionment with science and research, increased frequency of contacts by research groups; and increasing complexity of life in the 21st Century. This stands particularly true in the context of conducting research in Harare, which was the case in this study. Moreover, some respondents had an expectation of receiving compensation. Due to the nature of the research, no compensation was available for respondents and was unfortunately met with disinterest in completing the questionnaire by some potential respondents.

This study could be used as a point of departure for future research on SCRM in a developing country. It is in the interest of developing nations to gain knowledge and understanding on the concept of managing risk from a supply chain perspective and its perceived influence on the operational performance of firms and their respective supply chains. This is necessarily relevant considering the lack of knowledge on such new knowledge such as SCRM.

Perhaps a similar study in future could take a qualitative or mixed methods approach to further understand other factors that a quantitative study cannot fully express. Moreover, this study was

restricted to one city of a developing country, Harare province, Zimbabwe. A cross sectional approach on other cities in developing countries would present a far richer and comprehensive result that can make a more suitable generalisation of the results.

The invalidation of hypothesis six (SCRM has a positive and significant relationship with OP) may also assist scholars in formulating more research questions to try and understand the nature and factors that must be adopted by collaborating firms to improve their supply chain performance and firm performance through SCRM. In other words, scholars could further try to investigate possible factors directly related to supplying chain performance through SCRM.

Finally, since the results of this study are fundamentally centralised on the food retail industry, it presents a stimulus for researchers to extend their future studies to other industries. It would be necessary for future researchers to have a comparative analysis in this regard among other industries such as manufacturing, logistics and textile industries. This may help to understand further the differences in perceived risk management dimensions that may prevail across various industries and their impact on operational performance.

6.8 CHAPTER SUMMARY

This chapter serves as the final chapter of the study. It provides the overall synopsis of the study, recommendations, contributions as the limitations and implications for further research. Five out of the six hypotheses were proven and supported whereas the last hypothesis (H6) was disapproved. Specific recommendations were provided for each construct, rendering improved applicability to better address supply chain risks. The study experienced constraints and limitations, which resulted in suggestions that can be taken for future research undertakings.

The anticipation is that the current study would make significant contributions to the current body of literature by facilitating the need for future research relating to SCRM and SCM in general. It is also anticipated that the study should render assistance to supply chain firm owners/managers and policy makers in understanding the benefits and implications of adopting SCRM practices such as SCRIS, SCRAA and SCRSM in their supply chains.

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APPENDIX A: RESEARCH QUESTIONNAIRE LETTERHEAD

Faculty of Management Sciences
Research conducted by:
Mr Le-roy T Mutekwe
Cell: 083 791 4015
Email: troydem@gmail.com

Title: A MODEL FOR SUPPLY CHAIN RISK MANAGEMENT AND OPERATIONAL
PERFORMANCE IN THE FOOD RETAIL INDUSTRY IN ZIMBABWE.

Dear Participant,

You are requested to participate in an academic research study conducted by Mr Le-roy
Tanyaradzwa Mutekwe, a masters student from the Department of Logistics at Vaal University of
Technology in Vanderbjilpark, South Africa. I am in the process of writing my dissertation and as
part of its successful completion, I am inviting you to participate in this research study with the
title stated above by completing the attached questionnaire. You have been selected to participate
in the study based on your experience of working in the grocery retail industry. I therefore believe
that you will provide relevant information.

Should you agree to participate in this study, please note the following;

1. This study will provide an <u>anonymous</u> survey. Your name will not appear on the
   questionnaire and the answers you give will be treated as strictly <u>confidential</u>. You cannot
   be identified in person based on the answers you give.

2. Answer all questions as honestly as possible and return the completed questionnaires
   promptly to me or to the email address that will be provided. It should take approximately
   20 minutes to complete.

3. Your participation in this study is very important to us. You may, however, choose not to
   participate and you may also stop participating at any time without any negative
   consequences.

4. The results of the study will be used for academic purposes only and may be published in
   an academic journal. We will provide you with a summary of our findings on request.

5. Please contact my supervisors, Prof Chengedzai Mafini, chengedzaim@vut.ac.za or Dr Elizabeth Chinomona if you have any questions or comments regarding the study.

Please sign this letter to indicate that:

- You have read and understand the information provided above.

- You give your consent to participate in the study on a voluntary basis.

_____   _____

Respondent's signature   Date

APPENDIX B: RESEARCH QUESTIONNAIRE

SECTION A: DEMOGRAPHIC PROFILE

In this section we would like to find out a little more about yourself. Please place a cross (x) in the appropriate block.

A1	**Gender**	(1) Male			(2) Female	

A2	**Age**	(1) Under 30 years	(2) 30-39 years	(3) 40-49 years	(4) 50-59 years	(5) 60 years and above

A3	**Highest Qualification**	(1) Below ordinary level	(2) Advanced level	(3) Certificate	(4) Diploma	(5) Degree	(6) Postgraduate	(7)Other (Please specify) ………

A4	**Race**	(1) African	(2) White	(3) Indian	(4) Mixed Race	(5) Other (please specify) …………...

A5	**Employment period**	(1) 1-5 years	(2) 5-10 years	(3) 10-15 years	(4) 15-25 years	(5) Over 25 years

A6	**Contract type**	(1) Trainee	(2) Contract	(3) Part-time	(4) Permanent

A7	**Occupational Area**	(1) Procurement	(2) Transportation	(3) Customer Services	(4) Warehousing	(5) Other (please specify) ……………

A8	**Occupational Position**	(1) Executive	(2) Senior Manager	(3) Supervisor	(4) Specialist	(5) Operator/Clerk	(6) Other (please specify) ....

SECTION B: SUPPLY CHAIN RISK MANAGEMENT

We would like to find out a little more about your views regarding supply chain risk management in your organisation. Please indicate the extent to which you agree or disagree by encircling the corresponding number between 1 (Strongly disagree) and 7 (Strongly agree).

SUPPLY CHAIN RISK MANAGEMENT		Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
SCRM1	Supply chain risk management is built into our organisational planning process.	1	2	3	4	5	6	7
SCRM2	Supply chain risk management is an ad hoc process for us that occurs informally on an as-needed basis.	1	2	3	4	5	6	7
SCRM3	Top level management is involved in our risk management process.	1	2	3	4	5	6	7
SCRM4	We prioritise risk events based on severity of impact to our organisation.	1	2	3	4	5	6	7
SCRM5	We involve our suppliers in the identification and mitigation of potential supply chain risks.	1	2	3	4	5	6	7
SCRM6	We encourage our suppliers to use a structured supply chain risk management process	1	2	3	4	5	6	7
SCRM7	We work with our supply chain members to identify and mitigate potential supply chain risks	1	2	3	4	5	6	7
SCRM8	We have a process in place for corrective feedback to our risk management process.	1	2	3	4	5	6	7

SECTION C: SUPPLY CHAIN RISK INFORMATION SHARING

We would like to find out a little more about your views regarding supply chain risk information sharing in your organisation. Please indicate whether you agree with the statements by encircling the corresponding number between 1(strongly disagree) and 7 (strongly agree).

SUPPLY CHAIN RISK INFORMATION SHARING	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree

SCRIS1	Our partners share proprietary information with us.	1	2	3	4	5	6	7
SCRIS2	We share accurate risk related information with our supply chain members.	1	2	3	4	5	6	7
SCRIS3	We are willing to share real time information on demand with our suppliers.	1	2	3	4	5	6	7
SCRIS4	Information is actively shared between functional teams in our firm.	1	2	3	4	5	6	7
SCRIS5	It is expected that members in the supply chain keep each other informed about events or changes that may affect the other party.	1	2	3	4	5	6	7
SCRIS6	Our partners keep us fully informed about issues that affect our business.	1	2	3	4	5	6	7
SCRIS7	We have closely integrated information systems with key suppliers and logistic providers.	1	2	3	4	5	6	7

SECTION D: SUPPLY CHAIN RISK ANALYSIS AND ASSESSMENT

In this section, we would like to know about your views regarding supply chain risk analysis and assessment in your organisation. Please indicate whether you agree with the statements by encircling the corresponding number between 1 (strongly disagree) and 7 (strongly agree).

SUPPLY CHAIN RISK ANALYSIS AND ASSESSMENT		**Strongly disagree**	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
SCRAA1	Our firm has a clear process of risk assessment in place.	1	2	3	4	5	6	7
SCRAA2	Our firm continuously uses tools/processes to assess supply chain level risks (e.g., supply chain mapping, critical path analysis).	1	2	3	4	5	6	7
SCRAA3	Our firm often uses past and current information to identify potential risk.	1	2	3	4	5	6	7
SCRAA4	Our firm periodically identifies risk.	1	2	3	4	5	6	7
SCRAA5	Our firm continuously identifies and assesses the potential risk in our supply chain.	1	2	3	4	5	6	7
SCRAA6	Appropriate processes are in place for identifying, analysing, and dealing with risks.	1	2	3	4	5	6	7
SCRAA7	Our firm often uses tools/processes to assess internal process risks (e.g., process mapping, brain storming, six sigma method, and risk likelihood /impact analysis).	1	2	3	4	5	6	7

SECTION E: SUPPLY CHAIN RISK-SHARING MECHANISMS

In this section, we would like to know about your views regarding supply chain risk-sharing mechanisms in your organisation. Please indicate whether you agree with the statements by encircling the corresponding number between 1 (strongly disagree) and 7 (strongly agree).

SUPPLY CHAIN RISK-SHARING MECHANISM		Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
SCRSM1	Our firm utilises a strategy of sharing supply chain risk with our supply chain partners.	1	2	3	4	5	6	7
SCRSM2	There are risk management policies defining responsibilities for each party of the supply chain member.	1	2	3	4	5	6	7
SCRSM3	There are clear risk and revenue sharing rules between the members of the supply chain.	1	2	3	4	5	6	7
SCRSM4	We have formal mechanisms (e.g., buy back agreement) and informal mechanisms (e.g., verbal commitment) to share risk with supply chain partners.	1	2	3	4	5	6	7
SCRSM5	There are wildly acknowledged and accepted risk/revenue sharing mechanisms in our supply chain.	1	2	3	4	5	6	7

SECTION F: OPERATIONAL PERFORMANCE

We would like to find out a little more about your views regarding supply chain risk information sharing in your organisation. Please indicate whether you agree with the statements by encircling the corresponding number between 1(strongly disagree) and 7 (strongly agree).

OPERATIONAL PERFORMANCE		Strongly disagree	Disagree	Somewhat Disagree	Neutral	Somewhat agree	Agree	Strongly agree
OP1	Our firm can quickly modify products to meet our major customers' requirements.	1	2	3	4	5	6	7
OP2	Our firm can quickly introduce new products into the markets.	1	2	3	4	5	6	7
OP3	Our firm can quickly respond to changes in market demand.	1	2	3	4	5	6	7
OP4	Our firm provides a high level of customer service to our major customers.	1	2	3	4	5	6	7
OP5	Our firm provides consistent quality products with low defects.	1	2	3	4	5	6	7
OP6	Our firm is able to obtain and maintain low inventory costs.	1	2	3	4	5	6	7

OP7	Our firm offers prices as low as or lower than our competitors.	1	2	3	4	5	6	7

Thank you for taking time to complete this questionnaire. Your views are much appreciated.

APPENDIX C: DECLARATION FOR LANGUAGE EDITING
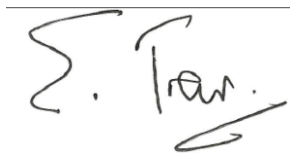
8 Belle Ombre Road

Tamboerskloof

Cape Town

8001.

27 November 2019.

LANGUAGE EDITING

This is to certify that I language-edited the dissertation "A model for supply-chain risk management and operational performance in the food retail industry in Zimbabwe," by Le-roy Mutekwe for the M.Tech degree in Logistics, in the Faculty of Management Sciences, University of Technology.

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