




Supply chain risk management and operational performance in the food retail industry in Zimbabwe



Authors:

Le-roy T. Mutekwe¹ 
 Chenedzai Mafini¹ 
 Elizabeth Chinomona¹ 

Affiliations:

¹Department of Logistics,
 Faculty of Management
 Sciences, Vaal University of
 Technology, Vanderbijlpark,
 South Africa

Corresponding author:

Chenedzai Mafini,
 chenedzai@hotmail.com

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Orientation: Supply chain risk management in the Zimbabwean business context is under researched, presenting numerous opportunities for further empirical investigations. This article is an attempt to address manifest research gaps in this area, using the food retail environment as a practical case.

Research purpose: To investigate the nexus between supply chain risk management and operational performance in the food retail industry in Zimbabwe.

Motivation for the study: The food retail industry in Zimbabwe faces numerous supply chain risks, as most of the products sold are imported. It is essential to understand how the management of these supply chain risks impacts the operational performance of firms.

Research approach, design and method: The study employed a quantitative survey design, using a sample of 227 food retail firm managers and supply chain professionals based in Harare. The collected data were analysed using structural equation modelling.

Main findings: The results of the study showed significant positive relationships between supply chain risk management and risk information sharing and risk analysis and assessment. Further significant positive relationships were observed between risk analysis and assessment and risk-sharing mechanisms. In turn, risk-sharing mechanisms significantly predicted operational performance. However, no significant direct relationship was observed between supply chain risk management and operational performance.

Practical/managerial implications: The study demonstrates that the operational performance of food retailing firms can be improved significantly through the institutionalisation of the mediating variables (risk information sharing, risk analysis and assessment, risk-sharing mechanisms) considered in this study. Management in the food retail industry may use the results of this study as a problem-solving framework for addressing operational constraints.

Contributions/value-add: The study provides information that aids in the understanding of supply chain risk management, risk information sharing, risk analysis and assessment, risk-sharing mechanisms and operational performance, as well as the connection between them in a food retail context.

Keywords: supply chain risk management; operational performance; supply chain risk information sharing; supply chain risk analysis and assessment; supply chain risk-sharing mechanism.

Introduction and background

The food retail industry in Zimbabwe has grown significantly in the past decade. This growth is primarily attributed to the dollarisation of the economy at the onset of 2009 when a new government of National Unity was formed (Chikweche 2015; Grant Thornton 2014; Mukhlani 2014; Ndlovu 2019). The dollarisation of the economy gave some businesses a new lease of life and operations resumed, with the Zimbabwean food retail industry emerging as one of the fastest-growing sectors in the country's recovery era (Mlambo 2017; Zimwara & Mbohwa 2015). With the dollarised economic regime, inflation levels normalised, and most businesses were able to reengineer their practices, bringing relief to their operations (Ngamanya & Chidakwa 2017). The Zimbabwean retail marketplace subsequently became dominated by a relatively large number of retailers (Vutete & Vutete 2015). Prior to this brief economic recovery, most retail supply chains had experienced severe turbulence between 2000 and 2008, characterised by unparalleled inflation levels, leading to the collapse of numerous business operations (Ngamanya & Chidakwa 2017; Tinarwo 2016). Key supply chain obstacles such as a dysfunctional political and economic environment coupled with competition from imported alternative products

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crippled the operations of the retailers of all types of goods, especially the food industry (Chikweche 2015). Post-2013, socio-economic and political problems, which were attributed mainly to the disputed general elections, resurfaced in Zimbabwe despite the dollarised economy (Chitiyo & Kibble 2014). The economic situation was again reversed, leading to the re-emergence of instability in the critical areas of the economy. As a result, many affected firms were compelled to downsize their operations, whilst some ultimately closed their business. For instance, about 4610 firms including those operating in the food industry closed down their activities between 2013 and 2014 (Confederations of Zimbabwe Industries [CZI] 2015; Monyau & Bandara 2017). Hundreds of other firms also closed down between 2015 and 2019, citing an uneven operating environment (Ndlovu 2019).

With the ensuing harsh operating environment in Zimbabwe, most remaining retail chains opted to import the bulk of their products as a strategy to maintain their survival and growth (Chikweche 2015; Tinarwo 2016). As a result, Zimbabwe's retail sector contributes the highest share of imports, with almost 67% of all goods traded by the retail sub-sector in Zimbabwe emanating from South Africa (Food and Agriculture Organisation of the United Nations 2019). However, dependence on imports comes at an enormous cost as it attracts various supply chain risks such as delivery uncertainties, theft of property, currency exchanges and logistical problems (Ayers & Odegaard 2012; Makanda 2015). The policy and legislative environments in Zimbabwe are both unfavourable and unpredictable, whilst the agricultural sector has collapsed as a result of the unsustainable and catastrophic land reform programme (Confederations of Zimbabwe Industries 2015; Makanda 2015; Makwembere 2012). The overall economic environment in the country is characterised by severe instability, manifested through a recurring liquidity crisis, the lack of investor confidence, government fraud and ethical misconduct, and poor infrastructure in addition to shortages of electrical power and clean water (Confederation of Zimbabwe Industries 2015; Zimwara & Mbohwa 2015). The situation is exacerbated by frequent salvos of natural disasters, such as droughts, sporadic flooding and, most recently, the novel coronavirus epidemic (Betti & Ni 2020; De Sousa, Olurounbi & Parija, 2020; International Monetary Fund 2017; The Global Fund 2020). Management of these supply chain risks is therefore essential for the survival of the food retail industry in Zimbabwe.

This study examines the nexus between supply chain risk management (SCRM) and operational performance (OP) in the food retail industry in Zimbabwe. Although it is widely acknowledged that businesses across all industries face numerous 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 (Majukwa & Haddud 2016; Makanda 2015). Whilst the failure and ineffectiveness of the Zimbabwean

food retail supply chains can be attributed to numerous factors, it could be suggested that the inability of most firms to manage supply chain risks (mentioned above) is a major contributing factor, prompting the need for further empirical studies directed to this area. Besides, notwithstanding its problems, the food retail industry remains one of the most outstanding sectors in the Zimbabwean economy and an important economic contributor (MarketResearch 2017). The Gross Domestic Product (GDP) of Zimbabwe stands at US\$29 billion (R432bn), of which the service sector under which the food retail industry operates constitutes 59.4% (Trading Economics 2020; World Bank 2019; Zimbabwe National Statistics Agency 2017). With such a high level of importance to the country's economy, it is necessary to generate (empirically) information that can be directed to the sustainability of this industry.

Furthermore, despite the available extensive literature on SCRM from other regions of the world (e.g. Cavinato 2004; Chopra & Sodhi 2004; Fan et al. 2017; Juttner 2005; Lavastre, Gunasekaran & Spalanzani 2014; Li et al. 2015; Manuj & Mentzer 2008; Sharma & Bhat 2014), there is minimal evidence of similar research studies covering this topic in the retail industry in developing countries, particularly in Africa. The few available studies in Africa were mostly conducted in South Africa (e.g. Meyer et al. 2019; Mhelembe & Mafini 2019; Simba et al. 2017), and provide inadequate answers to questions concerning the influence of SCRM on OP in the food retail industry, which this study seeks to answer. To the researchers' knowledge, no other study fits the description which this study addresses within the retail industry in Zimbabwe. The closest study was conducted by Mndzebele (2013), who explored the impact of SCRM on OP. However, his study was directed to the mining sector in Zimbabwe and used a set of research constructs different from those applied in the present study. Hence, in order to address these research gaps, this study examines the connection between SCRM and OP in the food retail industry in Zimbabwe.

This article is organised as follows: the next section provides a theoretical background of the study, followed by the conceptual framework and hypotheses. Then, the research methodology is presented followed by the results. The final sections of the article include a discussion of each set of results, conclusions, theoretical and managerial implications and, finally, limitations and suggestions for further research.

Theoretical background

This section briefly discusses the literature on the Zimbabwean food retail industry as well as the five constructs under consideration.

The food retail industry in Zimbabwe

Retailing encompasses firms that are involved primarily in 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). Whilst economic and political environments continue to be primary factors of influence on the retail space in Zimbabwe, the food retail industry is a very complex sector driven by various trends. These trends include an increasing food demand fuelled by a shift in the demographic composition of the African population in which the majority are young people, increasing urbanisation and a growing interest in healthy and nutritious consumption (Adeyemi 2011; African Development Bank 2011; Nguyen & Gizaw 2014; United Nations 2014; United Nations Economic Commission for Africa 2016).

The Zimbabwean food retail industry mainly comprise several large corporations and small businesses (Majukwa & Haddud 2016; Mlambo 2017; Sengere 2018). The sector has contributed towards the creation of employment, the development of new stores, facilitation of local income, food availability and affordability and influences the surrounding real estate sectors (African Economic Outlook 2014; Committee for Economic Development 2017). However, it still lacks in some areas that retailers in advanced economies have achieved, such as the use of the latest retail technologies and models (Zentes et al. 2017). Yet, the industry is on a growth trajectory making large-scale interventions and investments in supply chain risk practices necessary to make the food supply chains more efficient and risk-free (Majukwa & Haddud 2016; Simba et al. 2017). Although the food retail industry contributes immensely to the Zimbabwean economy and is poised for further growth in the future, it faces various challenges, amongst them competition from the informal sector, cash flow constraints and inadequate local supplies (Chitiyo et al. 2019; Mlambo 2017). To overcome these challenges, an operating environment should be created that would allow for further investment in the food retail industry, thereby ensuring food security for the country's increasing population.

Supply chain risk management

Supply chain risk management (SCRM) is the implementation of strategies that assist in managing threats facing the supply chain through continuous assessments aimed at reducing vulnerability and ensuring continuity (Breuer et al. 2013b). It seeks to control the risks and uncertainties caused by or that impact logistics-related activities or resources (Wieland & Wallenburg 2012). Unlike any other threats, supply chain risks extend beyond the boundaries of a single firm (Juttner 2005; Vilko, Ritala & Edelmann 2014). Because of the complexity of modern-day supply chain networks, a vast range of inherent risks ranging from minor delays to the disruption of entire supply chains are expected (Bahroun & Harbi 2015; Ivanov, Tsipoulanis & Schönberger 2019; Simba et al. 2017). Typically, examples of risk within the context of supply chains include 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 (Zsidisin & Ritchie 2009).

The failure to manage supply chain risk may lead to drastic downturns in a firm's share price, which can be challenging to recover, and can also generate conflicts amongst the firm's stakeholders (Hendricks & Singhal 2005; Li et al. 2015; Wieland & Wallenburg 2012). On average, major supply chain disruptions have the potential to reduce the stock market value of a firm by at least 10% (Hendricks & Singhal 2005; Sodhi, Son & Tang 2012). Sodhi et al. (2012) further add that firms that are affected by supply chain disruptions can experience up to 40% lower stock returns relative to their industry benchmarks. Hence, many firms have explicitly collapsed because they failed to adopt effective SCRM strategies (Bahroun & Harbi 2015; Hood & Young 2005). From a positive perspective, the effective implementation of SCRM creates a competitive advantage in a firm when risks are identified, estimated, managed and controlled (Mndzebele 2013). Supply chain risk management can offer cost savings by protecting against sales and market share loss and rebuilding costs (Li et al. 2015; Simba et al. 2017). It can also offer intangible benefits such as avoiding damages to firm reputation or brand (Supply Chain Risk Leadership Council 2011).

Furthermore, the implementation of the SCRM process showed increased resilience amongst grocery retailers in Tunisia, China and South Africa when faced with a disruption occurrence (Bahroun & Harbi 2015; Fan et al. 2017; Nieuwenhuyzen, Niemann & Kotze 2018). Hence, institutionalising a culture of SCRM is critical in making firms more prepared in dealing with exposures, thereby ensuring efficient and effective operations with minimal interruptions (Fan et al. 2017; Hendricks & Singhal 2005; Manuj & Mentzer 2008; Mndzebele 2013; Sodhi et al. 2012; Friday et al. 2018; Olson & Wu 2009).

Supply chain risk information sharing

Information sharing in the context of SCM is the extent to which a firm openly communicates essential and sensitive information to its partners (Shou et al. 2012). Supply chain risk information sharing (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 et al. 2015). 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). Strategic information sharing is a crucial driver of SCM as it allows supply chain players to work together to create an integrated and coordinated supply chain (Chopra & Meindl 2007). Pfohl, Kohler and Thomas (2010) and Lavastre et al. (2014) recognise information sharing amongst supply chain partners as a primary requirement for an effective SCRM system. Supply chains that do not share risk information are deemed more likely to create gaps and misalignments in their risk management processes. Hence, essentially, SCRIS provides a foundation on which management can make the right decisions.

Supply chain risk analysis and assessment

Risk analysis and assessment involve the identification of potential losses, establishing the extent of losses, understanding the likelihood of possible losses, assigning significance to potential losses and appraising the overall risk (Supply Chain Risk Leadership Council 2011; Zsidisin et al. 2004). Sodhi and Tang (2012) highlight that supply chain risk analysis and assessment (SCRAA) is a rational process conducted by SCRM experts, which provides clear and specific knowledge on the nature of threats existing within a supply chain. There are four main aims of SCRAA, which include (1) identifying different types of risks, (2) estimating the likelihood of each type of major disruption occurring, (3) assessing the potential loss because of a major disruption and (4) identifying strategies for reducing the identified risks. Supply chain risk analysis and assessment enables firms to develop a shared awareness of diverse types of threats and their potential effects on different supply chain partners (Ivanor, Tsipoulanis & Schonberger 2019; Olsson & De Verdier 2017; Sodhi & Tang 2012). This, in turn, provides firms with insight for best managing the anticipated risks. Firms are also able to implement proactive supply management tools, particularly those that focus on addressing supplier quality issues, improving supplier performance and preventing supply interruptions (Fan et al. 2017).

Supply chain risk-sharing mechanisms

Supply chain risks are less likely to affect a single firm but all the firms within a network, making it difficult to determine how responsibilities may be shared in the event of a disruptive event. Supply chain risk-sharing mechanisms (SCRSM) address this challenge by suggesting how risk may be managed collaboratively by supply chain partners. According to Ellinger et al. (2012), SCRSM refers to management approaches in which the cost of the effects of threats is spread amongst supply chain participants, instead of letting one firm carry them alone. An example of an SCRSM involves contract-based solutions in which supply chain partners agree on how to integrate their operations to share the risks and opportunities in the network (Cachon 2002; Knoblich, Heavey & Williams 2015; Liu 2005; Tsay, Nahmias & Agrawal 1998).

Spreading risk losses amongst several players of a network vastly affects supply chain performance as no individual firm is isolated with the costly burden of a risk event (Gröstch, Blome & Schleper 2013; Ivanov et al. 2019). As such, SCRSM keeps a firm competitive and continuously improves operational performance both within individual firms and the supply chain at large.

Operational performance

Operational performance (OP) 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). However, there is no general definition when analysing a concept such as OP because different firms have different metrics to measure their own performance (Andersen 2010). A few of the parameters are shared across the entire business environment, which include customer satisfaction, employee satisfaction, revenue generation, productivity and gross profit (Chenhall & Langfield-Smith 2007; Santos & Brito 2012). Flynn, Huo and Zhao (2010) 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 OP. In their study, Jiang, Frazier and Prater (2006) used quality, delivery and customer service as the measures of OP. Researchers such as Beamon (1999), Wiklund (1999) and Al Matari et al. (2014) contend that when several metrics are used together to measure operational performance, they provide a more detailed description of the actual OP of a firm than each metric does individually. Therefore, this study incorporated several aspects such as profitability, customer satisfaction and growth in the measurement scales to provide more robust and realistic evidence regarding OP in the food retail industry in Zimbabwe.

Formulation of hypotheses

Supply chain risk management and supply chain risk information sharing

Several researchers (Christopher & Peck 2004; Fan et al. 2017; Li et al. 2015; Zsidisin & Ritchie 2008) suggest that establishing SCRM processes 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. 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). This implies that adopting and establishing SCRM as part of organisational and business processes create an environment whereby potential and anticipated risks are communicated. Beyond the boundaries of the firm, shared norms and beliefs encourage supply chain partners to work together and communicate openly (Chen et al. 2013; Fan et al. 2017). A shared understanding of SCRM can also help firms define the scope and depth of information sharing, enhancing the accuracy and reliability of the shared risk information (Fan et al. 2017). After this information is transmitted to other stakeholders in the supply chain, appropriate action can be taken, which ultimately aids in limiting the impact of the potential risk (Ritchie & Brindley 2007; Zsidisin & Ritchie 2008). 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.

Supply chain risk management and supply chain risk analysis and assessment

A shared understanding of SCRM amongst supply chain partners can help them reach a coherent standard of risk evaluation and facilitate the process of SCRIS (Pfohl et al. 2010). Shared norms and beliefs regarding SCRM encourage supply chain partners to work together and communicate openly (Chen et al. 2013). Khan, Christopher and Burnes (2008) state that SCRIS initiatives are needed to embed the risk management process into a firm's culture. For instance, firms could define common risk categories and have similar protocols for risk analysis and assessment (Fan et al. 2017). There is a need for SCRM processes and protocols amongst supply chain players to have appropriate analysis and assessment of supply chain risks. A shared understanding of SCRM can also enable firms to define the scope and depth of SCRIS, thereby enhancing the accuracy and reliability of the shared risk information (Spekman & Davis 2004). Based on the literature provided, this study suggests that:

H2: Supply chain risk management has a significant and positive relationship with SCRAA in the food retail industry in Zimbabwe.

Supply chain risk information sharing and supply chain risk-sharing mechanism

It is established by Fan et al. (2017) that SCRIS helps to remove information asymmetry amongst departments and partner firms. This creates an environment whereby risk-sharing mechanism designs are considered for the benefit and interest of all partners involved. Moreover, SCRIS acts as an effective method of monitoring opportunistic behaviours when implementing SCRSM (Fan et al. 2017). If there is no effective SCRIS, then 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). Opportunistic behaviour amongst supply chain partnering firms is difficult to practise when all related firms share risk information (Ivanor, Tsipoulanidis & Schoberger 2019). 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.

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

The process of SCRIS is a rational process which is conducted by SCRM experts to provide clear and specific knowledge regarding the nature of supply chain risks (Fan et al. 2017). Moreover, SCRAA aids in understanding the point of occurrence of each type of risk and its consequences, which in turn helps firms to develop a shared awareness of different kinds of risk and their potential effects on various supply chain partners (Sodhi & Tang 2012). Based on their mutual understanding and shared appreciation about the supply chain risks, partners can better define their roles and responsibilities, thereby developing a fair and effective risk-sharing mechanism (Fan et al. 2017; Li et al. 2015).

In the event of a risk occurring, supply chain partners may invoke the risk-sharing mechanism contracts as agreed upon (Sodhi & Tang 2012). Without effective SCRIS, firms in the supply chain will not recognise the specific risks as well as the related potential losses they face, and so they are unable to design reasonable SCRSM. Therefore, an effective risk-sharing mechanism is grounded on a practical and informative risk assessment process (Kleindorfer & Saad 2005). In light of the literature provided, this study proposes that:

H4: Supply chain risk analysis and assessment has a positive and significant relationship with SCRSM in the food retail industry in Zimbabwe.

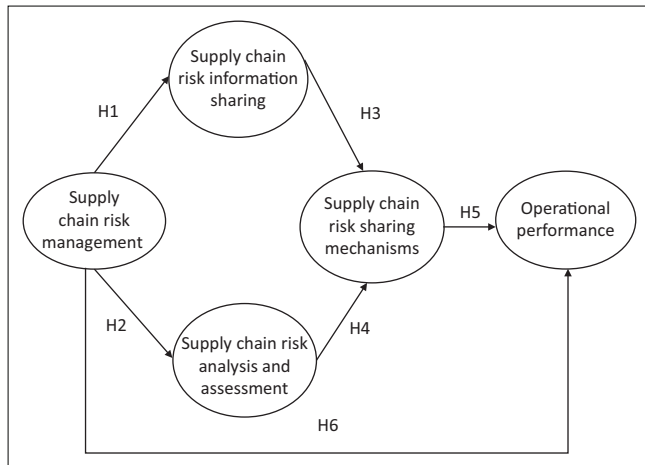
Supply chain risk-sharing mechanism and operational performance

With increasing threats and exposures, 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 suitable contracting options and apply governance models to implement these strategies along the entire supply chain such that the risks faced are spread across several supply chain partners to minimise their impact (Cohen & Kunreuther 2007; Faisal, Banwet & Shankar 2006). Ghadge et al. (2017) 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 OP. However, it is challenging 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 amongst supply chain partners, enabling them to share proprietary risk data, thereby limiting uncertainties (Buzacott & Peng 2012; Ghadge et al. 2017; Salman 2014) to positively impact OP. The present study, therefore, hypothesises that:

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

Supply chain risk management and operational performance

Supply chain risk management involves implementing strategies that assist in managing risks faced by the supply chain to reduce vulnerability and ensure operational continuity (Breuer et al. 2013a; Wieland & Wallenburg 2012). This eventually places the supply chain in a position of competitive advantage, ultimately resulting in improved operational performance (Wieland & Marcus Wallenburg 2013). It is generally acknowledged amongst scholars (e.g. Manuj & Mentzer 2008; Mndzebele 2013; Supply Chain Risk Leadership Council (SCRLC) 2011; Sodhi et al. 2012) that SCRM improves the OP of a firm as well as the effectiveness of the supply chain as a whole. This is because supply chain risks generate inaccurate and unreliable information which can render supply chains ineffective, inefficient and thus operationally incapacitated (Zhao et al. 2013). Consistent with the literature, effective management of supply chain



Source: Adapted from Fan, H., Li, G., Sun, H. & Cheng, T.C.E., 2017, 'An information processing perspective on supply chain risk management: Antecedents, mechanism, and consequences', *International Journal of Production Economics* 185, 63–75. <https://doi.org/10.1016/j.ijpe.2016.11.015>

FIGURE 1: Conceptual model for supply chain risk management and operational performance.

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 along with the performance of the supply chain as a whole (Christopher & Lee 2004; Derrouiche, Neubert & Bouras 2008; Riley et al. 2016; Wong, Boon-Ilt & Wong 2011). With respect to the literature provided, this study proposes that:

H6: Supply chain risk management has a positive and significant relationship with OP in the food retail industry in Zimbabwe.

Conceptual model

The conceptual model (see Figure 1) of the study highlights the direct and indirect causal relationships under investigation. The conceptual model consists of one predictor variable (SCRM), three mediating constructs (SCRIS, SCRAA and SCRSM) and one outcome (OP).

Research methodology

Design

The positivist paradigm was selected for use in this study because of its emphasis on testing for causality and the scientific formulation of hypotheses (Neuman 2016). To test the proposed relationships, a quantitative approach was adopted. A quantitative approach is used for testing theories by examining the relationship between variables and it facilitates the generalisation of the results of the study to other supply chains in different environments (Creswell 2014). A cross-sectional survey design was used to obtain the data needed for statistical testing, as questionnaires were administered once within a specific period to the selected respondents.

Sampling

In this study, the target population comprised managers and supply chain professionals employed by food retail firms

operating in the fast-moving consumer goods (FMCG) industry in Harare. Supply chain professionals may range from demand planners, purchasing managers, procurement managers, logisticians and supply chain managers of all sizes of businesses in the food retail industry. Harare was chosen as the research context because it is the capital city and the economic hub of Zimbabwe, being the most developed and densely populated metropolis with numerous commercial activities and businesses operating in the food retail industry. A total of 60 branches from nine major food retailing firms were selected randomly, using a list of registered firms operating in the FMCG industry in Harare as provided by the Ministry of Industry and Commerce in Zimbabwe. The sample size for the actual respondents was determined by benchmarking with previous similar SCRM-related studies (Chen & Paulraj 2004; Fan et al. 2017; Flynn et al. 2010; Li & Lin 2006; Kwamega, Li & Abrokwhah 2018; Mhelembe & Mafini 2019). In these studies, the least sample size used was 98, and the highest sample size used was 617. Based on this guideline and considering that this study used a quantitative approach, the final sample size was 227. In addition, Hair et al. (2010) recommend that the minimum sample size for a multivariate study should fall between 5 and 10 times the number of independent variables. Going by this rule of thumb, the present study should have had a minimum sample size of 200 cases as it had four independent variables (SCRM, SCRIS, SCRAA and SCRSM). Hence, the final sample size of 227 respondents was considered to be adequate as it was above the minimum cut-off value for this study.

The sample of managers and supply chain professionals in the selected firms was chosen 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 their knowledge or experience (Etikan, Musa & Alkassim 2015). The inclusion criteria included knowledge of SCM and at least 2 years of experience in the food industry in Zimbabwe.

Instrument development and procedures for data collection

Prior to the primary collection, a pilot study was conducted using 60 respondents conveniently selected from food retail outlets in Harare. Feedback from the pilot study was used to make minor adjustments to the wording of some of the questions, thereby improving their clarity and content validity. Technical aspects of the questionnaire, such as the length, font size and colour, were also modified accordingly. Data were collected between June and August 2019 using a self-administered survey questionnaire distributed to respondents using either the drop and collect method or emails. Retailers were approached with hard copies of the questionnaires, and the researchers requested some

TABLE 1: Measurement scales and their sources.

Construct	No. of items	Description	Source	Reliability (α)
SCRM	6	<ul style="list-style-type: none"> Supply chain risk management is built into our organisational planning process. Top-level management is involved in our risk management process. We involve our suppliers in the identification and mitigation of potential supply chain risks. We encourage our suppliers to use a structured supply chain risk management process. We work with our supply chain members to identify and mitigate potential supply chain risks. We have a process in place for corrective feedback to our risk management process. 	Florio (2017)	0.93
SCRIS	7	<ul style="list-style-type: none"> Our partners share proprietary information with us. We share accurate risk-related information with our supply chain members. We are willing to share real-time information on-demand with our suppliers. Information is actively shared between functional teams in our firm. It is expected that members in the supply chain keep each other informed about events or changes that may affect the other party. Our partners keep us fully informed about issues that affect our business. We have closely integrated information systems with key suppliers and logistic providers. 	Fan et al. (2017)	0.92
SCRAA	7	<ul style="list-style-type: none"> Our firm has a clear process of risk assessment in place. Our firm continuously uses tools/processes to assess supply chain-level risks (e.g. supply chain mapping and critical path analysis). Our firm often uses past and current information to identify potential risk. Our firm periodically identifies risk. Our firm continuously identifies and assesses the potential risk in our supply chain. Appropriate processes are in place for identifying, analysing and dealing with risks. Our firm often uses tools/processes to assess internal process risks (e.g. process mapping, brainstorming, six sigma method and risk likelihood/impact analysis). 	Fan et al. (2017)	0.90
SCRSM	5	<ul style="list-style-type: none"> Our firm utilises a strategy of sharing supply chain risk with our supply chain partners. There are risk management policies defining responsibilities for each party of the supply chain member. There are clear risk and revenue sharing rules between the members of the supply chain. We have formal mechanisms (e.g. buy-back agreement) and informal mechanisms (e.g. verbal commitment) to share risk with supply chain partners. There are widely acknowledged and accepted risk/revenue sharing mechanisms in our supply chain. 	Sharma and Bhat (2016) Fan et al. (2017)	0.90
OP	7	<ul style="list-style-type: none"> Our firm can quickly modify products to meet our major customers' requirements. Our firm can quickly introduce new products into the markets. Our firm can respond promptly to changes in market demand. Our firm provides a high level of customer service to our major customers. Our firm provides consistent quality products with low defects. Our firm is able to obtain and maintain low-inventory costs. Our firm offers prices as low as or lower than our competitors. 	Flynn et al. (2010)	0.93

SCRM, supply chain risk management; SCRIS, supply chain risk information sharing; SCRAA, supply chain risk analysis and assessment; SCRSM, supply chain risk-sharing mechanisms; OP, operational performance.

managers and specialists to provide email addresses of other possible respondents in inaccessible branches. Questionnaires were then emailed to these potential respondents. Respondents were given 2 weeks' time to complete the questionnaires.

The questionnaire for this study was divided into seven sections. Section A consisted of questions eliciting the demographic details of the respondents and their firms. Sections B–F contained segmented questions related to the five constructs under consideration in this study. The list of measurement scales and their previous reliabilities is provided in Table 1.

As indicated in Table 1, measurement scales used in this study contained 32 close-ended questions primarily developed based on validated instruments used in other studies. However, not all items were extrapolated in their original formats but were adjusted to fit the

current context of the study without changing their value or meaning.

Response options in sections B–F of the questionnaire were presented in a seven-point Likert-type scale ranging from 1= 'strongly disagree' to 7= 'strongly agree'. A seven-point Likert scale was preferred because it is more accurate, and it provides a better reflection of a respondent's true evaluation.

Data analysis

Data analysis was composed of descriptive statistics and inferential statistics. The first step in the data analysis process was to code the data in a Microsoft Excel spreadsheet to subject it to a data cleansing process to identify any missing entries. Then, the data were analysed using a combination of the Statistical Packages for the Social Sciences (SPSS version 25.0) and the Analysis of Moment Structures (AMOS version 25.0) software.

Ethical consideration

Ethical approval to conduct the study was obtained from Vaal University of Technology (Ethical clearance number: HDC071217).

Results

The research results present the demographic details of respondents, measurement scale accuracy analysis, hypotheses tests results, discussions, limitations and suggestions for future research and the conclusions and implications.

Demographic details of respondents

From the initial 350 distributed questionnaires, 264 were returned of which a total of 37 were found to be unusable. The final number of valid responses available for analysis rested on 227 questionnaires, with a response rate of 64.9%. Of the returned questionnaires, the majority (71.8%; $n = 163$) were hard copies collected in person from respondents, whereas the remaining 28.2% ($n = 64$) were received through the email surveys. Descriptive statistics were applied to analyse the respondents' demographic data. The results showed that the majority of respondents were men (60.4%; $n = 137$). With regard to age, the largest group was aged between 30 and 39 years (39.6%; $n = 90$). In terms of educational qualifications, most of the respondents possessed a degree (39.2%; $n = 89$). The majority (86.3%; $n = 196$) of respondents were Africans. Respondents who had been employed in the food retail industry for 5–10 years formed the largest group (31.3%; $n = 71$). A majority of the respondents (77.1%; $n = 175$) were permanently employed in their respective firms. In terms of occupational area, respondents who fell under the 'Other' category (e.g. operations, finance and management) were the most highly represented group in the sample (28.6%; $n = 65$) followed by those drawn from warehousing (26%; $n = 59$) and procurement (22.5%; $n = 51$). Roughly a quarter (25.1%; $n = 57$) was represented by senior management. However, those in the middle, junior and specialist positions who participated in this study were able to answer the survey questions because they possessed adequate knowledge and skill as exhibited through their educational levels and experience in the food retail industry in Zimbabwe.

Measurement scale accuracy analysis

This study set out to test the relationships between SCRM, SCRIS, SCRAA, SCRSM and OP in the food retail industry in Zimbabwe. This was achieved using the structural equation modelling (SEM) procedure. The SEM procedure consists of two sequential techniques, namely, confirmatory factor analysis (CFA) and path analysis (Pearl & Mackenzie 2018). Confirmatory factor analysis tested the psychometric properties of the measurement scale in terms of reliability, validity and model fit, whereas path analysis examined the hypothesised dependencies. The results of the CFA tests are reported in Table 2.

In testing for reliability, scale purification was conducted using item-total correlations. As indicated in Table 2, the item-total correlation values for all the latent constructs (SCRM to OP) were well above 0.3, as recommended by (Field 2018), implying acceptable scale reliabilities. Further tests for reliability included two measures, namely, the Cronbach's alpha coefficient and composite reliability (CR). All scales achieved Cronbach's alpha and CR values above the recommended minimum thresholds of 0.7 (Hair et al. 2010). Thus, all measurement scales were deemed to be reliable or internally consistent, as measured using the stated indicators.

Convergent validity was assessed using factor loadings (≥ 0.5) and the average variance extracted (AVE ≥ 0.5) as prescribed by Hair et al. (2010). Both parameters were satisfied, signalling that the items in this study correlated and hence were converging well with their intended latent constructs. Discriminant validity was established in this study through the use of correlations computed during CFA, as recommended by Moutinho and Hutcheson (2011). The results are shown in Table 3.

Table 3 reveals positive correlations across the individual paired constructs which were found to be lower than the maximum cut-off value of 1 (Tavakol & Dennick 2011), thus providing confirmation of discriminant validity amongst the scale items.

Model fit assessment

Model fit refers to a statistical model that describes how well a set of observations fits a theoretical expectation (Liu, Lee & Jordan 2016; McDonald 2014). The assessment of model fit is dependent on several indices. Several model fit indices were used in this study to establish whether collected data support the conceptualised model. These included the chi-square test (χ^2), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Incremental Fit Index (IFI), Normed Fit Index (NFI) and Root Mean Square Error of Approximation (RMSEA). The value of the chi-square divided by the degree of freedom (χ^2/df) should lie between 2 and 5 in order to accept the model fit (Tabachnick & Fidell 2007). Values of index (GFI, CFI, IFI and TLI) should be greater than or equal to 0.90 and the Root Mean Square Error of Approximation (RMSEA) value is equal to or less than 0.08 (Hooper, Coughlan & Mullen 2008). The results of the model fit assessment for this study are provided in Table 4.

Chi-square value over the degree of freedom was 3.811, which is acceptable according to Tabachnick and Fidell (2007). The other fit indices achieved the following outcomes: GFI = 0.701; IFI = 0.781; CFI = 0.779; NFI = 0.724; TLI = 0.761; and 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

TABLE 2: Accuracy analysis statistics.

Research constructs	Item code	Descriptive statistics		Cronbach's test		CR	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 ₂			0.484				0.493
	scrm ₃			0.712				0.803
	scrm ₄			0.722				0.759
	scrm ₅			0.720				0.839
	scrm ₆			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	scrrsm ₁	5.796	1.088	0.794	0.916	0.98	0.92	0.845
	scrrsm ₂			0.826				0.867
	scrrsm ₃			0.801				0.854
	scrrsm ₄			0.719				0.760
	scrrsm ₅			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; SD, standard deviation; CR, composite reliability; AVE, average variance reliability.

TABLE 3: Discriminant validity.

Research construct	SCRM	SCRIS	SCRAA	SCRSM	OP
SCRM	1.000	-	-	-	-
SCRIS	0.825	1.000	-	-	-
SCRM	0.744	0.712	1.000	-	-
SCRIS	0.738	0.820	0.683	1.000	-
SCRIS	0.552	0.689	0.597	0.764	1.000

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.

but close because of the values being very close to their respective thresholds. Several scholars (Barrett 2007; Hayduk et al. 2007; Kenny 2015; Kenny, Kaniskan & McCoach 2014) caution against the strict reliance on model fit cut-off values. They argue that fit indices can be misleading and do not add anything to the analysis, such that only the chi-square should be interpreted. Based on these insights, the model fit indices applied in this study were retained for academic purposes only.

Hypotheses tests results

Hypotheses were tested using the path analysis procedure. Path analysis is a statistical analysis method used to evaluate models by examining the hypothesised dependencies or

TABLE 4: Path analysis results.

Path coefficients	Hypothesis	Path coefficient	Outcome
SCRM → SCRIS	H ₁	0.85***	Accepted
SCRM → SCRAA	H ₂	0.77***	Accepted
SCRIS → SCRSM	H ₃	0.67***	Accepted
SCRAA → SCRSM	H ₄	0.23***	Accepted
SCRSM → OP	H ₅	0.76***	Accepted
SCRM → OP	H ₆	0.01	Not accepted

Note: Structural model fits: $\chi^2/df=3.811$; GFI=0.701; IFI=0.781; CFI=0.779; NFI=0.724; TLI=0.761; RMSEA=0.11.

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.

***, Significant level < 0.001.

relationships between an independent variable and two or more dependent variables (Judea 2018). Path analysis was used to test the six hypotheses and establish their validation or non-validation. For a hypothesised positive influence, the path coefficient must be positive, whilst a negative influence requires a negative path coefficient (Hair et al. 2010). The second requirement is 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. The results of the path analysis are presented in Table 4.

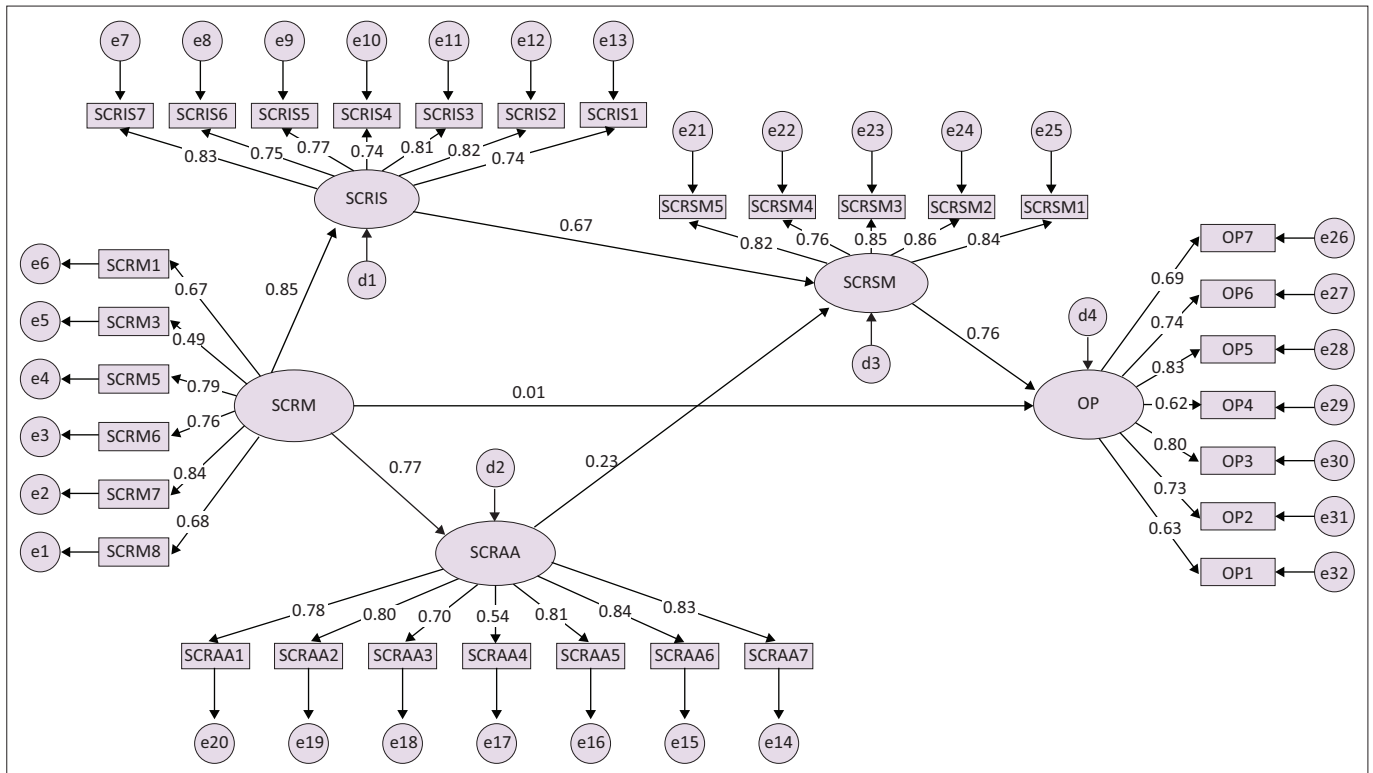


FIGURE 2: Structural model.

As portrayed in Table 4, all beta coefficients for the hypothesised paths are significant at a level of $p < 0.01$, with the exception of H_6 , which was statistically insignificant. Thus, 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 results are further presented in the structural model (Figure 2).

Discussion of results

The aim of this study is to examine the nexus between SCRM and OP in the food retail industry in Zimbabwe.

Six hypotheses were tested to show how the constructs are related from the independent variable (SCRM), the mediating variables (SCRIS, SCRAA and SCRSM) up to the outcome variable (OP).

Supply chain risk management and supply chain risk information sharing

The first hypothesis stated that there is a positive and significant relationship between SCRM and SCRIS. The results provided through SEM supported and accepted the stated hypothesis (H_1) with a path coefficient of ($\beta = 0.85$; $p < 0.001$). This result demonstrates that the adoption of SCRM within a firm improves the level of risk-related information shared amongst supply chain partners and also amongst internal departments. Adopting and establishing SCRM as part of the business processes in the Zimbabwean food retail industry 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 (Ritchie & Brindley 2007; Zsidisin & Ritchie 2008) which concluded that the establishment of SCRM is critical for enabling intra-firm and inter-firm communications on matters of risk management.

The relationship between SCRM and SCRIS produced the highest path 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. Chen et al. (2013) suggest 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 willingness of employees to report on risk issues is similar to the degree to which supply chain partners are keen to report risk information that may affect the performance of all parties involved in a network relationship. Accordingly, withholding risk-related information that could potentially affect the whole supply chain is detrimental to the functionality of any business, hence the strong relationship between SCRM and SCRIS.

Supply chain risk management and supply chain risk analysis and assessment

Structural equation modelling results revealed that H₂ is supported and acceptable ($\beta = 0.77$; $p < 0.01$). This result illustrates that SCRM has a significant predictive influence

on SCRAA. Consistent with this result, several studies (Chen et al. 2013; Pfohl et al. 2010; Spekman & Davis 2004) have found that shared norms and beliefs regarding SCRM encourage supply chain partners to work together and communicate openly. By implication, a shared understanding of SCRM can help firms in the food retail industry in Zimbabwe to define the scope and depth of SCRIS, thereby enhancing the accuracy and reliability of the shared risk information. Furthermore, the study confirms that a common understanding of SCRM amongst supply chain partners can enable firms to reach a clear standard of risk evaluation and facilitate the process of SCRIS.

Supply chain risk information sharing and supply chain risk-sharing mechanism

Supply chain risk information sharing and SCRSM were found to be positively and significantly related ($\beta = 0.67$; $p < 0.001$), which depicts 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. In parallel, previous literature (Fan et al. 2017; Huan et al. 2017; Kleindorfer & Saad 2005) supports that the sharing of supply chain risk information can facilitate effective crisis/risk management, implying that SCRIS can empower firms to design and implement effective SCRSM. The results of the study suggest that SCRIS helps remove information irregularities amongst 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 potential losses. An environment is created whereby risk-sharing mechanism designs are considered for the benefit and interest of all partners involved. If there is no effective SCRIS, the SCRSM will fail because some firms may take advantage of concealing some risk information to satisfy their own interests (Huan et al. 2017). An effective SCRIS breeds an atmosphere of trust whereby opportunistic behaviour amongst supply chain partnering firms becomes unfruitful to practise 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 in the food retail industry in Zimbabwe.

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

The results of the study indicate a weak but significant relationship between SCRAA and SCRSM ($\beta = 0.23$; $p < 0.001$). The result from SEM analysis, although weak, shows a statistically significant relationship between the two constructs, thereby implying that SCRSM, to a certain degree, relies on effective SCRAA.

When the extended supply chain structure between South African and other foreign suppliers of products sold in Zimbabwe is considered, it becomes logical to obtain a weak positive influence of SCRAA on SCRSM.

There seems to be little to no common risk analysis shared between the suppliers in South Africa and the Zimbabwean retailers as the suppliers experience far fewer risks by comparison. It is reasonable that suppliers in South Africa prefer to avoid any contractual SCRSM with high-risk focal firms such as Zimbabwean retailers, with whom they do business. It is possible that the high political and economic risks associated with Zimbabwe have further fuelled precautionary tactics from suppliers, both local and external, in being involved in any SCRAA on a supply chain level but is rather done as per the firm's discretion. This view blends well with a study by Simba et al. (2017) that suggests that risk assessment methods employed by South African grocery manufacturers are not well established and formalised. A previous study by Rossouw and Binnekade (2013) claimed that nearly half of the South African firms sampled in their survey never or rarely collaborated with their supply chain partners on issues of risk analysis. The few firms that collaborated with their supply chain partners were only achieving minimum success. Hence, the same view could be similar to the nature of relationships existing between Zimbabwean firms and their supply chain partners, the majority of whom are South Africa-based manufacturing firms. Supply chain members in the food retail industry do not analyse and assess these risks collaboratively; hence, SCRSM is not fully dependent on SCRAA.

Supply chain risk-sharing mechanism and operational performance

A strong positive relationship was observed between SCRSM and OP ($\beta = 0.76$; $p < 0.001$), highlighting the importance of SCRSM as a major driving force in achieving OP for food retailers. This result is supported in previous studies by Salman (2014) and Ghadge et al. (2017), which found that risk-sharing increases supply chain resilience through mitigating uncertainties and risks in addition to making supply chains more efficient, and hence improved OP. Thus, within the context of this study, the implementation of SCRSM contracts aligns with the interests and incentives amongst supply chain partners. This enables them to share proprietary risk information and thereby limiting uncertainties, which ultimately improves the OP within firms in the food retail industry in Zimbabwe.

Supply chain risk management and operational performance

The results reveal the lack of a direct relationship between SCRM and OP ($\beta = 0.01$; $p < 0.001$), suggesting that H_6 is unsupported and insignificant. This result demonstrates that implementation of SCRM does not influence OP directly in the food retail industry in Zimbabwe. This result contradicts previous studies (Bahroun & Harbi 2015; Fan et al. 2017; Manuj & Mentzer 2008; Mndzebele 2013; Nieuwenhuyzen et al. 2018; Riley et al. 2016; Sodhi et al. 2012) that concluded that SCRM is a key antecedent to maintaining optimum OP in unpredictable markets.

The generally acknowledged view is that SCRM should improve OP of the firm and supply chain performance as a whole. Given the results regarding H_6 , in which a very insignificant result was achieved in testing the direct relationship between SCRM and OP, it 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 and SCRSM). Figure 2 illustrates the causal relationship between SCRM, SCRIS and SCRAA. The connection is also significant with SCRSM up to the outcome construct, OP. As suggested by (Vilko, Ritala & Edelmann 2014), the effective management of risks in supply chains requires an understanding not only of the risks themselves but also of the capabilities, practices and resources that can be utilised in the process. Therefore, SCRM must be supported by the stated mediating variables (SCRIS, SCRAA and SCRSM), which encompass the capabilities and practices necessary to achieve optimum OP.

Limitations and suggestions for further research

Several constraints were experienced whilst conducting this research in Harare that may have reduced the effectiveness of the study. It was difficult to locate eligible respondents, most of whom were unwilling to participate, particularly because of an increased frequency of contacts by other research groups. There was, therefore, a general lack of interest and disillusionment with science and research from the older respondents.

Moreover, some respondents expected to receive compensation as a reward for participating in the survey. However, because of the nature of the research, no compensation was available for respondents, culminating in a disinterest in completing the questionnaire from numerous relevant individuals and groups. Because of these constraints, respondents were selected using a non-probability-based purposive sampling technique, which enhanced the study's susceptibility to sampling bias. Still, the selection of respondents from businesses located at various regions of Harare reduced the level of sampling bias in this study.

Conceivably, a similar study in the future could take a qualitative or mixed-methods approach to understand other factors that this quantitative study could not fully express. These may include the types of exposures and threats that prompt the need for SCRM in different firms and their supply chains. Also, a different approach could show the types of SCRM processes employed by different firms. Additionally, it may also be worthwhile to understand how and to what extent SCRM impacts OP in other markets and industries. Moreover, this study was restricted to one city of a developing country, namely, Harare. A cross-sectional approach in other cities in developing countries would present far richer and

comprehensive results that can render the results generalisable to other contexts.

The invalidation of hypothesis 6 (SCRM \rightarrow OP) may also assist scholars in formulating more research questions to investigate possible factors directly related to supply chain performance through SCRM. As the results of this study are fundamentally centralised on the food retail industry, a stimulus is presented for researchers to extend their future studies to other industries such as manufacturing, logistics and textile industries, amongst others. This may help understand further the differences in perceived risk management dimensions that may prevail across various industries and their impact on OP.

Conclusions, theoretical and managerial implications

The aim of this study was to examine the nexus between SCRM and OP in the food retail industry in Zimbabwe. The proposed conceptual model in this study was affirmed and substantiated using statistical evidence which tested and established the hypothesised relationships. Significant positive relationships were found between SCRM, SCRIS, SCRAA, SCRSM and OP. Although SCRM indirectly influenced OP, there was no direct relationship between the two constructs. The most important relationship occurring in the study was between SCRM and SCRIS, with the highest path coefficient of 0.85. This demonstrates that managers and supply chain professionals in the food retail industry should direct greater attention to this relationship than the others considered in the study, as they stand to realise more significant gains. However, the other relationships considered in the study (with the exception of SCRM and OP) are still essential because all path coefficients were sufficiently high (above 0.5), indicating that they too require considerable attention from managers and supply chain professionals.

This study has several theoretical contributions. It first provides empirical evidence on the nexus between SCRM, SCRIS, SCRAA and SCRSM on OP in the food retail industry of a developing African country. The study further provides information on the mediating effect of SCRIS, SCRAA and SCRSM on the connection between SCRM and OP. Overall, the study provides a complete theoretical framework for the relationship between SCRM and OP in the food retail industry in Zimbabwe. Based on its results, the study could, therefore, be used as a point of departure for future research on SCRM. It is in the interest of firms operating in developing nations to gain knowledge and understanding of the concept of managing risk from a supply chain perspective and its perceived influence on the OP of organisations and their respective supply chains. This is necessarily relevant considering the impact of SCRM on OP as indicated in this study.

Practically, the results provided in this study are beneficial to management and supply chain professionals in the food

retail industry because they can be used as strategy guidelines in the diagnostics of OP problems. Other relevant stakeholders such as communities of practice and/or professional bodies seeking to understand the applicability and impact of SCRM on the food retail industry may also find this study useful. For instance, when firms are faced with operational constraints, an SCRM-based approach should be espoused to improve performance. The study suggests that managers should build norms, routines, collaborative mechanisms and information technology platforms for the intensive and timely sharing of risk-related information. By implementing these systems, firms can achieve improved responsiveness, flexibility and time-based performance. Moreover, firms should advocate for win-win coordination mechanisms across their entire supply chains. In case the supply chains face risks and suffer potential losses, the partner firms can work in a synchronised way to manage the risks. Practical interventions that can enable food retail firms to fully realise the benefits of SCRM include providing risk management training, adoption of recent information and communications technology (ICT) systems and using them to integrate operations with suppliers and customers in providing a risk-sharing platform through streamlined inter-organisational communications. Best practices such as Collaborative Planning, Forecasting and Replenishment (CPFR), Joint-Managed Inventory (JMI) and Just-In-Time (JIT), amongst others, can be adopted as risk-sharing tools. Last but not the least, alliance relationships can be formed with other role-players in the food retail supply chain. This fosters a formalised relationship in which supply chain partners are obligated to assist each other in addressing all risks faced in their networks.

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Competing interests

The authors have declared that no competing interest exists.

Authors' contributions

L.M. collected the data and performed the review of literature. E.C. wrote the research methodology section and C.M. wrote the results section.

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Data availability statement

Quantitative data used in this study are available for sharing upon request to the authors.

Disclaimer

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