NELSON MANDELA UNIVERSITY

A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY

S. MUNUHWA

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A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY

By

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Submitted in fulfilment of the requirements for the degree (**PHD**) (**LOGISTICS**) in the Faculty of Business and Economic Sciences at the Nelson Mandela University

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DECLARATION

I, Shakerod Munuhwa, student number 223435449, officially declare that this thesis named “A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY” is my own original work. It has not been submitted or offered to any other institution for the granting of any other degree, diploma, fellowship, or similar designation.

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- Ms S Matekenya, my mom, for her prayers.

DEDICATION

I dedicate this study to God who blessed me with the intelligence and strength necessary to conduct and synthesize this research. Additionally, it is a tribute to my daughter, Ms Rukudzo Munuhwa. I also dedicate my research to my family for their kindness, love, and care, which helped me develop confidence and encouraged me to achieve higher milestones.

ABSTRACT

The food supply chain plays an important role in the Zimbabwean food industry. More so sustainable food supply chain management (SFSCM) is a subject that has not received much attention, and yet it is so pertinent in determining food security in Zimbabwe. Zimbabwe has faced episodes of inadequate grain/cereal food reserves, hence the urgent need to develop a stakeholder framework for sustainable food supply chain management. The main objective of the study was to develop a stakeholder framework for SFSCM in the food industry. To accomplish the main objective, the research intended to achieve the following sub-objectives, namely to: establish the drivers for SFSCM; identify SFSCM practices within the food industry; identify the key stakeholders' dynamic capabilities (SDCs) in the food industry and identify challenges faced by stakeholders in implementing SFSCM. The study also sought to establish the influence of: SFSCM drivers on implementing SFSCM practices; SFSCM drivers on SDCs; SFSCM practices on SDCs; SFSCM practices on SFSCM performance; SFSCM drivers on SFSCM performance; and SDCs on SFSCM performance. This study further sought to assess the mediation effect of: SFSCM drivers on the relationship between SFSCM practices and SDCs; SDCs on the relationship between SFSCM practices and SFSCM performance; SFSCM drivers on the relationship between SDCs and SFSCM performance and finally to assess the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

This study employed a pragmatic philosophy that allowed for the collection of primary data using a fixed concurrent mixed methods (qualitative and quantitative) approach. The data analysis for this research included qualitative data from 22 participants and quantitative data from 292 respondents, all of whom were recruited through nine gatekeepers (Grain Marketing Board, Consumer Council of Zimbabwe, Food and Nutrition Association of Zimbabwe, Grain Millers Association of Zimbabwe, Ministry of Lands, Agriculture, Water and Rural Resettlement, Chartered Institute of Purchasing and Supply, Food and Agriculture Organization in Zimbabwe, Confederation of Zimbabwe Retailers and Zimbabwe National Chamber of Commerce). A thematic analysis was used to analyse qualitative data. For the quantitative data, the Statistical Package for the Social Sciences (SPSS) version 27 package was used to perform descriptive analysis, and principal component analysis for factor reduction and dimensional groups. Analysis of a Moment Structures (AMOS 26) program was used

to perform structural equation modelling (SEM) for model fit evaluations and hypothesis tests.

The mixed methods approach (both qualitative and quantitative) results identified regulatory pressure, market pressure, societal pressure, availability of resources, organisational culture and corporate objectives as some of the key SFSCM drivers. Additionally, the results identified the following as the key SFSCM practices: waste management, carbon emission reduction, logistics optimisation, water conservation, energy conservation, cost reduction and price efficiency, employment of competent people, cultivation of profitable grain crops, corporate social responsibility, fair distribution of food, human development on nutritious food consumption, food donations and continuously conducting consumer tastes surveys. Further, the mixed methods approach results cited the following key SDCs: sensing, seizing, reconfiguration, reflexive control, partner development, co-evolving and supply chain integration capabilities. Major challenges faced by stakeholders when implementing SFSCM were also identified and these involved lack of resources, lack of top management commitment, poor information sharing, lack of mutual trust amongst stakeholders, unmotivated employees, lack of government support, ever-changing food regulations, poor customer demand for sustainable and healthy foods, corruption and economic hardship challenges.

The study also sought to establish relationships amongst variables. The mixed methods approach results revealed that SFSCM drivers have a positive influence on SFSCM practices, SDCs and SFSCM performance. The results also report a positive and significant influence of SFSCM practices on SDCs. The results further indicate that SDCs have a positive and significant influence on SFSCM performance. Although the qualitative findings reported a positive influence of SFSCM practices on SFSCM performance, the quantitative results from the SEM path analysis reported a very weak positive and insignificant influence of SFSCM practices on SFSCM performance.

Mediation analysis was also performed using the quantitative data analysis only, and the results revealed that SFSCM drivers have significant partial mediation effect on the relationship between SFSCM practices and SDCs. The results also report that SDCs have a significant full mediation effect on the relationship between SFSCM practices and SFSCM performance. SFSCM drivers were found to have a significant

partial mediation influence on the relationship between SDCs and SFSCM performance. Lastly, SDCs have a significant partial mediation effect on the relationship between SFSCM drivers and SFSCM performance.

Based on the empirical results, conclusions were drawn, and recommendations were made. The research proposes a new stakeholder framework for SFSCM in the food industry. The study recommends that stakeholders consider providing training and education to all employees about the critical role of SFSCM in ensuring Zimbabwe's food security. Additionally, policymakers are urged to implement supply chain anti-corruption and fair-trading policies in order to boost SFSCM performance. Stakeholder institutions are also urged to reward internal stakeholders who perform exceptionally well in terms of SFSCM in order to positively motivate all staff, and ultimately improve SFSCM.

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LIST OF ACRONYMS AND ABREVIATIONS

AGRA	Alliance for a Green Revolution in Africa
CCZ	Consumer Council of Zimbabwe
CFA	confirmatory factor analysis
CFI	comparative fit index
DC	dynamic capability theory
EMA	Environmental Management Authority
FAO	Food and Agriculture Organization
FSCM	food supply chain management
GDP	gross domestic product
GFI	goodness of fit index
GHG	greenhouse gas
GMB	Grain Marketing Board
HACCP	Hazard Analysis and Critical Control Point
IFI	incremental fit index
LFSP	Livelihoods and Food Security Programme
NAPF	National Agriculture Policy Framework
NFI	normal fit index
NGO	non-governmental organisation
NMU	Nelson Mandela University
PCA	principal component analysis
PCFI	parsimonious comparative fit index
PRATIO	parsimony ratio
RBV	resource-based theory

RFI	relative fit index
RMR	root mean square residual
RMSEA	root mean square error of approximation
ROI	return on investment
SC	supply chain
SCI	supply chain intermediary
SCM	supply chain management
SDCs	stakeholders’ dynamic capabilities
SDGs	United Nations' Sustainable Development Goals
SEM	structural equation modelling
SFSCM	sustainable food supply chain management
SSCM	sustainable supply chain management
TBL	triple bottom line
TLI	Tucker Lewis index
VC	value chain
WFP	World Food Programme
ZIM ASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZINWA	Zimbabwe National Water Policy
ZUNDAF	Zimbabwe United Nations Development Assistance Framework

CHAPTER 1
INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Supply chains are anticipated to reach the intended customers at the right time and in the right quality, with optimal shelf-life and the suitable route throughout the chain, as they are a critical aspect in preserving a firm's competitive edge (Accorsi & Manzini, 2019). This concept, however, must be expanded where sustainability considerations are included in decision-making. For example, the food industry across the globe has inherent sustainability difficulties due to a variety of natural resources incorporated and utilised, human demands for basic food, the cost of sourcing various food types, and communities that rely on food production for livelihood (Minnens, Luijckx & Verbeke, 2019; Saeed & Kersten, 2019). To increase food sector sustainability, all stakeholders must work together to address the problems of limited resources, customer wants, environmental and global climate change issues, as well as international legislation and policies (Caniato, Leon-Bravo & Caridi, 2017). In this sense, supply chain (SC) sustainability in the food industry is a strongly contentious topic, particularly when compared to long, conventional supply chains (Accorsi & Manzini, 2019).

According to Malak-Rawlikowska, Majewski, Was, and Borgen (2019) and Rodrigue (2020), a sustainable supply chain is one that controls economic, environmental and social implications, and works for good governance across the product or service life cycle. In this study, sustainable food supply chain management (SFSCM) refers to the systematic process that plans and manages the effective coordination, availability and accessibility (flow) of affordable, safe and nutritious food products along with their related information to the final consumers, and which are produced through a food organisation’s network using long-term profitable processes, activities and approaches that conserve natural resources and promote social value (Beske, Land & Seuring, 2014; Paloviita, 2017). The major objective of SFSCM is to retain, enhance, and grow long-term value for all stakeholders associated with any process that leads to products and services being offered to end users in any market (Rodrigue, 2020). The ultimate goal of a sustainable food supply chain is to enhance customer loyalty

and satisfaction through the most effective and efficient means while also considering the environmental and societal consequences of operations (Iakovou, Bochtis, Vlacho & Aidonis, 2016). Thus, measuring the sustainability of supply chains is an intriguing task, particularly in the food sector, which demands the greatest levels of safety and quality (Accorsi & Manzini, 2019).

Many organisations have benefited from sustainable practices which are based on the notion of sustainable supply chain management (SSCM). However, measuring the level of business accountability and practices expected for sustainable supply chain processes remains a difficulty task (Zeinstra, Van der Haar & Van Bergen, 2020). Thus, many organisations rely on a scouting mission to develop sustainable supply chains in food production, processing, and distribution (Zeinstra et al., 2020). There is still a concern in explaining how they actually realised the benefits of incorporating sustainable supply chain structures. The food and beverage industry is one such sector that often benefit from sustainable supply chain management but without a clear path on how they could have made it (Li & Ye, 2014). According to Chkanikova (2016) and Tsolakis (2018), supply chains must be monitored in order to produce higher economic and financial returns for its stakeholders, and the best way to accomplish that is by making sure that all stakeholders are involved, appreciate and adhere to environmental, economic, and social factors.

SFSCM has long been recognised as a global concern in the food and beverage sector. For instance, in 2020 it was reported that India has close to 175 million people while China has an estimated population of 130 million "fed with grain from over-pumping of water" (Borsellino, Schimment & Hamid, 2020). In India, 14% of families have foodless days (India Food Banking Network, 2021) while in Zimbabwe 27% of rural families and 42% of urban families have foodless days, respectively (Mavhunga, 2021). Food insecurity and scarcity in Zimbabwe have necessitated the Zimbabwean government to import staple grain food and other essential requirements for food from neighboring countries such as Zambia, Mozambique and South Africa (Mkodzongi & Lawrence, 2019).

The land reform program and command agriculture are mentioned as significant instruments for SFSCM that have failed to reduce food insecurity in Zimbabwe (ZDI Report, 2020). Zimbabwe has been unable to meet the country's food demand for

close to twenty years (Macheka, 2019). Food production has been irregular in practically every region, even the lush Mashonaland. The pertinent point to note is that land reform program distributed land primarily to peasant farmers with no understanding of commercial agriculture, and many promptly reverted to subsistence farming which they were used to (Makuwerere-Dube, 2021). This resulted in a lack of capacity within food enterprises as well as the collapse of several food processing, distribution and storage facilities (FAO-GIEWS-Zimbabwe Report, 2019). Furthermore, the statutory instrument utilised as the foundation for command agriculture did not indicate any stakeholder framework for supply chain sustainability, rather, it concentrated primarily on input and output security as well as contractual agreements between the farmers and the government (Agriculture Marketing Authority, 2017).

Food waste has also been identified as a significant global concern that can be addressed by SFSCM. Every year, almost one-third of the global food output is wasted or lost at various points throughout the supply chain (Accorsi & Manzini, 2019). As the world's population is predicted to rise from the current seven billion to nine billion people by 2050, food security will continue to be a significant problem (Accorsi, 2018:1; FAO & RUAF, 2019) which requires concentration on reducing food waste.

The FAO-GIEWS-Zimbabwe Report (2019) acknowledged that there are currently few programmes in Zimbabwe attempting to achieve SFSCM. These involved the 2016-2020 Zimbabwe United Nations Development Assistance Framework (UN Zimbabwe, 2020), the Zimbabwe Livelihoods and Food Security Programme (LFSP) spearheaded by the Food and Agriculture Organization FAO (FAO, 2020), and the United Nations World Food Programme 2022-2027 that aims to enhance collaborative, sustainable and resilient small farmer food production and supply being spearheaded by the United Nations-World Food Programme (UN-WFP) and Zimbabwean government (Macheka, 2021). The other previous programmes conducted include the land reform programme, command agriculture, and Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim Asset); however, these programmes failed to put considerable focus on sustainable food supply chain management.

Although a significant amount of research work has been done in developed nations, there is still a dearth in literature on SFSCM particularly focusing on the developing

countries such as Zimbabwe. Some of the studies on SFSCM from across the globe involve those conducted by Sgarbossa and Russo (2017) (Italy); Wang and Yue (2017) (China); Zhu, Chu, Dolgui, Chu, Zhou and Piramuthu (2018) (Spain) whilst in Zimbabwe, Mubaiwa, Fogliano, Chidewe, Bakker and Linnemann (2018) focused on SFSCM of groundnuts and Tawodzera, Chigumira, Mbengo and Kusangaya (2018) wrote on urban SFSCM. Identification of the best SFSCM framework that works, specifically for developing nations, has received far less research attention (Niehaus & Goedhals-Gerber, 2018). According to Naik and Suresh (2018), earlier studies mostly examined the retail food industry and were largely focusing on environmental and economic sustainability only. Focusing solely on food retailers does not adequately address the subject of sustainability across the entire supply chain because the food supply chain management begins with manufacturing and concludes with the final customer or end user.

Furthermore, by excluding the social component and concentrating primarily on the environmental and economic aspects, the food sector is unable to adequately address the concept of sustainability as a whole. Chkanikova (2016) and Tsolakis (2018) went on to say that there is growing concern about sustainability in the food supply chain due to a number of factors that need to be addressed including: food quality and security, the need for supply chain transparency within the food supply chain, ineffective communication among parties, rising supply chain costs, constantly changing customer preferences, and the inability to monitor and control stock in distribution centers and warehouses, among others. According to Caniato et al. (2017), research has examined the performance implications of sustainability practices, particularly on enhancing efficiency, quality, adaptability and responsiveness. Sustainability practices have been widely adopted throughout the food industry in industrialised nations only. However, across several supply chain stages, it is difficult to identify sustainability drivers and appropriate sustainability practices.

The goal of the current study was to close the existing research gap and create a framework that would help stakeholders manage the food supply chains sustainably. The study used an end-to-end methodology, taking into account every link in the supply chain from the point of production to the end -users. It placed focus on the triple

bottom line, which intended to simultaneously address environmental, economic, and social concerns.

1.2 RESEARCH PROBLEM

Although programmes are in place that seek to achieve SFSCM, food insecurity remains a key challenge in both rural and urban Zimbabwe. For instance, out of a target of almost two million tonnes from 400 000 hectares of land, the Command Agriculture Programme which was launched in the 2016/17 season produced a maximum of only 1.149 million tonnes in the 2018–19 season (ZDI Report, 2020). Lack of resources, fraud, poor stakeholder responsibility, poor stakeholder agricultural expertise, and improper stakeholder engagement were the main reasons why the targeted grain production was not achieved (ZDI Report, 2020). As such, between October and December 2020, 2.61 million people in rural Zimbabwe were facing severe food insecurity (IPC, 2020). Zimbabwe Vulnerability Assessment Committee (ZimVAC), (2020) also revealed that in 2020, 2.2 million individuals in urban areas were food insecure, yielding a 12% rise from 2019. The heightened food insecurity was mostly as a result of shocks and supply chain risks encountered in the nation, such as drought, limited livelihood prospects owing to COVID-19-related limitations, pests and illnesses as well as skyrocketing food costs.

Recently, Zimbabwe was listed in the Global Crisis Report for 2021 as one of the top six nations in the world facing food insecurity (Tinarwo, 2021). According to the rural Zimbabwe risk assessment review panel report for 2021, 2.9 million people or 27% of rural population continue to face food insecurity during the main lean season from January to March 2022. More so, the urban livelihoods assessment for 2021 by the World Food Programme (2021), indicated that up to 2.4 million individuals in Zimbabwe are food insecure in urban areas (Mavhunga, 2021). Some of the major reasons attributed to food insecurity for this season emanated from supply chain disruptions such as the Covid-19 pandemic and poor rains which have aggravated low production and high food prices (World Food Programme, 2021).

According to Accorsi and Manzini (2019), stakeholders' neglect for sustainable practices is what has led to the current challenges in the food supply chain. Brockhaus, Kersten and Knemeyer (2013), along with Accorsi, and Manzini (2019) explained that neglect of SFSCM can only be overcome by creating a structure, such as a

stakeholder framework that drives the adoption of SFSCM in the food industry. Further, it has been noted that food supply chain management systems are being dominated by market forces of demand and supply (which are primarily economically motivated), causing the entire system to be economically driven and therefore overlooking environmental and social elements which are equally important (Gurzawska, 2019).

As earlier noted, understanding SFSCM has received little attention to date, especially for developing nations like Zimbabwe (Borsellino et al., 2020). For instance, there is no known effective program for a sustainable food supply chain management system in Zimbabwe and Zambia (FAO & RUAF, 2019). The only evidence of SFSCM comes from Burkina Faso and Ghana where the two countries engaged in vertical integration between 1989 to 2011 and tracked tomato supply chains using a computer-based modelling system from the producers to the end users (IFPRI, 2020). Although there is no recognised framework that they used, the system actively involved stakeholders in the sustainable supply chain management of tomatoes between Burkina Faso and Ghana (Leander, Agyemang, Offei & Ofori, 2019). Although significant research has explored into supply chain sustainability, very few researchers have centred on SFSCM (Accorsi, 2019). Aworh (2021) further found out that for those who researched on SFSCM, very few were from Africa. Additionally, most of these studies did not holistically look at SFSCM from production to consumption (Roux, 2020).

A stakeholder framework for SFSCM to alleviate food insecurities in Zimbabwe was developed as part of the current study. Challenges experienced by stakeholders with regard to the implementation of SFSCM in Zimbabwe were one of the research's sub-objectives. The research also identified SFSCM practices, drivers for SFSCM, and stakeholders' dynamic capabilities (SDCs). The study further established the influence of SFSCM drivers on implementing SFSCM practices, SDCs and SFSCM performance in the Zimbabwean food industry. It also established the influence of SFSCM practices on SDCs and SFSCM performance in the food industry in Zimbabwe. The research eventually developed and proposed an implementation framework to guide stakeholders in curbing food insecurities in Zimbabwe.

1.3 RESEARCH QUESTIONS

To deepen the knowledge required for managing food supply chains, this research study responded to the primary research question given below:

- What is the appropriate framework for sustainable food supply chain management in the food industry?

The following secondary research questions were addressed in order to advance the understanding required for SFSCM in the food industry:

- What are the drivers for SFSCM?
- What are the SFSCM practices adopted within food industries?
- What are the key SDCs in the food industry?
- What are the challenges faced by stakeholders in implementing SFSCM?
- How do SFSCM drivers influence implementation of SFSCM practices?
- How do SFSCM drivers influence SDCs in the food industry?
- How do SFSCM practices influence SDCs in the food industry?
- How do SFSCM practices influence SFSCM performance?
- How do SFSCM drivers influence SFSCM performance?
- How do SDCs influence SFSCM performance?
- What is the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs?
- What is the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance?
- What is the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance?
- What is the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance?

1.4 RESEARCH OBJECTIVES

1.4.1 Primary objective

This study's main goal was to develop a stakeholder framework for managing the food supply chain in a sustainable way.

1.4.2 Secondary objectives

In order to achieve this primary objective, the following essential research objectives were formulated:

- To establish the drivers for SFSCM.
- To identify SFSCM practices adopted within food industries.
- To identify the key SDCs in the food industry
- To identify challenges faced by stakeholders on implementing SFSCM.
- To establish the influence of SFSCM drivers on implementing SFSCM practices.
- To establish the influence of SFSCM drivers on SDCs in the food industry.
- To establish the influence of SFSCM practices on SDCs in the food industry.
- To establish the influence of SFSCM practices on SFSCM performance.
- To establish the influence of SFSCM drivers on SFSCM performance.
- To establish the influence of SDCs on SFSCM performance.
- To assess the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs.
- To assess the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance.
- To assess the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance.
- To assess the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

1.5 METHODOLOGICAL RESEARCH OBJECTIVES

The following methodological research objectives were developed to address the study's core objective and secondary objectives:

- MO[1]: To conduct a thorough analysis of the existing literature on SFSCM, its drivers, practices, challenges and SDCs. The study will further explore how these variables help to improve SFSCM performance in the food industry;
- MO[2]: To suggest a framework for testing the study's hypotheses;
- MO[3]: To choose the best research design and research approach for the current study;
- MO[4]: To gather data from participants and respondents in the food sector and analyse it with mixed methods approach;
- MO[5]: To develop and propose an implementation framework to guide stakeholders to address food insecurities in Zimbabwe.

1.6 HYPOTHESISED FRAMEWORK AND RESEARCH HYPOTHESES

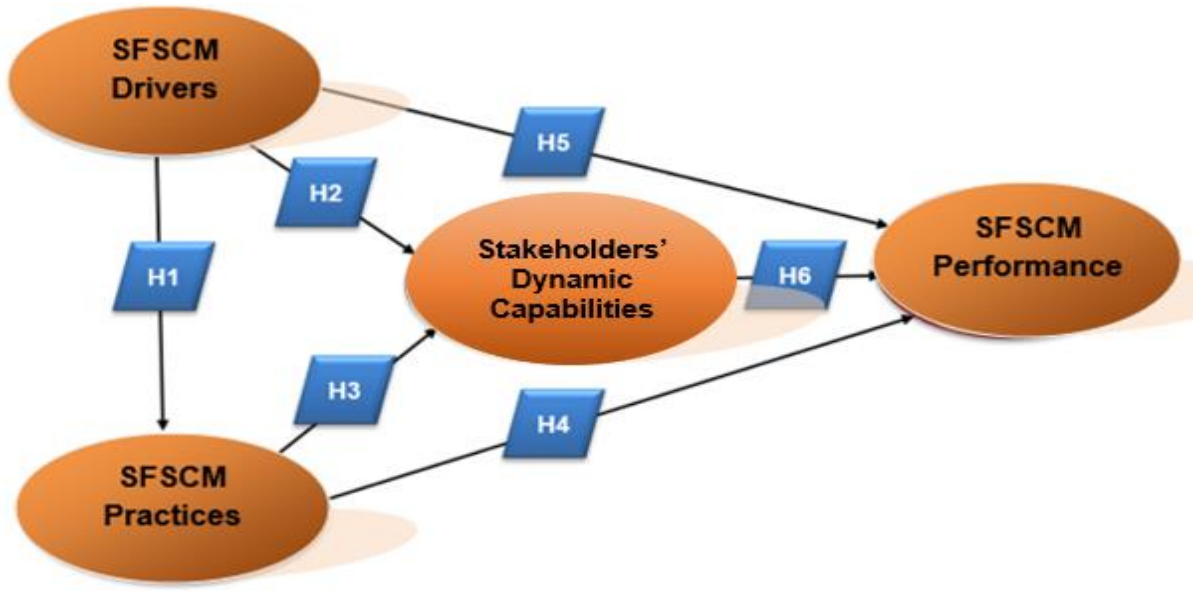

Figure 1.1: Hypothesised framework

Source: Author's own compilation

Figure 1.1 depicts the hypothesised relationships between SFSCM drivers, SFSCM practices, SDCs and SFSCM performance. From the conceptual framework depicted in Figure 1.1, SFSCM drivers and SFSCM practices are the predictor variables, while

SDCs are the mediating variables. SFSCM performance was the outcome variable for this study. The hypotheses posited between the research variables H1, H2, H3, H4, H5, H6, H7, H8, H9 and H10 are further stated below as:

$H0_1$: SFSCM drivers have a negative insignificant influence on implementing SFSCM practices.

H_1: SFSCM drivers have a positive significant influence on implementing SFSCM practices.

$H0_2$: SFSCM drivers have negative insignificant influence on SDCs in food supply chains.

H_2: SFSCM drivers do have positive significant influence on SDCs in food supply chains.

$H0_3$: SFSCM practices have a negative insignificant influence on SDCs.

H_3: SFSCM practices have a positive significant influence on SDCs.

$H0_4$: SFSCM practices have a negative insignificant influence on SFSCM performance.

H_4: SFSCM practices have a positive significant influence on SFSCM performance.

$H0_5$: SFSCM drivers have a negative insignificant influence on achieving SFSCM performance.

H_5: SFSCM drivers have a positive significant influence on achieving SFSCM performance.

$H0_6$: SDCs have a negative insignificant influence on achieving SFSCM performance.

H_6: SDCs have a positive significant influence on achieving SFSCM performance.

1.7 RESEARCH DESIGN AND METHODOLOGY

This study used a pragmatism philosophy as this allowed the researcher to tap into the strength of having multiple realities. Three research designs were used to provide a deeper understanding of SFSCM in the study and these were descriptive, exploratory an explanatory. The study was premised on the fixed concurrent mixed

methods approach, which allowed for concurrent use of quantitative and qualitative research approaches to achieve the research objectives in this study.

Data was collected using online semi-structured interviews and a close-ended questionnaire survey. Five groups of stakeholders in Zimbabwe, namely i. Food producers and processors; ii. Suppliers and distributers; iii. Wholesalers and retailers; iv. Consumer Council of Zimbabwe and consumers; v. Government (Ministry of Agriculture) and NGOs were the target population in this study. Participants were chosen using purposive and stratified sampling techniques. Twenty-two participants were interviewed for the qualitative data collection whilst 292 respondents were surveyed for the quantitative data collection.

Trustworthiness and minimisation of bias were ensured for qualitative data, while reliability and validity tests were performed to ensure quantitative data quality. Qualitative data was analysed using thematic data analysis performed in an Excel spreadsheet. Quantitative data was analysed using descriptive statistics, principal component analysis (PCA) performed in SPSS version 27, and structural equation modelling (SEM) confirmatory factor analysis (CFA) and path analysis (PA) performed in AMOS version 26.

1.8 ASSUMPTIONS OF THE STUDY

Without expectations, the study problem itself would not be possible (Leedy & Ormrod, 2010).The first assumption for the current research was that food supply chain management performance is positively influenced by supply chain sustainability. The next assumption was that all participants would provide honest responses. The third assumption was that the sample selected would be representative of the study's sample.

1.9 SCOPE OF THE STUDY

Stakeholders within Zimbabwe's food supply chain system were the study's primary focus. Companies and individuals primarily associated with cereals (grains) were among them. The stakeholders included the Consumer Council of Zimbabwe, food producers and processors, distributors and suppliers, wholesalers and retailers, the government (Ministry of Agriculture), NGOs, and academic institutions. The study area

was Harare since it is a significant commercial centre in Zimbabwe where the majority of intended research stakeholders (participants) are based.

1.10 ETHICAL CONSIDERATIONS

The research observed academic research protocols, including writing style, etiquette and conventions as guided by Creswell (2018). An ethical clearance was sought from the Nelson Mandela University (NMU) Ethics Committee (ethical clearance number H21-BES-LOG-132) (see Appendix D). The study also observed professional confidentiality, acknowledgment of sources, adherence to accepted citation styles, and accurate referencing. The right to privacy was respected for both interview and questionnaire survey respondents. Interviewees were given the option to select the online communication platform they felt most at ease using. Confidentiality issues received the respect they deserved and were upheld in relation to everyone who participated. There was no disclosure of information that may compromise the participants' integrity or the business activities of involved companies. The information was treated as grouped data and all respondents' involvement was completely voluntary and based on informed consent. Every respondent had the option to leave the study whenever they felt like it, without being prompted to provide an explanation.

1.11 OUTLINE OF THE STUDY

Chapter 1: Introduction to the study

Background of the study, research problem, research objectives and questions were outlined in this chapter.

Chapter 2: Food industry Overview and Theories in SFSCM

The chapter focuses on the food industry overview, three theories that explain SFSCM parameters and the legal framework governing food industry in Zimbabwe.

Chapter 3: Sustainable Food Supply Chain Management (SFSCM)

The chapter delves into detail covering practices, drivers, challenges as well as SDCs for SFSCM. It then presents the evidence from various previous studies that were related to the current study.

Chapter 4: Conceptual Model Development and Hypotheses

This chapter presents the conceptual model for research and hypotheses founded on an analysis of review of prior research conducted in Chapter 3. Additionally, it discusses the formulation of hypotheses and the study's framework.

Chapter 5: Research Methodology

The chapter discusses the research philosophy, designs and approaches used in this study, as well as the sampling design, data collection, and associated data analysis and processes.

Chapter 6: Discussion of Qualitative Findings

The chapter logically discusses the qualitative data analysis findings analysed, presented, and interpreted.

Chapter 7: Discussion of Quantitative Results

The chapter logically discusses the quantitative data analysis results presented and interpreted.

Chapter 8: Discussion of Mixed Methods Results

The chapter merges the qualitative findings and quantitative results with the overall aim of synthesising and drawing any deviations, similarities or patterns from the two approaches' results. The sections of the chapter are presented to fully address each research objective based on the findings from the mixed methods approaches used.

Chapter 9: Summary, Recommendations and Suggestions for Future Research

The chapter concludes with some observations on the analysis and makes recommendations. It also proposes a stakeholder sustainable food supply chain management framework.

CHAPTER 2
FOOD INDUSTRY OVERVIEW AND THEORIES IN SFSCM

2.1 INTRODUCTION

The food industry across the globe plays a fundamental role, particularly in ensuring food security. With the ever-growing population, continuous migration as people search for better opportunities, along with the various environmental, social and economic evils occurring worldwide, more pressure is continually exerted on the food industry and their supply chains to ensure availability and access to safe, quality, affordable, healthy, and nutritious food. The current chapter provides an overview of the food industry, from a global, continental and Zimbabwean perspective. The overview brings out the food industry's contribution to economic growth, challenges, trends, sustainable supply chain initiatives, and the future outlook of the food industry worldwide and in Zimbabwe.

Additionally, the chapter focuses on dynamic capabilities (DC), institutional theory (IT), and stakeholder theory (ST), are the three theories underpinning the study. Dynamic capabilities theory is used to theoretically ground the proposed relationships between SFSCM drivers and SDCs in the food industry; SFSCM practices and SDCs in the food industry; as well as between SDCs and SFSCM performance. Furthermore, the theory is used as the basis for understanding the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance. The theory is also used to understand the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

This study also used the institutional theory as a basis to explain the hypothesised relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers and SFSCM performance. The study further used the stakeholder theory as a basis to understand and explain the proposed relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers and SFSCM performance. Lastly, the chapter discusses the legislative framework that governs the food industry in Zimbabwe. The next section provides and overview of the food industry.

2.2 OVERVIEW OF THE FOOD INDUSTRY

This section highlights the context of the study by providing an overview of the food industry from a global, African and Zimbabwean perspective. The section discusses the food industry's contribution to economic growth, challenges, trends, sustainable supply chain initiatives, and the future outlook, worldwide, in Africa and specifically in Zimbabwe. The next subsection focuses on the global food industry.

2.2.1 Global food industry

The food industry is considered one of the biggest industries across the globe; and employs one billion people across all enterprises related to sustainable and conventional food systems worldwide (Anser, Khan, Nassani, Aldakhil, Voo & Zaman, 2021; World Bank, 2022). The food sector is a key contributor of a significant portion of the gross domestic product (GDP) to economies. According to Anser et al (2021) the global food industry's share of GDP contribution has grown by 1.7% from 3.8% in 2019 to 5.5% in 2020. In the US, the food industry contributed 5.2% in 2019 (USDA, 2020) while in the UK, 7.4% of their 2019 GDP was accounted for by the food and drink sector (Garvey, Norman, Owen & Barrett, 2021). In 2021, 7.7% of China's total GDP was explained by the food industry (Textor, 2021).

Despite the significant contribution to GDP, the global food industry is confronted with a range of issues posed by climate change-related and non-climate change-related stressors on the system. Around 34% of greenhouse gas is attributed to the global food system, and an European Union (EU) evidence evaluation published in 2020 concluded that this figure is on track to increase by 30% to 40% by 2050 as a result of population expansion and dietary change (Garvey et al., 2021). According to the FAO (2020), it is critical to strengthen agrifood systems' resilience so that they can sustainably assure the accessibility and availability to sufficient, safe, and nutritional diet for everybody, as well as the livelihood of agrifood system actors, throughout time and in the face of supply chain disruptions. It is, therefore, vital to transition to self-sustaining food systems in order to solve global concerns such as climate change, starvation, habitat destruction, and deforestation (FAO, 2020).

Sustainability issues such as food waste and insecurity continue to be a global challenge. As such, addressing issues at each level of the system can have system-wide consequences, since 30% to 40% of food that is produced is wasted during the

post-harvest process, up to retail and consumer stages of the supply chain (Liu, Ma, Huang, Shu, Chu, Li, & Jin, 2022). This is because reduced food waste improves food security, and minimises agriculture's environmental implications, such as land usage impacts, as well as food costs and shortages (Ananno, Masud, Chowdhury, Dabnichki, Ahmed, & Arefin, 2021).

In the modern world, the global food systems are increasingly used as the lens to frame and influence government agendas and debates worldwide. Sustainability in global food supply chains is driven by various factors and the United Nations (UN) sustainable development agenda and goals are some of the key drivers of sustainability even in the food supply chains and industries, across the globe (Sahani & Sharma, 2021). For instance, Goal 2 of the Sustainable Development Agenda, "Zero Hunger," and Goal 12 of the Sustainable Development Agenda, "Responsible Consumption and Production," are some of the notable goals placing a premium on sustainable food systems and driving SFSCM the world over. Recent global sustainability efforts include summits and conferences on food sustainability. The inaugural Food Systems Summit held in September 2021 organised by Sustainability and the United Nations is one of such global food sustainability initiatives which sought to conscientise nations on issues around hunger and food security (Zakari, Khan, Tan, Alvarado & Dagar, 2022).

Food sustainability indexing is another notable global food sustainability effort. In 2018, France, Netherlands, Canada and Finland had the best food sustainability indexes based on food and nutrition, efficient supply chain and high levels of food security, while Burundi, DRC, Sierra Leone and Yemen were ranked the least food secure countries in the same year (Win, 2018). In 2021, Ireland, Austria, the UK and Finland had the highest food sustainability indexes ranging from 80.9% to 84%, while Burundi, Yemen, Mozambique and Sudan had the lowest scores of between 34.7% and 37.1% (The Global Food Security Index, 2021).

The next subsection looks at the African food industry.

2.2.2 African food industry

According to Djekic, Batlle-Bayer, Bala, Fullana-Palmer and Jambrak (2021), Africa has recently established itself as an economic powerhouse. It is a home to some of

the world's most food secure countries, including Morocco, Egypt, Tunisia, Algeria, and South Africa (Global Food Security Index, 2021). Africa has the majority of the world's fertile land and employs more than half of its inhabitants. Given the right support, its food industry has the potential to grow and is unquestionably a critical cornerstone of Africa's future development. The African food business is expected to expand at a compound annual growth rate of 8.0% between 2020 and 2025. According to the World Bank report (2021), Africa's food market might reach US$1 trillion by 2030 (Morone, Papendiek & Tartiu, 2017). The market will experience considerable expansion during the projection period, owing to stable governments, increased disposable income, and improved food supply chain efficiency (Maqhuzu, Yoshikawa & Takahashi, 2021).

With regards to food sustainability indexing (based on food and nutrition, efficient supply chain and high levels of food security) in Africa, the global food sustainability in 2018 revealed that Algeria, Tunisia, Morocco, and South Africa had the best food sustainability indexes ranging from 61.6% to 63.7% (Beekaroo, Callychurn & Hurreeram, 2019). Burundi, DRC, Sierra Leone and Yemen were ranked the least food secure countries with indexing ranging from 31.1% to 34.7% (Win, 2018). In 2021, Algeria, Tunisia, Morocco and Egypt had the highest food sustainability indexes ranging from 60.8% to 63.9%, while Burundi, Yemen, Mozambique and Sudan had the lowest scores of between 34.7% and 37.1% (Global Food Security Index, 2021).

Food and agriculture contribute considerably to African economies' growth. For example, in 2020 it accounted for 54% of Ghana's GDP and more than 40% of export revenues (Pauw, 2021). South Africa, which has the largest food service business in sub-Saharan Africa and a huge and highly competitive hotel industry, is predicted to grow at a 7.9% compound annual growth rate between 2019 and 2026 (Roux, 2020).

Despite the contribution to GDP growth, Africa continues to produce insufficient and poor-quality food to feed its own people (Aworh, 2021). In 2020, acute food insecurity in Africa grew by more than 60% and threatens to spread further as COVID-19's consequences worsen, along with other factors such as war and governmental mismanagement, instability and a lack of sufficient transportation, climate change effects, and rising food prices (Borsellino et al., 2020).

2.2.2.1 Sustainability initiatives in Africa

A number of notable successful food sustainability initiatives have been seen in the African continent, which include the Resilient Food Systems 2006 initiative that brought together 12 sub-Saharan African nations that were facing challenges of unsustainable food production and supply chains (Zougmore, Laderach & Campbell, 2021). The initiative is funded by the International Fund for Agricultural Development with a target to assist two million beneficiary households under 2.1 million hectares using sustainable food production practices. In its first five years the programme had already surpassed two million beneficiaries and more than 2.1 million hectares of food crop production (Ram & Zhang, 2021).

The other initiative of a large scale is the Alliance for a Green Revolution in Africa (AGRA), headquartered in Kenya and founded in 2006 with the aim to alleviate poverty and hunger for millions of small-scale farmers and their families within 21 countries (Benegiamo, 2021; Bendjebbar & Fouilleux, 2022). Within ten years of inception, AGRA achieved a lot in research capacity building (more than 300 doctorate holders – across the 21 countries – in various crop production fields), research and development (more than 300 varieties of seeds), input production and distribution (112 seed companies supported,1.5 million tonnes of inorganic fertilisers produced), adoption (1.86 million farmers and 1.49 million hectares under farming technology) and post-harvest production and marketing (more than 1.3 million metric tonnes of commodities aggregated and sold) (AGRA, 2021).

2.2.3 Zimbabwean food industry

Up to the year 2000, Zimbabwe was the "Breadbasket of Africa" in terms of food production and supply chain effectiveness (Mkodzongi & Lawrence, 2019). Due to the nation's continued reliance on conventional food supply networks and systems, cereal food is currently in short supply compared to the level of demand. In Zimbabwe, the food business is classified as part of the agricultural, forestry, and fishery sectors. Toriro and Banhire (2021), stated that agriculture is the bedrock of Zimbabwe's economy since Zimbabweans are predominantly rural and rely on agriculture and other rural economic activities for their livelihood. Agriculture employs and earns money for between 60% and 70% of the populace, supplies 60% of the resources required by industry, and generates 40% of total export profits (Le-roy et al., 2020). In

2018, agriculture accounted for around 10% of Zimbabwe's GDP (World bank, 2019; Jonga et al., 2021). Its performance, being the primary means of livelihood for the bulk of the population, is a critical predictor of sustainable livelihood, poverty levels and resilience (Borsellino et al., 2020).

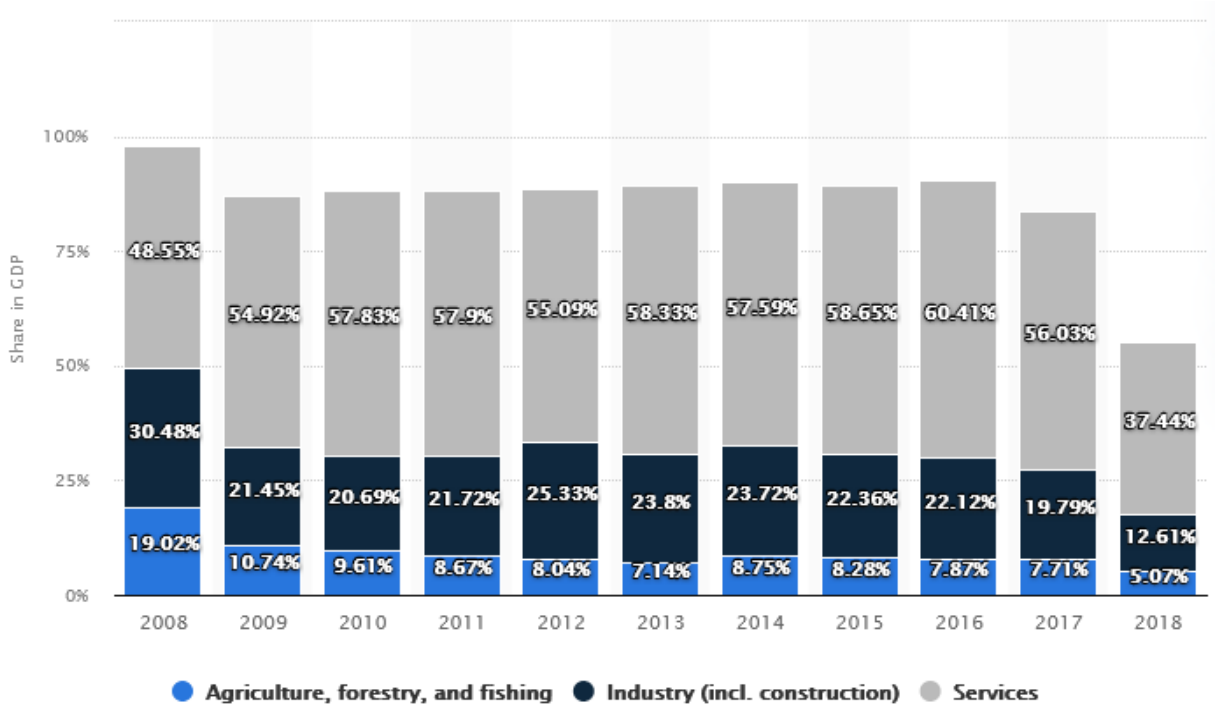

Figure 2.1: Zimbabwe GDP contribution by sector

Source: Borsellino et al. (2020)

As shown in Figure 2.1 above, in 2018, the Agriculture, Forestry and Fishing sector in Zimbabwe accounted for about 5.1% towards the country's GDP. It is also apparent from the figure above that the industry's performance has dwindled over the years, with 2018 being the lowest contribution during the 2008 and 2018 period (O'Neil, 2021). The 2009 decline was as a result of the global financial crisis, together with the political instability as well as the hyperinflation which made the cost of food production to go up (Dzapasi, 2020). Another significant decline is evident in 2018, and this was mainly because of the political instability of 2017 (Mbunge, 2020) and the cyclone Idai of March 2018 (Chari, Liu, Wang & Wang 2021).

2.2.3.1 Key challenges in the Zimbabwean food industry

The food industry has faced numerous challenges in recent years, including supply chain disruptions caused by the Covid-19 pandemic, inflation, a general economic

downturn, corruption, macroeconomic complexities, high unemployment, high fuel prices and shortages, perennial drought, a lack of commercial farming skills, and the effects of climate change (Stankus, 2021). More specifically, political instability and economic sanctions exacerbated a decline in Zimbabwe's food production capability (Mavhunga, 2021). The smallholder farmers in Zimbabwe, who are part of the suppliers and are the majority in terms of farmers, face a variety of obstacles, which makes them fail to meet the country's food demand. These obstacles include low and irregular rainfall, low and falling soil fertility, underinvestment, labour and draft animal shortages, inadequate institutional and physical infrastructure, lack of access to finance, poor access to market, poor water supply, and energy shortages (Muvhuringi & Chigede, 2021). Agricultural productivity is also susceptible to droughts on a recurring basis. Peasant farmers, who supply 70% of staple crops (maize, millets, and groundnuts), are particularly susceptible to these recurring droughts since they have access to less than 5% of the national irrigation systems (Mujeyi, Mudhara, & Mutenje 2021).

Due to the challenges faced by a majority of the food suppliers in the food industry, food insecurity continues to heighten in Zimbabwe. According to Watambwa (2021), 2.9 million rural residents experience persistent food insecurity throughout the primary lean season, which runs from January to March 2022. Additionally, the World Food Programme's evaluation of urban livelihoods for 2021 revealed that up to 2.4 million people in Zimbabwe needed food help in urban locations (Mavhunga, 2021).

2.2.3.2 Sustainability initiatives in the Zimbabwean food industry

As the aforementioned difficulties persisted throughout time, a variety of attempts were made by the government, corporate sector, and non-governmental organisations through programmes implemented to rescue the country from food insecurity and increase food sustainability. These programmes included the United Nations Development Assistance Framework for Zimbabwe 2016–2020 (UN Zimbabwe, 2020), the FAO-led Zimbabwe LFSP (FAO, 2020), and the United Nations World Food Programme 2022–2027, which aims to strengthen collaborative, sustainable, and resilient small farmer food production and supply led by the UN, WFP, and Zimbabwean government (Macheka, 2021). Earlier programmes like the land reform, command agriculture, and the Zimbabwe Agenda for Sustainable Socio-Economic

Transformation (Zim Asset) were implemented, but they did not place a high premium on sustainable food supply chain management.

- **2016-2020 Zimbabwe United Nations Development Assistance Framework (ZUNDAF)**

ZUNDAF's goals and objectives included ensuring food and nutrition security for targeted families in rural and urban areas, as well as equipping communities to deal with climate change and building resilience for family food and nutrition security (Bonga, 2020). In Zimbabwe, the United Nations has articulated its support for food security at the household and national levels and assist Zimbabwe in achieving its development goal for enabling agricultural productivity and production. The programme is meant to reduce food security and nutrition at family level and at the same time guaranteeing sustainable food production in Zimbabwe. However, according to Toriro and Banhire (2021), like other programmes, ZUNDAF did not manage to yield positive SFSCM results as expected during the programmes' lifetime.

- **Zimbabwe Livelihoods and Food Security Programme (LFSP)**

The LFSP is a project operated by the Food Agriculture Organization of Zimbabwe with the objective of enhancing the food security and nutrition of small-scale farmers and rural households in three provinces of Zimbabwe, namely Manicaland, Mashonaland Central, and Midlands. The project had hoped to assist 80 000 households out of food insecurity by September 2020 (Rubhara, Mudhara, Oduniyi & Antwi, 2020). It involved addressing the causal factors of poverty and food insecurity in rural regions, including agricultural production, market access, and consumption. This was accomplished by addressing low food productivity (by enhancing farmers' production and marketing knowledge and skills) and working to improve nutrition (by promoting biofortification of crops and foods, educating people on how to improve their nutrition, and promoting a change in consumption) (Chikwati, 2021). The programme also expanded farmers' access to markets (by enhancing farmers' ability to purchase inputs and sell their products through the strengthening of farmer groups, enhancing farmers' access to financial services, and promoting a change in consumption) (Chikwati, 2021).

- **United Nations World Food Programme 2022-2027**

The United Nations and World Food Programme developed the 2022-2027 Country Strategic Plan in close partnership with the Government of Zimbabwe, with the goal of fostering further collaboration in establishing sustainable, resilient, and shock-resistant social protection programmes with a food systems lens. The idea stems from the fact that agriculture provides for up to 70% of the population's livelihood in Zimbabwe, making it vital to identify the most efficient methods for growing food sustainably and connecting local supplies to markets (Macheka, 2021). Zimbabwe was identified as a middle- and low-income country with a wealth of expertise that can be shared and modified to combat food insecurity, resulting in the establishment of the United Nations World Food Programme 2022-2027 (Chikwati & Mutizwa, 2020).

- **Command agriculture**

Command Agriculture is a 2016 initiative spearheaded by the Zimbabwean Cabinet Committee on Food Security and Nutrition. It is a model based on import substitution that is purposefully designed to strengthen local cereal crop producers, hence increasing productivity for native stakeholders and providing jobs for many (Makuwerere Dube, 2021). Additionally, command agriculture focuses on minimising post-harvest food waste from the field to storage and distribution (Chisoko & Zharare, 2017). When the initiative began in 2016/2017, it achieved the anticipated goals, generating more than two million bushels of grain. In the following years, which is from 2018 till present, Zimbabwe's command agriculture encountered various obstacles and failed to deliver the desired food production due to a variety of factors, primary among which were discrepancies in how the agricultural community and authoritarian implementers evaluated the new programme's outcomes (Chinhema, 2021).

- **Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim Asset)**

Zim Asset was a national development plan implemented between the years 2013-2018 with the goal of achieving sustainable development and social equality via indigenous development, empowerment, and job creation (Mutenga & Vyas-Doorgapersad, 2021). It was organised around four key clusters amongst which included food and nutrition security and poverty eradication and social services. Among other things, the Zim Asset programme failed to accomplish food security and

alleviation of poverty in Zimbabwe for a variety of reasons, including its high level of politicisation, isolation of key stakeholders, dishonesty, lack of funds, policy autonomy, and inadequate monitoring and assessment (Masiyakurima, Chilunjika & Muzvidziwa-Chilunjika, 2018).

- **Food loss and waste measures**

On the one hand, food losses occur when the quantity or quality of food diminishes as a result of actions and decisions taken by food producers and suppliers within supply chain, eliminating retailers, food service providers, and consumers (Motsi, 2021). Food waste, on the other hand, is a more particular sort of food loss that centres on the quality and quantity of food lost as a result of retailer, food service provider, and customer handling (Kanonhuhwa, Toriro & Chirisa, 2021; United Nations Environment Programme, 2021:19). Despite the lack of evidence from food supply chains Leiras, Goncalves, Chawaguta, Brito and Yoshizaki (2021) projected Zimbabwe's food wastage to be over 30%, which equates to nearly a third of the country's food output going to waste. Two critical measures for lowering waste levels are the Environmental Management Act [Chapter 20:27] of 2002 and the Urban Councils Act [Cap. 29:15] of 1984. They were adopted to encourage the reuse and recycling of food waste at the household level (Kanonhuwa et al., 2021). Recycling and reusing food waste allows for the development of environmentally friendly and sustainable solutions such as biotechnological procedures (Chikowore, 2021). Additionally, chemical compounds having a good impact on human health may be derived from agricultural wastes, ensuring a consistent option to waste disposal in the food system.

- **Irrigation grains strategy**

Irrigation agriculture has been recognised as a critical component of agricultural growth in Zimbabwe, particularly in grain production, in the subsequent years. Water and irrigation development as a result of this growth has been critical in the production of important crops such as wheat, sugar cane, and maize (Zvokuomba & Batisai, 2022). The country's agricultural production accounts for around 20% of total output, as a consequence of spending in irrigation development projects and programmes (Musasa & Makomborero, 2022). Water demand is growing since agriculture consumes around 82% of available water, mining consumes 3%, and household and

industrial usage consumes 15% (Moyo, Van Rooyen, Bjornlund, Parry, Stirzaker, Dube & Maya, 2020).

Even with current investments in Zimbabwe's smallholder farmers engaged in winter wheat irrigation, the payoff is still relatively low, owing mostly to a shortage of infrastructure, land ownership, poor management, insufficient market access, and a lack of technical expertise in farming. In Zimbabwe, irrigation schemes have been implemented to alleviate some of these challenges, but smallholder farmers continue to face barriers related to policies, the environment (water shortage), socioeconomic, financial (lack of credit facilities), and technological (lack of knowledge about farming) (Zvokuomba & Batisai, 2022).

- **Water and energy conservation**

According to the World Health Organization, half of the world's population will live in water-stressed areas by 2025 (Nandini, Raja Sekhar & Subramanyam, 2021). Climate change, the consequences of which are already being felt in many areas of the globe, along with unsustainable resource use, is projected to greatly contribute to anticipated future water shortages (Nhamo & Chikodzi, 2021). Climate change is already having an influence in a number of nations, including Zimbabwe, through irregular rainfall patterns, droughts, flooding, and extended intra-season dry spells.

Zimbabwe has limited water resources (Zimbabwe National Water Policy (ZINWA), 2012) with a large portion of the nation being semi-arid and the average yearly rainfall being relatively low. This has a direct and significant effect on water availability, sanitation, food security, and the economy as a whole (Munanga & Mafuku, 2021). Additionally, water-related challenges are expected to worsen as a result of climate change's predicted increase in evaporation, evapotranspiration, water scarcity, flooding, and runoff.

The 1998 Water Act encouraged a more equal system of water distribution, increased stakeholder participation, and created the seven districts as the foundation for water resource management (Kusena, 2022). Agriculture continues to be a significant user of water in Zimbabwe. According to ZINWA (2021), it is critical for farmers to adopt water conservation in their daily operations. Numerous measures were outlined, including the use of water-efficient irrigation systems such as drip irrigation and the repair of all irrigation system leaks. Farmers of all sizes, large and small, are urged to

irrigate in the early or late afternoon to prevent water loss due to air heat. Additionally, farmers are recommended to learn the irrigation demands for crops at various stages of maturity and to practise cultivating drought-resistant crops (Zvokuomba & Batisai, 2022).

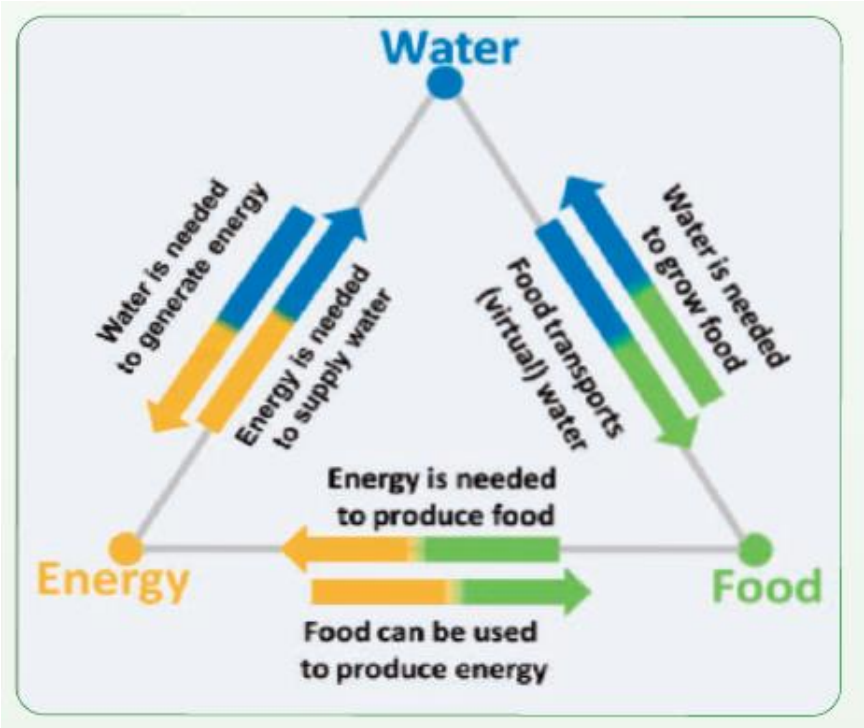

Figure 2.2: The water, energy, and food grid

Source: Sánchez-Zarco, González-Bravo & Ponce-Ortega (2021)

According to Sánchez-Zarco et al. (2021) and Figure 2.2, water is required in Zimbabwe for two primary purposes, namely to create energy such as electricity, and produce food through agriculture.

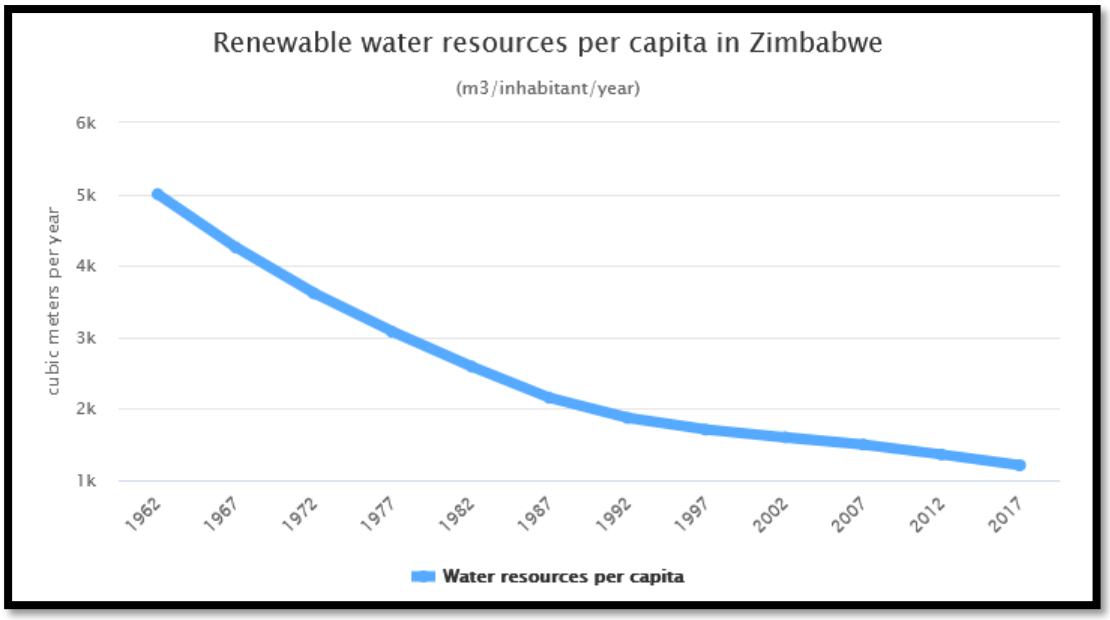

Figure 2.3: Renewable water resources per capita in Zimbabwe

Source: Sánchez-Zarco et al. (2021)

Figure 2.3 depicts Zimbabwe's water resources per capita from 1962 to 2017. The evidence indicates a dramatic decline from over 5000 cubic meters per year in 1962 to fewer than 400 cubic meters in 2017. This resulted in a significant loss of water in Zimbabwe, which has had a direct impact on food production and the country's capacity to generate electricity using water (Chipango, 2022). The drop in water use per capita is ascribed mostly to population increase, climate change, and agricultural development.

Duker, Mawoyo, Bolding, De Fraiture and Van der Zaag (2020) added that despite the foundation of the Zimbabwe national water policy and the establishment of ZINWA, irrigation investment has still lagged, resulting in the worsening of installed irrigation infrastructure across the country's farming sectors, and slowed expansion of new irrigation schemes to fully utilise the country's available water resources. While a fully effective irrigated agricultural production has the ability to take 82% of the country's water resources, the food and agriculture industry now consumes 20% of water in the majority of catchment regions, with the exception of Runde and Save (ZINWA, 2021).

2.2.4 The Future of Zimbabwe's food industry

Zimbabwe's food industry's future depends on a concerted effort by the government, food producers, and other stakeholders to increase agricultural production and

profitability on a sustainable basis. The government and commercial sector must work together to combat food loss on farms and in supply systems. Programmes to equip small-scale farmers with commercial food cultivation and production must be implemented (FAO & RUAF, 2019). This will contribute to the rapid reduction of food insecurity, since all farmers will begin producing on a massive scale. Additionally, market mechanisms must be strengthened via capacity building in the public and private sectors, engagement of big and smallholder farmers, and market access. The producer price should be increased to enable farmers to earn a reasonable profit; in fact, the concept should be more oriented around self-sufficiency in agriculture rather than peasantry (Kanonhuwa et al., 2021). In some instances, the government should subsidise innovative agricultural ventures capable of providing above-average yields (Chisoko & Zharare, 2017).

According to the Food and Agriculture Organization of the United Nations (FAO, 2012), contemporary agriculture frequently makes use of advanced technologies such as robotics, temperature and moisture sensors, aerial photographs, and GPS technology. Zimbabwe has to seriously evaluate how these technologies, precision agriculture, and robotic systems enable enterprises to be more lucrative, efficient, safe, and environmentally friendly in their food supply chains. Modern methods of capturing and conserving agricultural irrigation water are perfect for ensuring sustainable food production in an era where water per capita use is rapidly declining (Ahumada, Villalobos & Mason, 2012).

2.3 THEORIES IN SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT

Numerous notions have been theorised, resulting in the formulation of several relevant theories in various fields. Theoretical frameworks are frequently used to assist in the formulation of research questions, the choice of relevant data, the interpretation of the data, and the formulation of explanations for the underlying factors or impacts of observable events (Kumar et al., 2022). As earlier noted, the current study used the DC, IT and ST theories to help explain the relationships between the research variables. The next section discusses DC theory.

2.3.1 Dynamic capability theory

Teece and Pisano (1994) introduced the dynamic capability theory as an extension to the resource-based view theory (RBV). Dynamic capability refers to the organisation's capacity and ability to integrate, create, and restructure internal and external resources and competences in order to meet rapidly changing environments (Teece & Pisano, 1994). Such capabilities reconcile the competing values that should be robust enough for an organisation to provide distinctive, original and flexible value required to meet the changing macro-environmental demands. According to Samsudin and Ismail (2019), organisations with dynamic capabilities develop the ability to maintain or expand their competitiveness in changing business environments. Supply chain organisations equally leverage on dynamic capabilities to maintain their competitive advantage in ever-changing business environments. Given that the world population is growing, and food reserves are becoming scarce, food organisations can also take advantage of dynamic capabilities to improve their firms and supply chain competitiveness and sustainability (Meixell & Luoma, 2015).

Gruchmann, Seuring and Petljak (2019) expounded that even with limited resources, firms may restructure, reconfigure or review their internal resources to thrive and still be competitive. Dynamic capabilities in the food industries will enable stakeholders in the food supply chain to ensure availability and accessibility of affordable, adequate, healthy and quality food produced and logistically conveyed to the consumers through environmentally friendly ways, thus promoting SFSCM. Also, the complexities found in the food industry to meet triple bottom-line requirements, solving food security requirements and the desire to maintain competitive food supply chains at the same time creates the dynamism that requires the use of dynamic capabilities to thrive and meet food demand (Aslam & Azhar, 2018).

The current study used the dynamic capability theory to understand and explain the proposed objectives for the influence of SFSCM drivers on dynamic capabilities of stakeholders in the food industry; the influence of SFSCM practices on dynamic capabilities of stakeholders in the food industry; and the influence of SDCs on SFSCM performance. Further, the theory was used as the basis for understanding the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM

performance. The theory was also used to understand the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

Dynamic capabilities come in different forms depending on the requirements of an individual organisation. The current study dwelt on the five dynamic capabilities shown in Figure 2.4 as provided by Beske et al. (2014), and these are SC re-conceptualisation, SC partner development, reflexive SC control, co-evolving of stakeholders, and the assessment of knowledge and industry experience (for instance experience in the food industry) (Norberg, 2019). According to Beske et al. (2014), these five dynamic capabilities can be employed to meet supply chain management practices such as supply chain continuity, supply chain orientation, supply chain risk management and supply chain pro-activity. The five DCs and their applicability are discussed in the next subsections.

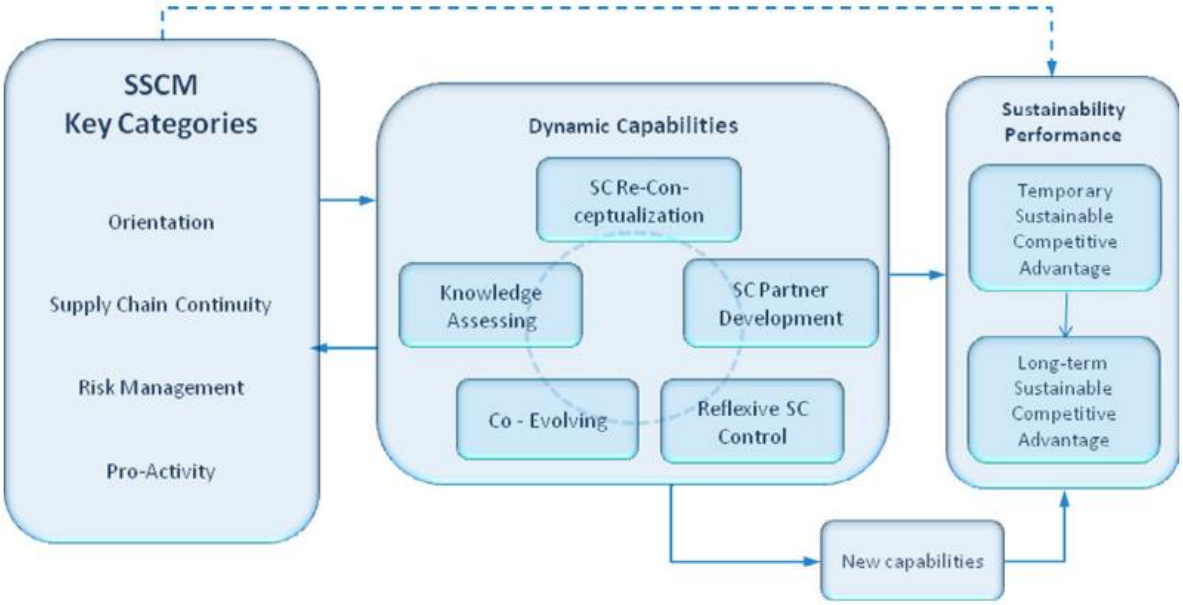

Figure 2.4: Dynamic capability framework and SSCM

Source: Beske et al. (2014:133)

2.3.1.1 Supply chain re-conceptualisation

Supply chain re-conceptualisation is characterised by the need to alter conventional business practices or to vary from the normal way of doing business (Cooke, Wong & Press, 2021). The search and selection of the right partners for the SC is an essential capability. In the food industry, this includes searching and selecting food suppliers, such as farmers capable of producing the requisite organic goods (Chukwuemeka &

Onuoha, 2018) or customers such as the retailers, NGOs, and the government or other partners like the governmental bodies/policy makers, such as the international aid agencies, storage and warehousing management, among others (Kurtmollaiev, 2020). In the Zimbabwean food industry, selection of partners can involve sustainability-driven organisations like Food and Agriculture Organisation in Zimbabwe, the Food and Nutrition Zimbabwe or the WFP. The common driving forces for selecting such partners could be the desire to satisfy customers in a sustainable way and maintain a competitive advantage irrespective of the change in the magnitude within the business environment (Silvestre, Monteiro, Viana & Souza-Filho, 2018).

2.3.1.2 Partner development

Partner development normally involves three important aspects which are partner development programmes, improving overall performance, as well as partner training and knowledge development. These dimensions may be applied depending on what the organisation requires in the different stages of supply chain to achieve sustainable supply chain performance (Meixell & Luoma, 2015). For instance, a food supplying organisation may decide to train its employees to meet new legislation for green practice products as buying institutions will be compelled not to accept non-compliant supplies (Rodrigue, 2020).

2.3.1.3 Reflexive control

Reflexive supply chain control involves comparing and measuring the supply chain's functionality to SSCM needs or practices (Huhtinen, Kotilainen, Särmä & Streng, 2021). Normally, checks and balance metrics are applied to ensure system transparency. Some organisations normally perform reflexive control through system audits and information sharing control mechanisms (León-Bravo, Caniato & Caridi, 2020). For example, constant auditing, exchange of information and system control in the food supply chain leads to careful monitoring and tracking of the shelf life of processed foods (FAO, 2014:11), leading to a sustained competitive advantage for the participating members with regards to food hazards control practice (Blome, Schoenherr & Rexhausen, 2013). Supervision of stakeholders, auditing, third party certification and review using written scorecards are some of the ways through which stakeholders (suppliers, distributors, producers) can be controlled in order to enhance SFSCM performance (Shakil, 2021). SFSCM performance can be regularly monitored by introducing an efficient and effective partner control system, enabling more cost-

effective and efficient long-term contract development, environmental management, quality criteria and customer requirements (Mzembe, Lindgreen, Maon & Vanhamme, 2016).

2.3.1.4 Co-evolving

Co-evolving is distinguished by strengthened partnerships between the various supply chain stakeholders. Supply chains need to evolve and adapt seamlessly, keeping each member's goals and visions aligned (León-Bravo et al., 2020). The best co-evolving strategy is demonstrated by the joint development of processes and products as well as partnerships in food production and processing. The partnership of maize grain farmers, millers, distributors, packagers and retail stores may be a particular example, resulting in a more manageable and sustainable flow of food, knowledge and resources. Co-evolving may be driven by the desire for integrative collaboration, positive dialogue and effective decision-making while maintaining the SC pro-activity practice (Beske et al., 2014:138). According to Chowdhury and Quaddus (2021), partner complementarities illustrated in a co-evolving scenario result in long-term sustainable supply chain performance and competitiveness of the entire supply chain.

2.3.1.5 Knowledge assessment

A significant way to achieving an open and fully apparent supply chain is the exchange of information and expertise (Teece, 2014). Focus is given to evaluating importance of existing knowledge and then sharing it with the relevent stakeholders within the supply chain. More so, the DC theory looks at continuous acquiring of new knowledge so that the supply chain system remains aligned to new trends required for firm and supply chain competitiveness (Tang & Gudergan, 2018). For example, the effectiveness and efficiency required in food handling practices are mainly dependent on the knowledge acquired about the nature of the food item, the required degree of temperature control, whether the product is perishable such that it will detriorate easily and requires delicate packaging or not (Monteiro, Soares & Rua, 2017).

Constant knowledge acquisition and assesment are therefore required to reduce food loss and waste within the food supply chain systems and stages (Mzembe et al., 2016). Accorsi, Baruffaldi, Manzini and Tufano (2018) claimed that evaluating knowledge is of high significance for stakeholders in the food supply chain as consumer tastes and

preferences are always changing. More so, sustainability practices such as soil conservation, water conservation, food waste management, packaging design and management, the reduction of emissions in the food supply chain, along with ensuring food quality and food safety in the chain all require continuous gathering and evaluation of information so that organisations keep doing the right thing and remain competitive (Baliga, Rakesh & Kamble, 2019).

2.3.1.6 Criticism of the dynamic capability theory

Just like any other theory, the DC theory has its own limitations. Some of the criticisms forwarded include the fact that the underlying operational processes, as well as the correlation between dynamic capabilities and company performance, are difficult to measure experimentally (Easterby-Smith, Lyles & Peteraf, 2009). It is also tough to quantify activities and routines that are often unique to an organisation or part of a resource package. Collis and Anand (2018) expressed concern that building a specific dynamic capability necessitates compromises with other dynamic capabilities and lower-level capabilities. As a result, businesses must accept that whichever DC they chose will have shortcomings of trading-off with another capability. Therefore, the applied dynamic capability will not be able to fix all difficulties at the same time. The next subsection focuses on the institutional theory.

2.3.2 Institutional theory

The institutional theory was postulated by DiMaggio and Powell (1983). The theory assumes that firms are persuaded by other organisations to operate in a certain way and that businesses react to external demands from competitors through isomorphism (DiMaggio & Powell, 1983). Isomorphism is a term that states that over time, all organisations become the same or embrace the same principles and techniques of operation (DiMaggio & Powell, 1983; Voronov & Weber, 2020). The theory further defines three isomorphism pressures which compel organisations to follow a certain path of operation. These are coercive pressure (compelled law or regulation pushing for compliance), mimetic isormophism (copying a competitor's successful business model), and normative pressure (companies become more professional and follow industry guidelines and best practices or professional community) (DiMaggio & Powell, 1983; Voronov & Weber, 2020; Boubaker, Harguem & Nyrhinen, 2021).

Understanding the relationship between institutional theory and different subjects is mostly premised on these three isormorphism pressures. For example, organisations practising traditional supply chain operations may be compelled to practise sustainability through different isomorphism levels. The current study uses the instituitional theory as a basis to understand and explain the proposed relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers and SFSCM performance. The three isomorphism presures are elaborated on below to indicate the importance of the instituional theory in SFSCM.

2.3.2.1 Coercive isomorphism

As noted above, coercive isomorphism results when an organisation is subjected to institutionalised pressure to behave or comply in a specific way (DiMaggio & Powell, 1983). Coercive pressures come in two ways: sector-level pressures which control the form of intervention required by a specific industry, and company-level pressure which is specifically applied to individual organisations (Glover, Champion, Daniels & Dainty, 2014). Coercive isomorphism is defined by the behaviour of those in charge, such as the pressure of regulators who control resources and operations of organisations. The power of influence by governments is an example of coercive isomorphism. Governments are legitimate and typically strong stakeholders with the ability to exercise influence via laws, regulations, and policies (Zhao, Fisher, Lounsbury & Miller, 2017). Examples include the selling and distribution of grain legislation, which is the product of government involvement in national food protection.

In the Zimbabwean context, organisations adhere to policy on selling of grain to the Grain Marketing Board (GMB) only at the government gazetted price (Musvota & Mukonza, 2021). More so, a number of institutions such as the Consumer Council of Zimbabwe (CCZ), Ministry of health, Standards Association of Zimbabwe, Environmental Management Authority (EMA) and other non-governmental organisations have sustainability (food production, food control, food safety, food distribution) laws for which all organisations within the food supply chain are supposed to equally comply with; failure to comply would result in the focal organisation delisted or its operator's licence revoked (Pswarayi, Mutukumira, Chipurura, Gabi & Jukes, 2014).

2.3.2.2 Mimetic isomorphism

Mimetic isomorphism occurs when firms replicate their successful competitors as they try to be successful as well. In order to achieve success, businesses will emulate or mimic competitive competitors' behaviour (DiMaggio & Powell, 1983: Rudyanto, 2019). Mimetic isomorphism implies that when a corporation faces uncertainty, it will often emulate others in order to remain competitive and avoid or minimise unfavorable and unexpected events.

A study conducted by Canello (2021) revealed mimicking of one small enterprise that was most sustainable and profitable through global sourcing. In a space of six months, seven more small enterprises in the same area were seen to be practising global sourcing through different contractual relationships. Mimetic isomorphism in the Zimbabwean food supply chain exists when upcoming or infant food organisations copy successful and sustainable organisations such as the National Foods, Probrands or Nestle (Moreau, 2021).

2.3.2.3 Normative pressure

The pressures that organisations submit to in order to be considered as members of a particular professionalism as collectively defined by other stakeholders within a particular occupation is known as normative isomorphism (Wobodo & Asawo, 2021). Organisations are required by normative pressures to adhere to standards that are thought to have acceptable organisational practices (Chen, Yi, Zhang & Li, 2018). Sustainable supply chain management could be an effective strategy for enhancing a company's record of corporate social responsibility, lowering reputational risks, cutting waste, and increasing flexibility to meet new environmental standards (Chen et al., 2018). This is based on the premise that persons who work in a certain profession follow occupational norms and cultural behaviours for example ISO 14000, ISO 9000, Food Safety certifications, Hazard Analysis and Critical Control Point (HACCP), or Environmental Management Systems. As a result, organisations within a certain industry are more prone to display similar features and attributes in order to look legitimate or compliant (Herold, 2018). Similarly, stakeholders in supply chain management end up functioning in a sustainable manner since they all understand the demands and standards of sustainable supply chain management. These standard norms are transmitted to supply chain organisations such as those in the food business

through their engagement with professional training institutes and universities, conferences and seminars, and trade publications.

DiMaggio and Powell (1983) extended this theory by arguing that, in addition to information filtering, professional networks are critical for disseminating institutional norms and behaviours within a professional community. Collectively, professional communities define a set of behaviours and cognitive frameworks that form organisational routines (Butkevičienė & Sekliuckiene, 2022). In light of these arguments, while certain professionals within an organisation may display unique personality traits, they often behave and appear similar to others in their professional network. Figure 2.5 below presents the influence of the three isomorphic mechanisms on SC sustainability.

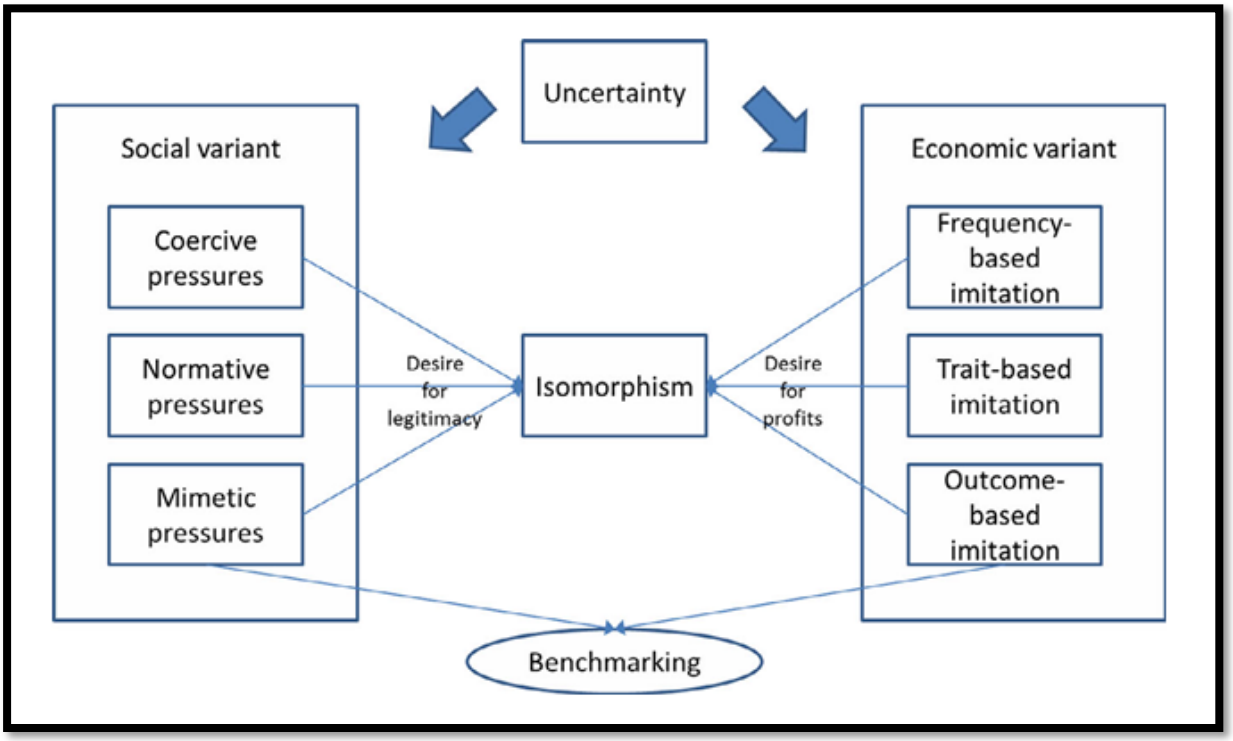

Figure 2.5: The influence of three isomorphic mechanisms on supply chain sustainability

Source: Kauppi (2013)

Kauppi (2013) substantiated DiMaggio and Powell's (1983) three essential isomorphic mechanisms, expanding on their impact on supply chain sustainability (see Figure 2.5 above). Isomorphism affects organisations in different ways and by the end of the day all organisations would have been pushed to comply with sustainability practices due

to different pressures exerted on it. Wobodo and Asawo (2021) explained that as economies develop, normative pressure takes the centre stage when every organisation strives for professionalism and best practice in their processes and operations.

2.3.2.4 Limitations of the institutional theory

According to Kauppi (2013), the institutional theory has limitations at different phases. The instituitional theory is defined by an isomorphic structure or viewpoint, which is constrained to describing the dynamics that allow for organisational variation, transformation and heterogeneity (Herold, 2018). In the food supply chain business, heterogeneity is primarily influenced by organisational uncertainty, which is characterised by individuals' or stakeholders' contextual and varied perspectives (Borsellino et al., 2020). According to Guerreiro et al. (2021), the institutional theory does not take into account the interaction of the three types of forces (coercive, normative, and mimetic) and hence is incapable of predicting which force is most influential in achieving isomorphic transformation.

The theory has shortcomings in its ability to explain stakeholders' functions with competing aims and also in creating a theoretical foundation for the categorisation of stakeholders and their degree of control (Herold, 2018). As a result, there is a need to explore and examine the responsibilities of organisational sector players or stakeholders in order to clarify and gain a greater grasp of how stakeholders affect SFSCM. Stakeholder theory presents an emerging and alternate technique for analysing or defining stakeholder categories based on their degree of control (Freeman, 1983). The section that follows gives an overview of stakeholder theory and stakeholder categorisation needs for sustainable supply chain management.

2.3.3 Stakeholder theory

The stakeholder theory is a theory proposed by Freeman in 1983. It assumes that a business environment can be far more complex than just the concept of shareholder value and it affects an organisation’s operations and management (Freeman 1984). Thus, the stakeholder theory requires that organisations operating in a highly turbulent and complex business environment, such as the food industry, be managed in a practically, cost saving, profitable, value adding, and responsible manner (Freeman, 1984). For firms to minimise costs and realise profits, there is need for effective

reciprocal strategic information sharing between the supply chain stakeholders and the firm managers.

Stakeholders also need some form of strategic flexibility in order for their organisations and supply chains to create sustainable value and outperform their rivals (Harrison, Freeman & Sá de Abreu, 2015). In any case, the performance of the supply chain depends on the performance of the various stakeholders, and the ability of company management to meet and manage their stakeholders' requirements and expectations, as well as to harmonise their conflicting interests. The current study used the stakeholder theory as a basis to understand and explain the proposed relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers on SFSCM performance.

Freeman (1984) insisted that there are numerous stakeholder variables in the business environment that may be defined as any group or entity that has the ability to affect or be influenced by an organisation's attainment of its objectives. In other words, stakeholders are a company's 'stakeholders' who have something 'at risk' and usually include both internal stakeholders (managers who manage both the organisations and stakeholders; and staff) and external stakeholders (shareholders, suppliers, manufacturers, distributors, consumers, industry organisations or regulatory bodies). Miles (2017) demonstrated that primary and secondary stakeholders are involved. Miles (2017) noted that a company will not thrive without the support of primary structures that comprise infrastructure and legal frameworks, including shareholders, workers, customers and suppliers. Secondary stakeholders, for example, are not considered essential to the company's survival and include media and special interest groups.

A standard framework was developed by Valentinov, Roth and Will (2019) to define the significance of stakeholder relationships that have since been widely used by practitioners as well as researchers. They argued that stakeholder acknowledgement and provision are dependent on the stakeholders' possession of one or more of the relationship's three characteristics: (1) power of the controlling stakeholder in the company, (2) the urgency of its claim and (3) the legitimacy of the relationship between the stakeholder and the company. The term "power" refers to the influence exercised by stakeholders over an organisation's decisions to exploit its critical (Ramoglou,

Zyglidopoulos & Papadopoulou, 2021). Thus, both the stakeholders and the organisation have the propensity to have the influence so they can control the other party's decisions regarding resource use and the means used to exploit those resources.

In any supply chain, stakeholders have control over the focal organisation when they can exercise their will to place conditions in the relationship, in a way that influences the focal firm's use of its resources. For instance, suppliers and customers can require the focal firms to invest in certain technologies and show proof of viable sustainability initiatives as a condition to do business with them. As noted in the food industry, customers such as the NGOs and government are said to have power over the food organisations if they have the ability to influence the food manufacturing organisations' operations and strategies (Bhattacharya & Fayezi, 2021). Additionally, these stakeholders are said to have power over their food manufacturing organisations in cases where they can drive the implementation of sustainable food practices such as conservation of water, recycling and reuse of waste food and water. These stakeholders can also have a condition that they will only buy food products from those food manufacturers who source their grain from farmers that save water and energy and uphold other sustainability practices in their operations (Nilsson & Aquino, 2021).

Relationship legitimacy is another key element that makes a stakeholder acknowledge and make provision to continue doing business with the focal organisation. Freeman, Phillips and Sisodia (2020) demonstrated that in relationship legitimacy, a social building of truth is the assessment of the validity of stakeholders. In other words, relationship legitimacy involves stakeholders validating whether or not an organisation is the right one to exist in their network or society. More so, the perceptions of the stakeholders on whether an existing organisation is the right one to exist in their supply chain is influenced by different factors such as social norms and acceptable practices, organisational principles, ideals and strategies, the nature of organisational control, personal values and beliefs, and even separate meanings (Miles, 2017; Freeman et al., 2020). Likewise, management's opinion of a stakeholders' legitimacy may or may not coincide with its own notion of legitimacy. Thus, organisations should also seek stakeholder legitimacy, since stakeholders would see the organisation's actions as an agreed practice to legitimise the company (Miles, 2017).

Stakeholders gain legitimacy if they have a legitimate business standing and argument emanating from the contractual, commercial, moral or legal rights, transfer of ownership, or risk status as a foundation for the validity of the partnership (Painter, Pérezts & Deslandes, 2021). A relationship is said to be legitimate when the stakeholders have the capacity to remain satisfied and convinced that, for instance, the existing food organisations are the right ones to exist in the food industry. This will depend on whether these organisations are adhering to the conditions such as those of implementing sustainable practices in the operations and management of food supply chains (Bischoff, 2021).

More so, a relationship between the stakeholders is only considered to be salient if the stakeholder concerned has the capacity to enforce its will or if its argument is considered urgently necessary. Therefore, the third aspect, urgency is connected to the claim's relevance and attention. This factor is defined by Theodoulidis, Diaz, Crotto and Rancati (2017) as time sensitive (claims that need to be taken into consideration right away) and urgency (claims to be critical and highly pertinent). These three characteristics in various combinations (power, urgency, authority) have led to the classification of seven stakeholders by Theodoulidis et al. (2017). In order to provide a forum to strengthen stakeholder organisational management activities, Painter et al. (2021) implemented a systematic stakeholder management model. In an organisation, this six-part methodology can be used and provides several tools for categorising stakeholders and their interactions, as well as the methods of Miles (2017) and Theodoulidis et al. (2017). Another common framework for categorising or ranking stakeholders has been developed by Friedman and Miles (2006). They theorised that the degree of power and stakeholder participation is expressed by the different forms of dialogue between stakeholders and organisations. The lowest level of authority is defined by non-partnership, while a multi-stakeholder discussion with significant implications for decision-making of the organisation is the highest level (Ramoglou et al., 2021). In other words, the greater the rank, the greater the interdependence and collaboration between stakeholders.

All these different stakeholder theory viewpoints ultimately converge in favour of the belief that SFSCM is only efficient if businesses understand the influence of all parties in their vicinity and how to interact with them so that, in particular, the food industry has a lasting supply chain (Eskerod & Larsen, 2018).

The significant disadvantage of stakeholder theory is that it tackles just a subset of the stakeholders' multidimensionality and so misses others. In other words, present stakeholder categorisation frameworks are mono-dimensional and insufficient for creating a sophisticated, multidimensional stakeholder image (James, 2016). Eskerod and Larsen (2018) argued that existing frameworks for stakeholder management are insufficient to clarify holistic and multi-stakeholder relationships between stakeholders and company management. The stakeholder theory has difficulties in terms of explaining the dynamics of power interactions between stakeholders or between enterprises and their partners from a network viewpoint. Nonetheless, the significance of power in stakeholder interactions should not be overlooked, since the strength of particular stakeholder groups can function as an institutional element (e.g. by establishing a powerful non-governmental organisation) affecting organisational operations and even the organisational field (Bischoff, 2021). The next section discusses the legislative framework.

2.4 THE LEGISLATIVE FRAMEWORK

Zimbabwe demonstrates a strong political will, as seen by the government's ratification of national, regional, and international policies. In June 2011, Zimbabwe embraced the scaling up nutrition campaign. Zimbabwe is also a signatory to additional regional and international food and nutrition security policy frameworks (as detailed in Table 2.1), including the United Nations' Sustainable Development Goals (SDGs), The Africa We Want Agenda 2063, the African Regional Nutrition Strategy, and the SADC Regional Food and Nutrition Strategy 2015-2025 (Thopacu, 2021). Zimbabwe joined the Comprehensive Africa Agriculture Development Programme in November 2013 in accordance with the Malabo Declaration, which set the course for Africa's agricultural transformation from 2015 to 2021 (Mkomwa, Kassam, Bwalya & Shula, 2022). In this programme the majority of farmers have access to agricultural consulting services, and it is recommended that efforts be made to boost social protection and improve food security and nutrition. However, a number of sectors require improvement to fully transform the food system, including increased public investment in agriculture, increased access to agricultural inputs and technologies, increased investment in resilience building, and strengthened agricultural data collection and management systems in Zimbabwe (Murendo, Aziz, Tirivanhu, Mapfungautsi, Stack, Mutambara, Langworthy & Mafuratidze, 2021).

The Food and Nutrition Council, which is housed in the Office of the President and Cabinet, coordinates a multi-stakeholder platform that brings together cross-sector stakeholders, and its leadership is critical in advancing scaling up nutrition through the food and nutrition security committees at the national, province, district, ward, and village levels (Mkomwa et al., 2022). This demonstrates that nutrition is a top priority at the national level, as reflected in important national policies. Thus, the Zimbabwean government (GoZ) is committed to ensuring that its people have access to enough and healthy food, as established in the Zimbabwean Constitution (Food and Nutrition Council, 2012).

The first National Development Strategy, 2021-2025, is crystal clear on the country's vision 2030 aspiration: "to become an empowered and prosperous middle-income society by 2030" fuelled by a strong food and nutrition security framework (Chipango, 2022). It establishes the national rhythm for food system transformation in Zimbabwe. The food and nutrition security policy, launched in 2013, and its recently revised execution framework, the Multisectoral National Food and Nutrition Security Strategy (2021-2025), also detail the national effort to achieve the sustainable development goals of "elimination of poverty, hunger, and all forms of malnutrition" by 2030 (Chari et al., 2021).

The National Agriculture Policy Framework (NAPF) (2018-2030) led by the Ministry of Lands, Agriculture, Fisheries, Water, and Rural Resettlement provides clear instructions for the agriculture sector to contribute to more beneficial nutrition outcomes (Kugedera, Sakadzo, Museva, Chivhenge, Kugara, & Chimbwanda, 2021). The NAPF (2018-2020) states as one of its guiding principles that Zimbabwe's agriculture industry would be nutrition sensitive. Agricultural investments and interventions will place nutritionally enriched foods, dietary variety, and food security at the centre of the fight against malnutrition and micronutrient deficiencies. Additionally, food system transformation is clearly defined in the Agriculture and Food Systems Transformation Strategy (2019-2023), which was heavily influenced by the 2014 Malabo Declaration and the 2030 Agenda for SDGs. This is crucial given that 67% of the population lives in rural regions and subsists on smallholder farming (Mkomwa et al., 2022).

The other regulatory body controlling SFSCM in Zimbabwe is the Environmental Management Agency (EMA). EMA is a legislative organisation charged with ensuring sustainable natural resource management and environmental protection, preventing pollution and environmental deterioration, as well as developing environmental plans for environmental management and protection. It was formed in 2002 pursuant to the Environmental Management Act [Chapter 20:27]. EMA regulates across the supply chain of food in the country, from the production (through environmentally friendly means), storage, and distribution (regulates on emissions in transportation of food products) to the consumers (regulation of wastes from food products generated by consumers) (Pisa, Raine-Bennett, Reed, Gatz, Getahun, Schoendorf, Postlethwaite, Fassett, Peipert, Saltus & Merchant, 2022).

With regards to irrigated food, the Zimbabwean government has long recognised irrigation as a critical component of agriculture, as evidenced by the count of policies identifying irrigation as a necessary component. Zimbabwe recently introduced an irrigation policy, and the Accelerated Irrigation Rehabilitation and Development Plan (2021-2025), with the goal of increasing annual cropping area by 50% and expanding irrigation area to 400 000 hectares through rehabilitation of existing irrigation schemes, construction of irrigation infrastructure throughout the country, and the establishment of the Presidential District Irrigation Vision 2030 Accelerator (Ziwira, 2020). This strategy aims to boost water efficiency, farmers' access to financial assistance, markets, and inputs, and to strengthen the country's governance and irrigation infrastructure. Irrigation is highly dependent on rainfall quantity and climate change, and as a result, an insufficient and unstable water supply has an adverse effect on irrigated agriculture, resulting in water stress and decreased crop production and quality in the country (Parry, Wani, Yaseen, Dar, Choh, Khan, Shah & Jehangir, 2020). Numerous factors contribute to Zimbabwe's high failure rate in irrigation, including the lack of coordination among some small-scale irrigation schemes and the lack of collaboration among stakeholders in the supply chain (irrigators, input suppliers, markets, extension staff, and governance systems), which results in system malfunctions and negative profit margins (Van Rooyen, Ramshaw, Moyo, Stirzaker & Bjornlund, 2017).

Table 2.1: Policies relating to food systems transformation in Zimbabwe

Policy / Strategy/ Regulation	Relevance to food security transformation agenda
Food and Food Standards (Food Labelling) Act, Chapter 15:04 amended under statutory instrument 236 of 2019	• The Food and Food Standards (Food Labelling) Act, Chapter 15:04 amended under statutory instrument 236 of 2019 is one of the current food safety and control regulations passed in Zimbabwe. This regulation has the following main general labelling requirements: recommended name; legibility requirements; food recall information; ingredient specifications; expiry date information; nutrition labelling; percentage labelling; directions for use and storage; country of origin; and mandatory advisory statements and declarations. These requirements help consumers to check the safety of food before consumption. • For example, the amendment of the Food and Food Standards (Food Labelling) Regulations, Act, Chapter 15:04 under statutory instrument 236 of 2019 provided that cereal foods containing gluten (a structural protein that may affect health) should be clearly labelled for consumers to see before they make a purchasing decision (Tekwa, and Tekwa, 2022). Within the first month of the amendment, organisations in the cereal food production system complied with the new practice as the ministry of health had advised to withdraw food licences from all those who would not comply (Toriro & Banhire, 2021). • The requirement of this legislation also enables food organisations to recall any food products that are deemed unsafe for consumption. Such recalls also lead to several other SFSCM practices, e.g. the handling, transportation, warehousing of the recalled food products, as well as waste management of such food products should the products be deemed unsafe for consumption and value cannot be salvaged out of the product.
National Development Strategy NDS-1 (2021-2025)	• Consistent with the 2030 Sustainable Development Goals concept of "leaving no one and no place behind," and also The Africa We Want Agenda 2063. • 14 multi-sectoral national priorities conducive for food system transformation. • Rebalancing the economy and reversing structural regression are two aims. The objective is to gradually increase the secondary sector's contribution to GDP from 10.6% in 2020 to 15% in 2025.
Food and Nutrition Security Policy (2013)	• The policy establishes a framework for sectoral plans and programmes related to food and nutrition security, allowing for coordinated and cost-effective action. • The seven commitment areas define the sectoral duties and obligations of the various food and nutrition stakeholders. • It embodies a unified vision for food and nutrition security, toward which all ministries and partners may collaborate. • The establishment of food and nutrition panels sought to make diverse stakeholders accountable for their contributions to obtaining the desired results ranging from equitable access to nutritious food, food waste minimisation, and food waste management, among other SFSCM practices
Multisectoral National Food and Nutrition	• Was reviewed in 2021 following the expiration of the national nutrition plan (2014-2018) in order to ensure alignment with the first National Development Strategy.

Policy / Strategy/ Regulation	Relevance to food security transformation agenda
Security Strategy (MNFNS) (2021-2025)	• The MNFNS serves as the basis for implementing the National Food and Nutrition Security Policy. • A multi-sectoral strategy was taken to address nutrition-specific as well as nutrition-sensitive initiatives. • The Government of Zimbabwe pledged to address chronic food insecurity and malnutrition using a multi-sectoral approach.
National Agriculture Policy Framework (NAPF) (2018-2030)	• The NAPF's overarching purpose is to give policy guidance and direction on how to encourage and support a sustainable flow of investments in order to change agriculture via higher and sustained agricultural production, productivity, and competitiveness.
Agriculture and Food Systems Transformation Strategy (2019-2023)	• The overarching goals outlined in Vision 2030, the 2014 Malabo Declaration, and the Sustainable Development Goals (SDGs) • Vision 2030: *"ensuring food and nutrition security and significantly contributing to national development in the face of increasing population and climate change"* • Four pillars of the strategy: 1. Creating an enabling policy and regulatory environment for agriculture 2. Appropriate investment in agriculture for productivity, food security, and resilience 3. Efficient agricultural knowledge, technology innovation system 4. Coordination, supervision, and evaluation.
Agricultural recovery plan (Maize, Wheat and Soya bean production Recovery Plan)	• The recovery plan is an excerpt from the Agriculture and Food Systems Transformation Strategy, which aims to reverse negative production trends and achieve agricultural self-sufficiency. • It aims to eliminate the country's reliance on imported crops, as well as the monetary strain imposed on Treasury, and eventually to put us on track to achieve Vision 2030.
Environmental Management Agency (EMA)	• Prevention of pollution in food supply chain • Sustainable natural resource management.

Source: Food and Nutrition Council, 2012; Africa SDG Index and Dashboards Report, 2020; Chari et al., 2021; Kugedera et al., 2021; Mkomwa et al., 2022 & Pisa et al., 2022

Despite significant success in implementing the Food and Nutrition Security Policy (2012), the National Nutrition Strategy (2014-2018), and other sector-specific interventions in agriculture, education, health, trade and industry, among others, Zimbabwe's food insecurity has continued to grow.

2.5 CHAPTER SUMMARY

This chapter provided an overview of the food industry, from a global, continental and Zimbabwean perspective. The overview brought out the food industry's contribution to

economic growth, challenges, trends, sustainable supply chain initiatives, and the future outlook of the food industry worldwide and in Zimbabwe. Additionally, the chapter focused on three theories: dynamic capacities (DC), institutional theory (IT), and stakeholder theory (ST). Dynamic capabilities theory is used to theoretically ground the proposed relationships between SFSCM drivers and SDCs in the food industry; SFSCM practices and SDCs in the food industry; as well as between SDCs and SFSCM performance.

This chapter also used the institutional theory as a basis to explain the hypothesised relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers and SFSCM performance. The chapter further used the stakeholder theory as a basis to understand and explain the proposed relationships between SFSCM practices and SFSCM performance, as well as between SFSCM drivers and SFSCM performance. Lastly, the chapter discussed the legislative framework that governs the food industry in Zimbabwe.

The next chapter (Chapter 3) reviews literature on SFSCM.

CHAPTER 3
SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT (SFSCM)

3.1 INTRODUCTION

It is becoming evident that the traditional approach to supply chain management is unsustainable, and firms are altering their processes to meet requirements for sustainability. This results in organisations being identified as one of the means to facilitate the implementation of sustainable supply chains in different nations, in addition to the requirement to serve stakeholders' interests and produce a competitive advantage for institutions. Industry and literature interpret sustainability in a variety of ways and with a variety of terminology. This chapter explores deeper into the concept of SFSCM and variables that strengthen the concept. SFSCM variables being reviewed in this chapter include SFSCM drivers, SFSCM practices, SDCs, and SFSCM performance on a theoretical and empirical basis. The variables are elaborated in the following subsections

3.2 SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT (SFSCM)

SFSCM is a term that is comprised of three concepts which are supply chain management, sustainability and food. These three intertwined terms are explained in more detail in the next subsections

3.2.1 Supply chain management (SCM)

Supply chain management is an interconnected collection of organisations that control information, money, and commodity flow from a place of origin to a place of consumption with the objective of maximising the satisfaction of consumers and reducing the overall costs to the organisations involved (Cavinato & Kauffman, 2000:145-146). SCM was further described by Grant, Trautrims and Wong (2017:9) as the planning and management of all activities involved in sourcing and procurement, transfer, and all activities of logistics management. Importantly, communication and cooperation with channel partners, who may be vendors, brokers, third-party service providers and clients, are also included. Supply chain management combines, basically, supply and demand management within and through industries (Masood et al., 2022). It is the process of "managing the flow of physical commodities and related information from the point of sourcing to the point of consumption in order

to provide increased customer and economic value" (Alameda County SBDC, 2017:17). As stated in Figure 3.1 by Alameda County SBDC (2017), SCM is an end-to-end process that focuses on the flow of demand products, and information between upstream and downstream.

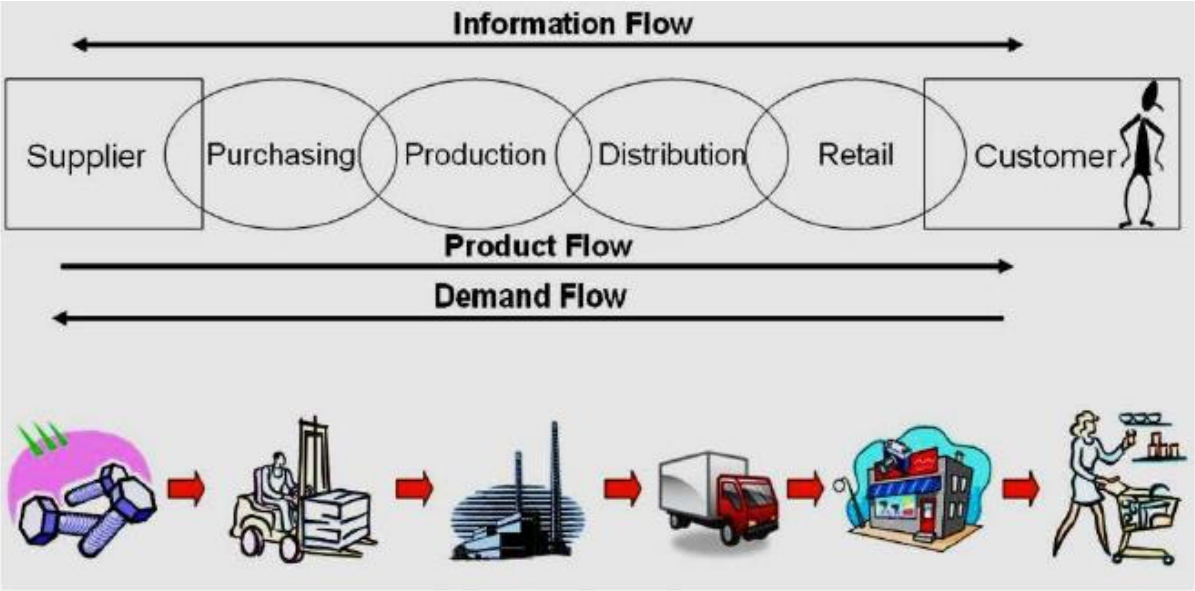

Figure 3.1: Supply chain management process

Source: Alameda County SBDC (2017:17)

The three definitions of SCM above all focus on three key elements. First is the notion of information, cash/demand, and product flows between upstream and downstream organisations. Traditional business practice has been there to independently handle these flows. They are treated in parallel way in an SCM environment. The second is the maximisation of satisfaction with consumption. This acknowledges the importance of the ultimate system of a supply chain rather than the significance of just the next channel participant. Third, the aim is to minimise overall costs for all supply chain organisations involved. According to Sgarbossa and Russo (2017), historically many businesses concentrated on minimising their costs detriment of their suppliers and/or clients. SCM includes the minimisation of overall costs for all participants. In every industry, SCM is a new way to do business, requiring major changes in many organisations.

3.2.1.1 Food supply chain management

Food supply chain management refers to the management of the flow of food, related products, information and money between upstream and downstream

supply chain stakeholders (Hajimirzajan, Vahdat, Sadegheih,Shadkam & El Bilali, 2021:713). According to Li, Shi, Si, Fu, Zhang, Jiang, Dai, Shen and Yuan (2022), food supply chains involve all the operations necessary to transform food items (i.e. raw materials) into foodstuffs ready for consumers, from sourcing through production, packaging, transportation, and distribution as well as their management and documentation. Figure 3.2 presents a typical food supply chain.

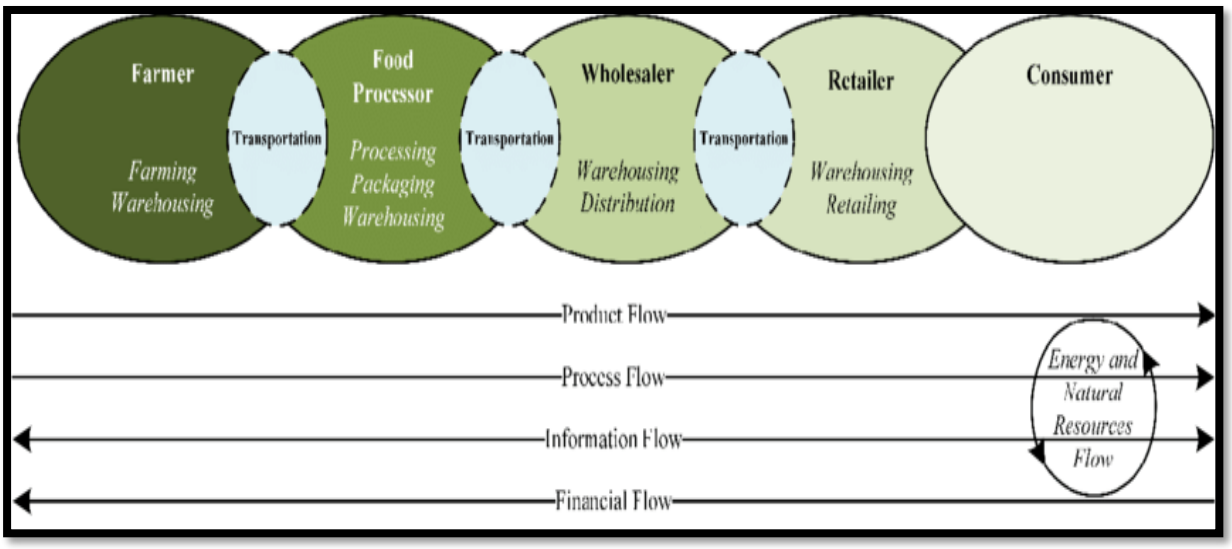

Figure 3.2: A typical food supply chain

Source: Tsolakis, Keramydas, Toka, Aidonis and Iakovou (2014)

As shown in Figure 3.2, the food supply chain typically comprises activities ranging from farming, industrial food processing, packaging, warehousing, distribution, and retailing (Tziantopoulos, Aivazidou, Iakovou, & Vlachos, 2015). The food supply chain involves the following: i) energy and water flows, ii) process and technology flows, iii) information flows, iv) financial flows as well as product flows between the food supply chain stakeholders (Tziantopoulos et al., 2015). Food supply chain stakeholders are individuals, organisations or associations who may affect the achievement of food-related goals of an organisation or that are affected by the execution of the food organisations (Ekren, Mangla,Turhanlar, Kazancoglu & Li, 2021). In the sense of food supply chain management, partners, such as food producers, distributors customers or suppliers of food rawmaterials may be part of the food supply chain and are referred to as stakeholders (Meixell & Luoma, 2015). In the food industry, primary stakeholders are mainly the final consumers, retailers, wholesalers, suppliers, distributers, organisation employees, while governments,

non-governmental organisations (NGOs), trade associations, competitors, society, and the media are secondary stakeholders (Meixell & Luoma, 2015; Rebs, Tobias, Brandenburg, Seuring & Margarita, 2018:201).

In a typical Zimbabwean cereal supply chain, farmers supply grain products (such as maize, wheat, finger millet and sorghum) to the food processers (such as National Foods Limited and ProBrands) for further value addition in the form of processing and packaging. The food processors then send the packaged processed food to the distributors (such as the Swift and Barrs Trucking) who transport the proceessed food to the wholesalers' and retailers' warehouses and stores from where the final consumers can buy the food products. In all the stages through which raw, processed and waste food goes, relevant information is gathered and shared for example information about sales data, product traceability and customer suport (Bechoff et al., 2022).

In order to manage food supply chains effectively, material quality, processing methods, storage conditions, and existing quality, among others, must be tracked at each point in the supply chain (Mapfeka et al., 2019). Synchronising and exchanging food supply information is crucial for allowing food consignment traceability, collaboration, coordination and optimisation of operations, product uniformity and quality control, regulatory compliance, and, ultimately, consumer safety and satisfaction (Kurihara, 2018). The next section discusses sustainable supply chain management.

3.2.2 Sustainable supply chain management (SSCM)

Sustainability evolved from sustainable growth, which is defined as "development that meets present needs without risking the ability of future generations to meet their own." (World Commission on Environment and Development 1987:16; Chkanikova, 2016:15). Essentially, sustainable development focuses on meeting the dimensions of the triple bottom line (TBL) (Grant et al., 2017). The TBL is a concept that takes into account all three elements of sustainable development, notably social, economic and environmental development (Beske, 2012:374; Gurzawska, 2019). Supply chain sustainability therefore leads to the development, preservation and growth of all stakeholders involved in bringing long-term environmental, social and economic value.

SSCM was further defined by Beske et al. (2014:132) and Chkanikova (2016) as information management, materials, and financial resources participation and coordination within organisations and companies along the supply chain, while taking into account TBL goals derived from stakeholder requirements. As a metric for performance, SSCM considers the entire life cycle of the product using the TBL way (Rota, Reynolds & Zanasi, 2013:45). Beske et al. (2014) clarified that in past research and practice, the social aspects of sustainability were largely ignored. This calls for a balanced report on the sustainability of the supply chain that treats all three factors equally.

3.2.3 Sustainable food supply chain management (SFSCM)

SFSCM is defined in many ways. According to Beske et al. (2014:135), SFSCM refers to the provision of nutritious, safe food products that respond to customer needs and ensure that customers can obtain wholesome and accurate information on food products. It is also defined as a supply chain system that supports urban and rural communities' variety and economic viability (Burey, Panchal & Helwig, 2022:19). SFSCM has also been regarded as the coordination of supply chain operations that consistently achieve excellent levels of environmental performance by cutting resource inputs, energy use, and utilisation of as much renewable energy as possible. (Valentina & Savvas, 2022:396). It is further referred to as the management of supply chain operations that promote a safe and healthy environment, and clean workplace environment with widespread social welfare and education for all critical players taking part in the food supply chain (Gunarathne, Navaratne, Gunaratne, Pakianathan & Perera, 2021:288). According to Rahimifard and Jagtap (2018) and Figure 3.3, sustainable food supply chain management must be able to guarantee food security through production and consumption of ecologically responsible products, manufactured locally with local resources, accessible, affordable and fairly distributed, healthy and producing no waste.

Figure 3.3: Sustainable food supply chain management
Source: Rahimifard & Jagtap (2018)

Paloviita (2017) further expanded that a sustainable food system meets availability, price, and accessibility demands, is varied, environmentally sound, and resilient, and develops future generations' capacities and skills. Li, Wang, Chan and Manzini (2014:2), on the other hand, advised that food supply chains become complicated when they involve a variety of stakeholders, from farmers to those who add value (processing) and those who transport to higher levels of distribution, such as wholesale and retail and eventually to the end user. Complexity also grows when a variety of different foods are involved, each with its own distinct and frequently diverse and fragmented supply chain. Additionally, consumers (ultimate stakeholders) typically place a premium on whether their food is produced responsibly, from production to consumption (Iakovou et al., 2016).

A number of authors (Beske, 2012:374; Chabada, Dreyer, Heidi, Romsdal & Powell 2013; Rota, Reynolds & Zanasi, 2013; Li et al., 2014; Rebs, Tobias, Brandenburg, Seuring & Margarita, 2018; Accorsi & Manzini, 2019; Gurzawska, 2019; Karman & Savaneviciene, 2021) agreed that attaining SFSCM necessitates the participation and collaboration of major supply chain management stakeholders. All of the authors stated above agreed that accountable key stakeholders must be involved in supply

chain processes. As a result, an SFSCM stakeholder framework is required to provide a road map to food security in the unforeseeable future.

Chkanikova and Mont (2012:67) stated that identifying significant stakeholders and recommending stakeholder management techniques is critical in developing successful SFSCM. Risk management by supply chain stakeholders has also been acknowledged as critical requirement to achieve SFSCM (Reefke & Sundaram, 2017; Rebs et al., 2018:198).

Despite its growing popularity in recent years, SFSCM is still poorly presented in the literature (Gurzawska, 2019). Furthermore, most organisations want to pursue sustainability and engage in SFSCM activities in order to respond to rewards and obligations from their immediate environment, which may include governments, pressure groups, NGOs, and a variety of other stakeholders (Chkanikova, 2016). Such organisations lack a specific design or strategy for achieving SFSCM in the absence of external constraints and incentives (Beske 2012:374; Beske et al., 2014). As a result, the authors indirectly advocate the need for an SFSCM stakeholder framework.

Rota, Reynolds, and Zanasi (2013:45) and Gurzawska (2019) agreed that the concept of a SFSCM should characterise a successful approach to gaining a competitive advantage and gaining the agreement of stakeholders every time. According to Govindan, Shaw, and Majumdar (2021), sustainable food supply chain management expands the notion of sustainability from an isolated organisation or business to the broader supply chain level, incorporating the entire value chain of organisations. In this context, sustainable supply chain management necessitates the participation and collaboration of a number of critical players. While it is important to adopt a holistic approach to the key stakeholders, the majority of authors (Beske et al., 2014; Li et al., 2014; Rebs et al., 2018; Accorsi & Manzini, 2019) only focused on the government, suppliers, and consumers as the core stakeholders. As a result, the approach's completeness suffers because crucial SFSCM influencers like food growers, processors, wholesalers, distributors, and retailers were not included. Few studies (Chkanikova & Mont, 2012; Kao, Redekop & Herbert, 2012; Rota et al., 2013:45) concentrated on producers and retailers as the primary stakeholders that matter in SFSCM, disregarding other important stakeholders.

It has been noted that there is no confirmed study on SFSCM in Africa, especially in Zimbabwe.

Apart from other sectors, focus is given to the food sector because of a collection of distinctive features which distinguish the sector from other industries. Food is essential for billions of people on the planet therefore the food industry is the most needed industry in the world. Iakovou et al. (2016:3) identified important features of the food industry that involve SSCM which are critical. These features include the exclusive nature of products that may be perishable and with life cycle that is short in most cases; product differentiation that is so high; presence of seasons in manufacturing and harvesting processes; quantity and quality differences of the necessary inputs and processing yields; as well as specialised requirements with regard to storage conditions or the need for secure transport.

Stakeholder participation and cooperation may provide SFSCM with many main benefits, including greater public recognition; greater legitimacy of initiative achievement, increased communication, and a higher possibility of having an impact on decision-making (Haddaway, Kohl, Rebelo da Silva, Schiemann, Spok, Stewart, Sweet & Wilhelm, 2017:2). In sub-Saharan third world countries, cereal food supply chains are intricate as they usually involve a number of small-scale producers or farmers with an entrepreneurial mindset but restricted market access and knowledge, and most of them have exceptionally extensive travel distances to their destinations (Nakamba, Chan & Sharmina, 2017; Tsolakis, 2018). To ease the process for farmers and manufacturers, these problems include the participation of intermediaries. Intermediaries, however tend to inflate prices, endanger the standard, decreasing net revenues and ultimately increasing food waste and loss for farmers, all of which eventually and directly affect the supply of food, food security and sustainability (United Nations Environment Programme, 2021; Iakovou et al., 2016).

So far there is no known SSCM programme for grain or cereals in Africa (FAO & RUAF, 2019; AGRA, 2021; Raza et al., 2021). However, a much closer example was in 2012, when South Africa had a research programme managed by the SFSCM consulting company of the Moss Group. In terms of a sustainable food retail supply chain, Pick n Pay, Massmart, SPAR, Shoprite, and Woolworths are the "big five" South African food merchants which were surveyed. The research conclusively viewed stakeholder

participation in the South African retail sector as a vital and strategic aspect of achieving SFSCM (Group-Moss, 2012). No literature has been retrieved on the successful implementation of suggestions proposed by consultancy Moss Group.

In comparison, from 1986 to 2011, Ghana experienced a successful programme on SSCM for tomatoes. Training programmes and participation of all major stakeholders contributed the most to their positive performance from 38.9 tonnes in 1989 to 340 tonnes in 2011 (Agyekum, 2015:6). Therefore, it is important to identify the key stakeholders, collect the requisite risks and challenges and identify practices in the food system to adhere to (Borsellino et al., 2020).

In the Zimbabwean context, as per the UN Data (2020), Zimbabwe's population has increased by over two million people between 2010 and 2020 alone. Cereal production has decreased by over 187 thousand metric tons, according to comparisons over the same period (FAO, 2020; World Bank Group, 2020). The food sector requires an improved supply of high-quality raw materials as the world's population grows and the demand for food increases. On the supply side, nevertheless, there is uncertainty regarding the industry's ability to meet expanding demand in terms of quality and yield improvements, which are impacted by challenges such as changing climate, water scarcity, land use, and farmer output drops (Emamisaleh & Taimouri, 2021).

Generally, food supply chains in underdeveloped nations are more complicated, as they often involve –small-scale farmers with less than two hectares, limited access to expertise and markets, and with great distances to travel (Rahimifard & Jagtap, 2018). These issues include a substantial degree of intermediation, which raises costs, jeopardises product quality, increases food loss and waste, and finally affects farmer earnings, all of which have a substantial impact on food supply (Bhattacharya & Fayezi, 2021).

3.3 DRIVERS FOR SFSCM

Companies are forced to implement sustainable supply chain policies by internal and external factors such as stakeholders' (customers, society, investors, the government, employees and suppliers) requirements (Iakovou et al., 2016), legislation and incentives, among others. These variables are referred to as determinants, drivers, or enablers. SFSCM drivers were identified by Caniato et al. (2017) as the forces driving organisations to implement distinctive food sustainability initiatives. Li and Ye (2014)

further described SFSCM drivers as extrinsic variables that assist and inspire the implementation of SSCM practices within the food industry. Thus, SFSCM drivers might be characterised as "engines or influencers that enable or push food institutions to adopt sustainable supply chain efforts" (Gunarathne et al., 2021). However, many forces have varying degrees of effect on supply chain decisions. For example, the media may have an effect on purchase decisions, while stockholders have a greater influence on logistics supply chain decisions. Similarly, personnel and non-governmental organisations have varying influence on social decision-making, while regulatory bodies have a greater influence on the TBL's environment (Saeed & Kersten, 2019).

In order to enhance more understanding, SFSCM drivers in this study analysis are classified as internal and external, based on their level of effect. Internal SFSCM drivers are those that influence the organisation to practise SSCM from within the organisation such as the driving effect from employees, departments, senior managers or general internal systems. External SFSCM drivers are the influence that comes from outside the organisation for example from customers, suppliers, the government, competitors or generally from the external environment (Brockhaus et al., 2013). Table 3.1 explains internal and external categories of SFSCM drivers.

Table 3.1: Drivers for SSCM in the food industry

External Drivers	Internal Drivers
Market pressure	Corporate strategy
Societal pressure	Organisation’s culture
Regulatory pressure	Organisation’s resources
	Organisation’s characteristics

Source: Saeed & Kersten (2019)

As shown in Table 3.1, external drivers are categorised broadly as market pressure, societal pressure and regulatory pressure. Internal drivers are broadly classified as corporate strategy, organisational culture, organisational resources and organisational characteristics.

3.3.1 External drivers of SFSCM

According to Conner (2020), organisations tend to take sustainable steps to avoid disadvantages or fines as external coercive, regulatory and socio-cultural pressures increase. External (exogenous) forces have external components, but they have an important effect on organisations' internal behaviour. As demonstrated in Figure 3.4, focal organisations are described in three categories and are instigated or inspired by SSCM external drivers (social pressures, regulatory pressures, and commercial forces). External driver categories were defined to include five drivers for regulatory pressures, six drivers for social pressures, and eight drivers for market pressures (Saeed & Kersten, 2019).

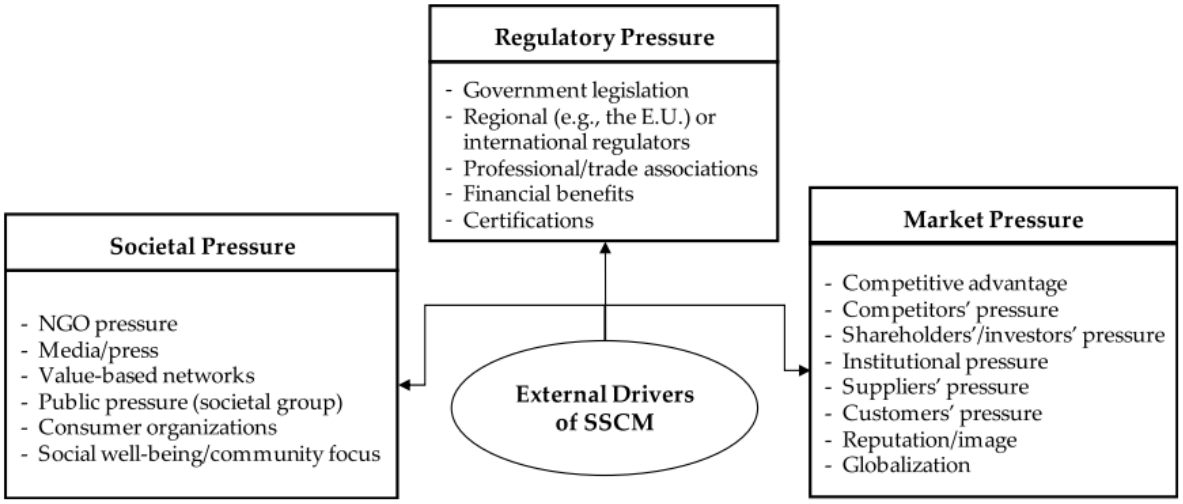

Figure 3.4 : External pressures of SSCM

Source: Saeed & Kersten (2019)

3.3.1.1 Food security and regulatory pressure

Zimbabwe's food and nutrition policy emphasises the nation's obligation to prevent malnutrition, hunger, and overall food insecurity, which continues to be a major problem in the 21st century (Food and Nutrition Council, 2012; Kanonhuwa et al., 2021). Food security has also become a worry in Zimbabwe as a result of climate change, shifting food pricing, and concerns of a worldwide economic disaster (Chowdhury & Quaddus, 2021). Additionally, food security has grown into a concept that is pertinent to the bulk of consumers as a result of public health efforts to improve nutrition (High Level Panel of Experts, 2020; Raza et al., 2021). According to Sundram, Chandran and Bhatti (2016), the ultimate driver for the food economy's structure and

dynamics is what occurs off farms in terms of operation, retailing, and food service. The basic driver of a sustainable food system is to feed everybody sustainably, fairly, and in a manner that promotes good health (Sustainable Development Commission, 2009). The FAO defines food security as an external driver that pushes for the availability, affordability, and accessibility of food, and the amount of food produced, stock levels, net trade, incomes, expenditures, markets, and pricing of food (FAO, 2020). As a result, food security has become a critical factor in driving the sustainability of food supply chain management, particularly in Zimbabwe.

In order to achieve food security, a number of regulatory drivers have been enacted in nations and the international world. The pressure to enforce such laws emanates from government authorities, regulators at the regional or international level, such as ISO certification, trade or professional affiliations which are included under the regulatory pressures controlling food supply chains (Accorsi & Manzini, 2019).

Government regulations are designed to meet the demands of both existing and upcoming legislation. Legislation encourages institutions to adopt sustainable practices in their food supply chains by increasing knowledge of sustainability issues. Punitive damages and trade obstacles could be imposed for any violation of the rules. Additionally, in order to maintain their image and market domination, businesses that operate in numerous nations must research and abide by each country's or region's legal requirements (Mogale, Ghadge, Kumar & Tiwari, 2020).

Various nations and regions may impose differentiated rules requiring businesses to adopt eco-friendly practices and other sustainability practices in their activities and supply chain operations. With more pressure, organisations can improve their sustainability and efficiency drive (Accorsi et al., 2018). While improvements in economic performance will take time to manifest, improvements in non-economic (social and environmental) performance will encourage improvements in economic performance.

More so, any applicable local, regional, or global standards (for example ISO, and the Occupational Health and Safety Evaluation) can help business operations to incorporate sustainable practices. Normally each standard comes with a set of instructions that allow organisations to earn certifications by following the set laws (Liu, Bai, Liu & Wei, 2017). The promotion of sustainable supply chains via certifications

increases the likelihood that enterprises will adopt sustainable practices, for instance companies certified with ISO 14001 are more focused on their environmental sustainability success (Baliga et al., 2019). Additionally, certifications enable companies to increase operational effectiveness, obtain a competitive advantage, and grow market share (Bhattacharya & Fayezi, 2021). Institutions are affected by regulated financial benefits that come with different bodies such as tax exemptions for ISO 14001 certification (Chkanikova, 2016). However, some organisations proactively take environmental precautions and adhere to regulatory requirements without considering the financial rewards. The regulatory norms are still flexible for some corporate sectors, and some firms see it as their social responsibility to take proactive steps to embrace sustainable practices (Bhattacharya & Fayezi, 2021). Table 3.2 provides various regulatory drivers and their definitions.

Table 3.2 : Regulatory drivers

Regulatory Drivers	**Definition**
Government legislation	Government agencies are responsible for developing regulations related to labour relations, employment conditions, and environmental management. Non-compliance to these regulations results in fines, penalties, or legal costs for organisations.
Regional (e.g., the SADC.) or international regulators	Organisations operating in more than one country are influenced by national as well as supranational (regional and international) regulations to adopt sustainability-related practices as proposed by legislators.
Professional/trade associations	Organisations experience pressure from various sets of requirements proposed by trade/professional associations. Non-compliance can lead to penalties and exclusion of the organization from the members' list. Compliance can lead to benefits such as access to international markets.
Financial benefits	Various incentives are introduced by national and international institutions to stimulate organizations' proactive behavior in adopting sustainability practices. These are mostly in the form of financial incentives such as a tax exemption for obtaining ISO certification.
Certification	Certifications such as ISO certificates are international voluntary standards designed to help organizations in achieving product- or service-related ecological and social requirements derived from the needs of customers and other stakeholders

Source: Saeed & Kersten (2017)

3.3.1.2 Societal pressures

There are several non-profit organizations, including NGOs, activist groups, and communication networks, such as the press and media, support the sensitisation of supply chain sustainability and encourage businesses to enhance their sustainability performance by engaging the general public and collaborating jointly. The category of social pressure, which is described in Table 3.2, includes pressure from NGOs, the media, press organisations, and communities. The public's understanding of the organisations' inadequate social and environmental policies is aided by NGOs, the media, and the press (Zubair, Saeed & Larik, 2021). Information on sustainability is spread through the media, and NGOs are able to mobilize and bring together various players in sustainable development (Saeed & Kersten, 2017).

Mangun et al. (2021) contend that mechanisms founded on values like scientific disciplines may similarly encourage businesses to use creative approaches to meet their sustainability goals. A firm's social and environmental violations may result in a bad reputation and regulatory agency fines if the media and the general public express concern. The promotion of ethical business practices in the food industry has received a lot of support from consumers, civic pressure groups, and other community organizations. According to Bomler (2021), organisations' management of sustainability-related opportunities and difficulties has indeed needed to be more transparent. They have become more conscious as a result of greater public attention and involvement in social organisations and consumer groups of these organisations' efforts to improve local communities and address global warming, as well as maintaining healthy and safe food supply (Arabsheybani & Arshadi, 2021). Companies are under pressure to implement sustainable projects that reflect their own sense of commitment and commitment to social responsibility for them to gain competitive leverage (Emamisaleh & Taimouri, 2021). Table 3.3 focuses on the social pressures and provides a brief description of each.

Table 3.3: Societal pressures

Societal pressure	Description
NGO pressure	NGOs educate the public and exert constant pressure on businesses to adopt sustainability measures in response to their poor social and environmental outcomes. NGOs can bring communities or stakeholders together to discuss sustainability challenges, particularly in the food business.
Media/press	Public opinion is shared, produced, and organised through the media. Media coverage of sustainability issues can spark public and governmental attention, harm government legitimacy, and influence governmental behavior toward failing institutions.
Value-based networks Public	Scientific societies and research institutes are examples of value-based networks that also promote the development of innovative approaches to sustainable development of goods and operations.
Public pressure (societal groups)	Public awareness has increased as a result of issues like "global warming." The sustainability competence of organisations, in turn, has an impact on consumer purchasing behavior. The public exerts pressure on businesses to adopt sustainable practices.
Consumer organisations Social	Consumers are more organised than ever because of new technologies, marketing techniques, the emergence of consumer and lobby groups. Some of these organisations are engaged in eco-friendly initiatives.
Social well-being /community focus	Organisations are under pressure to adopt sustainable policies that meet the needs of local people (i.e. parks, colleges, charities) and the well-being of those whom they operate with.

Source: Zimon, Tyan and Sroufe (2020)

3.3.1.3 Market pressures

There is pressure on organisations and associated supply chains from a variety of demand drivers such as suppliers or shareholders, in order to gain a competitive edge and continue technological innovation. Market-related drivers generally emphasize long-term concerns about market success and connection building. As defined in Table 3.4, the category of market pressure includes downstream consumer along with competition from rivals, shareholders, customers and suppliers, investors, public perceptions, and financial institutions (Kamble, Gunasekaran & Gawankar, 2020; Zimon et al., 2020). Through external and internal examination, firms are driven to comply to sustainable practices by the desire to differentiate themselves from their rivals and achieve competitive advantage (Neilson & Gibson, 2021). Sustainable products and system development programs have been critical to sustaining a worldwide competitive edge.

Companies implement sustainability programs to suit the needs of their customers and to provide sustainable food items in order to maintain market competitiveness (Ying,

Shan & Tikuye, 2022). Competent sustainability practices place businesses under more responsibility (learning) to carry out sustainable initiatives with a focus on long-term economic sustainability in order to achieve the same level of sustainability performance as their competitors (Zimon et al., 2020). Additionally, other stakeholders' (such as shareholders or investors) needs and expectations promote efforts by organisations (particularly large organisations) to take sustainable action. Similarly, when businesses are engaged in wasteful practices, institutional pressure, such as that from banks, compels firms to solve the sustainability challenges caused by their activities, or face credit reductions or suspensions. In order to enforce sustainability programmes, manufacturers in the supply chain should have valuable ideas. Although suppliers are one of the significant drivers driving the supply chain and sustainability practices, the incorporation of sustainability initiatives across the supply chain network plays a crucial role (Beske et al., 2014).

Table 3.4: Market drivers

Market drivers	**Description**
Competitive advantage Competitors	Organisations develop green technologies or improve social and environmental efficiency to have a competitive advantage over their rivals.
Competitors' pressure	Companies are similarly thoroughly scrutinized by their competitors. Competitors who support sustainable business practices will establish industry norms, increasing the pressure on other businesses to follow.
Institutional pressure	Organisations are under constant pressure from banks, financial institutions, and other stakeholders to adopt sustainable practices. For instance, banks have the right to revoke or suspend credit if a company engages in unethical environmental or social behavior.
Shareholders'/investors' pressure	Companies must deal with demand from shareholders and investors when implementing sustainability programs. Investors might stop investing if sustainability performance is subpar.
Suppliers' pressure Customers	The involvement of manufacturers is essential for the supply chain's sustainability goals to be met. They influence businesses indirectly and encourage the adoption of sustainable practices.
Customer pressure	Consumer demands for sustainable goods has raised the pressure on businesses to embrace sustainable practices in both upstream and downstream supply chains.
Reputation/image	In order to satisfy stakeholder needs and improve the company's sustainability profile, organisations establish sustainability programs. In addition to improving staff morale, a strong brand image boosts an organisation's bottom line.
Globalisation	Companies are being compelled by globalization to implement sustainable supply chain processes. Consumers are less dependent

	on a specific product or supplier since they have more options and easier access to numerous markets.

Source: Kamble et al. (2020)

Customer pressure is a type of market pressure, and it motivates businesses to increase their sustainable effectiveness. In order to remain relevant in the market, companies extensively emphasize on customer needs to gain customer loyalty. (Aworh, 2021). This is because sustainable practices are associated with higher levels of consumer satisfaction (D'Adamo et al., 2022). Losing more customers due to non-compliance with customer standards might have an impact on an organisation's ability to generate revenue and general survival (Karmaker, Ahmed, Ahmed, Ali, Moktadir & Kabir, 2021). Therefore, controlling sustainability challenges is essential for organisations that benefit from brand recognition and credibility. Being a market leader in the use of sustainability techniques confers prestige and guarantees that a business acts as a role model for competitors, improving staff productivity and income (Basnet, 2013). More so, the desire for organisations to make sales to numerous overseas customers and exports might persuade businesses to adopt sustainable business practices. Globalisation not only places additional organisational and customer influence on companies to apply such environmental policies across their supply chain, but it also creates opportunities for global competitors to learn about sustainable actions (Raza et al., 2021).

3.3.2 Internal drivers of SSCM

SSCM's internal drivers include organisational dynamics backed by efficient objectives and business ideals. As illustrated in Figure 3.5, company strategy, business culture, corporate capital, and organisational attributes are among the internal (endogenous) determinants that have been recognised and listed by four institutional literature review clusters. Four corporate strategy drivers, five organisational culture drivers, six corporate capital drivers, and six corporate organisational characteristic drivers were recognized and listed (see Figure 3.5 below).

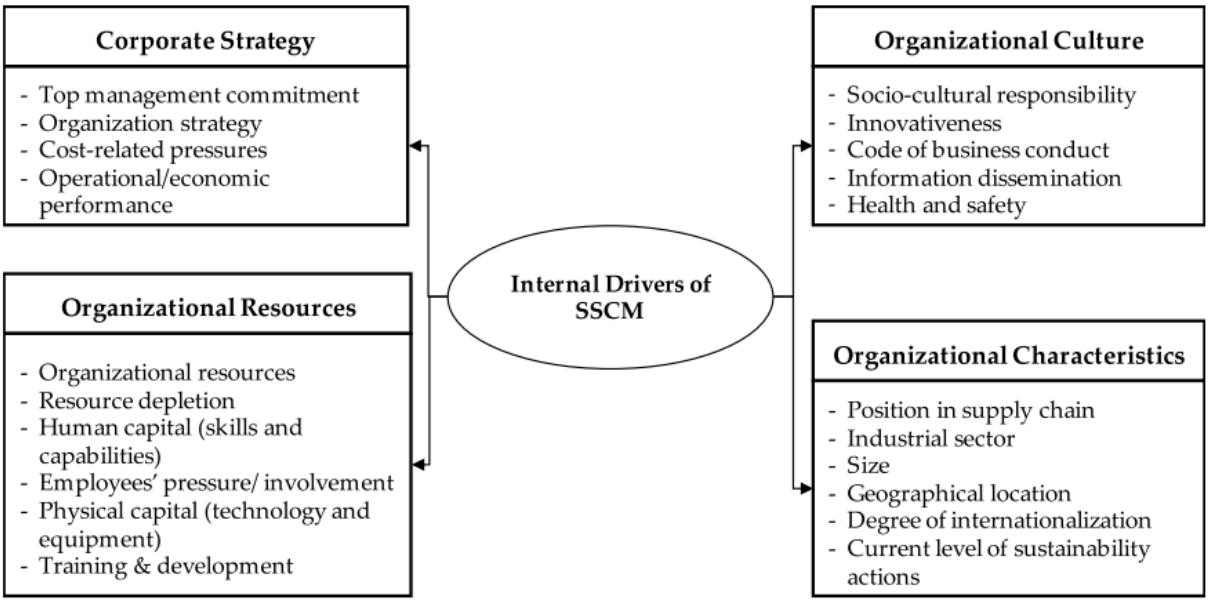

Figure 3.5: Internal drivers of SSCM

Source: Shibin, Rameshwar, Angappa and David (2020)

3.3.2.1 Corporate strategy

The organisational and financial goals of SSCM can only be attained with internal support inside the organisation and strategic sustainable performance priorities. High management engagement, the company's sustainability plan, cost pressure, and operational efficiency are all examples of the category of corporate strategy drivers as shown in Figure 3.5 (Zimon et al., 2020). In order to understand the sustainability challenges of stakeholders, top environmental management expertise is important, leading to the application of sustainability practices throughout the enterprise and throughout the entire supply chain. The achievement of sustainability across the supply chain would be a priority if the organisation's senior management were assured of prospective benefits, as top management is accountable for setting the organisation's vision and policies and for transmitting these policies to employees (Zhu et al., 2018). The help from senior executives is therefore regarded as an essential phase towards sustainability in the supply chain.

Companies will be motivated to follow a business plan by consumers' awareness of sustainability and willingness to buy merchandise in support of sustainable products while senior management determines business strategy and integrates sustainable development goals within it (Voronova, Khareva & Koshkin, 2022). By addressing sustainability-related concerns and putting sustainability strategies into place,

businesses can save money through preserving resources like energy, water, and materials. In return, businesses expand their profit margins and sustainability efficiency, cut expenses, improve customer loyalty and trust, and grow profit through sustainable practices (Liu et al., 2017). These lead to increased operational and economic efficiency which motivates companies to adopt sustainable business practices (Zeinstra et al., 2020).

3.3.2.2 Organisational culture

Growing consumer awareness and demand for sustainable products and services have been increased by environmental degradation and low social accountability of corporations (Rizzi, Annunziata & Gigliotti, 2021). The moral responsibility of organisations to society and their need to address stakeholder demands encourage organisations and their supply chains to embrace sustainable practices (Liu et al., 2017). The institutional culture driver group comprises information distribution, innovation, health and safety issues, and the institution's code of conduct. Socio-cultural duties are an organisation's moral duty to the community in which they function. Increasing public pressure encourages businesses to re-examine their sustainability-related supply chain practices but gives them chances to encounter new customers who want to buy sustainable products and improve their reputation as a sustainable business (Oriade, Osinaike, Aduhene & Wang, 2021). Innovativeness of products and processes is seen as proof of the purpose of an entity to alter and improve established environmental policies to achieve sustainable goals. While these innovations have strategic benefits, an initial economic downturn should be prepared by management. In order to recognise acceptable business conduct and other intergovernmental organisations, notably the United Nations (UN) and international labour organisations, have established rules as well. The code of ethics of a company is an internal driver for the adoption of sustainable policies and practices in order to meet stakeholder aspirations in compliance with the rules and regulations on a national and international level (Mangun et al., 2021).

Exchanging expertise externally and internally, however, is a requirement for reaching higher sustainability goals. The exchange of knowledge is a factor that determines how much sustainable practices are used will spur the development of innovative sustainability-related concepts and create a competitive edge through enhanced collaboration among supply chain partners (Erthal & Marques, 2018). Concerns about

issues with health and safety at work have existed for a long time in most industries. As such, organisations are under pressure from a variety of parties (NGOs, the media, employees, etc.) to reduce incidents at work that are linked to health and safety. Prioritising employee health and safety contributes to an increase in an organisation's overall sustainability efficiency (Dressler & Paunovic, 2021).

3.3.2.3 Organisational resources

Organisations are under pressure to pursue sustainability programmes across their supply chains due to the shortage of natural resources and the supply of natural resources (Astvik, Welander & Hellgren, 2021). Corporate resources, operational skills, physical capital (equipment and technology) and human capital are included in the organisational resource drivers category (Emamisaleh & Taimouri, 2021). The distribution of corporate resources plays a key position in incorporating sustainable practices. The organisations manage its sustainability initiatives, organizations should have a variety of instruments.

One of the primary motivators is the scarcity and deterioration of natural resources for sustainable development. Companies across all industry sectors are taking action to improve their sustainability and make optimal use of natural resources as a result of resource scarcity and deterioration (Kimaru, 2019). Organizations that currently employ sustainable practices gain more technical expertise and sustainability management capabilities, which serves as a spur for other businesses inside or outside the supply chain to develop human resource capabilities on par with their partners and rivals (Astvik et al., 2021).

Employees and trade unions can also encourage enterprises to develop sustainable practices to improve their sustainability performance. Walker, Gowland and Points (2018) have stated that staff engagement improves sustainability effectiveness of organisations and their supply chains. Employees who receive cross-functional training improve their skills and reduce errors and waste, enabling businesses to increase their sustainability effectiveness and decrease the frequency of work-related health and safety mishaps (Oriade et al., 2021).

3.3.2.4 Organisational characteristics

Companies from diverse industries are being pushed by a variety of stakeholders, based on their position and size, to implement sustainable strategies for their

businesses and supply chains. The category of organisational characteristic drivers includes factors including the company's size, the current state of its environmental policies, internationalization, geography, supply chain locations, and industry sectors. The scale of the business can be determined by the total number of full-time employees hired, and directly affects sustainability decisions (Emamisaleh & Taimouri, 2021). Due to their size, large corporations typically address more environmental issues than small ones and are under more pressure to increase their sustainability efficiency (Rizzi et al., 2021). However, consumers and competitors exert more pressure on smaller businesses. Different industries have diverse standards for measuring sustainability performance. Companies in one industry may have different standards from their stakeholders than companies in other industries.

Focal organisations face pressure from external supply chain and cultivate relationships with suppliers in order to accomplish sustainability goals (Saeed & Kersten, 2019). As a result, the function of supply chain stakeholders is seen as a critical aspect for SSCM because it has a direct impact on organisations' long-term behavior (Chkanikova & Mont, 2015). It is possible to lobby against the adoption of sustainable practices by upstream supply chain partners in downstream supply networks. But the burden is moved immediately to those who are a part of the upstream supply chain.

The geographic location of an operational site is an important consideration when selecting one. Organisations must comply with the regulations of the country in which they work, since some nations have stricter environmental and social laws than others (Karmaker et al., 2021). International trade raises concerns about the social and environmental practices of multinational companies as well as the worldwide supply networks (e.g. health, environmental pollution, human resource policies and security). Additionally, customers and other shareholders put pressure on corporations to achieve an equitable level of social justice and environmental security in their operations (Emamisaleh & Taimouri, 2021). Thus, an organisation with more international operations and considerable foreign involvement faces a comparatively greater burden to follow sustainable practices, than its counterparts. Also, organisations that perform well in terms of adopting sustainable practices and programmes endure less stakeholder pressure organisations that do not implement

sustainable principles face increased stakeholder pressure due to poor sustainability performance (Orji, Kusi-Sarpong & Gupta, 2020).

SSCM drivers constitute the most important external drivers among all others in the domain of external drivers. Sustainability programmes are pursued by governments to pressure companies to adopt sustainable practices and escape fines as well as help them create a better image in the market (Mzembe et al., 2016). International and regional regulatory requirements compel businesses to guarantee that such environmental and social demands are met (Accorsi et al., 2018). Regulatory forces increase competitiveness in non-financial sustainability but may create negative economic outcomes in the short term in terms of investment recovery (Murphy et al., 2021). In the market pressure cluster, credibility was identified as the primary factor for the implementation of sustainable practices.

A firm that is recognized as an international leader in environmental programs serves as a model for other organisations. In addition, in the implementation of the SSCM, the suppliers' role in sustainability efforts and their relations with the focal organisations are regarded as important aspects (Singh, Pandey, Kumar, Naz & Luthra, 2022). Also, corporations face pressure to adopt sustainable practices from social movements and public communities (Grant et al., 2017).

Some of the SFSCM drivers and organisational internal drivers of SSCM resource clusters are critical. For instance, among the most important internal aspects in the business strategy cluster that enable supply chain participants to implement and execute sustainable initiatives are top management participation and corporate strategy. Sustainability plans, the training of personnel and the allocation of resources for the introduction of sustainable initiatives are part of the dedication of an organisation’s top management (Hina, Chauhan, Kaur, Kraus & Dhir, 2022). The introduction of sustainable products and process technologies improve effectiveness of a company's sustainability, but also give it a competitive profit (Kiwala, Olivier & Kintu, 2022). The company's size may affect the use of sustainability practices, as a result of varying internal and external forces. When it comes to large enterprises, pressures from regulators may have a larger impact. Because of size, under external and internal stresses, small companies can fully refurbish their supply chains and introduce sustainable practices. In this area, research can be expanded by

categorizing SFSCM drivers based on their influence on the deployment of sustainable initiatives by businesses of various sizes (Blome et al., 2013).

Cost-related pressure, management commitment and operational/economic performance are SFSCM's three leading drivers for the internal driver category (Surucu-Balci & Tuna, 2021). Cost control pressure results in cost reductions and, eventually, higher profit margins (Mehmood, Ahmed, Viza, Bogush & Ayyub, 2021). Globally, sustainability has emerged as a serious concern. However, amid rapid market growth, the socio-economic and political realities in emerging economies differ from those in developed economies (Kannan, 2021). For developing-country organisations, there are a number of distinctive sustainability concerns that differ collectively from those in the developed world. Globalisation has offered developing world companies the opportunity to implement sustainable business practices modelled after those of consumers and competitors. Competition enables individuals engaged to gain knowledge about cost-effectively implementing sustainable practices and to enhance economic rewards. Each SFSCM driver seems to influence individual organisations based on the outcomes of this analysis (Accorsi et al., 2018). Cooperation between two or more drivers, however, can improve their effect. Non-governmental groups and the news media, for example, may not seem to be as significant in this literary research, but they may together exert greater effect than a number of other prominent SFSCM drivers (Orji et al., 2020). Managers must evaluate the context of any pressures, enhance their company's social and ecological image, and maximise their long-term economic rewards in a particular industrial setting (Hina et al., 2022). The findings of the literature review indicate that both geographical genesis and industrial sector play a significant role in determining the relative importance of various SFSCM drivers, owing to the fact that some industries are subject to stricter regulatory and social prerequisites than many others. Similarly, some countries place a higher premium on social and environmental issues than others. Additionally, the research focus on SFSCM has in recent years shifted away from individual supply chain jobs and toward supply chain challenges (Baliga et al., 2019).

3.4 SFSCM PRACTICES

SFSCM variables are classified into three broad categories, namely environmental, social and economic. These are presented and described in Table 3.5 below.

Table 3.5: Sustainability practices

Sustainability Category	Practice
Environmental	Environmental conformity, supplier assessment and evaluation, pollution, nutritional quality, and taste; seasonality; soil quality; biodiversity preservation; landscapes conservation; carbon reduction; waste generation and recycling; energy usage and efficiency; plant and animal health; degree of natural resource restoration.
Social	Supply chains and human rights, consumer concerns, social conformance, education and training, standards and rights, non-discrimination, and protection, human capital, health and safety, recruiting, and training. Responsible and ethical sourcing as well as fair treatment of all employees involved in the supply chain.
Economic	Economic costs and the application of supply chain system concepts, innovation and research, productivity and stability, sales and distribution, market competition, sustainable budgets for economic costs and food access, household income, and customer needs.

Source: Christiana, Tecco, Dansero, Girgenti and Sottile (2015:6725); Saeed and Kersten (2017)

According to Table 3.5, SFSCM practices have been classified into three distinct categories to show practices that may exist in each triple bottom-line dimension (Christiana et al., 2015:6725; Saeed & Kersten, 2017; Sharafizad, Redmond & Parker, 2022). However, in this study, the following SFSCM practices were discussed:

- **Food waste management**

Industrial food waste management entails recuperating energy from food waste via different methods such as anaerobic digestion, commercial composition and valorisation which converts food waste to energy and manure (Wu, Mohammed & Harris, 2021). Further, there are a number of waste management educational services on enhanced product labelling, food rescue operations, and improved waste monitoring via the use of inventory control systems (Martin-Rios, Hofmann & Mackenzie, 2021; United Nations Environment Programme, 2021). A food waste management plan must be in place to specify the levels when recycling, re-using or education on waste management reduction may be employed (Engler & Krarti, 2021).

- **Material and energy efficiency**

According to Engler and Krarti (2021), material, energy, and technological advancements have improved the food manufacturing system. Energy efficiency improvements in the food industry have been noted in areas related to the setup of intermediate consumption (particularly pesticide and fertiliser use and machinery use, which account for direct energy consumption), farmer decisions (modifications of production or farming practices), weather patterns, the form and variety of food processed, as well as the energy mix used in production.

- **Water conservation**

According to Ray, Muddu and Sharma (2022), a number of alternatives may be utilised to save on water consumed in food production and processing. These include re-using water for other purposes, for example used water in a food plant can be used for cooling the plant before it is tapped into the water treatment for recycling. For those in food agriculture, rainwater can be captured and stored in dams for irrigation later in the year, whilst selection of conservative irrigation systems such as drip and scheduled irrigation could be found ideal in saving water (Anser et al., 2021). More so, food producers may introduce practices such as dry farming whilst using drought resistant crop varieties as a way to conserve water (Jagtap, Garcia-Garcia & Rahimifard, 2021).

- **Greenhouse gas (GHG) emissions**

Food and agriculture industry accounts for around 37% of greenhouse gas (GHG) emissions which is a reasonably big impact (Arunan & Crawford, 2021). This figure (37%) represents GHG from crop production, land use, and supply chain of food (food manufacturing, packaging, transportation, retailing, and waste disposal management). To reduce GHGs, farmers can practise a zero tillage farming approach in which the farmers disturb the soil as little as possible through tillage operations, hence reducing emissions from fuel spent during tillage operations (Binns et al., 2021).

- **Supplier evaluations and assessment**

When sourcing for raw material and products, food organisations should only consider green-compliant, or those suppliers certified by environmental management systems

such as ISO 14000 as such suppliers are conscious of nature and conservation of biodiversity (Adamides, Mouzakitis & Zygouris, 2021).

- **Abiding to human rights in food industries**

Social sustainability involves upholding human rights in farming and agriculture with the main focus on the abolition of all types of involuntary and forced labour. This includes the prohibition of child labour and the abolition of employment and occupational discrimination in food production and processing organisations (Govindan et al., 2021).

- **Fairness and human capital training**

Further awarding of supply contracts for raw materials and food products should be based on competency rather than corrupt practices and personal gains. Such fairness improves the industry's ability to grow, and competitiveness of stakeholders involved (Morais & Barbieri, 2022). The food industry should employ skilled human resources in all the facets of food production, processing and logistics. In cases where there are knowledge gaps it is ideal that appropriate training is provided to ensure that there are no errors or deficiencies in food manufacturing (Cui, Jin, Li & Wang, 2022).

- **Food safety and quality management**

Stakeholders have the right to expect that the food they buy will be healthy and safe to consume. In this regard, organisations producing food should ensure that they control food production and processing systems so that they can be accountable for the food quality (López-Gálvez, Gómez, Artès, Artès-Hernández & Aguayo, 2021). In addition, high safety standards in the entire food supply chain have to be maintained to ensure that human beings, animals and plants involved are safe. For the best food safety and quality, organisations subscribe to quality assurance systems such as the hazard analysis and critical control point (HACCP) with special focus on aspects like safety, nutrition, quality and value of food (Gedikoğlu & Gedikoğlu, 2021).

- **Ethical responsibility**

Food organisations may give evidence of their dedication to moral duty in several ways. For instance, if the regional or government gazzeted rate does not reflect a fair salary, the instituition may set its own minimum wage "liveable wage" (Biggs, Caceres-Escobar, Kock, Thomson & Compton, 2021). Similarly, a corporation may demand the

sourcing of products, ingredients, resources, or components to adhere to free trade principles. Many businesses have procedures in place to ensure they are not acquiring items made through slave or child labour (Ling & Wahab, 2020).

- **Efficient transport and warehouse management**

Those who are in food distribution may utilise transport optimisation systems such consignment load consolidations and utilise full truckloads to achieve the least cost in food transportation (Cui et al., 2022). On the same note, stakeholders involved in food storage and warehouse should practise use of modern technology that allows organisations to stay in pace with manufacturing, production and customer demand. Some of these technologies include warehouse management systems, blockchain technology, and cutting-edge robots that can operate completely autonomously which enable organisations to cut on human capital costs (Ezeudu, Agunwamba, Ezeudu, Ugochukwu & Ezeasor, 2021).

- **Improvement of organisational efficiency**

To improve organisational efficiencies, food organisations continuously check performance gaps in their employees and provide appropriate training (Thapa, Shrestha & Anal, 2020). This eliminates unnecessary costs related to underperformance and mistakes within food organisations. Food production, handling and safety require skilled personnel with no room for disastrous errors that may trigger the legal eyes (León-Bravo, Caniato & Caridi, 2021).

- **Fair food pricing**

According to Pourmohammad-Zia, Karimi and Rezaei (2021), food products' pricing systems made up of transparent costliness enable the competitiveness of food organisations. Transparency in food pricing and costing makes food organisations achieve sustainable bottom lines as well as gaining reasonable market share growth at the same time. Stakeholder loyalty builds from fair pricing and open costliness resulting in organisations existing into the unforeseeable future whilst registering reasonable profitability (Kannan, 2021).

- **Minimisation of energy use**

The agri-food supply chain globally consumes 30% of available energy and energy is required in the production of crops, seafood, cattle, and forestry products, as well as

in the storage, processing of food, and in the transportation and distribution of food (Papaioannou et al., 2022). Poponi, Arcese, Pacchera and Martucci (2022) expounded that food organisations should minimise use of non-renewable energy resources such as coal to reduce the detrimental effects of global warming. According to Afolabi, Leonard, Osei and Blay (2021), food organisations should focus on using renewable energy such as hydropower, wind, geothermal and solar energy to reduce the effects of global warming. More so, Karwacka, Ciurzyńska, Lenart and Janowicz (2020) elaborated that these renewable energy sources like wind and solar are also way cheaper than non-renewable in the long run.

- **Managing food packaging**

The food industry is characterised by a lot of packaging requirements especially downstream supply chain (retailers and consumers). Chen, Brahma, Macay, Cao and Aliakbarian (2020) explained that organisations may use less weight and much simpler packaging material that can easily degrade without harming the environment as a way to minimise the carbon footprint of the food sector. Additionally, organisations should have effective recycling plans for used packaging. Wandosell, Parra-Meroño, Alcayde and Baños (2021) further explained that given the option to reduce, or reuse packaging, organisations should embrace the opportunity which can lead to savings on the cost of buying new packaging and thus avoiding environmental pollution.

- **Use of decentralised food distribution**

According to Grant et al. (2017), the use of small, decentralised food distribution centres is ideal and would enable food organisations to improve on route efficiency while promoting easy physical and economic access to food. Furthermore, food warehouses and distribution centres may opt to use low energy lights and sensors to reduce the unnecessary light usage and reduce energy waste. On the contrary, organisations that are into transport and distribution of food should ensure that they adhere to efficient fleet management principles which include ensuring that vehicle maintenance is done at correct intervals and that solid and liquid wastes from maintenance are disposed properly (Ambriško & Teplická, 2021).

3.5 CHALLENGES FACED WHEN IMPLEMENTING SFSCM

3.5.1 Lack of top-level management commitment

Getting top-level management endorsement has been one of the biggest challenges affecting food supply chain management (Muñoz-Torres, Fernández-Izquierdo, Rivera-Lirio, Ferrero-Ferrero & Escrig-Olmedo, 2021). Sustainable food supply chain management aims at ensuring the availability, affordability, and accessibility of healthy, nutritious food produced, stored, and distributed in an environmentally friendly manner. Without the support of top management, all the variables are difficult to achieve. The backing of senior management has a positive effect on the level of collaboration between internal and external stakeholders in the supply chain. According to Kumar and Barua (2022), a lack of top management disintegrates all efforts made towards SFSCM, as top managers are expected to be the pacesetters in any direction the organisation takes. Fu, Rahman, Jiang, Abbas and Comite (2022) further elaborated that managers usually lack commitment when their main aim is just to make supernormal profits or when they are on a drastic cost-cutting drive for their organisations.

3.5.2 Lack of financial resources

SFSCM initiatives and processes can only be achieved at a premium cost and therefore some food organisations do not have enough financial backing or capital to meet all the food sustainability requirements. Failure to have enough financial resources results in organisations pursuing the traditional supply chain without much bearing on sustainability (Caiado, Scavarda, Azevedo, Nascimento & Quelhas, 2022). Muñoz-Torres et al. (2021) noted that organisations who practise SFSCM need to have much financial resources from the beginning and then later less money will be needed to fund processes. Almutairi et al. (2022) expounded that the sustainability payback period is normally too long or unknown, hence even financial institutions may not opt to fund sustainability projects.

3.5.3 Lack of stakeholders' commitment

According to Liu, Zhu, Xu, Lu and Fan (2021), it takes all stakeholders' commitment to achieve a performing and sustainable supply chain system. The biggest challenge is that many as they are, stakeholders have different aims and goals and hence they can easily be committed in divergent objectives. For example, the distributor may

focus on food safety and not nutrition while the consumer focuses on food availability and nutrition. Such different requirements make it difficult for stakeholders to achieve the same sustainability goal in a short time as it requires a high level engagement, collaboration and information sharing (Fernandes, Capitão, Tereso, Oliveira & Pinto, 2021).

3.5.4 Lack of incentives for sustainable supply chain management efforts

Sustainability benefits are usually seen after a long time, hence individuals and organisations with commercial objectives feel that it's not financially beneficial (Accorsi & Manzini, 2019). Like any other business in which efforts are rewarded, employees and other supply chain stakeholders expect to provide the best effort only when sustainability is related to some incentives. In the absence of incentives, as in the current Zimbabwean situation, stakeholders put in minimum to no effort and hence most stakeholder organisations' performance remains unsustainable (Dhliwayo, 2018). Morone et al. (2017) advised that it is ideal that SFSCM incentivise some of its stakeholders.

3.5.5 Lack of technology

The ability to monitor a food product through all stages of the supply chain has become increasingly important to many customers today. Several customers now want to know the origins of all product lines, including trace ingredients. To increase food transparency, food firms are currently working to adopt cutting-edge technologies like the Internet of Things (IoT), artificial intelligence, and blockchain for activities including supply chain analysis, weight calculation, and temperature tracking (Paul, Shukla, Paul & Trianni 2021). Typically, organisations who still rely on antiquated technologies, manual inspections, or traditional paper monitoring are to blame for the lack of traceability in the food supply chain. These cause delays and inaccuracies in the exchange of information. It has been reported that due to a lack of technology and suitable methods, few businesses in Zimbabwe are able to track food (Glover et al., 2014; Saldanha, Mello & Knemeyer, 2014; Herold, 2018).

3.5.6 Corruption

Silvestre et al. (2018) described corruption as "a misuse of office authority for personal interests" (Maramura & Shava, 2021:626). However, it is out of the government's control and has an impact on all enterprises as well as the supply chain system.

(Bonga, 2021). Corruption has various implications and meanings that differ from time to time and place (Barone, Masciandaro & Schneider, 2022). The common scope of corruption encompasses trade, violations of ethics, and the misuse of influence (Zinyama, 2021). In some circumstances, people gain an edge over others by exchanging favours in order to avoid a commitment. Corruption arises even in the absence of inferior institutions and opportune actions by trustworthy professionals who wield too much power to pursue personal gain (Maramura & Shava, 2021).

According to Sarker, Henningsson, Jensen and Hedman (2021), food supply tenders awarded through corruption can lead to unfair competition which crowds out some of the players in the market, further leading to compromised food quality and increased food prices. Zinyama (2021) expounded that corruption increases food insecurity as customers will either fail to access food due to unaffordable prices or due to unhealthy food offered.

3.5.7 Lack of sustainability performance measurement yardstick

Many organisations that strive for sustainability in food supply chain management make substantial efforts but are unable to measure their efforts (FAO, 2012; Caiado et al., 2022). Corporates utilise benchmarking with other organisations to analyze themselves because measuring yardsticks and matrices are not simple. The downside of benchmarking is that corporations wind up comparing themselves to non-sustainable organizations and believing they are the best, despite the fact that they still need to improve significantly (Paul et al., 2021). Organisations may be making efforts towards sustainability without knowing whether their efforts are sufficient or not. For instance, a food processing plant focusing on improving energy efficiency, air pollution reduction, water use reduction, and food waste reduction may not be able to know how much they have achieved in terms of their objectives for a combined measure (United Nations Environment Programme, 2021).

3.5.8 Meeting ever-changing stakeholder demands

Many of the issues confronting food producers are related to addressing ever-changing stakeholder demands. This must also happen fast while keeping expenses at a minimal, which is difficult for most food producers (Li, Chi, Hao & Yu, 2018). SFSCM has the biggest challenge of ever-changing stakeholder needs especially

focusing on the consumers. The food industry is such a delicate market with consumer needs ever drifting. Organisations really need to perform continuous surveys and research to keep abreast with trending consumer tastes. For instance, in Zimbabwe most urban families are shifting from the refined grain mealie to semi-refined fibre grain meal which consumers find healthier. Such a scenario becomes a challenge when food processors do not know what consumers want and may result in loss of sales and a negative effect on an organisation's profitability. Despoudi (2021) noted that reasonable financial investment and effort in research and development should always be made to understand the trends in stakeholder demand.

3.5.9 Organisational objectives misaligned with SFSCM

SFSCM entails integrating ecologically and financially sustainable operations across the supply chain's lifespan, from product development process to manufacture, packaging, transportation, storage, distribution, usage, disposal and return SSCM stakeholders frequently find it challenging to align all of their interests with the triple bottom-line of SSCM. The main reason is that they will be in a business with higher predicted profits than any other SSCM-related motive (Tsolakis, 2018). Where objectives are more aligned to just profit making, it is difficult to incorporate any sustainability within the system (Fresco, Geerling-Eiff, Hoes, Van Wassenaer, Poppe & Van der Vorst, 2021).

3.5.10 Rising supply chain costs

According to Saeed and Kersten (2017), rising supply chain cost in a food industry matters a lot. Supply chain costs are often the single highest cost component for a grain farmer in a regular year in the majority of nations. For instance, in Canada, where grain travels up to 1200 kilometres from field to port, supply chain expenses account for around 43% of the free on board (FOB) value (Arabsheybani & Arshadi, 2021). Even in Australia, supply chain expenses for wheat traveling 200 kilometres between farm and port account for 35% of the FOB price (Sekine, 2021). As a result of supply chain costs, organisations forego the opportunity for diversified income streams, that tend to lower concentration risk, and increase the product's market exposure through greater competitiveness (Christiana et al., 2015). As food producers try to avoid excessive supply chain costs, distribution of the product concentrates on a small catchment area causing shortages in some distant regions (Mogale et al., 2020).

3.5.11 Lack of information on SFSCM requirements

The food supply chain will be impacted by fragmented information and a lack of communication. This is because the chain is comprised of various parties that have little to no awareness of one another's activities (Neto, 2020). Between suppliers and consumers, poor communication results in inefficiency, waste, and distrust (Imon, Fahim, Salehin & Sarkar, 2020). This issue becomes more pronounced when you work on a global scale. One of the most important aspects of successful and efficient supply chain management is proper information flow. Information is critical for making efficient supply chain decisions because it provides the wide perspective needed to make the best judgments (Caniato et al., 2017). Knowledge is a critical supply chain driver because it serves as the glue that binds other supply chain drivers together to form an integrated, coordinated supply chain. The issue emerges since not all stakeholders have access to or knowledge of the aim for SSCM. As a result, the intended sustainability targets may not be met (Coyle, Langley, Novack & Gibson, 2013).

3.5.12 Supply chain risks

According to Xu et al. (2019) and as shown in Figure 3.6, supply chain risks are a bigger challenge to achievement of SFSCM in any industry. These risks come in different forms ranging from operational, social and environmental threats posing challenges to sustainable food supply chain management. In addition, Chopra and Meindl (2013) elaborated on supply chain risks such as supplier involvement, supplier disruption, forecasting, supply chain transparency, global index, and environmental impact hazards are just a few examples. All of these things impede organisations' progress toward SFSCM (Xu et al., 2019).

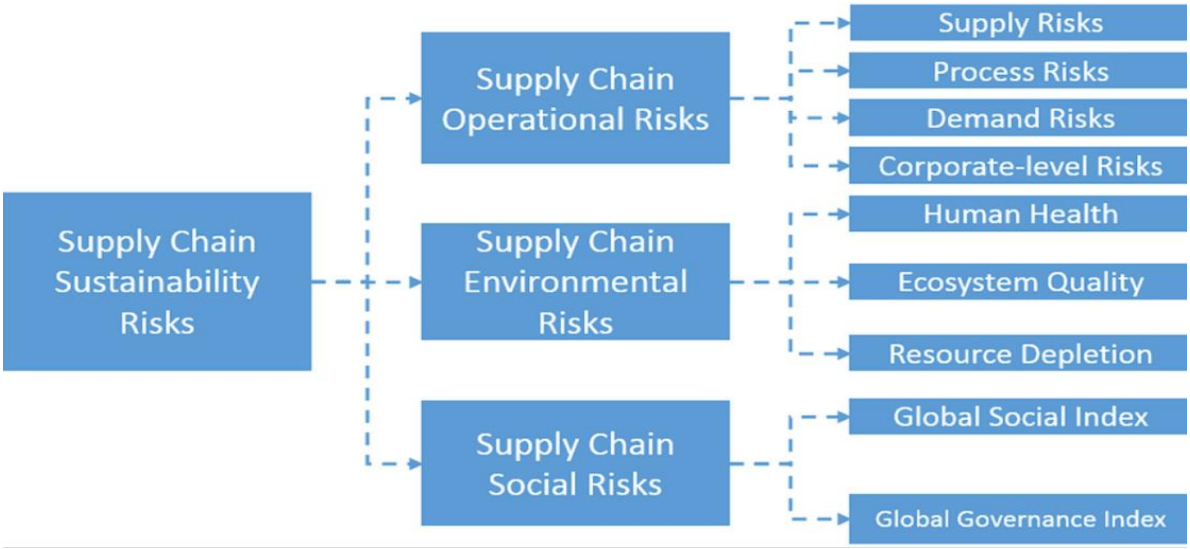

Figure 3.6: Supply chain sustainability risks

Source: Xu et al. (2019)

3.5.13 Lack of knowledge about the importance SFSCM

Kouhizadeh, Saberi and Sarkis (2021) concurred that having knowledge of SFSCM directly benefits organisations and not just the environment. Food organisations may boost profitability in the long term by decreasing food waste, restricting energy and water usage, and developing more sustainable business strategies only when they have appropriate knowledge to follow the practices. A number of food stakeholders do not have enough knowledge of the relevance and benefits of SFSCM to their organisations as well as to other stakeholders within organisations (Bui, Tsai, Tseng, Tan, Yu & Lim, 2021). Lack of SFSCM management knowledge on the part of policy makers, investors and senior executives in an organisation could be the biggest challenge affecting effective implementation of the SFSCM in the entire nation as these categories of people are expected to be spearheading sustainability in the food industry (Moktadir et al., 2021). When management and other senior executives lack knowledge of SFSCM, chances are that no one would be able to push for any programme or activity in line with sustainability.

3.5.14 Inconsistent managerial approaches towards SFSCM

According to Wieland and Durach (2021), inconsistent management approaches towards promoting SFSCM may be a subject of confusion for lower-level employees. Giri, Molla and Biswas (2022) added that inconsistency may be a result of lack of

information or a deliberate move to be selective about which aspects of SFSCM to incorporate or organisational food programmes. In situations where inconsistencies remain unchallenged, sustainability practices fade away and lower-level employees find it difficult to try and put forward the agenda of SFSCM without management support. Inconsistency on the part of leaders is such a challenge to SFSCM as it tends to confuse people (who could be the food handlers or process line workers), erodes trust, and can result in a form of learned inertia in which the employees, crippled by uncertainty, find no reason to pursue anything different from the tradition (Do & Huang, 2022).

3.5.15 Lack of government support

Government support of SFSCM is a necessary tool to ensure that all stakeholders are moving in the same direction (Cole & Aitken, 2020). For instance, when the government gives a directive that all food suppliers must be ISO 14000 compliant, there is guarantee that each supplier works on meeting environmental sustainability (Lahri, Shaw & Ishizaka, 2021). When the government does not intervene or support food supply chain sustainability, the nation will normally not have policy that shows minimum food requirements in terms of pricing, distribution, safety and other necessary controls (Adamides et al., 2021). Such a situation poses a serious challenge to food security in nations like Zimbabwe where basic food may not be affordable for every household as prices become too high whilst traders hoard all the available reserves for resale at high prices (Chavunduka, Dipura & Vudzijena, 2021).

3.5.16 Policy issues in SFSCM practices

Food policies and programmes are necessary to guarantee that all aspects of the food system, from production to processing to consumption, are geared towards promoting healthier eating habits, nutritional results and accessibility of food across the nation (Diprose, Kurniawan, Macdonald & Winanti, 2021). Lack of food policy may result in inequitable distribution of food that does not protect the poor (Ülkü & Engau, 2021). The number of food insecure populations is likely to rise due to a lack of SFSCM governing policy.

3.5.17 Lack of proper planning for reverse logistics

Reverse logistics is the technique of planning, coordinating, and controlling the flow of raw materials, in-process inventory, and finished products from the point of

consumption to the place of origin in order to reclaim value or dispose of them properly. (Mathiyazhagan, Krishnan, Bharathi & Appolloni, 2021:672). The food industry is characterised by the need for reverse logistics due to expired products, contaminated products, damaged products, or generally unfit for consumption products. Where organisations do not have a proper plan for reverse logistics, the likelihood of waste food dumping and pollution increases without control, resulting in food supply chain malperformance (Wijewickrama, Chileshe, Rameezdeen & Ochoa, 2021).

3.5.18 Lack of mutual trust among stakeholders

According to Hove et al. (2021), lack of mutual trust amongst stakeholders directly results in a disintegrated food supply chain system. When stakeholders lack trust, there is likely to be a lack of transparency and little information will be shared. For example, information about ingredients and the way food is processed may not be shared which is a challenge with current consumer requirements to know every process (Grunwald, 2022). Lack of mutual trust may go a long way in affecting food organisations' reputation, market share and general profitability. When organisations lack mutual trust, they do not put enough effort towards SFSCM and hence this results in unsustainable performance (Castelblanco, Guevara, Mesa & Hartmann, 2022).

3.5.19 Lack of employee motivation to uphold SFSCM practices

Govindan et al. (2021) expounded that motivated employees are the lifeblood of a sustainable supply chain system. Accorsi (2018) added that the food industry holds human lives and hence it really needs motivated employees to produce healthy, quality and nutritious foods that can be priced affordably and available to everyone. Once employees are demotivated, they are likely to give the least effort towards sustainability. It is the greatest risk and challenge to have demotivated employees because they can be damaging and produce substandard food products that are a hazard to human health (Kumar, Raut, Nayal, Kraus, Yadav & Narkhede, 2021).

3.5.20 Collaboration challenges

The flow of food products from producers/suppliers to the consumers passes through a number of stakeholders who are known as intermediaries. Intermediaries are traditionally known to smoothen the flow of goods but in the current environment they are a challenge to implementation of SFSCM (Despoudi, 2021). Currently, too many intermediaries are involved, and they tend to inflate prices, endanger the standard of

quality and ultimately increase food waste and loss. Due to this bad practice of profiteering, food becomes so exorbitant, yet would be of low quality (affects food security) (Caiado et al., 2022).

3.6 APPROACHES TO REDUCE CHALLENGES AGAINST IMPLEMENTATION OF SFSCM

Different literature sources have established a number of approaches that can be employed to reduce the effects of the challenges to sustainable food supply chain management. These approaches are explained below.

3.6.1 Orientation

Orientation consists of an organisation's adherence to SCM as well as its positioning towards the TBL (Shaw & Majumdar, 2021). This indicates that businesses depend primarily on SCM practices to ensure the safety and traceability of food. In addition, the high TBL orientation count reflects a rising understanding of sustainability problems in the food industry. Increasing customer requirements or pressure from legal bodies can be seen as motivations for this trend (Gurzawska, 2019).

3.6.2 Risk management

The adoption of standards and certifications is the most prominent risk management practice. These standards come in the form of the individual focal companies' Code of Conduct or in the form of general certifications such as ISO 14001 or SA8000 (Vermeulen, 2010; Bitzer, & Marazzi, 2021). In food supply chains, it is very important for members of the whole supply chain to work together as monitoring and tracing are essential for sustainable food production (Fritz & Schiefer, 2009; Parmigiani, Klassen, & Russo, 2011). A similar but differentiated image is shown by Pressure Group Management. This mostly deals with NGO pressures and their ability to harm a company's reputation (Vermeulen, 2010; Muller, Vermeulen & Glasbergen, 2012; Miao, Liu & Ma, 2020). Government pressure may be viewed as less relevant by more proactive businesses since they already adhere to better standards than those imposed by governments (Soler, Bergstrom & Shanahan, 2010) or it may result in the proactive adoption of specific sustainability measures (Smit, Driessen & Glasbergen, 2008). The government's interest in a particular supply chain may also coincide with the chain's, which might be seen positively. Government programmes, for example, can promote sustainable agriculture (e.g., organic produce) and facilitate conversion

by giving subsidies or shortening conversion timelines (Smit et al., 2008). However, interests frequently diverge, and the influence is frequently seen negatively. In general, pressure groups play a critical role in helping corporations achieve SSCM in the food market.

3.6.3 Development of stakeholder communications plan

According to Fernandes et al. (2021), communication and supply chain collaboration have moved to the top of many sustainability-minded firms' corporate agendas. By integrating sustainability concepts throughout the value chain, businesses can create a balanced strategy that aligns the firm's sustainability principles with those of its significant stakeholders. Sustainability communication is a method for integrating stakeholders and showcasing how a company is progressing toward achieving its sustainability goals (DeCourcey, Partin, Revette, Bernacki & Wolfe, 2021). Sustainability communication successfully engages key stakeholders, such as investors, customers, and employees, and is consistent with the firm's strategic objectives as defined in the sustainability action plan (Dressler & Paunovic, 2021). To accomplish the targeted non-material and material benefits, a complete sustainability communication strategy is necessary. As with any other strategy, a sustainability communication plan must begin with an audience and stakeholder analysis based on facts. Using the proper combination of communication channels, these communication plans may therefore be sent and forwarded more quickly. The fact that sustainability communication directly relates to an organisation's ESG (Environmental, Social, and Governance) rating is one of its most significant benefits (Santamaria, Paolone, Cucari & Dezi, 2021). ESG standards are used to evaluate the sustainability or ethical obligations of a business while transparency through the media and other channels improves customer retention and loyalty (Rosgen et al., 2022).

Sustainability communication also has an effect on shareholder value, which is critical for an organisation's survival. With the objective of guaranteeing food security, it is important to create a communications strategy for managing a sustainable food supply chain (High Level Panel of Experts, 2020; Khalid, Sun, Huang & Su, 2021). This approach guarantees that all stakeholders are informed about developments in the food business. Kumar (2021) discussed how a stakeholder communications approach enables the establishment of positive stakeholder connections throughout the food

supply chain system. Shakil (2021) outlined several key benefits of communication development in the sustainable food supply chain, including cost savings while maintaining sustainability, collaborating to develop effective and sustainable procurement strategies that are aligned with organisational goals, integrating procurement processes to ensure supplier engagement, and effectively monitoring the advancement of sustainability. The success of a company's efforts to manage a sustainable food supply chain is heavily dependent on stakeholder interaction with both internal and external business resources (Khalid et al., 2021).

3.6.4 Collaboration

Transparency of the supply chain and the shared information's quality are both of high importance (Chkanikova & Mont, 2015). Transparency for consumers is crucial in the food industry, particularly regarding food origin, production and processing methods, ingredients or inputs used (Paloviita, 2017). For larger firms, two general levels of collaboration and joint development can be carried out. This involves the development of new products (Chan, Chiou & Lettice, 2011; Sarkis, Zhu, & Lai, 2011; Liu et al., 2021) and the general development and improvement of processes (Schiefer, 2002; Balaji & Arshinder, 2016). This is largely because larger firms have more advanced skills and development programmes than their upcoming supply chain partners that are often controlled by relatively strong focal companies. Another factor is the concentration at the farm level, where farmers could be asked for experience, especially in developing countries, but not take part in the actual development of new processes (Accorsi & Manzini, 2019).

In general, companies in the supply chain should be involved in secure and productive collaboration relationships, indicating continuity. Such relationships are used to build trust and loyalty (Chu, Hongsuk, Mansokku & Sangwook, 2017), frequently beginning with a few key partners and eventually spreading throughout the chain (Chkanikova, 2016). Partner formation is essential in food supply chains, for instance, supporting and teaching producers new agricultural techniques or financing the costs needed to move to more sustainable farming (Aramyan, 2014). Strengthening the relationship between stakeholders and partners ensures that participants such as farmers are often kept accountable for the cost of transforming agricultural practices and selling them to retailers (Gonzalez-Porras, Heikkinen, Kujala & Tapaninaho, 2021).

3.6.5 Pro-activity

Pro-activity is a necessity for a dynamic industry, particularly with regard to organic or fair-trade foods, and still relatively young industries such as the sustainable food industry, as many new processes and technologies are yet to be developed. Learning is one significant practice in this regard. This therefore involves acquiring new knowledge from NGOs, government development agencies (Gonzalez-Porras et al., 2017), and researchers, stakeholder management educators, and partners in the chain (Fadhel, 2021). According to Borges, Neuberger, Saatkamp, Lansink and Darr (2021), pro-active stakeholder engagement results in stakeholder commitment, more valuable engagement, fewer surprises in food quality expectations, better understanding of stakeholder needs, better understanding of concerns, time invested in the right places, improved communication, improved reputation and happier stakeholders.

3.6.6 Training and capacity building for stakeholders

The primary goal of stakeholder training and capacity building is to guide and equip institutions, individuals, and stakeholders in navigating a process of individual and organisational change, as well as to augment and encourage organisations, individuals, and stakeholders in attaining their developmental goals (Humphries, Gupta, Dukpa & Wangmo, 2021). Capacity development and training are essential for organisations to overcome social, economic, environmental, and industry-related obstacles and constraints (Murphy et al., 2021). To educate stakeholders throughout the supply chain system, the food industry requires significant institutional capacity in areas such as food safety and risk management. Employees in the food industry must receive training in critical areas such as hazard analysis and critical control points (HACCP) accreditations, food premises layout, temperature control, food equipment management, food transportation and storage, food waste disposal, and hygiene practices when handling food (Mangun et al., 2021; United Nations Environment Programme, 2021). These types of training assist in ensuring that the highest possible standards of food safety and cleanliness are maintained for the health of all stakeholders across the chain of food distribution. The principal goal of stakeholder training and capacity building is to facilitate and empower organisations, individuals, and stakeholders in navigating a process of individual and organisational change, as

well as to promote and empower organisations, individuals, and stakeholders in obtaining their developmental goals (Tobin, Crawford, Hallett, Maycock & Lobo, 2022).

3.6.7 Participation of stakeholders in food industry collaborations and associations

According to Bhattacharya and Fayezi (2021), the efficacy of a strategy for sustainable food supply chain management depends on all stakeholders in the joint food supply chain system adopting and executing a collaborative approach to stakeholder engagement. These groups typically have competing interests, and the unified food regulation system tries to resolve these tensions while preserving public health. Stakeholder association is usually centred on identifying and managing conflicting stakeholder interests.

Salvatori et al. (2021) reaffirmed that stakeholder groups urge focus firms to enhance the sustainability performance of their SCs. Government pressures and incentives are often derived from local, national, and international regulations established by national governments or transnational regulatory bodies (Filimonau & Ermolaev, 2021). External stakeholder groups have an influence on the competitive advantage of a business and reputation, pushing businesses to publicly monitor and control their sustainable performance on social and environmental issues (Hribar, Viskovic & Bole, 2021). Pressures, which are seen as pushing forces that drive SC participants to act sustainably, and incentives, which are viewed as pulling elements that encourage SSCM development, are two influential triggers that magnify SSCM implementation (Siems, Land & Seuring, 2021). Collaborations in Zimbabwe include those between trade unions, the National Employment Council for the Food Industry, the Grain Millers Association of Zimbabwe, the Consumer Council of Zimbabwe (CCZ), the Confederation of Zimbabwe Retailers (CZR), the Chartered Institute of Purchasing and Supply (CIPS), the Grain Marketing Board, the Food and Agriculture Organization (FAO), and the Food and Nutrition Council of Zimbabwe, amongst others.

3.6.8 Organisations' culture to incorporate SFSCM aspects

Adopting sustainable supply chain strategies enhances an organisation's environmental and social performance, and also gives companies a chance to obtain a replacement set of capabilities that may assist them in achieving a competitive position via sustainability (Gunarathne et al., 2021). In supply chain management,

sustainability is a wide word that refers to continuous accountability for the risks and adverse impacts caused by a range of supply chain operations (Ezeudu et al., 2021). Additionally, sustainability efforts aim to promote equity and provide positive results for suppliers, employees, customers, intermediaries, end users, and any other stakeholders (Fortin & Harvey, 2021). Sustainability helps firms to form new commercial relationships and consolidate current capabilities. According to Fresco et al. (2021), sustainable supply chain management practices enhance company security by ensuring that supply networks are robust to rapid changes in price, availability, quality, and safety (in the context of food). The capacity of supply networks to support the long-term survival, resilience, and competitiveness of businesses serves as an incentive to achieve sustainability (Ezeudu et al., 2021; Gunarathne et al., 2021).

3.6.9 Employee training on SFSCM

Adamides et al. (2021) expressed concern that enough training should be provided to internal stakeholders on sustainable food production and handling. Normally well-trained employees are motivated and reduce errors and mistakes in food handling and production (Food and Nutrition Council, 2012). The human resources managers are expected to continuously check for any knowledge gaps, for example when a new recipe is introduced or when a new grain miller has been acquired. According to Agyekum (2015), the strength of any organisation is backed by the amount of knowledge and skill that the employees have. SFSCM performance can easily be achieved if all stakeholders know what they are supposed to be doing in different value chain levels.

3.7 SDCs AND SFSCM

The notion of dynamic capabilities has arisen as a result of the unpredictability and rapid change in the business environment and market. Teece, Pisano and Shuen (1997) developed the term "dynamic capabilities". According to Teece et al. (1997), dynamic capabilities refer to a company's capacity to develop, integrate, and restructure internal and external resources and competencies in response to changes in the business environment. Karman and Savaneviciene (2021) elaborated that dynamic capabilities enable enterprises to reactivate and reorganise their productive capacity to meet changing customer needs and competitor strategies. As noted in Chapter 2, the dynamic capabilities (DCs) theory is an expansion of the resource-

based view (RBV), which asserts that organisations with VRIN (valuable, uncommon, imperfectly imitable, and non-substitutable) resources may attain competitiveness. "Dynamic" was defined by Teece et al. (1997) as "the ability to develop and reactivate competences in order to accomplish consistency with the dynamic business environment" and "capabilities" refer to the importance of acclimatising, incorporating, and reshaping internal and external abilities, productive capacity, and operational competence to meet the demands of a changing environment. The importance of utilising dynamic capabilities in a long-term supply chain is becoming more critical (Baliga et al., 2019; Kareem & Kummitha, 2020). Changes in short and long-term dynamic capabilities have been developed as a result of market structure, supply and demand, and client requirements for the supply chain (Kurtmollaiev, 2020). To address these changes, businesses must have dynamic, long-term supply chain capabilities. An organisation can develop relationships with other organisations, customers, and suppliers in a collaborative nature across dynamic sustainable supply chain capabilities, and accurately predict market demands (a critical requirement in food supply chain management), enhancing supply chain adaptability to fulfil customer and supplier needs (Papachroni & Heracleou, 2020). Qiu, Jie, Wang and Zhao (2020) indicated that dynamic capabilities do not have a profound impact on organisational performance outcomes. They have an indirect impact on organisational effectiveness and performance by integrating and reconfiguring resources in response to environmental turbulence or to bring about external and internal change (Mousavi & Vliet, 2019). Dynamic capabilities shape the firm's competitiveness and, as a result, performance by defining the firm's individual resource configuration (Galunic & Eisenhardt, 2001).

In the perspective of sustainable supply chain management development, dynamic capabilities delineate between substantive (ordinary) capabilities (i.e. abilities and resources that enable a company to solve a problem or achieve a goal) and dynamic capabilities (capabilities that allow a company to solve a problem or achieve a goal given the circumstances of a volatile and non-stable environment) (Qiu et al., 2020).

SDCs are concerned with responding to changing dynamic environments by adjusting the resource base (Ananno et al., 2021). As a result, they represent a dynamic, rather than a rigid, resource-based theory of organisations (Kurtmollaiev, 2020). SDCs are typically known as multidimensional constructs that allow for monitoring a constantly

changing environment as well as detecting and securing growth opportunities. From the standpoint of the supply chain, several researchers have looked into dynamic capabilities. According to Qiu et al. (2020), in supply chain, dynamic capabilities are critical for meeting future needs and ensuring long-term sustainability. Karman and Savaneviciene (2021) expanded that human capital mediates the link between organisational capabilities and sustainable supply chain performance. Oh and Jeong (2019) asserted that supply chain skills influence company performance via the mediating effect of information technology. Sustainable supply chain capabilities contribute to coordination, flexibility, velocity, and visibility, all of which influence supply chain adaptability and beneficial sustainable supply chain performance (Beske et al., 2014). According to Teece (2007), Yu, Chavez, Jacobs and Feng. (2018), Kurtmollaiev (2020:5), and Karman and Savaneviciene (2021), dynamic capabilities are high-level capabilities that can be broken down into various configurations depending on the environment or organisation. As a result, the knowledge and technology capability, responsive control capability, partner development capabilities, co-evolution/collaboration capability, re-conceptualisation capabilities, and logistics leveraging capabilities were disaggregated in the current study. In order to be able to meet stakeholder and market demands and attain sustainable supply chain performance in a volatile market, a firm requires dynamic capabilities. The next section discusses the six capabilities used in this study.

3.7.1 Capabilities for management of knowledge and innovation

Acquiring new information and the understanding of existing knowledge through use of supply chain stakeholders are both part of knowledge management (Beske et al., 2014). Karman and Savaneviciene (2021) found that innovation management may make the process of innovation and adaptation to new technologies and practices easier while also generating new ideas for new growth prospects.

Supply chain innovation plays a critical role in extending the value proposition of the supply chain sustainability. It can be viewed as a critical process that uses innovative technology to define better ways that can enhance processes and generate new information processing and logistics services (Accorsi & Manzini, 2019). As a result, SFSCM may cause substantial changes in traditional food supply chains, such as new customer needs, the requirement for modern technology (online) applications, new

norms, and new regulatory frameworks susceptible of destabilising the present system and fostering innovation (Chukwuemeka & Onuoha, 2018). Long-term SC innovation can significantly refine deployable capabilities like logistics and supply chain relationship management (Gruchmann et al., 2019). Implementation of modern technologies and systems utilising interactive methodologies, life-cycle assessment of agricultural operations on-site, and promotion of consumers' engagement in local food supply system development are all examples of relevant practices in the food industry (Maloni & Brown, 2006). Gruchmann et al. (2019) further stated that in the food industry, knowledge management and innovation are the lifeblood of SSCM and are necessary for profitability and long-term survival. Stakeholder preferences and perceptions are constantly changing, and stakeholders are searching for innovative food products to meet these demands.

3.7.2 Reflexive-control capabilities

Karman and Savaneviciene (2021) described reflexive-control capability as the capacity of supply chain partners to adapt to changes and modifications in the environment. Supply chain responsiveness or reflexive control is concerned with minimising lead times, enhancing service quality, promptly reacting to customer requests, and optimising transportation (Chukwuemeka & Onuoha, 2018). According to Shekarian (2020), sustainable supply chain reflexive-control contains three critical components, namely agility to respond to customer needs; adaptability to ensure development and entrance into new markets; and risk mitigation for supply chain hurdles and interruptions. Supply chain responsiveness refers to a company's capacity to quickly adjust supply to variations in customer preferences, wants, production, and delivery amounts, as well as product range, volume, and delivery (Siems, Land & Seuring, 2021). These modifications are most likely to result in improved performance outcomes such as lower manufacturing costs, increased stakeholder satisfaction, and efficient delivery (Kareem & Kummitha, 2020).

3.7.3 Capabilities in partner development and alliance management

Kurtmollaiev (2020) defined partner development as all activities entailed in trying to qualify supply chain partners and stakeholders to fulfil their (sustainability) responsibilities. Partner development, from the perspective of joint learning, can be profitable to each stakeholder through assessing new (sustainable) competencies

(Caniato et al., 2017). Furthermore, capabilities for establishing coalitions and acquisition routines can be used to mobilise external resources (Teece, 2012). The capacity to develop strong alliances with supply chain stakeholders is measured by the firm's alliance management capability (Gurzawska, 2019). The provision of the appropriate food items to the appropriate customers and stakeholders at the appropriate time and at a reasonable price is emphasised by supply chain alliance management (Gruchmann et al., 2019). According to Rajaguru and Matanda (2019), compatibility of information flows, assimilation of physical flows, and integration of financial flows are necessary for long-term supply chain partner development.

SC continuity is concerned with how supply chain partners and stakeholders participate in long-term partnerships and contractual arrangements, most notably by ensuring supplier stability, which enables their businesses to flourish, reinvest, innovate, and expand (Beske et al., 2014). In the food industry, similar practices involve promoting and teaching suppliers in the use of innovative farming techniques as well as funding the costs of converting operational activities towards more sustainable farming and food production (Borsellino et al., 2020). As a result of long-term investment decisions in more sustainable infrastructure, major techniques to SSC coherence also combat decreasing margins caused by highly industrialised agriculture (FAO, 2020). According to Oh and Jeong (2019), supply chain partner development helps a firm respond to market demands more quickly by limiting the bullwhip inefficiencies in the supply chain. Karman and Savaneviciene (2021) alluded to the fact that the effect of supply chain partner development on organisational performance is insatiable.

3.7.4 Coevolution capabilities

Coevolution is defined by optimised relationships between and amongst specific supply chain players, leading to more effective collaboration (Beske et al., 2014). By integrating market forces into the workplace in inter-organisational development processes, coevolution aims to go further than designing and developing new products and services (Norberg, 2019). Once effectively functioning systems from one corporate environment are applied to another, external factors can have a substantial impact on the coevolution of supply chain partners (Teece, 2007).

SSCM assists firms in implementing risk-mitigation measures, such as minimising health hazards connected with perishable food (Kareem & Kummitha, 2020; Norberg, 2019) (Gruchmann et al., 2019; Mousavi & Vliet, 2019). Sustainable food distribution practices may assist in mitigating risks connected with food manufacturing, such as seasonal temporary supply (for example, temporary labour), hygienic concerns, intense competition, perishable foods, labelling, branding and packaging (Borsellino et al., 2020). Traceability procedures, such as the deployment of ISO14001 or SA8000 certifications, are critical for long-term SCM success.

SC coordination is usually viewed as a collaborative culture centred on the exchange of information, skills, and resources (Alameda County SBDC, 2017). Kareem and Kummitha (2020) emphasised the need of exchanging information about food sources between farmers and consumers while defining the SFSC system's components. As a result, food industry policies such as labelling and fair trade emphasise openness, most notably about food source, manufacturing, processing techniques, and ingredients (Kurtmollaiev, 2020). Saeed and Kersten (2019) argued that this collaboration must resolve the intricacy of supply chain relationships, particularly from the standpoint of food crop providers. As a result, in the SFSC, trust-based connections may be more effective than power-based ones (Pullma, Longoni & Luzzini, 2018).

According to Papachroni and Heracleou (2020), supply chain cooperation strengthens the collaborative edge of supply chain members, enabling them to achieve better synergy and effectiveness. Jimenez-Jimenez, Martínez-Costa, and Rodriguez (2018) asserted that cooperating with external supply chain partners promotes both transactional and transformative innovations. Malak-Rawlikowska et al. (2019) emphasised the need of internal and external collaborations in guaranteeing supply chain performance in a sustainable manner. Collaboration has the potential to increase revenues, reduce expenses, and enhance technical cooperation (Accorsi, 2018).

3.7.5 Reconceptualisation capabilities

The term "re-conceptualisation capabilities" refers to an organisation’s capability to renounce, modify, or rebuild entrenched, yet unsustainable, organisational practices (Karman & Savaneviciene, 2021). Additionally, Chukwuemeka and Onuoha (2018)

defined reconfiguration capability as an organisation's capacity to develop capabilities for the purpose of integrating existing capabilities. Polater (2021) argued that reconfiguration may be defined as the capacity to escape from adverse route dependencies. This is accomplished through reconfiguring assets, business models, specialisation management, corporate governance, organisational structures, and knowledge management procedures in response to changes in the organisation's size and market features. As a result, it ensures evolutionary fitness continuity. However, the rate of change is determined by whether the innovation is gradual or revolutionary in character.

This type of supply chain reform, when combined with planning and operations, reduces pivotal-firm orientation and competition (Teece, 2012). According to Beske et al. (2014) in this strategy, competencies for sustainable supply chain re-conceptualisation contribute to the purposeful reconfiguration of the supply chain's resources. Gruchmann et al. (2019) discovered that corporate SCM resources have an impact on shared SCM resources, which will in turn have an effect on collaboration and SCM execution.

3.7.6 Logistics-leveraging capabilities

In comparison with primary competences, the capacity of logistics service providers to aggregate widely dispersed resources across the supply chain allows the creation of innovative business models that embrace more sustainable practices. Utilising existing logistical resources and ecologically friendly (logistics) methods has been found to improve a business's economic, social and environmental performance (Pusparini & Kusumastuti, 2018). Additionally, introducing additional capabilities enables logistics service companies to diversify their service offerings and perform much better (Gruchmann et al., 2019).

3.8 SUSTAINABLE FOOD SUPPLY CHAIN PERFORMANCE OF STAKEHOLDERS IN THE FOOD INDUSTRY

Sustainably managed supply chain is a relatively emerging subfield within supply chain management (SCM). SSCM's success is defined not only in social and environmental terms, but also in economic terms, as it is founded on the triple bottom line concept, which encompasses people-planet-profit (Grant et al., 2017). A number of facets make up SFSCM performance and these are discussed in the following subsections.

3.8.1 Reduction in emissions and air pollutants

Carbon emissions and air pollution reductions, in general, indicate a healthy food supply change management (FSCM) system. Organisations are on the verge of developing a desire to reduce their environmental and pollution footprints as a means of ensuring an efficient, cost-effective, and sustainable supply chain management system (Tsolakis, 2018). Baliga et al. (2019) emphasised that no organisation can attain SFSCM success on its own and requires collective effort from various stakeholders. This means that all food supply chain stakeholders must collaborate to achieve SFSCM performance. The supply chain is usually comprised of stakeholders such as big, medium, and small producers engaged in agriculture and commodity trading; intermediate processors engaged in processing, manufacturing, and marketing main and value-added products; distribution companies such as wholesalers and retailers engaged in marketing and selling food; and consumers engaged in food shopping, purchase, and consumption (Hakkim, Kumar, Sinha & Sinha, 2022). There is a possibility that carbon emissions and significant pollutants will be generated at each of those levels (Brown et al., 2021). All that is required is for all stakeholders to raise their awareness in order to ensure that carbon emissions are reduced. Chu et al. (2017) claimed that food supply chain stakeholders are enacting a variety of institutional and macroeconomic policies to ensure the performance of the food supply chain is efficient.

3.8.2 Water waste reduction through food processes

According to Kibler, Reinhart, Hawkins, Motlagh and Wright (2018), one of the primary indicators of SFSCM success is the decrease of water waste in operations. Morone et al. (2017) detailed how a number of critical functions must be monitored in order to minimise water waste and improve the sustainability of the food supply chain system. To effectively reduce water waste, stakeholder organisations must begin with the client at the end. A critical component of any waste elimination effort is ensuring that it does not negatively impact the customer experience or satisfaction (Karandish, Hoekstra & Hogeboom, 2020). They should continue to get the same quality of service or, preferably, a higher level of service that they have grown accustomed to receiving from a given institution (Khalid et al., 2021). While some enhancements will have no external impact, others, such as changes to order fulfilment procedures or delivery

dates, will most certainly have an impact on the consumer. Before rolling them out across the organisation, there is need for closely monitoring those regions for any adverse impacts. On the other side, customers can provide valuable input that can help identify areas for improvement. Complaints regarding a certain product or service are frequently made. If a certain location's consumers complain more frequently than others, this signals the presence of a problem to solve (Evans & Taylor, 2021).

3.8.3 Engage suppliers and industry professionals to provide their expertise

Occasionally, both firm owners and staff are too close to the process to recognise the process flaws. Add to it a degree of comfort that promotes resistance to change, and organisations have an obvious need for a new set of eyes. In this case, an unbiased third party can provide the objective viewpoint necessary to identify areas for development in a food supply chain system (Wu, 2017).

Suppliers are an excellent starting point, since they should be prepared to go above and beyond to assist a firm to grow its business (and, in turn, grow their own). Though they will only be able to provide significant input on their segment of the supply chain, holding multiple of these feedback sessions across the supply chain is likely to be a great source of inbound analysis (Karhade & Dong, 2021). Additionally, a supplier may be able to give extra information to facilitate the process later down the line. By bringing in an independent expert, an organisation takes things to the next level. More so, by hiring someone with knowledge in all facets of logistics, stakeholders may anticipate receiving advice that will help the organisation to optimise the whole supply chain (Baliga et al., 2019).

3.8.4 Establish feedback channels and conduct periodic assessments

After completing selected waste reduction assessments and addressing the high-priority items, it is worthwhile to invest time in implementing procedures that will alert future inefficiencies (Kazungu, Kabia, Munge & Barasa, 2021). Once the stakeholder organisation has identified what went wrong and developed a superior procedure to replace it, the only remaining task is to create criteria for the procedure. To improve performance of a SFSCM system, stakeholders should concentrate on establishing feedback loops that allow for real-time assessment of performance and any new concerns that may develop (Sun, Ni & Lam, 2015). Solving problems as they arise is the optimal waste elimination strategy, as it significantly reduces the likelihood of

things spiralling out of control. Again, empowering employees to create these feedback systems by inquiring about their needs and providing them with the required tools is necessary. With the long term in mind, organisations can create periodical evaluations at predetermined intervals (twice a year or annually is often sufficient) to assess the new process's effectiveness and iron out any residual waste problems (Brown et al., 2021).

3.8.5 Establish reports and tolerance limits

As a logical continuation of the previous phase, it is prudent to tie new procedures to weekly or monthly reporting needs. Those charged with monitoring and performance should also be assigned the job of preparing these reports and ensuring that activities remain within acceptable limits (Kumar, 2021). This provides the organisation with an early warning system for potential failures, enabling rapid response and resolution if and when supply chain inefficiencies recur (Zorpas, 2020). Thus, establishing reward-based incentives for improved performance helps to fend off such alarms and motivates continued progress. It begins with the process's primary aim and moves backward to get report statistics that accurately reflect how things are progressing (Myler et al., 2021). Transparency must be stressed, with an emphasis on accountability rather than blame. Inefficient practices can readily resurface, possibly even more surreptitiously, if staff perceive that they are being scrutinised. To avoid this, it is critical to emphasise the detection and resolution of issues as the sole objectives of new reporting processes (Bautista-Gomez et al., 2016).

3.8.6 Adoption of national and international standardisation

In order to have consistency in implementation of the triple-bottom-line fundamentals, institutions in the food supply chain system are required to be synchronised in all their operations and processes. Synchronisation is ideal for organisations to have a common goal, which is sustainable food supply chain performance (Matamala & Orero, 2018). International standards such as ISO 26000 provide guidance on using it in the food supply chain by focusing on the major aspects of its seven core subjects, namely organisational governance, human rights, labour practices, the environment, fair operating practices, consumer issues, and community involvement and development (Keys & Taylor, 2021). The fundamental aim of this ISO 26000 is to ensure that the standard harmonises all aspects and functions of the triple bottom-line

within the food industry. The other essential element in standardisation is HACCP. This is a monitoring system in which food safety is handled through the control and analysis of biological, chemical, and physical risks throughout the manufacture, distribution, and consumption of the completed product (Praia & Henriques, 2021). The HACCP is highly recommended to improve efficiency and workability of the food supply chain system (Edmunds et al., 2016).

3.8.7 Reduced use of non-renewable energy in supply chain

Appropriate use of fertilizers and pesticides is essential to avoid pollution of soils and waterways in the food development phase (Agyekum, 2015). Stakeholder organisations should strive to reduce GHG emissions to aid in the preservation of air quality, reverse soil degradation, boost the organic carbon content of the soil, and increase biodiversity through conserving land, water, and energy resources, as well as wetland and forest regions (Ragazzi, Ionescu & Cioranu, 2017).

3.8.8 Procure food ingredients from environmentally friendly suppliers

A myriad of initiatives are available to enhance sustainable procurement of food supply chain commodities, which include use of food packaging that is ecologically friendly, the use of low-impact materials, or the use of recyclable materials (Sonnino, 2019). Technical solutions, such as product re-engineering to increase shelf life and the use of functional packaging, can help decrease spoiling and disposal of perishable foods, and decrease garbage disposed of in landfills (e.g. food recycling plants, use as animal feed, donate excess food to local charities) (Morley, 2021). It can also help reduce the carbon footprint from production, packaging, transportation, storage, and disposal of our food products. A major way to influence the carbon footprint in this phase is by considering the suitability of packaging to your product; the packaging can be optimised around the product and its packing, reducing unnecessary waste (Radojević, Tomas Simin, Glavas Trbić & Milić, 2021). Reusable packaging solutions can also significantly reduce environmental impact. Neto (2020) expounded that organisations that have excellent sustainable supply chain performance normally experience a decrease in costs from wastewater treatment. More than that, institutions experience a decrease in costs for waste disposal (Morley, 2021).

The number of on-time and full deliveries increases as stakeholders work on optimising the whole process. Focusing on the health of the environment has

increased customers' satisfaction (Conner, 2020). Customer satisfaction is critical in nearly every industry, particularly the food supply chain. Not only is it a leading indication for loyalty of customers, but it also helps organisations to detect dissatisfied consumers, mitigate customer grievances, and mitigate negative word of mouth while improving revenue (Sonnino, 2019). To begin, environmental management is a technique by which a business portrays itself as a responsible one, and it is also one of the ways in which customers associate with businesses (Neto, 2020). By and large, individuals support institutions that reflect their values (Accorsi & Manzini, 2019). As a result, clients who identify with businesses are more likely to be happy with their products and services (Baliga et al., 2019). Second, when businesses invest in social development and restoration, their consumers have a chance to contribute to that effort through their relationship with those businesses. This possibility is most likely to result in increased customer satisfaction with businesses' goods and services. Additionally, the consumer is more likely to receive evaluated quality and considered value from businesses that contribute to broader social development and, in particular, environmental sustainability. These are likely to result in increased consumer satisfaction (Sun et al., 2015).

3.9 CHAPTER SUMMARY

This chapter initially discussed SC, SSCM, and SFSCM in detail and explained the relationships existing within these variables to enhance an easy understanding of the study. Additionally, the chapter focused on the research variables, which are SFSCM practices, SFSCM drivers, challenges faced when implementing SFSCM, approaches that can be employed to reduce challenges faced when implementing SFSCM, SDCs, and SFSCM performance. Relationships between the above-mentioned research variables were explained in line with the food industry and sustainable supply chain management. The literature employed helped to define and discuss the concepts of SFSCM to build a solid basis for all of the variables in the research study. The next chapter examines the conceptual framework and hypothesis formulation.

CHAPTER 4
CONCEPTUAL MODEL DEVELOPMENT AND HYPOTHESES

4.1 INTRODUCTION

Understanding of different hypothetical variables can be made easy when the variables are downsized to a conceptual model. The previous chapter reviewed literature on SFSCM practices, SDCs, SFSCM drivers, SFSCM challenges and SFSCM performance. The present chapter reveals previously developed conceptual frameworks that are related to the current study. An in-depth analysis of these previously developed models eventually results in the strengthening of the current research conceptual framework. The current research conceptual framework is discussed in much depth together with the posited hypothetical study linear relationships amongst variables. Lastly the chapter discusses mediation relationships amongst the latent variables.

4.2 CONCEPTUAL FRAMEWORK FOR THE RESEARCH

Previous research conceptualisation models were used in the current research focusing on sustainable supply chain best practice, SFSCM drivers, SDCs of supply chain stakeholders and challenges faced with the implementation of SFSCM were utilised to develop the conceptual framework for the present study's exploration. The next section addresses some conceptual models used in previous research that are relevant to the current study.

4.2.1 Frameworks from prior research

This section presents some research conceptual approaches from previous studies that are related to or pertinent to this study. These frameworks include studies done by Liu et al. (2017); FAO (2014); UNEP (2016) and Baliga et al. (2019).

4.2.1.1 Lui et al. (2017) framework for sustainable service supply chain

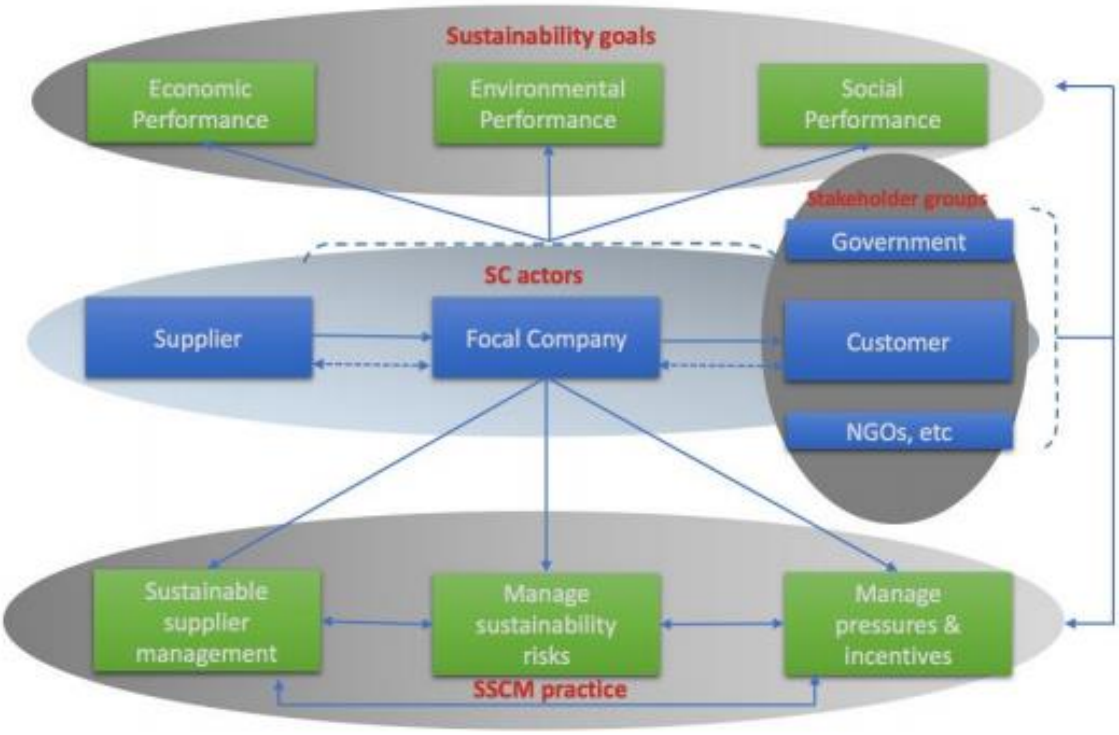

Figure 4.1: A Framework of sustainable service supply chain

Source: Liu et al. (2017:13)

According to Liu et al. (2017), Figure 4.1 illustrates how focal enterprises are connected to suppliers and users via goods and processes. Various stakeholders outside the supply chain, such as governments and political opinion, put pressure on or motivate companies to manage their supply chains sustainably, including consumer management and risk management. These sustainable methods must adhere to three criteria for sustainability: social, economic, and environmental performance, in accordance with the TBL. Meanwhile, objectives are always win–win situations, ensuring that economic, environmental, and social performance standards are met.

4.2.1.2 FAO sustainable food value chain framework

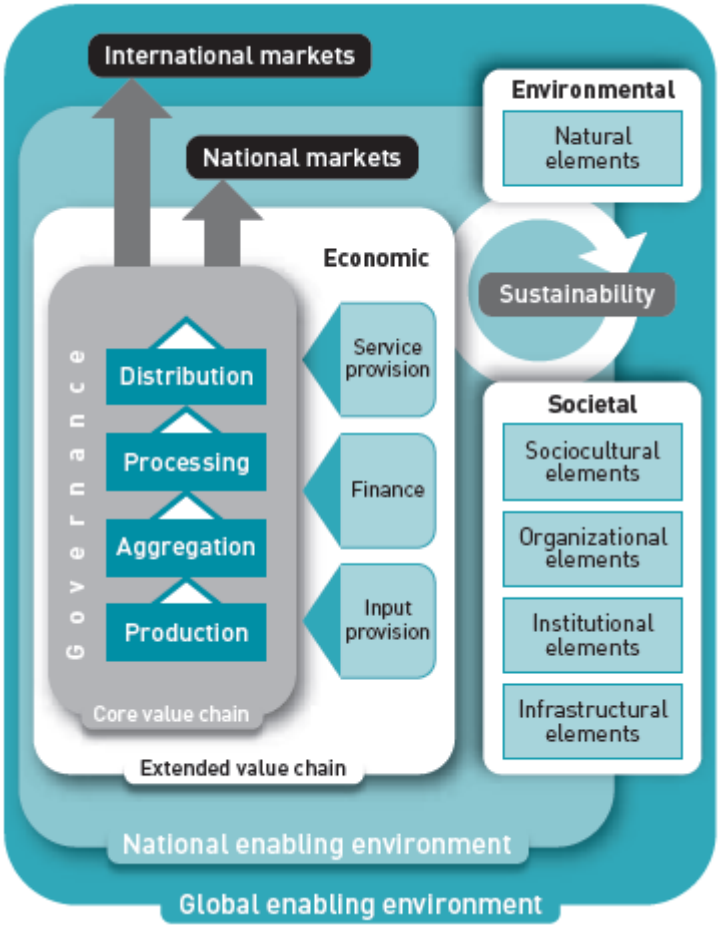

Figure 4.2: The sustainable food value chain framework

Source: FAO (2014)

The framework depicted in Figure 4.2 is based on the numerous value chain (VC) frameworks. In essence, it depicts a system in which a complex environment influences the performance and behaviour of farms and some other agrifood enterprises. The framework is based on the term "core VC" which refers to the SC actors who create or acquire the product at the upstream level, build value to it, and then sell it to the subsequent level. Value-chain participants are mostly private-sector businesses, but they can also be public-sector organisations like food banks or emergency food buyers like the World Food Programme (FAO, 2014). Stakeholders at each level of the chain are diverse, with different types of actors with different sizes, technologies, or goals connecting through multiple channels to a wide range of end markets. The chain is divided into four core functions, namely production (agriculture or fishing, for example), consolidation, processing, and transportation (wholesale and

retail). The aggregation phase is critical for food venture capitalists in emerging markets. Aggregation can be performed by producer groups, aggregation-specialised intermediaries, processors of food, or, less frequently, distributors of food (wholesalers or retailers). The governance structure of the core VC is an important component. The word "governance" refers to the relationship between players at various levels of the supply chain (horizontal interconnections) and also within the whole supply chain (vertical interconnections). It involves components, among others, which include information interchange, cost, standardisation, payment systems, collaborations with or without integrated solutions, market power, lead firms, and wholesale and retail systems. Corporate innovation service providers, who do not own products but play a critical role in facilitating the value-creation process, assist value-chain participants. These support providers, together with the SC actors, portray the extended VC.

Value chain participants and support groups operate in a specific enabling environment that distinguishes societal, economic, and natural environmental elements. Societal components are human-created entities that form the fabric of a society (Baliga et al., 2019). These are divided into four categories: 1) informal sociocultural element, such as consumer preference and religious preferences; 2) formal institutional elements, such as regulatory frameworks, laws, and policy proposals; 3) organisational elements, such as national –multi-professional affiliations and scientific and educational institutions; and 4) infrastructural elements, such as roadways, ports, communications infrastructure, and energy grids.

Sustaining the VC is a three-pronged endeavour: social, economic, and environmental. On the economic side, a VC that has been formed or developed is deemed sustainable if the required actions at the person or support provider level are economically or monetarily feasible (financially profitable for commercial entities –for public services). On a societal level, sustainability alludes to achievements that are socially and culturally acceptable in terms of wealth and income distribution and the expenses associated with greater value production (Brown et al., 2021). On the environmental side, sustainability is mostly defined by venture capitalists' capacity to demonstrate that their value-adding operations have a negligible negative impact on the environment; when feasible, they must demonstrate a positive benefit (Caniato et al., 2017).

4.2.1.3 UNEP, 2016 food sustainability framework

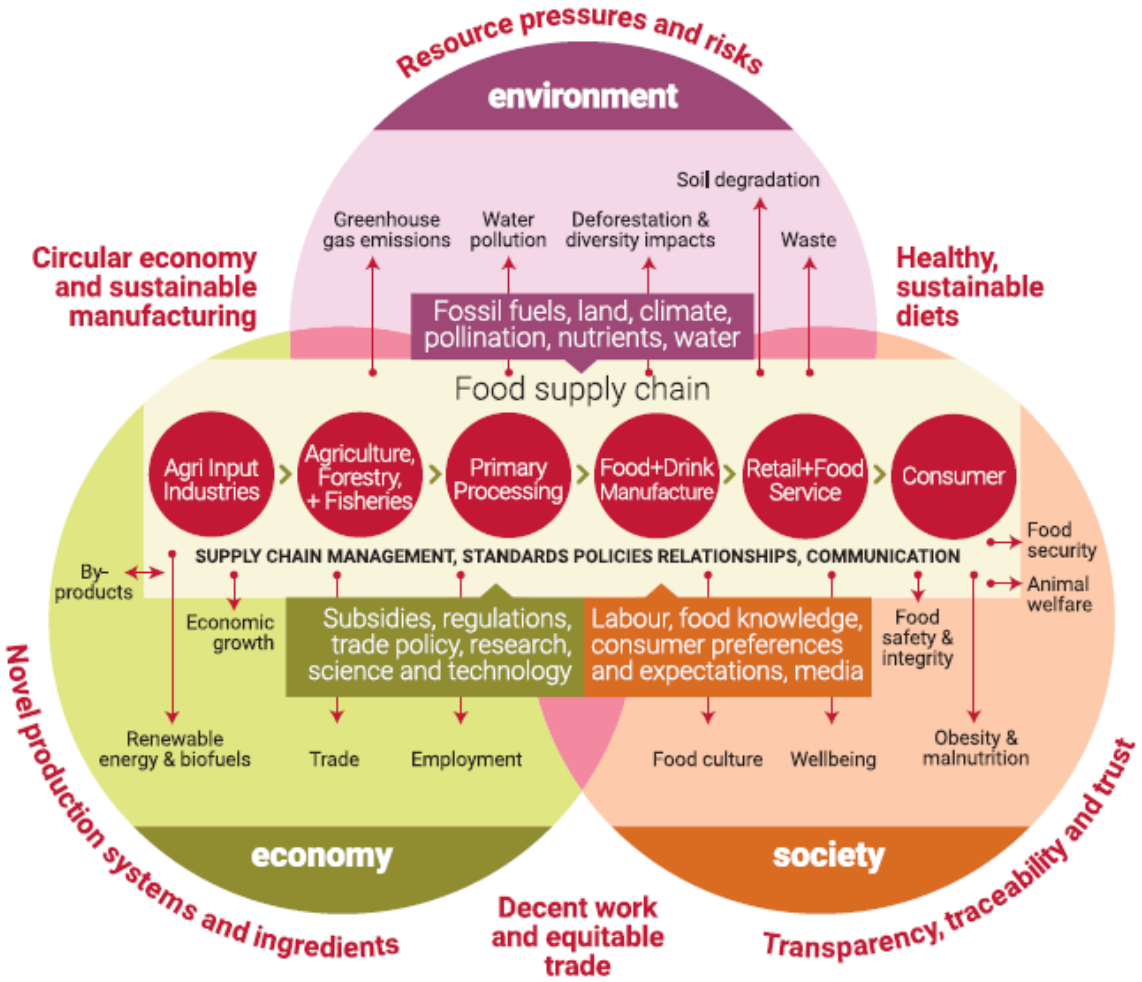

Figure 4.3: Food sustainability framework

Source: UNEP (2016)

Figure 4.3 depicts six key themes outlined by UNEP (2016) which provide a foundation for a regenerative food supply chain. Resource risks and increased pressure, sustainable healthy diets, green economy and sustainable products, novel industrial processes and food item ingredients, decent work and equitable trade, and accountability, traceability, and loyalty in the food supply chain system are among them.

- **Risks and pressures on resources**

The food supply system is inextricably linked to the natural environment while also having a significant environmental impact. Stakeholders in the supply chain should build guidance for the food sector on limiting the risk of evolving international

environmental risks. In this theme, supply chain participants must identify how to integrate a large scope of social and environmental risks into food corporation and supply chain sustainability and risk management (Brown et al., 2021).

- **Diets that are both healthy and sustainable**

There is a need for the food system to provide excellent human and environmental health outcomes. This can be achieved by selecting and presenting best practice guidelines for incorporating sustainability into the evaluation of new products and processes. Through the application of technology, sustainable diets support the growth of solutions to the problem of food and dietary waste (UNEP, 2016).

- **Circular economy and environmentally friendly manufacturing**

The present system of 'take-produce-consume-dispose' is unsustainable. According to UNEP (2016), the best fundamental principles to solve food compliance and operational perspective complexities to promote the improved use of waste products and by-products as components in other processes and sectors are a circular economy and sustainable manufacturing. These concepts further promote and support industry attempts to expand resource efficiency in the food sector to reduce energy, waste, and water. Furthermore, the themes aid in the development of new practical energy standards for supply chain stakeholders, as well as the optimisation of food usability through the enhancement of product date/storage/usage labelling information.

- **New manufacturing processes and ingredients**

Ezeudu et al. (2021) expounded that there are opportunities for new food production and manufacturing technologies to be developed in order to provide sustainable nutrition. They contribute to future protein technologies, legal, and consumer acceptability challenges. Novel food production systems encourage or support research into automation, as well as increased use of information technology and "artificial intelligence" in the food supply chain system (UNEP, 2016).

- **Work that is decent and trade that is fair**

The living standards and working conditions of people working in the food system must be improved. Exploring the benefits and drawbacks of a move toward technology

innovation in the agro-food supply network is also meant to generate decent work (Ahumada et al., 2012; UNEP, 2016).

- **Openness, traceability, and trust are all important**.

Increased industry awareness of evolving transparency and traceability technologies in supply chains is needed to strengthen food system sustainable growth and consumer trust. Mechanisms to support the development and adoption of innovative approaches to ensuring the sustainability of supply chain members should be put in place as part of the preparations for a sustainable food supply chain system (Salvatori et al., 2021).

4.2.1.4 Baliga et al. (2019) SSCM performance

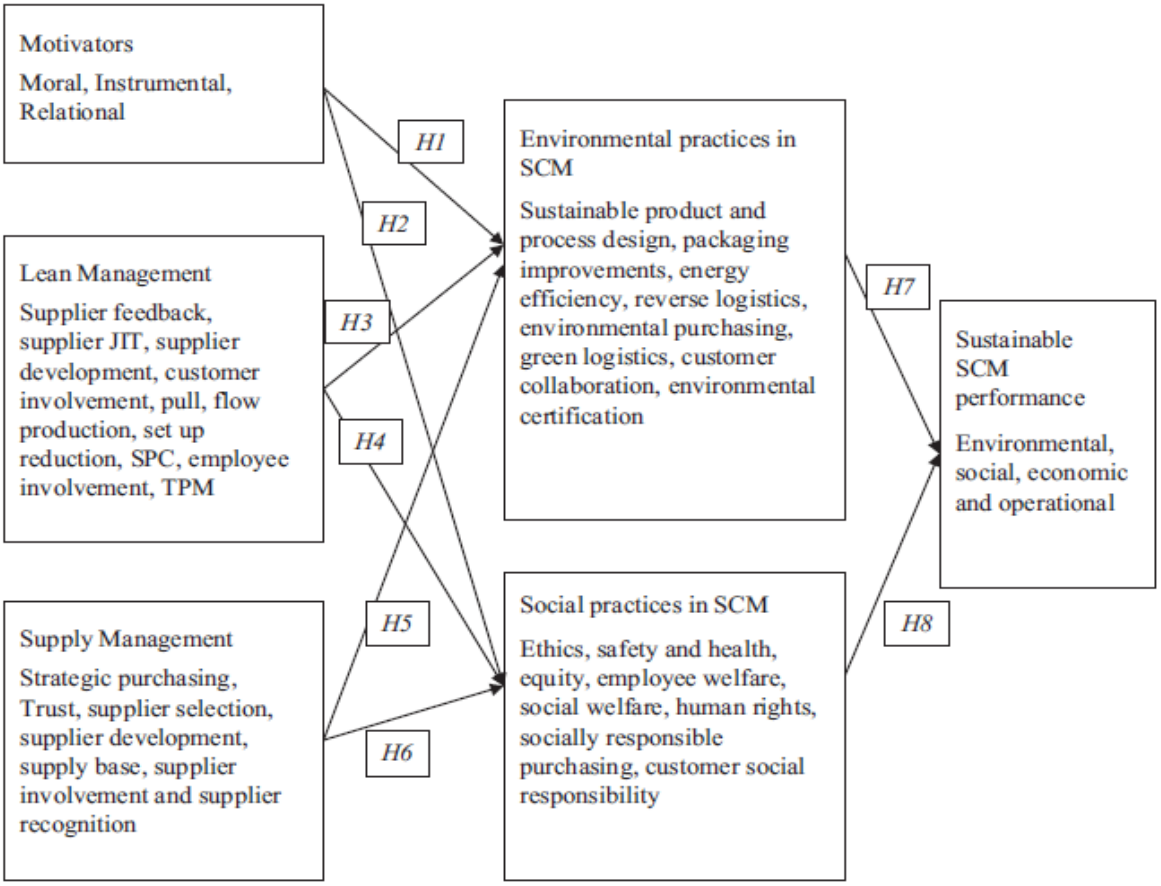

Figure 4.4: The sustainable supply chain performance management framework
Source: Baliga et al. (2019)

As shown in Figure 4.4, numerous critical implications may be derived from the study, as demonstrated in Baliga et al. (2019). Motivators have an effect on SSCM practices, and SSCM practices entirely moderate the relationship between motivators and SSCM

performance. As a result, the natural question is how to increase the bar for SSCM motivators. While the government establishes legislative rules on environmental and social issues, consumers and NGOs put pressure on businesses to improve their sustainability performance.

Lean and supply chain management ideas, the study discovered, may also contribute to SCM sustainability. With its focus on waste reduction and inventory reduction, lean has an inescapable link to sustainability. Similarly, supply chain sustainability is only possible with the use of SCM principles such as vendor codes of ethics and supplier engagement management (Beske et al., 2014). Ultimately, sustainability performance is multifaceted, spanning financial, social, and environmental sub-constructs. The study established a statistically significant beneficial relationship between social and environmental behaviours and SSCM success, which includes, of course, financial performance

4.2.1.5 Current research framework

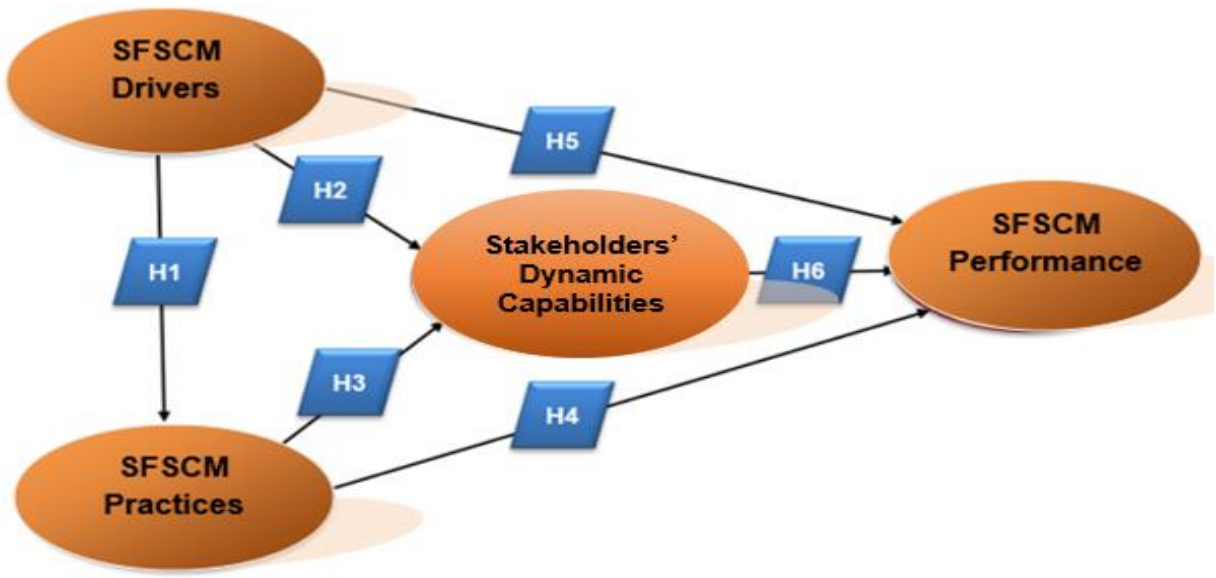

Figure 4.5: Conceptual framework for the research

Source: Author's own compilation

The framework depicted in Figure 4.5 illustrates the hypothesised connections between SFSCM drivers, SFSCM practices, SDCs and SFSCM performance. From the conceptual framework depicted in Figure 4.5, SFSCM drivers and SFSCM practices are the predictor variables, while SDCs act as a mediator. The outcome variable in this study was SFSCM performance. The research provides further

explanations for the hypotheses proposed among the research elements – H1, H2, H3, H4, H5, H6, H7, H8, H9 and H10 are the hypotheses presented below.

4.3 PROPOSED HYPOTHESES

This section discusses the claimed connection between the hypothesis' variables. Numerous hypotheses were developed to address the main research purpose, based on the literature and the conceptual framework depicted above. The model was modified, refined, and finalised based upon the results of the Zimbabwean supply chain stakeholders. The variables include SFSCM drivers, SFSCM practices, SDCs and SFSCM performance. The development of any acceptable stakeholder framework is largely dependent on a wide range of determinant factors. These are basically independent, dependent, and mediating factors as proposed by the hypothesised model in Figure 4.5. The hypothetical underpinnings are discussed below.

4.3.1 SFSCM drivers and SFSCM practices

Development of practices in SFSCM is mainly influenced by the existence of drivers for supply chain sustainability. This reflects that practices are a result of the existing drivers for SSCM. The hypothesis was developed to show the relationship between SSCM practices and SSCM drivers. According to Accorsi and Manzini (2019), the existing drivers in a given supply chain set up determine what sort of practices are in existence. For instance, regulatory drivers normally result in environmental compliance practice as stakeholders fear sanctioning when they fail to meet the laid down standards. In the Zimbabwean case, organisations like the EMA are known to drive the whole supply chain system into sustainable environmental compliance. Thus, the current study claims that:

H_1: SFSCM drivers have a positive significant influence on implementing SFSCM practices

4.3.2 SFSCM drivers and SDCs in the food supply chain

SDCs have been explained on a theoretical foundation in Chapter 2 as the organisation's capacity and ability to integrate, create, and restructure internal and external skills to meet rapidly changing environments. These dynamic capabilities are mostly a result or a function of the available external or internal drivers such as regulatory, societal pressure, market pressures, organisational culture, or

organisational strategy (Micheli, Cagno, Mustillo & Trianni, 2020). These fundamental drivers act like the influencers of dynamic capabilities that stakeholders will eventually leverage on in developing a sustainable supply chain framework. Based on the above, the current study developed a hypothesis to show the relationship between SFSCM drivers and dynamic capabilities. In this case, the relationship would be derived from the SFSCM drivers as an independent variable, and dynamic capabilities as a dependent variable. Thus, this study claims that:

*H_2: SFSCM drivers have a positive significant influence o*n SDCs *in food supply chain.*

4.3.3 SFSCM practices and SDCs

SFSCM practices were discussed in Chapter 3 and these include environmental sustainability practices, such as waste management, material efficacy, energy efficiency, water conservation, emissions, land use, environmental protection, supplier evaluations and assessment in supply chain management (Saeed & Kersten, 2017). Social sustainability practices include how a company handles its social and human capital obligations, such as social sustainability, efficiency, Individual values and anti-corruption, human resources, safety and health, training, increasing consumer awareness, and societal compliance are just a few of the issues that have been raised. The third category of practices focuses on economic sustainability. This describes the financial capital distribution and movement among an organisation's stakeholders. The economic fundamentals involve consistency and profitability, profit distribution, and market competitiveness. Beske et al. (2014) explained that dynamic capabilities such as knowledge assessment, partner development, supply chain re-conceptualisation, co-evolving, and reflexive control in sustainable supply chain management are determined by the best practices which the organisation chooses to follow. For instance, one organisation may decide to dwell on economic sustainability best practice alone, and hence, if one follows that with the profit motive, the particular organisation may not adopt all five dynamic capabilities. The organisation may simply focus on supply chain re-conceptualisation to enhance ways of ensuring its long-term profitability. The same applies when an organisation focuses on social sustainability. They may choose co-evolving and partner development capabilities. Beske et al. (2014) stated that selection of all dynamic capabilities is mostly seen when an organisation has a focus on triple bottom-line practices. In this case, Beske et al.

(2014) acknowledged that SFSCM practices have a significant influence on SDCs. The current study developed a hypothesis which claims a relationship between FSCM sustainability practices and SDCs as follows:

H_3: SFSCM practices have a positive significant influence on SDCs.

4.3.4 SFSCM practices and their influence on SFSCM performance

SFSCM practices were discussed in Chapter 3 as well as in Section 4.3.3 of Chapter 4. Baliga et al. (2019) expounded that supply chain performance may be dependent on the practices that an organisation chooses to implement. For instance, constant monitoring of food waste, distribution costs, and understanding of customer food requirements may be practices that result in positive sustainable food supply chain management performance. According to the proposed hypothesis, SFSCM performance is a phenomenon that results from a perfect match of triple bottom-line practices; otherwise, if organisations are not careful in the practices they employ, negative performance may result. Based on the above, this study claims that:

H_4: SFSCM practices have a positive significant influence on SFSCM performance.

4.3.5 SFSCM drivers and their influence on SFSCM performance

Emamisaleh and Taimouri (2021) described SFSCM drivers as the engine that gives energy to SFSCM performance. SFSCM drivers can be favourable or harsh but can still yield the same results in terms of achieving SFSCM performance (Grant et al., 2017). According to Aramyan (2014), SFSCM drivers such as government regulations can easily yield positive performance as the government will be looking for total compliance from all stakeholders. Non-enforceable drivers may or may not yield positive performance in the short term, depending on the drivers' effect on the organisation under concern. For instance, if the SFSCM driver results in cost savings in one organisation, then the organisation may follow and get guidance on how to articulate the process, whilst if the driver is about long-term emission reduction, organisations normally take time to follow through on such a driver (Bhattacharya & Fayezi, 2021). According to Brown et al. (2021), all SFSCM drivers are likely to lead to positive SFSCM performance if they are put into consideration and all stakeholders work together towards it. As such, the current study hypothesises that:

H_5: SFSCM drivers have a positive significant influence on achieving SFSCM performance.

4.3.6 SDCs and their influence on SFSCM performance

Sustainable supply chain management performance has been defined by Accorsi and Manzini (2019) as a monitoring process, determining if the appropriate sustainable practices are followed and observed and the intended objectives are met. In this study, the term "sustainable food supply chain performance" refers to the ability of the supply chain to be aligned with the tripple bottom line approach in all the processes where food is produced and processed. Different capabilities that stakeholders have affect SFSCM perfomance in different ways. It is not all capabilities that are fully in line with the requirements of the three sustainable supply chain dimensions. Only knowledgeable stakeholders with the appropriate resources would rightly be able to align necessary capabilities. In support of the theorised hypothesis, literature acknowledges that SDCs have an influence on achieving SFSCM performance (Baliga et al., 2019). The current study claims that:

H_6: SDCs *have a positive significant influence on achieving SFSCM performance.*

4.3.7 Mediation effect of SFSCM drivers on SFSCM practices and SDCs

According to Baliga et al. (2019), some practices in sustainable supply chain management remain unenforced until there is a necessary push coming from different SFSCM drivers or pressures. This normally happens when the sustainability practice is viewed negatively and most stakeholder organisations are not willing to invest and enforce it sooner, for example the practice to reduce greenhouse gases in food processing plants may require hefty investments which the focal organisation may not be willing to expend in the near future. In such an instance it may require regulatory pressure (through law enforcement) or enforcements coming from the government’s relevant ministry and or surrounding community complaints to push or drive the focal organisation to reconsider its decision with the urgency it deserves and to work on reducing GHG emissions as required. When the organisation has been given the necessary pressure to reconsider urgently reducing GHGs, chances are that the organisation may employ one of the dynamic capabilities such as the re-conceptualisation, through reviewing and altering the traditional plant operation system by either modifying the plant system or investing in a new plant that pollutes

less. Normally the focal organisation may reconceptualise their decisions when the law threatens to close down the plant should the organisation fail to comply with the regulation in time (Edwin, Kamble, Belhadi, Ndubisi, Lai, and Kharat, 2021). In such instances, SFSCM drivers would have played a pertinent role in mediating the relationship between SFSCM practices and dynamic capabilities. The current study assumes that there is an indirect relationship between SFSCM practices and SDCs through SFSCM drivers, and posits that:

H_7: SFSCM drivers have a significant mediation effect on the relationship between SFSCM practices and SDCs.

4.3.8 Mediation effect of SDCs on SFSCM practices and SFSCM performance

SFSCM practices may have an indirect relationship with SFSCM performance depending on the practice and capabilities available (Pham & Doan 2020). For example, a maize miller may decide to improve on processed grain production through partnering with a farmer (partner development capability) and then introduce modern sustainable farming methods such as drip irrigation or dry farming to enhance bulk production of grain with the minimum damage of the land and minimum water use. In this case vertical integration between the maize miller and the farmer enhances new farming methods that conserve water, soil and uses less energy in producing almost double the yield as before (Cole & Aitken, 2020). This integration (co-evolving capability) would have mediated environmental and economic sustainability practices and result in better farming methods and improved yields (SFSCM performance). Based on the above, this study assumes that there is an indirect relationship between SFSCM practices and SFSCM performance through SDCs, and claims that:

H_8: SDCs have a significant mediation effect on the relationship between SFSCM practices and SFSCM performance.

4.3.9 Mediation effect of SFSCM drivers on SDCs and SFSCM performance

According to Mehrabi, Perez-Mesa, and Giagnocavo (2022), the need to review systems used in food production or farming methods (re-conceptualisation capability), stakeholder development and training (partner development capability) or exchange of expertise and information (knowledge assessment capability) may be triggered by a new law (SFSCM driver) that requires all food and agriculture organisations to abide

by set guidelines on environmental management practices such as zero emissions, and total use of organic fertilisers in farming (Hove, 2020). This implies that the decision to review systems, to develop stakeholders or to share information with stakeholders would have been enhanced by a regulatory pressure/driver to ensure stakeholder total compliance and sustainable performance. Such a scenario reflects SFSCM drivers having a mediating effect on the relationship between SDCs and SFSCM performance. The current study assumes the presence of an indirect relationship between SDCs and SFSCM performance through SFSCM drivers, and hypothesises that:

H_9: SFSCM drivers have a significant mediation effect on the relationship between SDCs *and SFSCM performance.*

4.3.10 Mediation effect of SDCs on SFSCM drivers and SFSCM performance

Rising consumer requirements in terms of the need for nutritious diets at fair prices trigger food organisations to employ ISO standards (such as HACCP) in food production whilst putting in place cost leadership measures to achieve all stakeholder requirements (SFSCM performance) (Liao & Widowati, 2021). Given the circumstances of ever-changing stakeholders food tests, the focal organisation would constantly need to measure supply chain functionality compared to HACCP standards or any other best practice benchmark parameters, and also carry out performance evaluation audits at different stages of food production/processing (reflexive control capability) to ensure that customer requirements are fully met (SFSCM performance) (Adamidesu et al., 2021). Given such a scenario, the relationship between SDCs and SFSCM performance would have been mediated by SFSCM drivers. Thus, the current study claims that:

H_{10}: SDCs have a significant mediation effect on the relationship between SFSCM drivers and SFSCM performance.

4.4 CHAPTER SUMMARY

This chapter evaluated previously developed research models from a variety of writers and that were relevant to the study's research constructs and how they were used to develop the conceptual underpinning for the current study. The current research's conceptual framework was later discussed in detail together with the posited

conceptual relationships. The conceptual basis for the current research was discussed and the chapter further provided a theoretical review of the ten hypothetical study objectives which comprised six linear and four mediation hypotheses. All the hypotheses were theoretically reviewed elaborating their relevance to the current research study. The following chapter (Chapter 5) discusses the research methodology.

CHAPTER 5
RESEARCH METHODOLOGY

5.1 INTRODUCTION

Research is a combination of two words Re + Search. It means going to try the search again. Research provides answers to problems, rectifies existing errors, eliminates existing misconceptions, and adds new learning and information to the existing knowledge bank (Creswell, 2014; Pandey & Pandey, 2015:7; Creswell & Guetterman, 2019). To obtain understanding of current reality on SFSCM implementation in the Zimbabwean food sector, the current study required a thorough analysis of new ideas on SFSCM in order to bring new knowledge to light.

The aim of this research was to formulate a stakeholder framework for SFSCM. The previous chapters outlined the area of research, problem statement, research objectives, intent of the study and the assumptions of the study. The theoretical, and previous empirical literature related to the research problem, the conceptual context, as well as the hypotheses proposed, were reviewed in Chapters 2, 3 and 4 based on the research problem and study objectives. The current chapter discusses the research methodology used to achieve the research objectives and address the identified research problem. The purpose of this chapter is to clarify how the study was carried out, how the information was collected, how it was analysed and interpreted. The chapter discusses the research philosophy, design, approach, sampling design, data collection and analysis techniques used in this study. Ethical considerations are also discussed in this chapter. To establish a structure for conducting research, the next sections address the meaning and importance of research philosophy and research design.

5.2 RESEARCH PHILOSOPHY

The research philosophy is connected to the way the author or researcher establishes information, and refers to what the researcher perceives as truth, knowledge and reality (Tesar, 2021). Therefore, a basic understanding of research philosophy is crucial for researchers because it profoundly affects research method choices (Wilson, 2010:9). Four important philosophical world views were outlined by Creswell (2009),

these are (1) post-positivism, (2) constructivism, (3) participatory or advocacy, and (4) pragmatism, as illustrated in Table 5.1.

Post-positivism contends that a researcher's points of view, as well as their self-identity, affect what they perceive and, as a consequence, what they conclude. Post-positivism finds objective answers by attempting to recognise and work with imperfections in thinkers' ideas and knowledge. Constructivism is a philosophical viewpoint that asserts that all knowledge is derived from human experience rather than being discovered as self-evident information (Lukman, 2021).

According to an advocacy/participatory worldview, research must be entwined with politics and a political narrative. As a result, the study includes a reform agenda that has the potential to improve the lives of participants, the organisations in which they work or reside, and the researcher's lifestyle. It aims to comprehend the world by attempting to alter it in a collaborative and reflective manner (Kankam, 2019).

The current study followed a pragmatism philosophy, which is a realistic model and revolves around practical factors. As shown in Table 5.1, this research philosophy is focused on behaviour, circumstances and their implications and focus on the research problem rather than the approaches and strategies used. It is described as the philosophical theoretical foundation upon which mixed methods are built (Creswell, 2014).

Table 5.1: Philosophical world views

Post positivism • Determination • Reductionism • Empirical observation and measurement • Theory verification	**Constructivism** • Understanding • Multiple participant meeting • Social and historical construction • Theory generation
Advocacy/Participatory • Political • Empowerment issue oriented • Collaborative • Change oriented	**Pragmatism** • Consequences of actions • Problem centred • Pluralistic • Real world practice oriented

Source: Creswell (2014)

Creswell and Poth (2016) asserted that pragmatism is a branch of philosophy which provides research with a theoretical context and has the features given below:

- The pragmatic philosophy is not dedicated to any formal scientific theory or concept and this is demonstrated by the combination and inclusion of both quantitative and qualitative approaches.
- The world is seen as a dynamic unit of pragmatism, and researchers employ a variety of data collecting and processing techniques because they help to give a full comprehension of the research problem at hand.
- The "how" side of the study has a direct link with the pragmatic worldview. In this view, it is important to define the intent of mixing quantitative and qualitative data as well as providing justification for the use of these two methods. The current study provides such justification for using a mixed method that combines qualitative and quantitative approaches concurrently, as revealed in Section 5.4.3.
- The researcher is required to utilise several approaches to acquire different views of the same problem and make numerous conclusions through use of various data collection and data analysis methods (Creswell 2014).
- Pragmatism is best described as a problem-oriented ideology that promotes a realistic approach to the world view (Howell, 2013). In this study, a pragmatic philosophy was deemed suitable to promote a realistic approach to the SFSCM phenomena in the Zimbabwean food industry.

5.3 RESEARCH DESIGN

A research design is a blueprint, plan or road map of the methods used to conduct an inquiry to explore or resolve research questions or issues at hand for a study (Gravlee, 2022:67). It can be regarded as a structure that helps a researcher to anticipate and specify the various decisions along with the logical basis for all such decisions linked to measurement of research variables, as well as collecting, processing and analysing of data (Creswell, 2014). When formulating a research design, the researcher will construct a model or prototype depicting the requirements, parameters, costs, activities, methods, techniques and processes that need to be executed to achieve the research objectives and to address the identified problem in the light of constraints (Ralph & Wand, 2009:109; Creswell, 2014). The research design decisions are usually centred on variable measurement, data collection, processing and analysis (Gravlee,

2022). A good research design should enable the researcher to gather data and analyse it in a manner that best addresses the identified research questions or problems (Erikson & Kovalainen, 2008:4 & McDaniel & Gates, 2013:42).

Research designs are commonly classified as: descriptive, exploratory and explanatory research designs (Voght, Gardner & Haefelle, 2012; Gorard, 2013:3; Pandey & Pandey, 2015:18). In the current study, a combination of descriptive, exploratory and explanatory research designs was used. The descriptive research design was used for sample profiling and to help answer the descriptive objectives for SFSCM. Exploratory design was used to analyse and examine an area that is not precisely defined (SFSCM). It only investigated the research problem without providing definitive or conclusive remedies to current issues (Gravlee, 2022). The explanatory research design was utilised to explain patterns of varying relationships as guided by Voght et al. (2012).

5.3.1 Descriptive research design

Descriptive research studies elucidate the characteristics of a particular person or group (Kothari, 2004). Studies on whether variables are related or not are examples of descriptive analysis. Descriptive experiments are often studies related to predictions, narration of person, group, or event features. The majority of social science research falls in the descriptive research design category. Descriptive and diagnostic studies, from the point of view of study design, share similar features and can be grouped together. Researchers must accurately describe what they want to test in descriptive and diagnostic studies and therefore must find appropriate measuring techniques together with a specific description of the 'population' that they want to examine (Kothari, 2004:36-39). McDaniel and Gates (2013) clarified that descriptive studies are largely linked to casual relationships that accurately assess the causal factors of the issue at hand. In the fields of science, causality is widely accepted if: i) there is a relationship between variables that can influence each other logically, ii) before an outcome takes place, there is an impact of the causal variable, and iii) other possible explanations must be ruled out, like the third factor affecting both indicators (Alaka, Oyedele, Owolabi, Ajayi, Bilal & Akinade, 2016). This study made use of a descriptive research design to profile the sampled stakeholders in the Zimbabwean food industry and describe the SFSCM variables.

5.3.2 Exploratory research design

An exploratory research design is often referred to as formative. The major aim of this research design is to develop a problem or to establish operational theories for a more precise study (Gorard, 2013). Wilson (2010:104) specifically clarified that exploratory research studies have mainly been characterised by qualitative research approaches that allow focus group opinion polls, in-depth interviews, historical reviews, and assumptions to be used (Creswell, 2014). To assist with the development of a new instrument for the upcoming quantitative testing process, qualitative data may further be used (Creswell, 2014 & Thomson, Ehiemere, Carlson, Matlock, Barnes, Moody & DeGeus, 2020). An exploratory research design is appropriate if the condition at hand is poorly understood or information about how similar research issues have been solved in previous years cannot be obtained (Creswell, 2014; Creswell & Guetterman, 2019). This implies that exploratory studies are ideal for circumstances where there would be lack of available research and a dearth of familiarity with a certain area or subject. Voght et al. (2012) elaborated that an exploratory research design needs systematic versatility in addressing the research problem as there is typically little literature or previous studies to direct the researcher. Therefore, the research design was suitable for the present study as no known studies had been carried out on the development of a stakeholder framework for SFSCM in Zimbabwe. More so, the area of SFSCM is still fairly new and not much is known, particularly in the Zimbabwean context. Thus, an exploratory research design was deemed suitable to explore SFSCM implementation in the Zimbabwean food industry. The exploratory research design was used in combination with and to complement the explanatory research design which used a quantitative survey centred on those with realistic knowledge of the SFSCM issue studied in this study. In the current research, 22 experienced and information-rich interviewees were drawn from five distinctive sectors of the food industry in Zimbabwe.

5.3.3 Explanatory research design

The explanatory research design is a common design, which often appeals to social science with strong quantitative inclinations. An explanatory research design can be in two forms, namely mono-explanatory or in a mixed method set up (either concurrent or sequential-explanatory) (Allan, 2020). A mono-explanatory design is conducted in a single research approach (either qualitative or quantitative only) that collects and

analyses numeric data to address a previously unresearched topic in order to establish operational definitions and present a more thoroughly studied model. It is a form of research design that focuses on thoroughly discussing the features of the investigation (Alaka et al., 2016).

In a concurrent explanatory mixed method setup, the researcher can collect both quantitative and qualitative data and analyse it concurrently in order to compare the results for congruency (Azorin & Cameron, 2010). The qualitative findings can also be used to further explain the quantitative results or the quantitative results can be used to validate the qualitative findings. A mixed methods sequential-explanatory research design can be used where the researcher wants to compare quantitative and qualitative data. Rutz et al. (2021) defined a sequential-explanatory design as one where the researcher first collects quantitative data, then later collects qualitative data to help clarify or expand on the quantitative results. The rationale for this approach is that quantitative data outcomes provide a broad image of the study topic. Thus, the qualitative data is used in the subsequent interpretation and clarification of the quantitative results from the quantitative data analysis (Azorin & Cameron, 2010). Using a sequential explanatory research design helps to clarify and interpret traditional quantitative results. In quantitative analysis, it is more apt to clarify and interpret relationships. In particular, it can be useful when unexpected results occur in a quantitative sample. This approach may have, or may not have, a theoretical viewpoint. This design feature enables the definition and reporting simultaneously (Creswell, 2014).

In this study, an explanatory research design was used in a mixed research study setting, and to explain data analysis findings that were concurrently conducted. The explanatory research design was utilised in explaining the nature of proposed relationships between research variables under study (relationships between SFSCM drivers and SFSCM practices, SFSCM drivers and SDCs, SFSCM practices and SDCs, SFSCM drivers and SFSCM performance, SFSCM practices and SFSCM performance) through hypotheses testing. The focus was also to explain the variables of the study such as SFSCM drivers, SFSCM practices and SDCs in a detailed manner. Lastly, the explanatory research design was used to validate the proposed stakeholder framework for SFSCM in the Zimbabwean context.

5.4 RESEARCH APPROACH

Kothari (2004:5), McDaniel (2009:17), Gates (2013), Creswell (2014), Creswell and Guetterman (2019) and Levitt, Creswell, Josselson, Bamberg, Frost and Suárez-Orozco (2018) described three main research approaches which are quantitative, qualitative, and the third as a combination of the two, called the mixed method. The first-mentioned applies to quantifying the data in a quantitative way that enables a systematic and rigid form of careful review. The qualitative approach is primarily concerned with the perceptual examination of sentiments, beliefs and behavior patterns (Maarouf, 2019). A mixture of quantitative and qualitative approaches, hence the term mixed method, is part of the third approach. The subsections that follow reflect in greater depth on these three approaches.

5.4.1 Qualitative research approach

The qualitative research approach is widely used in various areas, including market research and social sciences (Martyn, 2021). In most cases an assessment of individual behaviour, as well as the explanation for the behaviour is gathered through qualitative research. The qualitative approach explores how and why decision-makers perform activities in certain ways, not just where, when and what, which relates it to exploratory (Bryman, 2008; Creswell 2013:13).

Qualitative research's main goal is to understand better what individuals do and how they do it and manage it. The qualitative research approach examines why and how choices are taken and typically uses smaller, concentrated samples (Allan, 2020). Researchers use qualitative analysis to gather data, ideas and observations that can be used when the data is analysed either qualitatively or quantitatively (Martyn, 2021). Creswell (2012:47) explicated the importance of qualitative analysis when the topic being reviewed is very complicated and a clear yes or no cannot address the concept under review. Quantitative research employs a wholly natural approach to the topic matter, and the subject materials are analysed in greater depth, along with conversations. In qualitative research, the data gathered has a predictive quality. Creswell (2012) went on to say that qualitative research allows for a more in-depth understanding of human psychology and behaviour.

The scope of the research approach maintains that all information required for the analysis is gathered and that the length of time involved is streamlined. In contrast to

quantitative research, qualitative research offers reliable outcomes for a relatively smaller sample population (Hayashi, Abib & Hoppen, 2019). The quantitative approach usually has a high level of variability in relation to the sample size.

The qualitative research approach was chosen for this study because it provided a more realistic understanding of SFSCM and its sub-variables (SFSCM drivers, SFSCM practices, SDCs, and challenges affecting stakeholders when implementing SFSCM) which could not be obtained through quantitative research's numerical data and statistical analysis. The qualitative research approach was used to extract as much SFSCM information as possible from a limited sample size (22 participants) of information-rich participants within the food industry in Zimbabwe. More so, the approach was preferred to complement the quantitative approach in understanding SFSCM and the relationships amongst variables. It further allowed participants to vividly express attitudes, feelings, beliefs and opinions related to SFSCM whilst providing relevant data.

5.4.2 Quantitative research approach

The quantitative approach entails the use of quantitative data in the form of numbers, proportions, and graphs (Fischler, 2012). In quantitative studies, data is obtained and analysed using techniques and procedures that are deemed objective and widely suited to populations of greater size (Creswell, 2014). In contrast, a qualitative research approach attempts to address the basic how, when and why questions of judgment, while the quantitative approach responds to questions such as the number of persons who feel or act a specific way, the number of individuals who behave that way, and so on (Chang, Hsu and Jong, 2020). A quantitative approach allows researchers to describe different communities based on a survey, researchers can make general conclusions about what the entire population is going to look like (Allan, 2020). In a quantitative approach, the method of measuring items is essential since it opens up the potential to form quantitative relationships through empirical research (Martyn, 2021). The quantitative approach relies on mathematical models, while qualitative research emphasises people's characteristics and personal opinions (Creswell & Guetterman, 2019). To analyse social phenomena using statistical and empirical methods, the quantitative approach is deemed the most appropriate to employ.

In this study, a quantitative approach was used to provide more scientific, objective, focused and acceptable SFSCM results that can be generalised in the entire population of Zimbabwe and the world at large. The quantitative research approach was also used to test and validate the hypothesised relationships amongst SFSCM drivers and SFSCM practices, SFSCM drivers and SDCs, SFSCM practices and SDCs, SFSCM drivers and SFSCM performance, SFSCM practices and SFSCM performance as well as SDCs and SFSCM performance. More-so, the quantitative research approach was employed to complement the qualitative approach in a fixed concurrent method to produce robust results used to develop a representative stakeholders' framework for SFSCM.

5.4.3 Mixed research approach

This research is premised on the mixed method approach. In a single study, the mixed methods allow for the collection and analysis of both quantitative and qualitative data wherein the data is gathered simultaneously or sequentially and includes the incorporation of the data in one or more phases of the research process (Voght et al., 2012:103; Creswell, 2014 & Perez, 2019). In other ways, the technique lets the researcher answer questions that could not be answered using a single approach. Mixed approaches offer a more comprehensive image by noting patterns and unfounded assumptions as well as an in-depth appreciation of the experiences of participants (Creswell & Poth, 2018). The mixed method approach improves both reliability and data validity (Creswell & Clark 2011; Sekaran & Bougie, 2013). The validity of findings is improved by using more than one approach. The design incorporates both quantitative and qualitative data collecting techniques (Creswell & Clark, 2011:179; Sekaran & Bougie, 2013:146). The following summarises the rationale for employing a mixed method approach in a study:

- If qualitative and quantitative data are combined, the analysed issue would be better understood than any type itself.
- Mixed methods can be used when data that is quantitative or qualitative is used, and the problem statement cannot be properly addressed while the research questions may not be adequately answered.
- Practically, the use of mixed methods research approaches provides different points of view: subjective and objective, opinionated and impartial.

- Utilising a mixed method approach helps the researcher to transition from one study phase to another (Creswell, 2012:47; Creswell & Clark, 2011:179; Sekaran & Bougie, 2013:146).

The decisive factor that inspired consideration of mixed methods in this study was that it offers a better insight into the research problem when a combination of quantitative and qualitative data is analysed concurrently and in a complementing manner rather than each type individually. More so, the mixed method approach is mainly known for its ability to bring several points of view to science, taking advantage of the strengths of each of the numerous methods used to clarify or address complex phenomena or findings (Creswell, 2012). The current study used a mixed research approach to tap into the benefits of using both qualitative and quantitative research approaches in a manner that allows the two approaches to complement each other when investigating the SFSCM phenomena in the Zimbabwean food industry. Since the primary objective of this study was to develop a stakeholder framework for SFSCM, using a mixed method approach enabled the researcher to explore the SFSCM issues, test and validate the nature of hypothesised relationships between variables under study together with qualitative surveys, thus validating the proposed stakeholder framework.

Study designs with mixed method approaches come in two ways, fixed and emergent. A fixed mixed methods approach includes quantitative as well as qualitative approaches being used from the outset of the study process and done according to a predetermined schedule (Creswell & Guetterman, 2019). The emergent mixed approach is an outcome of mixed approaches that are used when problems arise during the study process and require the researcher to either conduct further enquiries through qualitative approaches or to confirm and validate the qualitative findings through quantitative approaches. For instance, in cases where the researcher adopted measures from previous studies to confirm a phenomena in a different context using a quantitative approach but ending up with mixed results, further explorations through qualitative approaches may have been needed to fully understand the phenomena under study in that particular context. Thus, when the research is under way, emerging mixed method approaches can necessitate the incorporation of a second method (qualitative or quantitative), premised on the fact that the key approach used is found to be deficient (Voght et al., 2012: 103; Creswell, 2013:14).

The current research was premised on the fixed method approach in which qualitative and quantitative approaches were planned to be utilised from the beginning up to end of the research study. Specifically, a fixed concurrent (convergent parallel triangulation) design was utilised in the study as shown in Figure 5.1. According to Kimmons (2022) in a concurrent design, the researcher collects and analyses qualitative and quantitative data separately on the same phenomenon and then converges the obtained results by comparing and contrasting them during the interpretation stage. As guided by Zin and Ahnuar (2022), in the current study a fixed concurrent design was chosen as the author believed that there was equal value in both qualitative and quantitative data for the topic being investigated. More so, the researcher believed that both qualitative and quantitative approaches carry equal weight to award each approach an equal depth to strengthen the understanding of SFSCM in the Zimbabwean context.

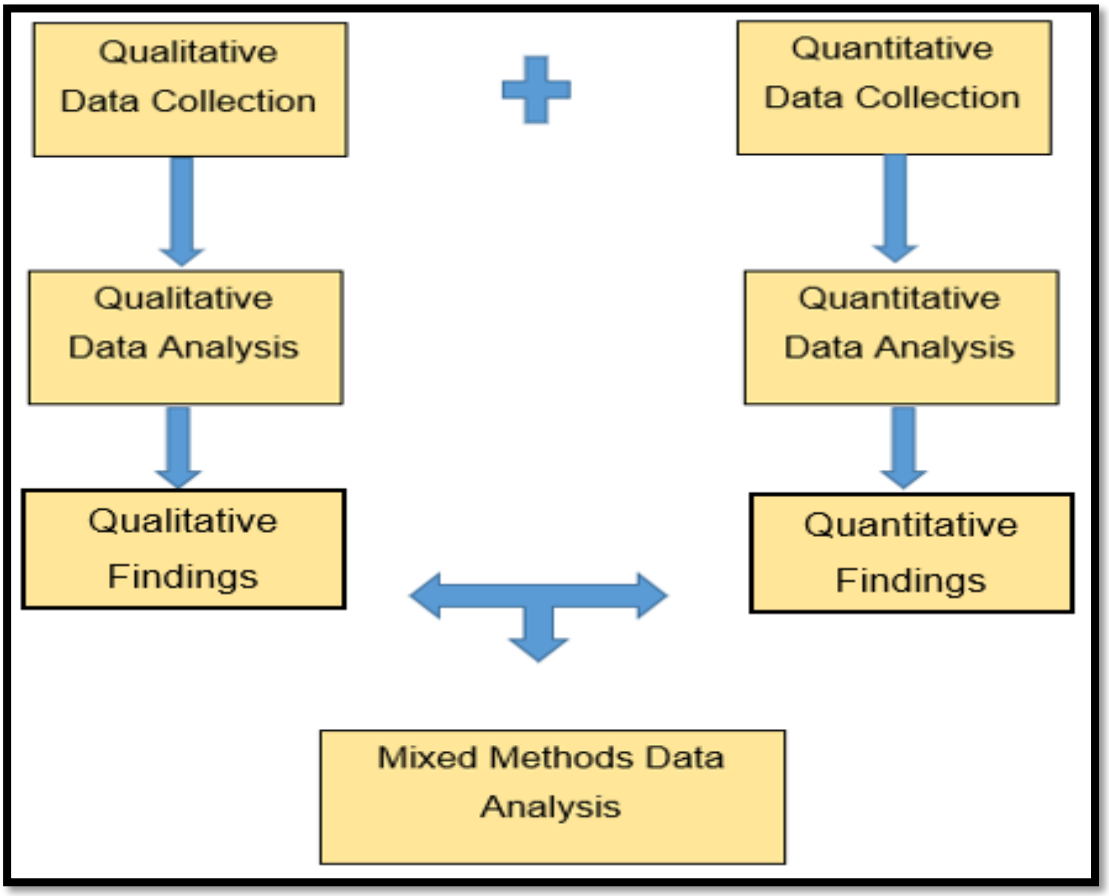

Figure 5.1: Fixed concurrent research design (Convergent parallel triangulation design)

Source: Adapted and modified from Kimmons (2022)

Further, the choice of the fixed concurrent design was informed by the need to overcome any weakness of using one approach, whilst leveraging on the strength of the two approaches to produce a robust outcome of the study objectives (Creswell & Guetterman, 2019). More-so, a fixed concurrent design was selected to give a holistic interpretation of results from the two data sets (quantitative and qualitative). Lastly, the choice was intended to develop a more complete understanding of SFSCM in the Zimbabwean context as guided by Kimmons (2022). The next section focuses on primary research.

5.5 SAMPLING DESIGN

5.5.1 Target population

A population is the entire collection of people, components, or items about which the researcher wishes to make inferences (Berndt & Petzer 2011:347). The target population, also referred as the theoretical population, frequently has diverse characteristics (Black, Babin & Al, 2019). Cereal or grain growers and processors, suppliers and distributors, wholesalers and retailers, the Zimbabwe Consumer Council and customers, and the government (Ministry of Agriculture), as well as NGOs were the target population for this study. These were drawn from nine gatekeeper organisations/associations, namely: Grain Marketing Board; Consumer Council of Zimbabwe; Food and Nutrition Association of Zimbabwe; Grain Millers Association of Zimbabwe; Ministry of Lands Agriculture, Water and Rural Resettlement; Chartered Institute of Purchasing and Supply; Food and Agriculture Organization in Zimbabwe; Confederation of Zimbabwe Retailers; and Zimbabwe National Chamber of Commerce. A population size of 3172 food supply chain employees/respondents was established from the nine gatekeepers.

5.5.2 Sampling methods

Sampling is a method employed to specify a particular quantity of units (which may be human elements) or components from a focus population to conduct a study (Voght et al., 2012:121; Creswell & Guetterman, 2019:156). The primary reasons for sampling include reducing the time, labour, and money required to survey the entire target population, particularly in areas with a large population (Sekaran & Bougie, 2013). All participants for both the qualitative and quantitative approaches had age ranges

between 30 to 60 years. For the qualitative research approach, the study used purposive sampling to select 25 participants comprising of five participants with a wealth of knowledge from each of the 5 categories listed above. The criteria for selecting the 25 participants was based on at least ten years of experience in SFSCM system. The participants were expected to have held a senior management position for at least five years. However, only 22 participants participated in the interviews, thus making 22 the final sample size for the qualitative part of the study.

For the quantitative research approach, this study employed the stratified random sampling technique to choose participants from five different food stakeholder groups. The groups were composed of: i. Food producers and processors; ii. Suppliers and distributers; iii. Wholesalers and retailers; iv. Consumer Council of Zimbabwe and consumers; v. Government (Ministry of Agriculture) and NGOs. When the population is diversified and includes multiple different groups connected to the topic, stratified random sampling delivers more precision (Creswell & Guetterman, 2019).

5.5.3 Sample size

As earlier noted, initially, 25 participants were planned to be recruited for the qualitative research part of the study, however a total of 22 participants were finally drawn using purposive sampling from the five groups which are: i. Food producers and processors; ii. Suppliers and distributers; iii. Wholesalers and retailers; iv. Consumer Council of Zimbabwe and consumers (buying organisations); v. Government (Ministry of Agriculture) and NGOs. Participants were recruited based on ten years of working experience in a food supply chain industry. The human subjects involved had held supervisory or managerial position for at least five years in the food industry. The age ranges of participants were between 30 to 60 years.

With regards to quantitative research a population size of 3172 food supply chain employees/respondents were established. All these respondents came from food supply chain organisations that directly affiliate with the nine gatekeeper organisations/associations (Grain Marketing Board, Consumer Council of Zimbabwe, Food and Nutrition Association of Zimbabwe, Grain Millers Association of Zimbabwe, Ministry of Lands, Agriculture, Water and Rural Resettlement, Chartered Institute of Purchasing and Supply, Food and Agriculture Organization in Zimbabwe, Confederation of Zimbabwe Retailers and Zimbabwe National Chamber of

Commerce). The population was categorised into five (5) groups, namely: (i. Food producers and processors; ii. Suppliers and distributers; iii. Wholesalers and retailers; iv. Consumer Council of Zimbabwe and consumers (buying organisations); v. Government (Ministry of Lands, Agriculture, Water and Rural Resettlement) and NGOs. From each of the five groups, 100 respondents were randomly chosen using a stratified random sampling technique to give each relevant respondent a known and equal chance to represent their respective sub-group. A total of 500 respondents were initially selected for the online survey; however, only 292 online questionnaires were completed and usable. Of the targeted 500 respondents, 306 respondents submitted questionnaires signifying a 61.2% response rate. From the 306 respondents a total of 292 fully completed and usable questionnaires were obtained. As such, a final sample size of 292 was used for the quantitative segment of this study thus yielding a response rate of 58.4%. The recruitment process involved respondents between 30 and 60 years and with a minimum of five years of working experience in the food industry.

5.6 DATA COLLECTION PROCEDURES

Researchers can either use secondary or primary data or a combination of these two to address the identified research problem. This study collected primary qualitative and quantitative data from human participants and respondents using a fixed concurrent approach to address the research problem, purpose and objectives of the study. A variety of methods of data collection, such as face-to-face interviews, telephone interviews, focus group interviews, and online or face-to-face surveys may be used in primary research (Voght et al. 2012; Samuels, 2020). The current study used online (Zoom and Teams) semi-structured interviews and survey questionnaires concurrently to collect primary data on the SFSCM phenomena from human participants in the Zimbabwean food industry. The next subsection discusses interviews as a qualitative primary data collection procedure used in this study.

5.6.1 Qualitative data collection procedures

There are various ways of collecting primary qualitative data, and the most common ones are in-depth interviews and focus groups. This study used in-depth interviews to explore SFSCM issues in Zimbabwe. Collection of primary qualitative data using the in-depth interview way involves direct face-to-face or online or telephonic contact between two persons, who include the interviewer and the interviewee (Samuels,

2020). In-depth interviews are effective research techniques, primarily because they employ an open-ended, discovery-based approach and enlightening approach which offers the interviewer a chance to objectively investigate the emotions and points of view of the participant on a topic (Lester, Cho & Lochmiller, 2020). As a result, the outcome is a solid context data that enables the researcher to go further into the subject and provide more questions. Not only do interviews need probing questions, but they also require concurrent recording and collection of the responses in order to query for deeper meaning and explanation (Wilbanks, 2020). The current study collected qualitative data using online (Zoom and Teams) semi-structured interviews. This gave the target participants an opportunity to freely express their views on the SFSCM phenomenon, thus enabling the researcher to gain an in-depth understanding of SFSCM implementation in the Zimbabwean food industry. The researcher used an interview guide comprising semi-structured questions to guide the interviews (Martyn, 2021), and the interview guide is attached in Appendix B.

As earlier noted, an interview guide outlining the topics to be discussed with participants was created (Appendix B). The key objective of the interviews was to elicit qualitative data from participants to establish the drivers for SFSCM in Zimbabwe, identify SFSCM practices within food industries, establish the key SDCs in SFSCM and to identify stakeholders' challenges when adopting SFSCM. For the most part, the interview guide had open-ended questions that encouraged further questioning. The interview guide was reviewed by the following: the study supervisor, a senior supply chain specialist at GMB Zimbabwe, a chairperson for the Consumer Council of Zimbabwe, and experts in the faculty and central ethics committee to ensure that the questions were simple, detailed and clear. The ethics committee experts assessed the interview guide to ensure that the questions asked would fully address the research objectives, and to ensure that the questions asked did not embarrass or cause any form of discomfort to the participants.

Once the interview guide had been revised, and an ethical clearance had been granted, the researcher approached the gatekeepers in order to schedule interview appointments with participants prior to the interviews taking place (see Table 5.2). The potential participants were provided with a copy of the interview guide so they could examine and evaluate the questions before responding, in advance of the interview.

This enabled deep and meaningful explorations of participants' thoughts on and experiences in the SFSCM phenomenon in Zimbabwe during the interview sessions.

Conducting in-depth interviews require the researcher to be skilled and competent in order to obtain trustworthy and credible findings. This is also because the efficacy of the in-depth interview process is mainly dependent on the interviewer's communication skills (Howell, 2013; Sekaran & Bougie 2013:119). As explained by Dzuke (2015:93), when conducting interviews, a researcher must possess the following five abilities:

- Capacity for asking appropriate questions and evaluating responses to such inquiries.
- The capability to listen carefully and ensure that own perceptions would not limit objectivity.
- The ability to be versatile and receptive to novel situations and consider such situations to be opportunities rather than obstacles.
- The ability to clearly interpret the study and associated issues.
- Predetermined opinions, even those obtained from theory, should not prejudice the researcher.

In the current study, the researcher managed to ask appropriate questions through a thorough assessment of prior literature on the subject of SFSCM. All interview sessions were recorded so that the researcher could listen to participants' comments several times and avoid any listening bias. All interviewee responses were viewed as opportunities to learn something new about SFSCM. The research supervisor was consulted for additional advice on how to improve the five abilities. Table 5.2 presents appointment dates for the various participants types interviewed in this study.

Table 5.2: Interview participants and appointment dates

Number of Interviewees	Participant Type	Organisation/s	Appointment Dates
4	Food producers and processors	Shankuru Farm, Grain Marketing Board Dura (GMB), National Foods, Grain millers Association of Zimbabwe (GMAZ)	07 February 2022
4	Food suppliers and distributers	SWIFT Zimbabwe, NRZ, Mac Frank Haulage, J and J transport	08 February 2022
4	Wholesalers and retailers	OK Zimbabwe, Pick n Pay, Spar	09 February 2022
4	Consumer Council of Zimbabwe	Consumer Council of Zimbabwe, Maize and wheat buyers (processed and raw)	10 February 2022
6	Government (Ministry of Agriculture), NGOs	FAO Zimbabwe, Ministry of Agriculture, World vision, World Food Organisation	11 February 2022

Source: Author's own compilation

Participants for the qualitative segment of this study were recruited and enrolled using a purposive sampling technique. Twenty-two participants were drawn from nine gatekeeper associations and organisations and these are Grain Marketing Board, Consumer Council of Zimbabwe, Food and Nutrition Association of Zimbabwe, Grain Millers Association of Zimbabwe, Ministry of Lands, Agriculture, Water and Rural Resettlement, Chartered Institute of Purchasing and Supply, Food and Agriculture Organization in Zimbabwe, Confederation of Zimbabwe Retailers and Zimbabwe National Chamber of Commerce. These gatekeepers were further classified in five groups of stakeholders in Zimbabwe, namely i. Food producers and processors: ii. Suppliers and distributers; iii. Wholesalers and retailers; iv. Consumer Council of Zimbabwe and consumers; v. Government (Ministry of Agriculture) and NGOs were the target population. Participants were purposively drawn from these groups so that each group was well represented.

The age ranges of participants were between 30 and 60 and these participants had more than 10 years of experience (in a food supply chain organisation or industry) with a minimum of five years in a supervisory/managerial role in a food supply chain organisation or industry. This group represented participants with a sound

understanding of SFSCM issues. The interviews were conducted online using Zoom and Microsoft Teams. This helped to minimise the need to meet face to face with participants in the current COVID 19 pandemic. A link was shared on email to gatekeeper organisations' heads, and these heads were asked to share the same link to participants. Participants who did not have internet were interviewed by telephone. Participants provided informed consent to participate in this study and to record the interviews (See Cover Letter in Appendix A). The interviews were conducted in English and ranged between 30 minutes to one hour per session. The researcher took notes to complement the recorded responses. This helped the researcher during the qualitative data analysis.

The next subsection looks at phase two of the primary research (quantitative data collection).

5.6.2 Quantitative data collection procedures

The previous section (5.6.1) dwelt on qualitative primary research data collection. The current section focuses on the quantitative primary research data collection. The purpose was to fulfil secondary objectives of the study while also addressing the study's primary objective (to develop a stakeholder framework for SFSCM in the food industry). Besides the interview guide used to collect primary qualitative data in in-depth interviews (discussed in the previous section), this study also used online survey questionnaires to collect primary quantitative data to develop, validate and propose a stakeholder SFSCM framework for implementation in the food industry. Questionnaires were also used to answer the secondary objectives in this study, and to generalise the results to a larger population in the food industry. The next subsection looks at the cover letter that accompanied the questionnaire.

5.6.2.1 The cover letter

In most questionnaire surveys, cover letters play a major role as they look for informed consent and involvement mostly from selected sample respondents (Wilbanks, 2020). Ruel, Wagner and Gillespi (2016) confirmed that the information or communication in the cover letter of a self-administered questionnaire boosts the rate of responses. As a result, questionnaires are frequently accompanied by a cover letter that helps to briefly define the study's purpose and clearly describe it. This letter also acts as a notice to the respondents for informed consent and that they would only willingly

participate. In addition, the relevance of the study, the usefulness of the information given by respondents and the guarantee of confidentiality along with the cover letter confirms the privacy and anonymity of the responses. Ruel et al's (2016) guidelines on cover letter content were followed and the study questionnaire was structured and accompanied by a cover letter (refer to Appendix A). All the respondents were presented with the cover letter.

5.6.2.2 The questionnaire

A questionnaire is a type of data collecting tool that is often prepared by the researcher with the primary goal of eliciting desirable responses from participants based on empirical evidence (Ahmadaliev, Xiaohui & Abduvohidov, 2018). In the current research study this instrument was used to cover a broad geographical distribution and different target groups in the food supply chain industry. Questionnaires are not expensive and before posting to the respondents, no prior arrangements are required. Questionnaires are commonly answered anonymously and have no interviewer bias if they are properly conducted (Ahmadaliev et al., 2018). There are three key explanations for the design of the questionnaire, according to Neijens (1987), which are: (1) to maximise validity and quality of the data gathered; (ii) to promote targeted participants' engagement and inclusion; and (iii) to improve data collecting and analysis.

For the purposes of the analysis, the distribution of the questionnaire was made simple in that all the organisations in the selected groups are based in Harare. This study extensively used electronic means, specifically using anonymous google forms system. This made the distribution of questionnaires simpler in the entire targeted area (Harare). Google forms were programmed to give reminders after every seven days for a period of four weeks. No questionnaires were distributed manually.

As mentioned earlier, an online questionnaire was used as the quantitative data collection instrument in this study. The questionnaire comprised entirely of structured questions and the questions were designed such that respondents would be able to check the comments section or box. An inclusive, systematic, and mutually exclusive category in the form of a five-point Likert scale was used. The five-point Likert scale is widely known for producing a high degree of reliability, validity and generating significant statistical results (Pearse, 2011:163 & Vieira, 2016). Vieira (2016) noted

that a five-point Likert scale is sufficiently reliable to avoid interpolation while being adequately compact to permit rapid and time-efficient responses. Wegner (2012:86) clarified that Likert scale questions are suitable for these reasons: (1) they minimise respondents' response bias; (ii) they measure values, perceptions, attitudes, and points of view; (iii) the Likert scale enables response standardisation, making responses comparable across participants; and (iv) responses to Likert scale statements are simple to code and evaluate.

Guided by Hove's (2015) study, a questionnaire containing 105 items was developed with seven sections (Section A to G). The sections of the questionnaire included personal information (6), SFSCM drivers (11), SFSCM practices (18), challenges affecting stakeholders on implementing SFSCM (17), approaches to reduce challenges affecting stakeholders in implementing SFSCM (11), SDCs in the food industry (30) and SFSCM performance of stakeholders in the food industry (12) (See Appendix C). A 5-point Likert-type scale was designed showing measurements of 1= strongly disagree to 5= strongly agree to show the degree of agreement or 1= not implemented to 5= extensively implemented (Mirahmadizadeh, Delam, Seif & Bahrami, 2018).

5.7 PILOT STUDY

In preparation for the main study, a pilot study is carried out, which is often known as a trial run. It is a smaller analysis conducted without the full expense of time and effort required to conduct a thorough assessment (Bell, Whitehead, & Julious, 2018). It allows the researcher to have a concise and plain understanding of what they intend to explore and how to conduct the study most effectively (Lee et al., 2022). According to Anon (2017:865), pilot studies are frequently used to pre-test a certain research instrument in order to determine whether or not the planned research methodologies or research tools are adequate for the main research project. Anon (2017:865) further noted that a pilot research is a small study accompanied by a systematic evaluation to determine practicality, cost, duration, statistical variability, and negative events in order to determine the needed sample size and modify the design of the research before a comprehensive study is carried out.

In this study, the interview guide was pilot tested using seven participants comprising of four senior managers in the food supply chain industry (in Botswana) and three

supply chain academics from Ba Isago University to avoid sensitising the target population in Zimbabwe. The questionnaire instrument was also pilot tested using 35 respondents drawn from three food organisations in Francistown (Botswana) to ensure that the respondents understood what the study objectives were and to decide if the questions were clear or not. Dzuke (2015) stated that a questionnaire needs pilot testing before using it to collect data. This will remove the majority of data recording difficulties. A pilot study enables the researcher to strengthen the data's reliability and validity (Naude, 2009:162). Anon (2017:866) added that the initial examination of the data generated during the pilot test ensures that the research study questions can be answered by the data gathered.

The reasons for pilot testing the research instruments (interview guide and questionnaire) used in this study are twofold: first, to fine-tune the questions so that participants understand what they are being questioned and have no difficulty responding. Secondly, to stimulate data collection and ensure that respondents understand the questions to avoid language difficulties. Ahmadaliev et al. (2018) agreed that the researcher would benefit by pre-testing the questionnaire in that one collects and analyses the data in an accurate and reliable manner. Flipping Psychology AQA (2017) explains that in order to achieve the essential goal of ensuring that data responds to the research questions, a preliminary examination of the data gathered during the pilot test must be carried out (Flipping Psychology AQA, 2017). Pilot-testing prevents the chance of using and administering invalid research instruments to several hundreds of participants. From the current research's pilot study, no questions were deleted; instead, 12 questions (Section B; B3, B5, B9: Section C; C1 & C6: Section D; D7 & D17: Section E; E8 & E11: Section F; FA8, FB6, FE4) were re-worded because they were ambiguous. Three more questions from the questionnaire (Section B; B9 & B11, Section C; C9) (see appendix C) and one question from the interview guide (interview guide question 5) (see appendix B) were revised through addition of examples to improve on clarity.

5.8 DATA ANALYSIS

Creswell and Guetterman (2019) characterised data analysis as a complex, confusing, and time-consuming exercise through which a mass of acquired data is brought to order, structure, and meaning. Data analysis can be in two broad forms, namely

quantitative and qualitative (Creswell & Guetterman, 2019). According to Mölder et al. (2021), data analysis is used by researchers to reduce data to a narrative and analyse it in order to draw insights. Data analysis aids in the reduction of a big amount of information into manageable parts (Hsiao, 2022). Within the data analysis process, three critical steps occur (Fan, Han & Liu). The first step is data organisation, which is the process of classifying and categorising data to make it increasingly usable. Summarisation and classification work in tandem is the second most often utilised strategy for data reduction, mostly used in quantitative analysis. In qualitative analysis, categories and summaries assist in identifying themes or patterns in qualitative data in order to facilitate identification and connection. Thirdly, and most importantly, researchers do data analysis in either a top-down or bottom-up method (Bryman, 2008). The current research was premised on a combination of both qualitative and quantitative. The two data analysis methods for the study are discussed below.

5.8.1 Qualitative data analysis

5.8.1.1 Thematic data analysis method

A number of qualitative data analysis methods may be employed, and the common ones include content analysis, narrative analysis, discourse analysis, thematic analysis, grounded theory (GT) and interpretive phenomenological analysis (IPA) (Kiger & Varpio, 2020). The current research used a thematic analysis as guided by Braun and Clarke (2006; 2021). Thematic analysis provides a number of distinct advantages when applied to qualitative data analysis and these include its ability to produce findings available to the informed general audience (Gauthier & Wallace, 2022). Thematic analysis has the ability to summarise essential elements of a big body of data, draw attention to similarities and discrepancies in a data collection, and can be beneficial for creating qualitative evaluations that may be used to guide policy or framework formulation (Braun & Clarke, 2021). A thematic analysis was used for this study because it enabled the researcher to make qualitative evaluations of the implementation of SFSCM, and explore the links between SFSCM drivers, SFSCM practices, SDCs and SFSCM performance. It also enabled the researcher to draw some similarities and discrepencies, especially since the qualitative findings were used in a fixed concurrent and converging mixed methods approach set up.

The following stages were followed in analysing the current research qualitative data:

Step 1: Familiarise with the data,

Step 2: Generate initial codes,

Step 3: Search for themes,

Step 4: Review themes,

Step 5: Define themes,

Step 6: Write-up (Ali et al., 2021).

- **Step 1: Familiarise with the data**

At this stage recording was done and notes were written down to enhance comparison during the transcription stage. The recorded scripts and written notes were used to transcribe the data into text using an Excel spreadsheet. Brief notes were also made to capture the unique ideas provided by each of the 22 participants.

- **Step 2: Generate initial codes**

In this step, data was organised in a meaningful and methodical manner breaking down large amounts of data into small amounts of significance. Research questions were used as the coding criteria in the current study. As a result, coded segments were arranged to answer specific research questions posed in Chapter 1.

- **Steps 3, 4 and 5: Development of themes**

As revealed in Table 6.2 (in Chapter 6), themes were developed based on the nine reseach questions and the 12 interview questions were aligned to respond to each of the research questions (themes). The development of themes was informed by the reviewed literature in Chapters 2, 3 and 4; as well as by the research questions asked in Chapter 1.

5.8.1.2 Data saturation

Data saturation in qualitative research occurs at a time and point where no new information is discovered through data analysis, and this duplication indicates to researchers that data gathering should be discontinued (Hughes, Dwivedi, Rana, Williams, & Raghavan, 2022). Saturation occurs when a researcher has a reasonable expectation that more data gathering will provide similar findings and will help to validate prevailing themes and conclusions (Matthes, Davis & Potter, 2017).

Initially, in this study, 25 participants were contacted through email to organise interview dates for the current study. Following an evaluation of the data collected, it

was concluded that participation reached saturation on the 21st interviewee. Thus, at this time (i.e. interview number 21), it was decided that doing any more interviews with the outstanding participants would yield no new or important information. However, an extra interview (22nd participant) with a government authority was undertaken to ascertain the supply chain data's legitimacy and dependability.

5.8.2 Quantitative data analysis

Jansen and Warren (2020) asserted that quantitative data analysis includes data modelling and transformation utilising a number of statistical methods that are particularly categorised as descriptive and inferential. Descriptive statistics summarise and categorise information, while inferential statistics are used to draw assumptions for the population at large (Black et al., 2019). Hypotheses testing is among the principal strategies used for inferential statistics. Samuels (2020) explained the basic hypothesis as a process that begins with the formulation of a statement about some element of the population and continues with the generation of a sample to determine whether or not the hypothesis can be refuted or accepted. This study used descriptive statistics to describe and characterise the study participants and firms. Inferential statistics were used to validate research hypotheses. The principal hypothesis of this research is broadly based on the following: drivers for SFSCM, SFSCM practices in the food industry, challenges faced by stakeholders when implementing SFSCM, and SDCs within the food industry have an influence on SFSCM performance. The quantitative research data collected was analysed using a three-step process that included: principal components analysis (PCA) performed in SPSS version 27, as well as SEM confirmatory factor analysis (CFA) and SEM path analysis performed in Amos version 26. Principal factor analysis was employed to reduce the number of variables in the study by identifying components or factors that were substantially interrelated with several of the study variables. The CFA was employed to determine the likelihood that the data sample would support or confirm the predicted factor structure. Following CFA, the study model and hypotheses were tested using SEM path analysis. In this particular study, SEM centres on four models, namely the confirmatory factor analysis, measurement model, the full latent variable analysis and the path analysis model. The following segment concentrates on these analytical methods and computer-aided packages used in this research.

5.8.2.1 Principal component analysis

The principal component analysis was performed to compress the 105 questionnaire items used to measure the six research variables, which comprise SFSCM drivers, SFSCM practices, SFSCM challenges, approaches, SDCs and SFSCM performance. Dimensional decrement was carried out by the principal component analysis. This was achieved in two distinct forms: by choosing from all functionalities the most key features that are used to make the model construction (known as feature selection) or by converting the high-dimensional data into low-dimensional data and preserving the most essential aspects. This technique saves the information and data that should be interpreted, while also representing the original data set correctly and fully (known as feature extraction) (Jolliffe, 2022). One of the widely used dimension reduction techniques is PCA and it is known as a method of feature extraction used for the multivariate data method (Huang & Wei, 2022). The 105 items observed in the questionnaire for all variables were analysed using the SPSS version 27 statistical software package and were reduced to a smaller number of 15 main factors or components. This was performed by determining the initial questionnaire elements' linear configurations in each of the six variables that contributed for the greatest amount of variance in the original data collection, as guided by Samuels (2020).

The 15 main components were methodically identified using eigenvalues larger than one and factor loadings greater than 0.5 (Sturgis, 2021). The varimax rotation process was further employed to rotate these 15 variables to determine which products are considered to be unconnected or orthogonal to each other. The varimax rotation approach aims to maximise the variance described by questionnaire elements through enhancing the correlation of highly correlated items and decreasing the correlation of less correlated elements (Sturgis, 2021).

Furthermore, the 15 principal components that had been rotated by varimax were related to the six study constructs (SFSCM drivers, SFSCM practices, SFSCM challenges, approaches address SFSCM challenges, SDCs and SFSCM performance). This was made on the foundation of extracted variables in which measurement items loaded the most. Additionally, extracted components were utilised in SEM CFA, and testing of hypotheses. The next section discusses SEM in detail.

5.8.2.2 Structural equation modelling (SEM)

As described by Epskamp (2020), SEM is a very effective data analysis approach that incorporates multiple-regression and factor analysis in order to simultaneously estimate a number of inter-correlated dependent linkages. It is a multivariate statistical method that involves CFA and hypotheses testing for analysis of structural theory related to a certain phenomenon (Byrne, 2001:53). Sturgis (2021) added that structural equations define how a collection of variables are connected to one another in terms of causation (causal models) or pathways via structured networks of statistical dependency using a set of linear equations (path analysis). The fundamental aim of SEM is to carry out a theoretical model test that researchers use to predict the connections between observed variables using different models (Jolliffe, 2022). In some respects, the SEM analysis determines the extent to which the conceptual model is accurately represented by the data sample. Thus, if the researcher's sample data validates a certain theoretical model, the scholar may present more complicated theoretical models. Conversely, if the sample data is not sufficiently supported by the theoretical model, it is necessary to either reconfigure the initial model and recheck it, or to create and analyse more theoretical models (Loehlin & Beaujean, 2017).

According to Sturgis (2021), the SEM consists of two primary components: measurement and structural model. This study was able to employ a variety of indicators to represent a single independent variable because of the measurement model approach. Since the structural model represents a path, this study was required to link and evaluate the presumptive relationship between the independent and dependent variables (SFSCM drivers, SFSCM practices, SDCs and SFSCM performance). In addition, this study identified SFSCM drivers, SFSCM practices and SDCs as having an influence on SFSCM performance. The SEM approach necessitated execution of a measurement model, which is discussed in further detail below.

- **Measurement model**

The measuring model is defined by Jansen and Warren (2020) as a theoretical model illustrating the functional relationships between latent variables (essentially, independent and dependent variables) and their observable variables, as well as the paths that connect them directly and error terms for their observed variables. The measuring model may either be done as an analysis of CFA or EFA. EFA aims to

define and improve probable factor structures for research in which literature is inadequate or when the researcher has no prior hypothesis about factors or patterns of measured variables (Reio & Shuck, 2014). CFA is a method which attests the loading of existing measurement objects onto latent variables based on how the investigator relates the measurements to latent variables (Brown, 2015; Sturgis, 2021). The current study used the CFA because prior latent variable measurements (SFSCM drivers, SFSCM practices, challenges affecting stakeholders in implementing SFSCM, approaches to reduce challenges affecting the implementation of SFSCM, and analysis of SDCs within the food industry) exist. The following section focuses on CFA.

5.8.2.3 Confirmatory factor analysis (CFA)

CFA evaluates the relationship between factors and their measurement variables exclusively (Sturgis, 2021). It aims to statistically assess the likelihood of endorsing or verifying a hypothesised factor structure (Hox, 2021). CFA focuses on assessing the relevance of the researcher's posited factor model and checks whether the factor model is endorsed by the data and whether the data does not vary considerably from the model. If the data does not support or correspond to the factor model, the data will be significantly different from the factor model (Hove, 2015; Sturgis, 2021).

The assumption of CFA is that there are common themes that can reflect the total variance of the variables across their components and therefore there is no variance in error (Sturgis, 2021). The use of CFA is mainly acceptable in instances where the researcher is aware of the structure for latent variables. Hamim-Ashraf, Rahman, Hossain and Sarker (2020) added that the researcher is able to use the theory or empirical analysis expertise to hypothesise statistically significant relationships between the observable variables and the intrinsic elements. CFA, therefore, allows the researcher to define a predetermined number of associated variables that quantify each factor for the observed variables (Hamim-Ashraf et al., 2020). CFA was considered in the analysis of this study for two critical aspects: (1) that prior research has been conducted on certain factors; and (2) that CFA has been employed by other researchers in the field of SFSCM. Therefore, CFA has enabled SFSCM drivers, SFSCM practices, SDCs, and SFSCM performance within the food industry as inter-related constructs.

CFA's efficiency suggests that screening of the results should be done. This involves the study of the correlation matrix in an effort to weed out components that are not associated with any other elements (Brown, 2015). In addition, the successful output of the CFA demands that the size of the sample be measured to verify that it is large enough (Hamim-Ashraf et al., 2020). The final sample size of 292 is consistent with the bulk of the suggested samples that are large enough to match a factor model (Black et al., 2019).

The study applied CFA to determine the fit for the model and to assess whether the sample data matched the research factor's hypothesised model. The fitness indices analysed in the CFA for the evaluation of the model fit are the following models performed in Amos version 26: the chi-square, the goodness of fit index (GFI), the Tucker-Lewis index and the root mean square residual (RMR), comparative fit index (CFI), root mean square error of approximation (RMSEA), normal fit index (NFI), incremental fit index (IFI), relative fit index (RFI), parsimony ratio (PRATIO), parsimonious comparative fit index (PCFI). In Chapter 7, each of these fit indices is addressed in depth. CFA leads to path analysis and this is discussed further in the next section.

5.8.2.4 Structural model

A structural model is a framework that demonstrates underlying relationships between the latent variables and their observed variables (including the measurement arcs) as well as between the direct vertices that link them and the error terms for the observed variables (Sturgis, 2021). The correlation between unobserved variables indicates the study's suggested hypotheses. In the present study, the ten variables have ten linear relations, which are presented in Table 5.3 below.

Table 5.3: Theorised variable paths

Hypothesis	Theorised variables paths
H1	**SFSCM drivers → SFSCM practices**
H2	**SFSCM drivers → SDCs in food supply chains**
H3	**SFSCM practices → SDCs**
H4	**SFSCM practices → SFSCM performance**
H5	**SFSCM drivers → SFSCM performance**
H6	**SDCs → SFSCM Performance**

H7	**SFSCM practices → SFSCM drivers → SDCs**
H8	**SFSCM practices → SDCs → SFSCM performance**
H9	**SDCs → SFSCM drivers → SFSCM performance**
H10	**SFSCM drivers → SDCs → SFSCM performance**

The hypotheses posited different paths as follows: H_1: SFSCM drivers have an influence on SFSCM practices, H_2: SFSCM drivers have an influence on SDCs, H_3: SFSCM practices influence SDCs, H_4: SFSCM practices influence SFSCM performance, H_5: SFSCM drivers influence SFSCM performance, and H_6: SDCs influence SFSCM performance. Four mediation hypotheses were also proposed for H7, H8, H9 and H10. H_7, assessed the mediation effect of SFSCM drivers the relationship between SFSCM practices and SDCs, whilst H_8 assessed the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance. In addition, H_9 assessed the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance. Lastly, H_{10} assessed the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

The structural model incorporates both the path model and measurement model. This implies that both models fit and the research hypotheses are tested by the structural model. The next section discusses the path analysis.

5.8.2.5 Path analysis

A path analysis explains the linear co-relation between the latent variables (Hamim Ashraf et al., 2020). It is a more sophisticated version of multiple regression, incorporating several regression models that are projected concurrently (Black et al., 2019). In the same vein, Hamim-Ashraf et al. (2020) argued that the path analysis step includes the specs of the model developed by researchers in an attempt to describe the justifications for the causal relationships amongst latent variables. Alternatively, a path analysis would entail the following: predicting the proposed causal relationship between unobserved variables; or proposed non-causal associations, such as a baseless relationship between two variables. The purpose of path analysis is to ascertain how much the model factor accounts for the observed relationship in the sample data (Jolliffe, 2022).

Structural connections are the study hypotheses that reveal directed relationships in path analysis perspectives or interrelationships between various parameters (Thornley, 2013). More simply, the structural relationship shows how independent variables such as SFSCM drivers affect the dependent variable SFSCM performance. As argued by Hamim-Ashraf et al. (2020), the path analysis provides a more direct and effective way for simulating mediation, spillover effects, and other complicated connections between variables. The aspects of trustworthiness of findings, validity and reliability are of prime significance in SEM models and are further elaborated in the following section.

5.9 TRUSTWORTHINESS OF FINDINGS/RELIABILITY AND VALIDITY OF RESULTS

Since this study used a mixed methods approach, this section discusses both the trustworthiness of qualitative findings as well as reliability and validity of quantitative results. In qualitative studies, data quality is guaranteed by ensuring trustworthiness, credibility, confirmability, transferability of findings as well as through minimisation of bias. In quantitative studies, data quality is ensured by testing for reliability of measurement items, and validity of results. The next subsection focuses on trustworthiness of qualitative findings.

5.9.1 Trustworthiness of findings

In qualitative research, the level of confidence in data collection and analysis procedures employed to guarantee the data quality is referred to as the study's trustworthiness (Cloutier & Ravasi, 2021). Qualitative researchers must show that data collection and analysis were carried out in a clear, systematic, and rigorous manner by recording, systematising, and exposing the techniques of analysis in sufficient detail to allow the reader to judge whether the procedure is trustworthy and credible. Likewise, this study discussed data collection and analysis in a clear, systematic manner to enable the readers to judge how trustworthy the qualitative segment was in the entire study. An inquiry audit conducted by a third party is another approach used to assess a qualitative study's trustworthiness (Ma, Zhao, Guo & Chen, 2022). Further, as guided by Stahl and King (2020), in the current study, trustworthiness was attained by meeting and accomplishing five fundamentals: credibility, transferability,

dependability, confirmability and minimisation of bias. Each of these factors on trustworthiness in qualitative research is discussed below.

5.9.1.1 Dependability

Dependability is a key criterion of trustworthiness (Stahl & King, 2020). The term "dependability" is used to describe or quantify the reliability and consistency of a qualitative study's findings (Bahaei & Gallina, 2021). It can also be defined as the consistency of qualitative data over comparable times and under various conditions (Klem et al., 2022). This begins with documenting the exact procedures employed for data collection, analysis, and interpretation, as well as providing sufficient contextual information concerning each piece, so that the research can theoretically be duplicated by other scholars and provide consistent results (Dorathy, 2021). Screening parameters is one way that can be utilised to establish research dependability (Stahl & King, 2020). This is because it shows the findings of the qualitative study as consistent and reproducible.

In the current study, dependability was attained by establishing a screening process for participant recruitment to ensure that a broad selection of demographics and levels of experience were represented. Participants in the food sector with an age range of 30 to 60 years and a minimum of ten years of supervisory or managerial experience in SFSCM were recruited as the SFSCM phenomenon required a certain level of experience and knowledge from participants to obtain credible responses.

5.9.1.2 Credibility

The fit between participants' views and the researcher's representation of them is referred to as credibility (Dorathy, 2021). Credibility is dependent, to some extent, on researchers' consistency as well as their study methodologies. Procedures such as triangulation, extended involvement with data, prolonged monitoring, negative scenario analysis, participant checks, and referential sufficiency can all be utilised to boost the credibility of qualitative research (Klem et al., 2022).

The current study established credibility by concurrently triangulating online semi-structured in-depth interviews (with senior executives) and online surveys conducted in the Zimbabwean food industry. In order to uncover overlapping themes and patterns in the qualitative data obtained, the findings for each research question were further summarised. The study also converged the qualitative findings with quantitative results

in a manner that enabled the researcher to draw any comparisons, patterns and discrepancies, thus ensuring the credibility of the study.

5.9.1.3 Confirmability

According to Cloutier and Ravasi (2021), confirmability assures that qualitative research is unbiased and unaffected by the researcher's prejudices or assumptions. Rather, credible research should produce outcomes that realistically represent data collected from participants. To put it yet another way, data should be able to speak for itself. Confirmability is typically demonstrated by providing an audit trail that captures each level of data processing and shows that results are not biased by conscious or subconscious bias and accurately reflect participant replies (Dyar, 2022).

Thematic analysis and summarising the substance of each response from the in-depth interview were used to produce confirmability in the current study. This is a non-biased presentation of the overlapping topics. Furthermore, the researcher retains the qualitative raw data for the transcribed interview scripts for five years.

5.9.1.4 Transferability

Transferability refers to whether or not the findings of a study may be applied to other situations, conditions, or places (Ma et al., 2022). It can also be considered in terms of generalisability (Dyar, 2022). Thick description, which comprises providing appropriate details about the place, participants, and procedures or methods used to gather data during the study, can be used to establish transferability in qualitative research. To ensure transferability in the current study, the researcher provided a detailed account of relevant information, including the study's context, setting (SFSCM), sampling technique (purposive sample), qualitative sample size (22 participants), demographics (30-60 years old), inclusion and exclusion criteria (participants with at least ten years of supervisory or managerial experience in the Zimbabwean food supply chain industry), and interview procedure (semi-structured questionnaire).

5.9.1.5 Minimisation of bias

Qualitative research bias refers to any influence that provides a distortion in the results of a study (Orel & Mayerhoffer, 2021). Qualitative research bias can exist in sample selection, data collection, or in the data analysis stages of the study (French, Courtney & Yang 2021).

To avoid of sample selection bias, the researcher recruited a sample that is inclusive of multiple sectors of the food industry (from five groups of the food SCM industry) and with experience in SFSCM (only those with 10 years or more in supervisory or managerial roles within the food industry in Zimbabwe). To minimise data collection bias, an interview guide was developed to guide both the researcher and the participant. The guide helped to maintain consistency in questioning all participants with exactly the same questions. Furthermore, the researcher recorded the interviews to ensure that there could be repeated reference to the audios and reduce transcription process bias. To avoid the halo effect (being influenced by participants who are fluent in English and well-spoken) and horn effect (being influenced by those who do not have a good command of English, slow speakers, and those who stammer) bias in data collection, the researcher only collected responses in relation to the subject (SFSCM). To minimise data analysis bias, the researcher triangulated the findings with those from quantitative analysis as well as compared them with previous literature on SFSCM.

5.9.2 Reliability and validity of results

During the quantitative research process, different precautions were applied to improve the reliability and validity of the sample data collected. In this study, the item-to-total measurement items were utilised to assess the reliability of multi-item construct metrics. Principally, the item-to-total correlation of at least 0.3 values were utilised to determine the correlations of the sum of the remaining units. Additionally, the Cronbach coefficient's alpha (at least 0.7), composite reliability (CR) of at least 0.7 (Kumar et al., 2021), and average variance extracted (AVE) values less than 0.7 were also applied to assess the reliability of the research variables in this study (Ajmal et al., 2022). To assess each variable's internal reliability, composite reliability results were computed (for SFSCM drivers, SFSCM practices, SFSCM challenges, approaches, SDCs and SFSCM performance). Finally, the values for AVE data were used to calculate the total variation explained by the latent construct in the measurement components (Middleton, 2020).

Both convergent and discriminant validity were used to measure construct validity in this study. Convergent validity is determined by the extent to which the standard measurement elements display homogeneity within the same latent variable that has

been measured (Bashir & Marudhar, 2018:68). It is established when the results are highly correlated using two or more unique measurement items to assess the latent variable (Black et al., 2019). Thus, a correlation between the measurement element and other evaluation items that measure the same latent variable are expected to be greater in order for convergent validity to exist and be validated. This research measured convergent validity by evaluating whether the factor loadings of individual measurements meet the minimal cut-off level of 0.5 for each relevant study component (Sturgis, 2021).

This study also assessed discriminant validity of variables to ensure robustness of the quantitative results obtained in this study. Perret (2018) related to discriminant validity as an analysis conducted to evaluate the levels to which heterogeneity between distinct latent variables is shown by the measurement items for various latent variables. Discriminant validity, for example, requires that questionnaire or measurement items used to measure a variable (e.g. SFSCM practices) to be loaded distinctly from the measurement elements supplied into the other variable (e.g. SDCs). Where two or more latent variables are predicted, discriminant validity can be established (Dixon & Johnston, 2019). The discriminant validity of the quantitative segment of this study was determined using coefficients smaller than one in the correlation matrix and also AVE values of less than one. The study also assessed discriminant validity by comparing the latent variance estimates with the largest shared variance (which is the square of the parameter estimate for the measures) (Ronkko, 2019). The following section concentrates on the study's ethical implications.

5.10 ETHICAL CONSIDERATIONS

Ethics is a subject concerned with establishing moral principles for evaluating circumstances in all situations in which a person or community may be harmed, embarrassed or feel any form of discomfort as a result of the data collection procedures administered (Massie & Gillam, 2014:506). Consequently, the study observed academic research practices and etiquette, as well as all written conventions (Creswell & Poth, 2018). An ethical clearance was sought from the NMU Ethics Committee (ethical clearance number H21-BES-LOG-132) (see Appendix D). The interview participants and survey respondents for this study took part freely. They were also informed of the objectives of the research and that the study was undertaken as

a requirement to fulfil a PhD in Logistics project, and that data was only gathered for academic purposes. This was done using a cover letter at the front of the measuring instrument (questionnaire) and the same was explained before conducting interviews. The researcher also informed the interview participants and survey respondents that their participation was strictly voluntary, and that they had a right to withdraw their participation at any time of the study with no explanations and no penalties. Moreover, the details of the respondents were held in strict confidence and anonymity was ensured (Massie & Gillam, 2014:506). Informed consent for participation in the interviews and surveys as well as consent to record the interviews was sought from the study participants and respondents (see attached Informed Consent in Appendix A). The following section gives a closing summary for the chapter.

5.11 SUMMARY

This chapter outlined the research methodology followed in this study which included the research philosophy, design, approach, sampling design, data collection procedures, pilot study, data analysis, trustworthiness of findings, reliability, and validity of results as well as ethical considerations of the research. This research adopted a pragmatic philosophy that was anchored on a fixed concurrent and convergent mixed method approach (qualitative and quantitative). A pilot study was conducted as the preliminary measure to ensure the reliability of the research instruments used. A qualitative sample of 22 participants was recruited using purposive sampling. The quantitative sample of 292 was recruited using a stratified random sampling technique.

A discussion of the thematic analysis used to analyse qualitative data in this study was provided. The chapter also discussed the four-way quantitative analysis performed in this study. Initially the descriptive data analysis was conducted using SPSS version 27. Secondly to whittle down the questionnaire's excessive number of items, a principal component analysis was carried out using SPSS version 27. Thirdly, a confirmatory factor analysis was conducted in AMOS version 26 using SEM models to evaluate the model's goodness of fit. Lastly, a path analysis was performed in AMOS version 26 using SEM models to test the research hypotheses. The chapter further discussed how trustworthiness of the qualitative findings was ensured in this study. Issues of credibility, dependability, confirmability, transferability and minimisation of

bias were also discussed. Reliability and validity were briefly discussed whilst ethical considerations followed in the study were also provided. The next chapter (Chapter 6) covers the study's extensive qualitative data analysis.

CHAPTER 6
DISCUSSION OF QUALITATIVE DATA FINDINGS

6.1 INTRODUCTION

Chapter 5 discussed the research philosophy, design, approach, the sampling design, data gathering techniques, and data analysis methods. The main aim of the current study was to develop a stakeholder framework for SFSCM in the food industry, and both qualitative and quantitative data was collected to achieve the research objectives. Qualitative data collection was conducted using a semi-structured interview guide, while a close-ended questionnaire was used to collect quantitative data. The current chapter (Chapter 6) only focuses on the findings from the qualitative data, while the next chapter (Chapter 7) focuses on the quantitative results. The mixed methods approach results are discussed in Chapter 8.

This chapter first provides a profile of the interviewed participants with regards to their gender, work experience, age ranges, occupations, and experience at managerial or supervisory levels. This is followed by the presentation of findings from the thematic analysis employed to help achieve this study's research objectives. The chapter later summarises, interprets and discusses the qualitative findings. The next section provides the profile of participants.

6.2 PROFILE OF PARTICIPANTS

Table 6.1 below shows the summary of participants interviewed.

Table 6.1: Summary of interviewed participants

Pseudonym	Gender	Work experience (Years)	Age range	Occupation	Working experience at managerial level
Pat1	Male	15	41 to 50	Logistics Manager	6
Pat2	Male	18	41 to 50	Supply Chain Coordinator	14
Pat3	Female	16	41 to 50	Contracts Manager	9
Pat4	Male	21	41 to 50	General Manager	13
Pat5	Female	19	41 to 50	Procurement and Logistics Manager	16
Pat6	Male	11	41 to 50	Stores Manager	7

Pseudonym	Gender	Work experience (Years)	Age range	Occupation	Working experience at managerial level
Pat7	Male	11	31 to 40	Warehouse and Distribution Manager	5
Pat8	Female	17	41 to 50	Buyer	7
Pat9	Male	20	51 to 60	Purchasing and Logistics Director	16
Pat10	Female	14	41 to 50	Supply Chain Analyst	8
Pat11	Male	11	31 to 40	Inventory Controller	8
Pat12	Male	15	31 to 40	Dispatch Manager	12
Pat13	Male	12	41 to 50	Inbound Logistics Manager	9
Pat14	Male	10	31 to 40	Driver Controller	6
Pat15	Female	14	31 to 40	Logistics Manager	10
Pat16	Female	17	41 to 50	Procurement Manager	15
Pat17	Male	23	41 to 50	Procurement Manager	14
Pat18	Male	16	51 to 60	Logistics Coordinator	6
Pat19	Male	25	51 to 60	Supply Chain Manager	21
Pat20	Female	26	51 to 60	Assistant Procurement and Logistics Manager	19
Pat21	Male	11	41 to 50	Distribution Manager	5
Pat22	Male	13	41 to 50	Transport Manager	7

Source: Author's own compilation

As shown in Table 6.1, all of the essential conditions for participant enrolment were satisfied. All participants had at least five years of management or supervisory experience. Each participant had at least ten years of work experience within the food supply chain industry and all were between the ages of 30 and 60.

6.3 QUALITATIVE RESEARCH FINDINGS

Twenty-two participants were interviewed in order to get qualitative data. Each participant was interviewed individually as guided by Bryman (2008), who warned that some participants are uncomfortable speaking openly in front of others. Individual

interviews with these participants ensured the trustworthiness and confidentiality of the information supplied by the participants (Creswell & Guetterman, 2019). The researcher was able to ask questions and allow participants to react in their own terms by using semi-structured interview questions. By responding in their own words, participants were able to offer specific information, enabling the collection of a large amount of data. The data collected yielded a total of nine themes in the form of research questions. The data was categorised according to study research questions. Each of the themes (research questions) and interview questions are explained in Table 6.2.

Table 6.2: Themes and interview questions

Research Question	Themes: Research questions	Interview questions that address the research Question
1	What are the drivers for SFSCM?	Interview questions 1 and 3
2	What are the SFSCM practices adopted within food industries?	Interview question 2
3	What are the key SDCs in the food industry?	Interview question 5
4	What are the challenges faced by stakeholders in implementing SFSCM?	Interview questions 4 and 11
5	How does SFSCM drivers influence implementation of SFSCM practices?	Interview question 6.
6	How do SFSCM drivers influence SDCs in the food industry?	Interview question 7
7	How do SFSCM practices influence SDCs in the food industry?	Interview question 8
8	How do SFSCM practices influence SFSCM performance?	Interview question 9
9	How do SFSCM drivers influence SFSCM performance?	Interview question 10
10	How do SDCs influence SFSCM performance?	Interview question 12

Source: Author's own compilation

6.3.1 RQ1: What are the drivers for SFSCM?

The current study sought to establish the drivers for SFSCM. This objective was addressed through interview questions 1 and 3 (see Appendix B). Since the key drivers depend on an organisation's stakeholders, participants in this study were first asked to identify their organisation's key stakeholders and indicate how these stakeholders influence their decision and ability to implement SFSCM practices.

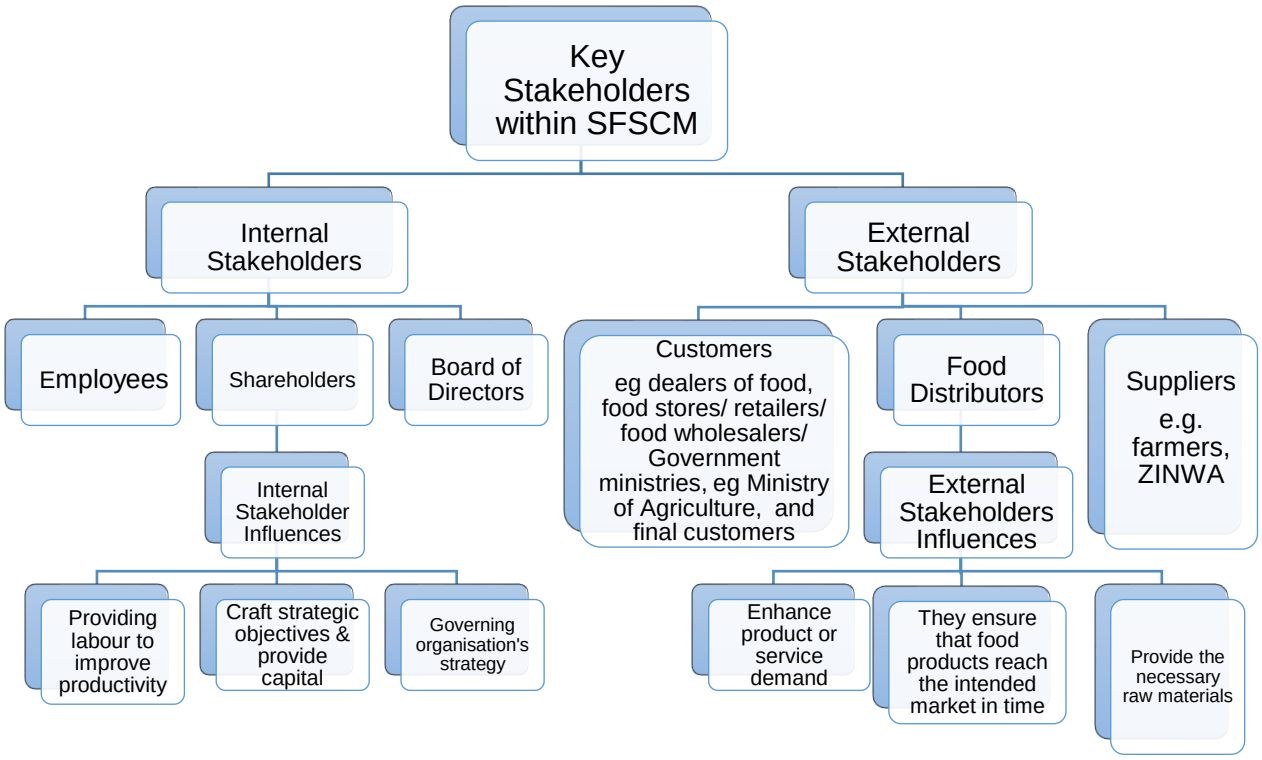

Figure 6.1: Key stakeholders within SFSCM

Source: Research Findings (2022)

Figure 6.1 reveals key stakeholders within SFSCM as provided by participants. The findings show two main categories of stakeholders, namely internal and external stakeholders. Participants interviewed stated the following:

"*Okey…… mmmh …our role is mainly storage of raw materials used for Agriculture and also supply them to the identified farmers, so I think you already picked some of the stakeholders such as the government and the ministry of agriculture together with ZINWA. So that's the line of people we deal with"* (Participant 7, Male, Food Warehouse and Distribution Manager, 5 years' managerial experience).

"Let's say we have internal stakeholders as like all employees who work for our organisation, then outside of our organisation we have the government, non-governmental organisations the traffic safety, EMA, all small-scale farmers and families that we assist." (Participant 6, Male, Food Store Manager, 7 years' managerial experience).

"Actually, our stakeholders are so diverse, here within the organisation, we have our board of directors, shareholders and employees. We have a policy to source from everywhere in this world for farm equipment so in Zimbabwe here and across the globe we have a number of stakeholders. Like for example we have so many transactions with China and Malaysia. Also coming back to Zimbabwe, all the people within the organisation, transporters, suppliers and the government, they are all stakeholders to us." (Participant 17, Male, Procurement Manager, 14 years' managerial experience).

"*We encourage everyone to be an opaque beer drinker so that all adults in Zimbabwe are our clients…..laughs…Yes, so we also have National foods, GMB, farmers, in fact all our suppliers and our employees in all provinces they are our valued stakeholders as well.*"(Participant 21, Male, Food distribution manager, 5 years' managerial experience).

Based on the interview responses, all the participants were generally well aware of sustainable supply chain stakeholders in the Zimbabwean food industry. Of the 22 participants interviewed, 19 identified internal and external stakeholders, while three of them only identified external stakeholders. The key internal stakeholders comprise the employees, shareholders and board of directors, while customers, food distributers and suppliers such as farmers and ZINWA were cited as the key external stakeholders in the Zimbabwean food industry. The participants identified various types of customers in the Zimbabwean food industry ranging from the food wholesalers, dealers of food, food retail stores who buy food for resale, as well as the government ministries (e.g. Grain Marketing Board under the Ministry of Agriculture along with the Ministry of Industry and Commerce) who buy food for national reserves, exporting and for charitable reasons; and final customers who buy for consumption. The findings were in line with those of Baliga et al. (2019) who identified supply chain stakeholders as those organisations or people around an organisation and with a bearing towards the services or products that a particular organisation produces.

- **Stakeholders' influence on food organisations' decisions to implement SFSCM practices**

Participants were also asked about their stakeholders' influence on their food organisation's decisions to implement SFSCM practices. Figure 6.1 presents the findings. All the participants explained comprehensively that their organisations may

not be able to achieve food supply chain sustainability without their stakeholders' input. This emphasises the importance of each stakeholder and the interrelatedness that should continuously exist within and amongst these stakeholders in the food industry. As shown in Figure 6.1, participants indicated that their key internal stakeholders influence their decisions to implement SFSCM practices by providing labour to improve productivity. The internal stakeholders also craft long-term objectives, govern the organisation's objectives and provide capital to implement SFSCM practices in food organisations. This helps create a culture of sustainability in the food organisations. The findings also show that the key food external stakeholders such as customers influence demand for focal organisations' goods and services, while suppliers provide the necessary raw materials, technologies and harness external relationships even with competitors, for the food supply chain industry to achieve sustainability. Common technologies transferred and shared between organisations that promote sustainability in the Zimbabwean food industry include warehouse management systems, electronic point of sale, food vehicles tracking systems and blockchain food traceability technology, amongst others (Chikoko & Maumbe, 2022).

The influence of stakeholders is so profound in the Zimbabwean food industry. One example is the Pfumvudza (a sign for life) low-input sustainable agriculture method project concept of 2020-2021, where small-scale farmers, the government and non-governmental stakeholders engaged to apply techniques and utilisation of small pieces of land to increase cereal (e.g. maize and millet) production and ensure food security and nutrition through proper food supply chain management (Chikwati & Mutizwa, 2020; High Level Panel of Experts, 2020). In 2021, an increase of crop yields (360 000 tonnes of grain were produced) and improved smallholder farmer resilience were reported as a result of this low-input sustainable agriculture method to enhancing household food and nutrition security (Tanyanyiwa, 2021). The widespread use of the Pfumvudza low-input sustainable agriculture method project concept increased yields of the majority of smallholder farmers and increased food security in Zimbabwe during the 2020-2021 period. From the success of 2020-2021, the project further earmarks to produce 487 296 tonnes of cereal crops from 280000 hectares of land owned by 1.5 million smallholder farmers in the current 2021-2022 harvesting season (Parwada, Chipomho & Mandumbu, 2022).

- **The drivers of sustainable food supply chain management**

After establishing the stakeholders' influence on food organisations' decisions to implement SFSCM practices, the study further explored the drivers of SFSCM in the Zimbabwean food industry. To achieve this objective, participants were asked to indicate the key drivers affecting SFSCM in the Zimbabwean food industry. Based on the findings, all 22 participants had the required experience and were information-rich in identifying and explaining the SFSCM drivers further. The hierarchical Figure 6.2 presents a number of drivers which were mainly categorised as internal and external.

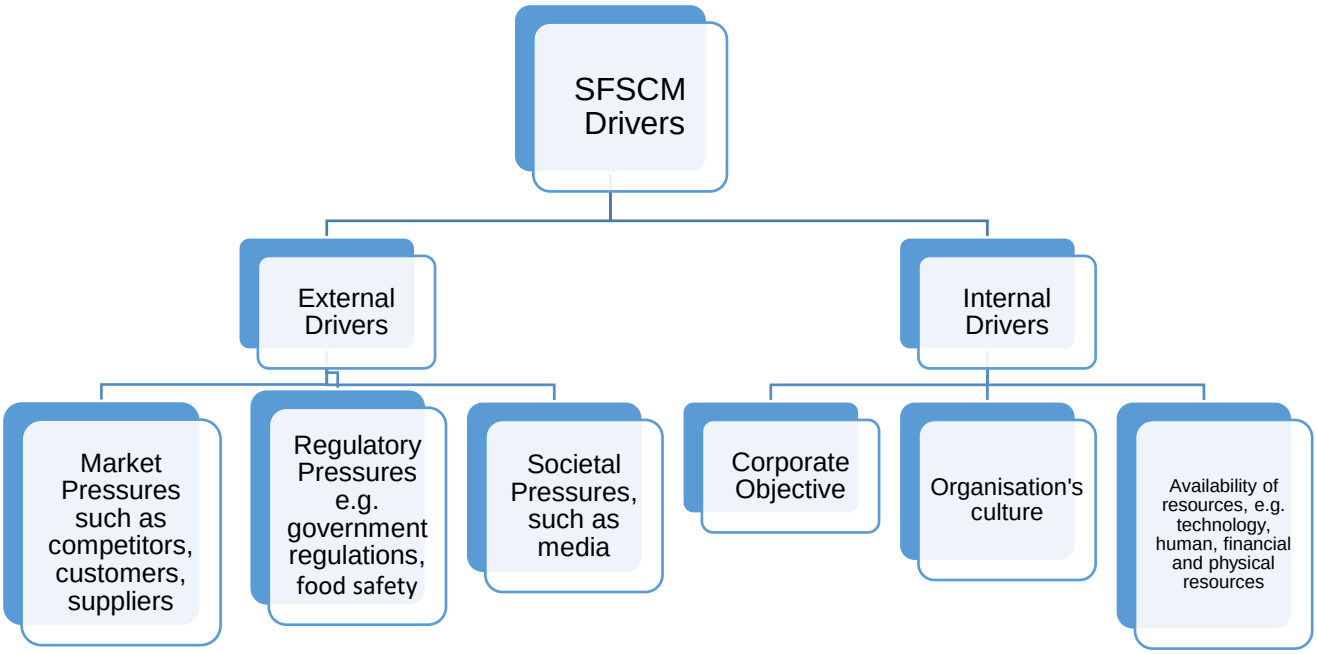

Figure 6.2: Key stakeholders for SFSCM

Source: Research Findings (2022)

Some of the interviewed participants' responses on drivers for SFSCM, were as follows:

"Customers are one of our drivers, the market in which we sale our products as well, and….sometimes the media, actually social media these days is dangerous" (Participant 5, Female, Procurement and Logistics Manager, 16 years' managerial experience).

"We are mainly driven by availability of customers, availability of nutritious food products, corporate social responsibility, our ethics, the media and of course the laws around us" (Participant 8, Female, Buyer, 7 years' managerial experience).

"Food distribution I think in our case is affected by GMB gazetting prices, transporters because we depend on them so much to move our produce, also our own employees because they may not be willing to work to their best sometimes" (Participant 3, Female, Food Distribution Contracts Manager, 9 years' managerial experiences*).*

"So I would say it's the law imposed by the government that really affects our operation" (Participant 18, Male, Logistics Coordinator, 6 years' managerial experience).

As shown in Figure 6.2, SFSCM in the Zimbabwean food industry is mainly driven by internal factors such as the corporate objectives, organisational culture and availability of resources. This is logical since all these factors stem from the vision and policy of the organisation. In other words, having a corporate vision that is anchored in sustainability makes it easier to prioritise sustainability issues in all the activities, processes and systems of the organisation as well as in those of the supply chain, even in the food industry. For instance, if an organisation's vision seeks to be the industry leader in sustainable food supply chain management issues, such an organisation will source for experienced and skilled personnel who can utilise the available technologies to foster the provision of nutritious, healthy, easily accessible, safe and affordable food products to its customers using systems and methods that promote the health of the environment as well as increase social value. Zhu et al. (2018) pointed out that senior management are responsible for setting and translating the organisation's vision, mission, policies and strategies to employees; and as such the management will only prioritise the implementation of sustainability across the entire supply chain once they are assured of the prospective benefits to the organisation.

The findings in Figure 6.2 also show that SFSCM implementation is driven by external factors such as the pressure from the market forces (e.g. competitors, customers or suppliers). This makes sense since today's customers have increased public awareness and consciousness of organisations' efforts to improve local communities, address global warming, promote environmental health, as well as maintaining healthy and safe food supply due to the rapid technological developments which make information easily available and accessible (Kumar, 2021). Emamisaleh and Taimouri (2021) indicated that organisations are under pressure to implement long-term

projects that reflect their own concept of social obligation and commitment for them to gain competitive leverage in the market. According to Ying et al. (2022), organisations introduce sustainability programs to match their consumers' expectations and provide sustainable food products in order to maintain their market competitiveness.

Additionally, the findings in Figure 6.2 show that regulatory pressures such as the passing of a new food safety regulation in the country also drive organisations in the Zimbabwean food industry to implement SFSCM. For example, the amendment of the Food and Food Standards (Food Labelling) Regulations, Act, Chapter 15:04 under statutory instrument 236 of 2019 provided that cereal foods containing gluten (a structural protein that may affect health) should be clearly labelled for consumers to see before they make a purchasing decision (Government of Zimbabwe, 2019). Within the first month of the amendment, organisations in the cereal food production system complied with the new practice as the Ministry of Health had advised to withdraw food licences from all those who would not comply (Toriro & Banhire, 2021). Such legislation drives the implementation SFSCM practices in food organisations, particularly, the need to recall any food products that are deemed unsafe for consumption. Such recalls further led to several other SFSCM practices, e.g. the handling, transportation, warehousing of the recalled food products, as well as waste management of such food products should the products be deemed unsafe for consumption and no value can be salvaged out of the product. One participant reiterated that some SFSCM drivers are so harsh (such as the food regulatory body) and require organisations to have readily available huge capital investments which organisations may not have in a short period of time as may be required. This can in a way discourage organisations from pursuing any SFSCM initiatives and projects.

Societal pressures such as those from the media were also cited as another driving force towards the implementation of SFSCM among organisations in the Zimbabwean food industry (See Figure 6.2).

6.3.2 RQ2: What are the SFSCM practices adopted by organisations within the Zimbabwean food industry?

The study further explored the SFSCM practices adopted by organisations within the Zimbabwean food industry. This objective was addressed through interview question 2. The interviewed participants depicted that they have been in the SFSCM industry

for some time as evidenced by different enriched and industry-related responses. All 22 participants indicated that they implement the SFSCM practices; and a fair balance was provided in terms of the SFSCM practices that are consistent with the triple bottom-line approach. The participants identified a number of SFSCM practices, and, as presented in Figure 6.3, these were grouped as social, economic and environmental.

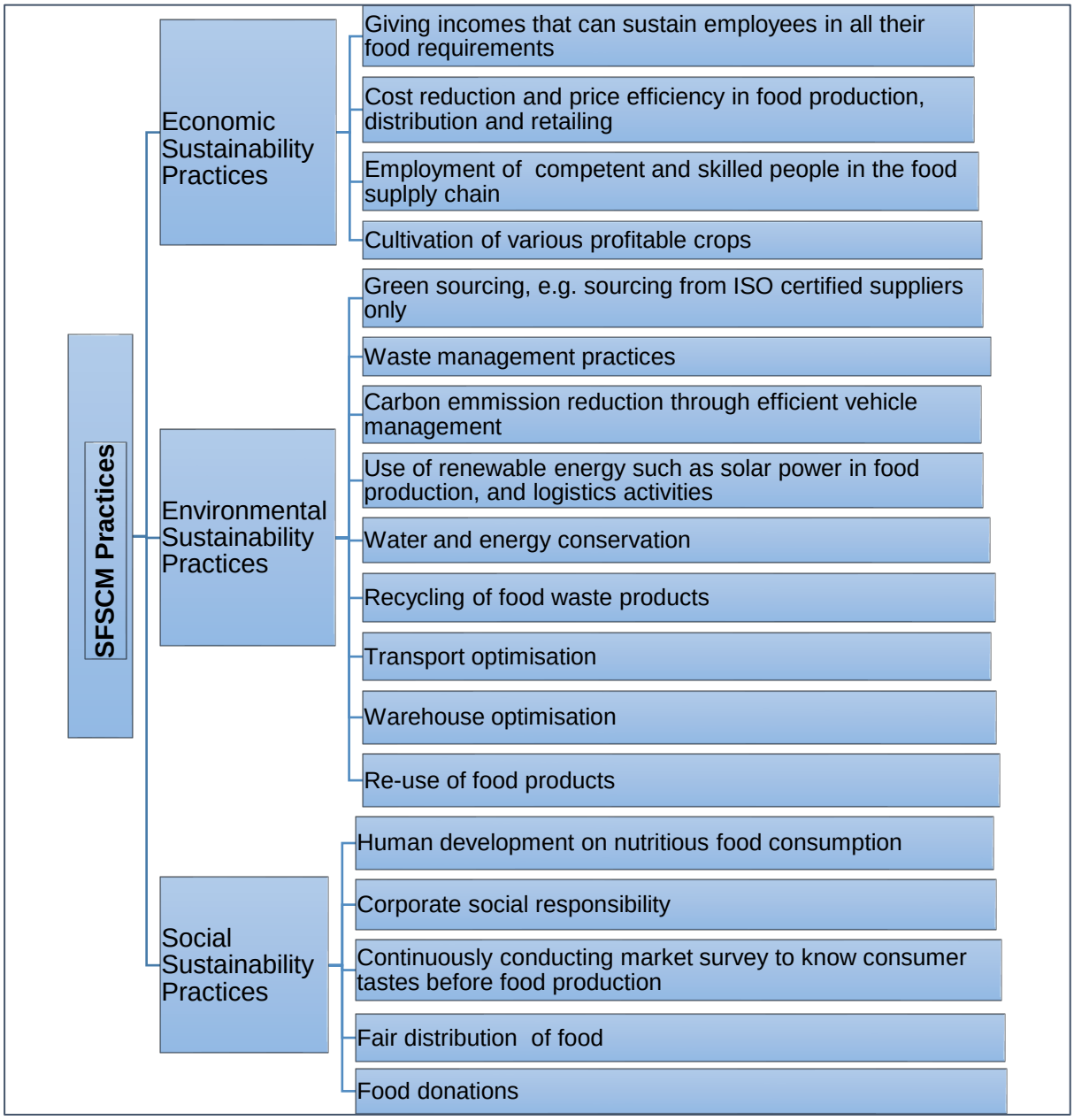

Figure 6.3: SFSCM practices

Source: Research Findings (2022)

In response to the interview question 2 on SFSCM practices implemented by organisations within the Zimbabwean food industry, participants stated the following:

"*energy conservation, water conservation, food waste reduction, fair distribution of food and a number of small ad hoc things to reduce poverty in Zimbabwe*" (Participant 12, Male, Dispatch Manager,12 years' managerial experience).

"It's actually a lot, we encourage our farmers to use environmentally friendly farming methods. We also ensure the growing of crop varieties that are commercially profitable so that farmers become self-sufficient with their agricultural proceeds. More we encourage use of fuel-efficient vehicles that doesn't pollute much. On the same note, we constantly carry surveys to identify which crop varieties do our customers prefer most and we make sure seed organisations provide as per customer preference. Further as you can see, we sale maize to households and individuals at very affordable rates to ensure that even the poorest families can afford" (Participant 4, Male, General Manager, 13 years' managerial experience).

"Yes our role is to ensure that all consumers of different levels are satisfied with the food which they consume in terms of a number of variables including pricing, availability and accessibility of grain, ingredients and food packaging weights. And also lobbying and advocacy, consumer education, complaint processing, and consumer representation are some of the services available to food consumers which are practices we always do to protect our consumers." (Participant 19, Male, Supply chain Manager, 21 years' managerial experience).

"We use energy server lights in warehouses, and our production system runs when there is need for us to serve on electricity. Ooh yes, we have a warehouse optimisation system that help us when picking orders and also when a certain stock item is moving fast, we quickly see that without having to constantly count, so we haven't been experiencing stock-outs since we got the system in late 2018. So…. the same system helps to effectively monitor shelf life of our food products" (Participant 6, Male, Stores Manager, 7 years' managerial experience).

As shown in Figure 6.3 and in the direct quotes above, the identified economic sustainability practices include cost reduction in food production and distribution, encouraging farmers to cultivate various profitable crops for self-reliance, the employment of competent and skilled personnel in the food supply chain which

improves productivity in the food industry, along with giving incomes that can sustain employees in all their food requirements. For instance, when organisations in food supply chains pay decent wages and salaries to their employees, this gives their employees the buying power to afford and have access to nutritious, healthy, quality and safe food products, which improves sustainable food security. This will however depend on the size of the organisation, as well as the organisation's vision and policies that drive SFSCM.

The participants also cited corporate social responsibility, human development on nutritious food consumption, and continuously conducting market surveys to know consumer tastes before food production and these were grouped under social sustainability practices. The findings in Figure 6.3 and in the quotes above also show the following environmental sustainability practices: green sourcing, for example sourcing from ISO certified suppliers only; waste management practices; reduction of carbon emissions through efficient vehicle and food materials handling equipment management; transport optimisation; warehouse optimisation; water and energy conservation in food production; re-use of food products and recycling of food waste products; and the reduction of non-recyclable packaging materials, along with the use of renewable energy such as solar power in food production across the food industry in Zimbabwe. Those in transport and distribution elaborated further on transport optimisation, pointing out that they use eco-friendly vehicles, fuel management and tracking, vehicle routing, scheduling and maintenance to reduce the environmental impact caused by motor vehicles as they distribute food products among wholesalers, retailers, and end users. This is consistent with Yan et al. (2022) who associated the above listed transport optimisation activities with organisations' reduced environmental impact.

Four participants who were in order processing and procurement explained that they adopted green procurement and use compliance with this practice as one of their selection and evaluation criteria for their potential and existing suppliers, respectively. The other three participants engaged in warehousing and inventory management expounded that their organisations have moved from manually operated warehouses to total automation, which saves time. These findings show that despite the economic hardships in the country, the Zimbabwean food industry is making efforts to go beyond the bottom-line practices and are keeping abreast with the SFSCM practices

implemented in other countries, across the globe. The responses from the interviewed participants are well in line with Dhliwayo (2018) who expounded that implementing sustainable supply chain practices in the food industry saves organisations from unnecesary long-term costs and protects them from reputational damage whilst putting organisations in the limelight for efficiency and new partneships.

- **The extent of SFSCM practices implementation in the Zimbabwean food organisations**

All 22 interviewed participants indicated that SFSCM practices are implemented, although at different levels. Eleven participants acknowledged that they fully and consistently implement SFSCM practices in their organisations to a larger extent. These participants further explained that their consistent implementation of SFSCM practices is mainly because their organisations subscribe to various food professional institutions that manage food quality, safety or the environment. The institutions to which these organisations subscribe include a mix of local and international institutions. Specifically, these institutions include the EMA, Standards Association of Zimbabwe, Hazard Analysis Critical Control Point (HACCP), ISO14000, ISO9000, ISO22000 and Food Safety Management Systems (FSMS), amongst others. However, the other 11 participants highlighted that there is some back-and-forth behaviour within their organisations in terms of being consistent with implementing SFSCM practices. This could be because of the cited ever-changing food regulations, which in turn cause confusion on the part of top management planning and strategy implementation. Most of the participants reiterated that exorbitant costs associated with organisations struggling to thrive within the COVID-19 era are the major drawback pulling organisations from consistently implementing SFSCM practices. In addition, 17 participants openly explained that most of the practices they are implementing and those they are planning to implement can only be achieved at certain costs, implying that they really require funding.

It is worth noting that all participants, regardless of their implementation level, fully understand that SFSCM can only be achieved if all stakeholders are on the same page in terms of converting practices into appropriate performance matrices. Baig, Abrar, Batool, Hashim, Shabbir and Foroudi (2020) substantiated this notion by stating that SFSCM practices may be implemented well when all stakeholders are committed and collaborate towards sustainability. The next section focuses on theme 3, SDCs.

6.3.3 RQ3: What are the key SDCs in the food industry?

The current study further sought to identify the key SDCs in the Zimbabwean food industry. This objective was addressed through interview question 5 (*May you list and explain the key SDCs in your organisation?*). A number of SDCs were mentioned, and all the participants seemed to have a good grasp and comprehension of SDCs and their (SDCs) relevance in SFSCM. The findings on the various SDCs are depicted in Figure 6.4 on the following page.

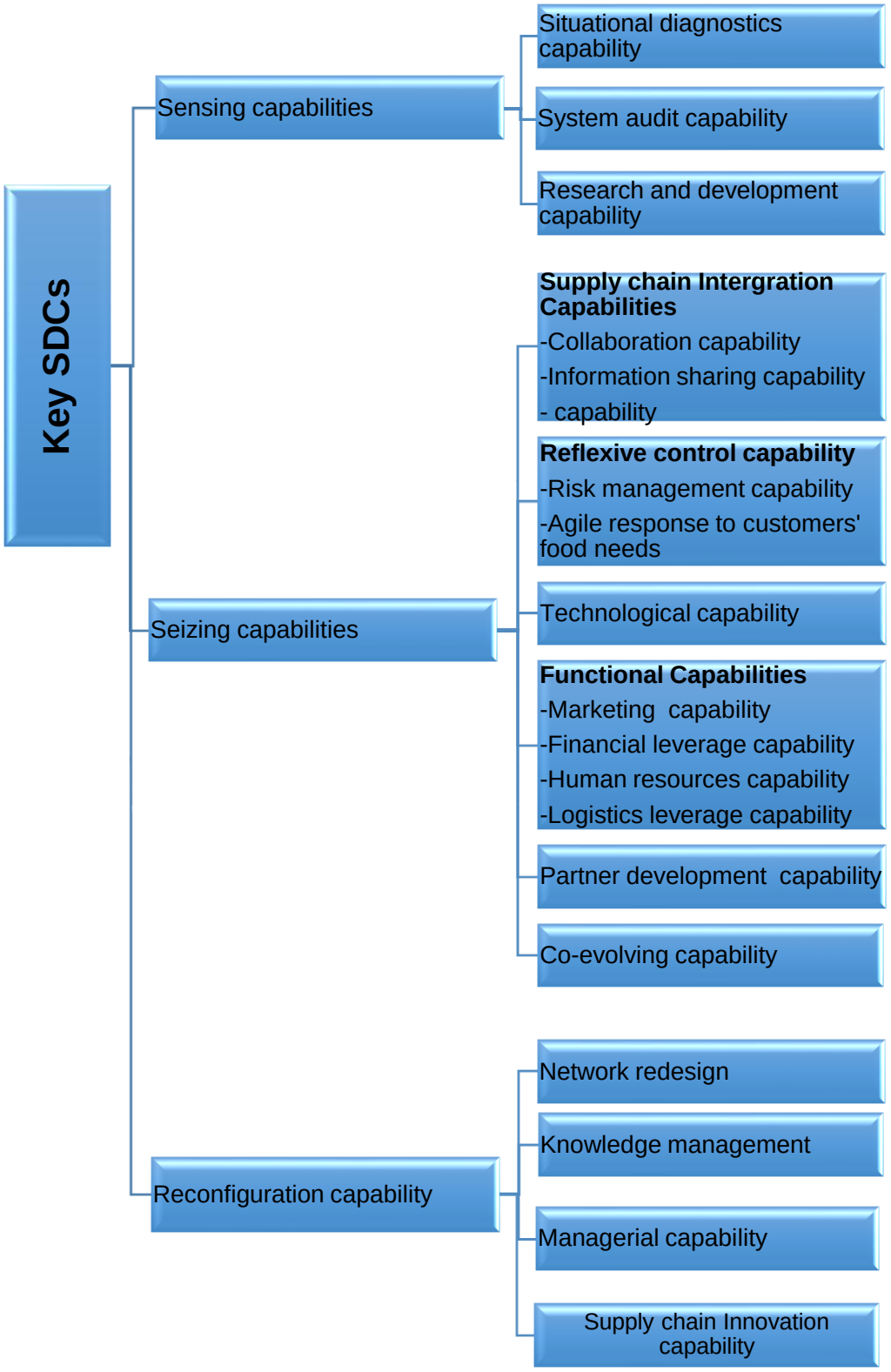

Figure 6.4: Stakeholder dynamic capabilities

Source: Research Findings (2022)

In response to interview question 5, participants provided the following key SDCs.

*"Dynamic capabilities ……**sigh**…. I think…**sigh**… they allow organisations to know how capable they are in hard times. They are more like drivers applied to solve a crisis such as the current business environment"* (Participant 6, Male, Stores Manager, 7 years of managerial experience).

"Stakeholder dynamic capabilities may be in form of different organisational functions, these involve marketing dynamic capability, human resources capability, sales analysis capability, logistics capability, normally depending on what the organisation focuses on and current requirements which may be complex to achieve" (Participant 10, Female, Food Supply chain analyst, 8 years' managerial experience).

"well, we have supply chain partner development, co- evolving, innovation capabilities, reflexive control and mmmhh… research and development capabilities" (Participant 15, Female, Logistics Manager, 10 years' managerial experience).

The interviewed participants identified a number of key SDCs, and as presented in Figure 6.4, these were grouped in three dimensions namely sensing, seizing and reconfiguration. A number of SDCs under the sensing dimension were cited, which included situational diagnostics capability, system audit capability and, research and development capability. Similar to organisations in other industries, food organisations scan and sense their business environment for any potential opportunities and threats. This is done through shelf-life research, freshness evaluations, authenticity assessments, and other quality control studies related to SFSCM. Such research helps food organisations to sense any potential sources of compromised food safety and provides possible ways to mitigate threats before they occur.

The participants also identified the following seizing capabilities categorised into supply chain integration capabilities (collaboration capability, information sharing capability), reflexive control capabilities (risk management capability, agile response to customers' food needs), technological capability, functional capabilities (marketing capability, financial leverage capability, human resources capability, logistics leverage capability), partner development capability, and co-evolving capability. The SDCs provided by participants are necessary given the current situation in Zimbabwe where the economy is not doing so well and calls for the organisations to have modified competencies and abilities. Such an economic situation requires food organisations to

have capabilities to engage partners with diversified resources, enhance technological capabilities to be cost effective, as well as to be able to manage any risk against organisational downfall or possible closure threats.

As shown in Figure 6.4, reconfiguration is the third key capability identified by the interviewed participants. This capability is made up of network design, knowledge management, managerial capability and supply chain innovation capability. A notable example of the reconfiguration capability would be the implementation of blockchain technology which provides incorruptible food traceability across the supply chain (supply chain innovation capabilities) (Scanlon et al., 2020).

The key SDCs in Figure 6.4 are in line with Gruchmann, Timmer, Gold and Gebner (2021:4) whose study established key dynamic capabilities for sustainable change in Germany's food processing industry. Their study found that major key dynamic capabilities were grouped as sensing, seizing, reconfiguration and transforming. The study further concluded that these key dynamic capabilities are the necessary tools for the success and adoption of SFSCM practices. The current study findings are also in agreement with a study done by Mutsvanga (2021) in Zimbabwe with the purpose to identify key dynamic capabilities necessary for sustainability of customs clearing and freight forwarding industry in Zimbabwe. Mutsvanga's (2021) study identified sensing, seizing and reconfiguration as the major capabilities. The next subsection looks at the specific SDCs affecting the food industry.

- **Specific SDCs affecting supply chain sustainability in the Zimbabwean food industry?**

The participants were also asked to indicate the specific stakeholder dynamic cap SDCs' abilities that affect supply chain sustainability in the Zimbabwean food industry. A majority (16) of the interviewed participants showed that they understood what SDCs are. Participants further explained that all the three groups of dynamic capabilities revealed in Figure 6.4 (sensing, seizing and reconfiguration) equally affect supply chain sustainability in the Zimbabwean food industry, though in different time intervals and circumstances.

In response to the interview question on specific dynamic capabilities affecting the supply chain sustainability in the Zimbabwean food industry, participants stated the following:

*“Our current focus is on reconfiguring out network within the food value chain so that we can be resilient and survive this economic downturn”. (*Participant 13, Male, Inbound Logistics Manager, 9 years’ managerial experience).

*“We always carry out research and development on the food products needed by our customers. We also focus on continuously understanding the dynamics of consumer tastes. If we do not do that, surely we won’t make it within this customer sensitive industry”. (*Participant 15, Female, Logistics Manager, 10 years’ managerial experience).

The specific dynamic capabilities we focus on are managing risk against a drop in our food products demand as well as researching on any possibility for us to integrate and diversify our operation vertically or laterally to prepare ourselves against any further economic or natural shocks (Participant 12, Male, Food Dispatch Manager, 12 years’ managerial experience).

The findings from participants are in line with the Zimbabwean current food supply chain system characterised by economic downturn and the effects of the Covid-19 pandemic (Ventura, 2021). Such an economic picture pushes stakeholders to focus on survival, research and development on how food organisations can continue to exist in the unforeseeable future as well as ways to align with the right network and partners necessary for sustainability. The current initiative like the Transforming Food and Agricultural Systems through Research in Partnership with Africa (TSARA) is one of such initiatives launched by French and African countries in 2022 focusing on research and development in food system sustainability. Zimbabwe is one of the 15 African countries earmarked to benefit from this particular research and improve on SFSCM before the end of year 2022 (CIRAD, 2022).

The findings from interviewed participants are in sync with the previous research conducted to establish key dynamic capabilities within the electronic industry. According to the research findings, two electronic organisations, Huawei and Hitachi, actively managed to adjust their resource base through sensing (research and development), reconfiguration (network re-design), and seizing (changes in management) capabilities and managed to outsmart competitors and become part of the top-six electronic companies in the world in 2020 (Nayak et al., 2022).

- **Relevance of stakeholder-to-stakeholder collaboration in achieving SFSCM**

After identifying the key stakeholders, participants were further asked to indicate whether stakeholder to stakeholder collaboration is necessary in achieving SFSCM. Additionally, the participants were asked to suggest ways through which stakeholders could collaborate to achieve SFSCM in the food industry.

Participants interviewed for question 5a provided the following responses;

"True all I can say is that stakeholder to stakeholder relationship is really necessary in achieving sustainable food supply management because sustainability requires group effort" (Participant 1, Male, Food Logistics Manager, 6 years' managerial experience).

"As long as all partners understand their roles in the collaboration it becomes a benefiting relationship, and even better when all involved stakeholders have the same objective for example providing food to rural people" (Participant 8, Female, Warehouse and Distribution Manager, 7 years' managerial experience).

"I would give an example of farmers and transporters and other stakeholders. So food security may only be achieved if the farmer produces, then the transporter focuses on distributing, it becomes sustainable when one stakeholder concentrates on what they know best and just specialise on that, there are a lot of efficiencies in the system which may result in achieving food security objective without wasting, on the way" (Participant 10, Female, Food Supply chain Analyst, 8 years' managerial experience).

Generally, participants explained that stakeholder to stakeholder collaborations are relevant and necessary to achieve SFSCM. Participants further expounded that their organisations may not be able to achieve food supply chain sustainability without engaging and aligning goals with stakeholder requirements. This emphasises the importance of each stakeholder and the interrelatedness that should continuously exist within and amongst all stakeholders in the food industry.

The findings provided by participants are all converging on Bhattacharya and Fayezi's (2021) idea that stakeholder collaboration within a sustainable food supply chain helps to increase supply chain transparency and cost effectiveness, advocate for higher environmental and social standards, and exert greater pressure over portions of the supply chain that are resistant to positive change needed for sustainability. For

instance, a producer of bulk maize earmarks to feed consumers down the supply chain (also as a way to improve on national food security) but may not have information on which specific group of the entire population requires which quantities of maize. The producer may also not have the capability and capacity to distribute the bulk maize to the targeted population. This requires collaboration with relevant stakeholders like grain processors, distributers, wholesalers and retailers who will eventually provide the raw maize or processed maize meal to the different and relevant consumers.

The findings from interviewed participants relate with Saint-Ville, Hickeyand and Phillip's (2017) study which focused on the influence of stakeholder interactions on national food security in the Caribbean. The results from Saint-Ville et al.'s (2017) study revealed a poor food security system attributed to a general lack of effective multi-stakeholder collaboration, low stakeholder participation levels, conflicting roles of stakeholders, poor information sharing amongst stakeholders and lack of trust among stakeholders in the food sector network. Recommendations for the research indicated that re-shaping and improving stakeholder to stakeholder collaboration was the only solution towards achieving sustainable food security. The next section focuses on theme 4, SFSCM challenges.

6.3.4 RQ4: What are the challenges faced by stakeholders in implementing SFSCM in the Zimbabwean food industry?

The current study further sought to identify the challenges faced by organisations in implementing SFSCM. To achieve this objective, participants were asked to identify the challenges faced by their organisations when implementing SFSCM practices. This objective was addressed through interview questions 4 and 11. Having knowledge of challenges faced by stakeholders in implementing SFSCM is important and enables stakeholders to plan in advance on how to overcome the commonly faced SFSCM implementation challenges. Figure 6.5 presents challenges faced by organisations in the Zimbabwean food industry when implementing SFSCM practices, and these are shown as either organisational or macro-environmental challenges.

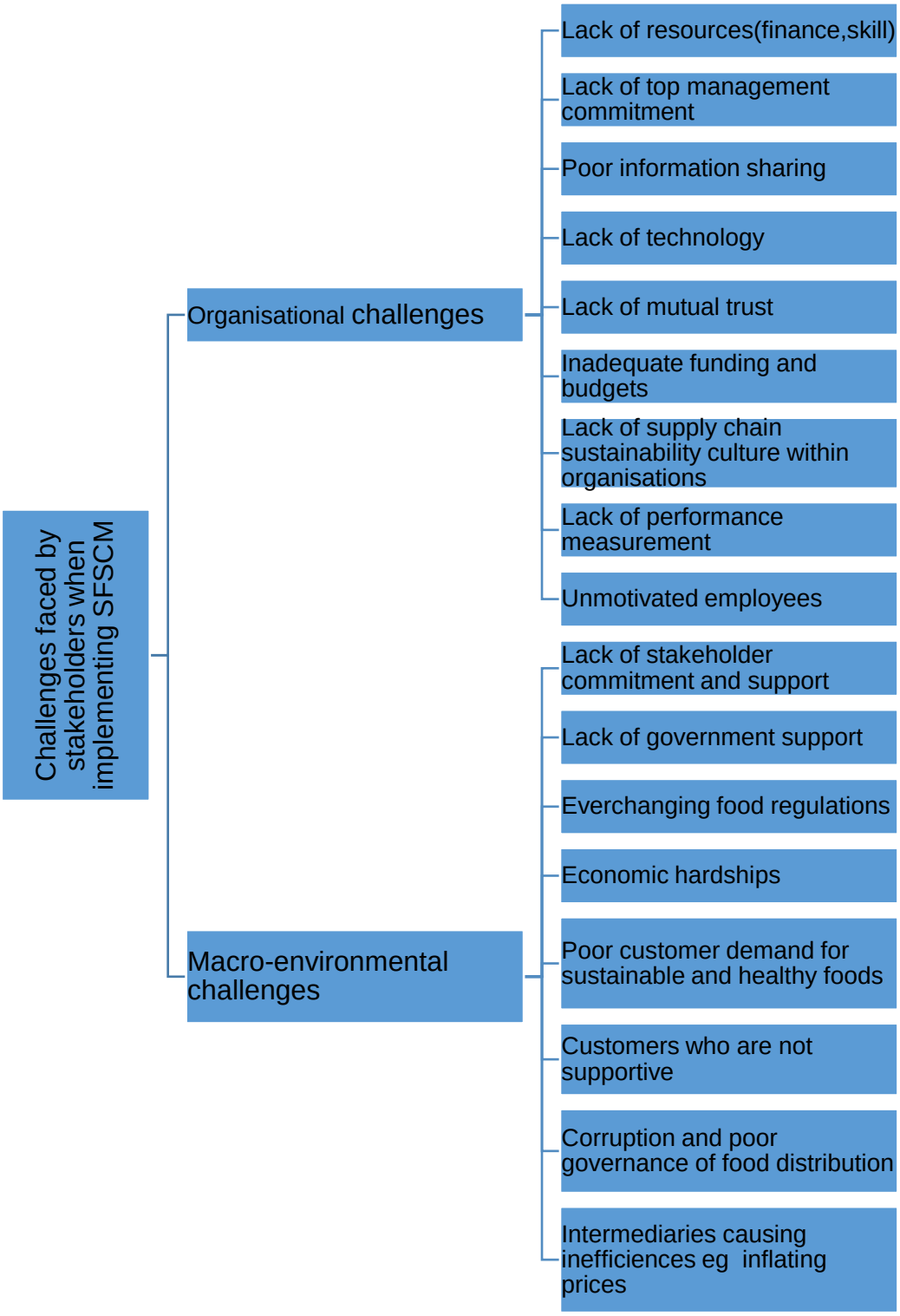

Figure 6.5: Challenges faced by stakeholders when implementing SFSCM

Source: Research Findings (2022)

In response to the interview question on challenges faced by stakeholders when implementing SFSCM in the Zimbabwean food industry, participants stated the following:

"The challenge is that when we produce environmentally friendly and healthy foods like the fibre mealie meal, it takes more than forever on the shelves without selling. Now we end up producing the more refined which is not equally healthy but is preferred by our customers and helps us to boost on sales. Also, these healthy and environmentally friendly products are not becoming popular with consumers because they are distributed by intermediaries who tend to increase prices and sometimes charge double our producer price" (Participant 10, Female, Food Supply chain Analyst, 8 years' managerial experience).

"Eish, I think we have a number of challenges including lack of technology, inadequate funding and budgets, poor information sharing amongst stakeholders in the food and beverage supply chain. Also corruption is everywhere, when we think maize has been allocated to a certain population, the next day you go there and they still ask for more citing that they didn't get enough, the same applies to inputs like fertilisers donated by our partners, the distribution is just not done right" (Participant 11, Male, Inventory Controller, 8 years' supervisory experience).

"Our customer base has gone down drastically that we may soon be unable to meet our overhead costs, I think the business environment is generally so tough for now and employees are not motivated because they are not getting salaries in time, plus the salaries are not inflation adjusted, there is nothing the organisation can do for now since we are on the verge of closing down. We made an application to the government to assist us, but it wasn't successful. Apart from that I really feel stakeholders within our industry are not willing to help in anyways as well. The situation is currently tough for the organisation" (Participant 22, Male, Transport Manager, 7 years' managerial experience).

All 22 participants expressed concern over the rising challenges in the Zimbabwean food industry. A myriad of multidimensional challenges were mentioned. The participants identified the following organisational challenges: lack of resources, lack of top management commitment, lack of performance measurement, poor information sharing among stakeholders, lack of mutual trust among food stakeholders, inadequate funding and budgets, lack of technology, and unmotivated employees. The participants also identified the following macro-environmental challenges: lack of stakeholder commitment and support, lack of government support, customers who are

not supportive, poor customer demand for sustainable and healthy foods, corruption and poor governance of food distribution, economic hardships, ever-changing food regulations, and intermediaries causing inefficiencies e.g. inflating prices. For a food supply chain to yield greater benefits for the entire network, there is need for transparency, mutual trust, sharing of information between stakeholders, and proper governance of food distribution. According to Mahroof, Omar and Kucukaltan (2021), countries source a large number of their food items from global sources that are part of the greater coordinated supply chain network, which makes it difficult to access food information and even compromises the stability of food support functions. The Zimbabwean food industry is not immune to such challenges. Zimbabwe is currently ranked at a global corruption index of 23 (being one of the most corrupt countries) (Mahuni & Bonga, 2017). Such high levels of corruption and poor food distribution governance exacerbate inefficient food supply, which leaves more people in Zimbabwe in a state of chronic hunger, and food insecure. Mohseni, Baghizadeh and Pahl (2022), in support, added that poorly managed food supply chain stages, particularly food production, processing, distribution and consumption significantly contribute to food waste, which in turn adversely affects sustainability. The next subsection discusses the findings on the approaches to address the above identified SFSCM challenges.

- **SFSCM approaches and the extent of their success in addressing listed challenges**

The participants were further asked (through interview questions 2 and 11) to indicate the approaches used to address the SFSCM implementation challenges. The findings show that, in an effort to curb challenges affecting the implementation of SFSCM, a lot has been done and more is yet to be done to ensure a smooth roadmap towards total sustainability within the Zimbabwean food industry. The interviewed participants identified a number of positive efforts, including constantly training internal stakeholders on SFSCM, developing stakeholder communication plans to reduce information gaps, and some organisations have incorporated SFSCM into their mission and vision statements to show top management commitment. In addition, participants pointed out that it is necessary to lobby for government support and promote open information sharing amongst internal and external stakeholders within the Zimbabwean food industry. Three of the interviewed participants expounded that

their organisations are promoting dialogue on matters of SFSCM as never before. For instance, one of these participants said:

*"The issue of lacking transparency needs effective information sharing starting from within the organisation then going out to all our external stakeholders. On the other hand, employee knowledge gaps may be closed by employing appropriate training, such as explaining the importance of sustainable food production. I also feel that consumer awareness campaigns should constantly be carried out by food supply chain stakeholders to parade the importance of consuming healthy and nutritious foods" (*Participant 3, Female, Contracts Manager, 9 years, managerial experience).

Other participants stated that:

"The human resources department must develop programmes aimed at training all employees on current trends in consumer food tastes so that we may develop own products that are mostly healthier, eco-friendly and that meet consumer needs. And also…. technology is ever improving these days, it is necessary that our organisation acquires modern grain harvesting and drying machines to improve on overall process efficiency" (Participant 10, Female, Food Supply chain Analyst, 8 years, managerial experience).

"The idea of SFSCM challenges needs to be presented to the parliament so that the government puts it as one of its priorities. The ministry of Industry and Trade specifically should spearhead assisting organisations to articulate challenges revolving around sustainable food supply chain. Zimbabwe as a nation is constantly not meeting food requirements for its entire population. Also the government should introduce another programme, more or less like the command agriculture and then employ audit teams that expedite the flow of inputs and post-harvest grain output to ensure that there is no corrupt distribution to the needy communities" (Participant 14, Female, Driver controller, 6 years, supervisory experience).

Additionally, the participants were asked to indicate the extent to which these approaches were successful in addressing the listed challenges in terms of improving the level of implementation of the SFSCM practices in their organisations and in their entire food supply chain. Most of the participants (17) indicated that they had not yet implemented the approaches to address the SFSCM challenges, and some (3 participants) of them also added that they were still working on addressing the

identified challenges. Only two of the interviewed participants indicated that their organisations had recorded positive results from engaging stakeholders as an approach to address the SFSCM implementation challenges. More so, three participants said implementing some of the approaches have helped them to partially address the SFSCM implementation challenges faced by their organisation.

From the above, it is clear that organisations in the Zimbabwean food industry still have a long way to go in order to fully address the SFSCM implementation challenges. In line with the above findings, Bomler (2021) explained that it is difficult to manage and monitor external sustainable supply chain challenges where a number of stakeholders are involved. Bomler (2021) emphasised that the best way to overcome complex SFSCM challenges is through alignment in responsibilities, transparent information sharing, commitment between internal and external stakeholders as well as through constant review of agreed processes.

The interviewed participants further suggested that organisations involve their employees in SFSCM matters to boost employee motivation. One participant suggested that organisations in the Zimbabwean food industry need to ask government for funding to address the SFSCM implementation challenges. This makes sense since lack of funds was cited as one of the key SFSCM implementation challenges currently faced by organisations in the Zimbabwe food industry. Another participant further suggested that organisations in the Zimbabwean food industry should do continuous environmental scanning and auditing in order for them to be certain that they are prioritising solving the right SFSCM implementation problem. Such a suggestion is not far-fetched but is rather warranted. This is because constant environmental scanning and auditing will help the organisations, even those in the food industry, to get their priorities right when it comes to the much pressing SFSCM implementation challenges, as well as deciding on which approaches will best solve such challenges, and yield greater benefits for the organisation, and the entire supply chain. The next section provides findings on how SFSCM drivers influence the implementation of SFSCM practices.

6.3.5 RQ5: How do SFSCM drivers influence the implementing of SFSCM practices?

The current research question sought to establish the influence of SFSCM drivers on SFSCM practices. This research objective was addressed through interview question 6 (*In your opinion, how have the SFSCM major drivers you listed influenced the implementation of SFSCM practices in Zimbabwean food industry? Please elaborate on your response*). For a more objective view, this objective was also answered quantitatively, and the results are discussed in Chapter 7.

All the interviewed participants concurred that SFSCM drivers influence SFSCM practices either negatively or positively. Twenty participants concurred that SFSCM drivers positively influence SFSCM practices. Participants provided the following responses:

"Deriving it from the general supply chain understanding, sustainable supply chain drivers assist or enhance the achievement of sustainable supply chain management practices. You will realise that without sustainable food supply chain drivers, we may not be able to enforce some practices, for example without EMA here in Zimbabwe no one would be able to enforce emissions and waste reduction practices in food production and distribution" (Participant 8, Female, Warehouse and Distribution Manager, 7 years' managerial experience).

"Sustainable food supply chain drivers like the government regulations, may positively push practices such as carbon emission reduction" (Participant 3, Female, Logistics Contracts Manager, 9 years' managerial experience).

"Those in food distribution technology may drive organisations to put into practice vehicle telematics and diagnostics, which is ideal for proper vehicle routing and scheduling, thereby improving on vehicle operation efficiency reducing emissions in the environment as they optimise vehicle mileage run" (Participant 15, Female, Logistics Manager, 10 years' managerial experience).

As acknowledged by all participants, these findings mean that there is a relationship between SFSCM drivers and SFSCM practices. Contrary to the above, two participants said there is negative relationship between SFSCM drivers and practices. The two participants stated that:

"I just think there is a negative relationship between the two variables. I do not have an example to give for now but that's just what I think about these two variables" (Participant 19, Male, Supply chain Manager, 21 years' managerial experience).

"To me the more we put driving force towards stakeholders the more we receive retaliative forces and then affect the practice inversely. SFSCM drivers must not really push institutions, especially these environmental laws that they are always imposing on us when we are doing our best to improve national food productivity, we then tend to have negative energy" (Participant 22, Male, Transport Manager, 7 years' managerial experience).

Participants generally revealed that they have an in-depth understanding of the relationship between SFSCM drivers and practices providing relevant links between the two variables. An appreciation of this relationship would mean that achieving SFSCM may not be a very difficult task in the Zimbabwean food industry as these stakeholders (participants) may easily spearhead it. Such view is corroborated by Chowdhury and Quaddus (2021) who explored the relevance of SSCM drivers and SSCM practices as complementary variables needed to achieve SSCM performance. The next section discusses the findings on the influence of SFSCM drivers on SDCs.

6.3.6 RQ6: How do SFSCM drivers influence SDCs in the food industry?

The current study further sought to establish the influence of SFSCM drivers on SDCs. This objective was addressed through interview question 7.

Nine participants seemed unfamiliar with the concept of relating the two variables. It was only after posing a few probing questions that the interviewees understood the logic and relationship properly. All participants then understood and confirmed that there was some relationship between SFSCM drivers and SDCs. Two-dimensional responses were explained vividly by the interviewed participants. One of the dimensions indicated that SFSCM drivers directly and positively influence SDCs, whilst the other one reported a negative influence of SDCs. In other words, interviewees described both constructs as independent and also as dependent to each other. These explanations show that, generally, these two variables may influence each other in a bi-directional way.

Participants provided the following responses:

“my thinking is that drivers will initiate organisational innovativeness, leading into various capabilities being put in place” (Participant 1, Male, Food Logistics Manager, 6 years’ managerial experience).

“normally what I have witnessed is that SFSCM drivers act like that dynamic environment that puts organisation in a situation where they are compelled to change utilising any of the appropriate food supply chain stakeholders dynamic capabilities, for example the push to comply with human nutritional rights and labour law in food organisations may instigate engagement of a consultant immediately to assist the focal organisation” (Participant 2, Male, Supply chain Coordinator, 14 years’ managerial experience).

“I just know that these two relate with each other in some way, but mmmh for now I’m not sure how the relationship looks like” (Participant 4, Male, General Manager, 13 years’ managerial experience).

*“Stakeholders’ dynamic capabilities affect SFSCM drivers, I guess. For example, technological capability may influence the government to introduce cybersecurity laws to safe guard the food industry from any possible vulnerability” (*Participant 16, Female, Procurement Manager, 15 years’ managerial experience).

“Network capability or co-evolving capability (which can be through diversification) may directly enhance an organisation to have resources that they previously did not have, this could be competitive skills or increased financial leverage. In such an instance I really think the dynamic capability would have influenced SFSCM drivers” (Participant 10, Female, Food Supply chain Analyst, 8 years’ managerial experience).

Some organisations are failing to utilise SDCs not because they do not want but they don’t know how these SDCs may be utilised to benefit food supply chain organisations. It is important that gatekeeper organisations such a CIPS, Grain Millers Association of Zimbabwe, Ministry of Lands, Agriculture, Water, and Rural Resettlement amongst others create SDCs awareness campaigns through different platforms (for example bulletins and conferences) and engagements with sustainable supply chain stakeholders.

The responses from participants are in accordance with research done by Wolters Kluwer (2021) which indicated that information sharing and sensitivity to customer

wants and expectations drive the flow of food products and how consumers are serviced. Prioritising information and responsiveness helps organisations to accept unforeseen fluctuations in the food market and in the process effectively win on customer preferences and market share.

According to Chowdhury, Agarwal and Quaddus (2018), understanding SDCs requires participants who have a sense of strategic planning and SSCM requirements because without such, stakeholders may find it difficult to understand how SDCs may really be necessary in achieving SSCM. Aslam and Azhar (2018) revealed that most organisations understand the influence of SFSCM drivers on SDCs through experience derived from benchmarking with other organisations, though the major challenge lies with which capability to utilise in relation to the most influencial SFSCM driver.The next section discusses the influence of SFSCM practices on SDCs.

6.3.7 RQ7: To establish the influence of SFSCM practices on SDCs in the food industry

The study also sought to establish the influence of SFSCM practices on SDCs. This objective was addressed through interview question 8. Seventeen interviewees acknowledged that SFSCM practices have a direct and positive influence on SDCs. More so, participants had knowledge that sustainable management practices in the supply chain are more profitable if they are manipulated by the appropriate dynamic capability. All the respondents confirmed that SDCs may not work alone if there are no practices in the place first. One interviewee explained that the relationship can be vice versa, starting from identifying the dynamic capability and focusing on the befitting practice.

Participants' responses to the interview question were as follows:

"I can say an enforced practice may result in a number of dynamic capabilities being utilised, but if the practice is not backed by a certain driver normally an organisation do not change much. So it means food sustainability practices have positive or negative influence on stakeholder dynamic capabilities" (Participant 1, Male, Food Logistics Manager, 6 years' managerial experience).

"I think sustainable food supply chain management practices affect stakeholders' dynamic capabilities in both positive and negative mmmh yaaah thats my opinion, I do

not have any example to give though" (Participant 8, Female, Warehouse and Distribution Manager, 7 years' managerial experience).

"Practices obviously influence certain dynamic capabilities to be enacted. Without any practice available and any internal or external environment changes, you will find out that there is no need for any dynamic capability because organisations will be content with their status quo, no need to improve on anything. For example, when the government announced that food organisations must have 51% local ownership, a lot of foreign owners developed partnerships with Zimbabweans and relinquish some shares to the local people for them to keep operating legally, in that case a driver has influenced a practice, and a practice has influenced partnership capability. So yes practices influence dynamic capabilities" (Participant 11, Male, Inventory controller, 8 years' managerial experience)

The interview question seemed a bit complex to a number of participants, maybe because a number of them initially did not appreciate SDCs well until the researcher provided an explanation to them. In that regard, linking the two variables with examples or further explanation was not easy for ten of the interviewed participants. However, those who proved to be familiar with the relationship gave enriched responses showing deeper understanding of SFSCM practices and SDCs. According to Chukwuemeka and Onuoha (2018), the relationship between SFSCM practices and SDCs may be difficult to elaborate on and justify especially if one does not really understand the appropriate SDC to utilise, in relation to the SFSCM practice being enforced. The next section focuses on the influence of SFSCM practices on SFSCM performance.

6.3.8 RQ8: How do SFSCM practices influence SFSCM performance?

The current study further sought to establish the influence of SFSCM practices on SFSCM performance. This objective was addressed through interview question 9. All interviewees, when they were identifying SFSCM practices, confirmed that SFSCM performance can only be achieved if the organisation manages to identify and implement the right practices. Interviewees reiterated that it is up to the individual organisation to really put SFSCM practices into appropriate action. All the participants also confirmed that SFSCM practices have a direct and positive influence on SFSCM performance.

Participants responded were as follows:

"Here SFSCM practices affect performance positively, actually the more practices we have the more our food supply chain become sustainable" (Participant 6, Male, Stores Manager, 7 years' managerial experience).

"Actually, sustainable food supply chain practices affect sustainable food supply chain performance positively" (Participant 7, Male, Warehouse and Distribution Manager, 5 years' managerial experience).

"Practices like water conservation improves water availability so performance get better. As along as a supply chain sustainability practice is put into action, it results in positive sustainable food supply chain performance" (Participant 12, Male, Food Dispatch Manager, 12 years' managerial experience).'

"Sustainable food supply chain practices are necessary tools to guide the supply chain environment into sustainability performance. For example, practices like subscribing to ISO certifications makes the whole process effective since organisations are provided with guidelines to achieve positive food supply chain sustainability performance" (Participant 13, Male, Inbound Logistics Manager, 9 years' managerial experience).

All the responses point out that SFSCM practices directly influence SFSCM performance. This implies that once food organisations identify their practices well and are able to implement them, the probability of achieving SFSCM performance is high. Food organisations in Zimbabwe therefore need to focus on implementing the necessary sustainability practices and maintaining them for long-term SFSCM performance.

The current study's interview findings are consistent with a prior study (León-Bravo et al., 2021) that used a multiple-case study approach to analyse the application of sustainability practices and subsequent assessment of supply chain performance at various stages in the food (fresh fruit and vegetable) sector in Italy. The study's overarching goal was to provide a roadmap for sustainability practices and evaluation methodologies to promote the assessment of sustainable supply chain performance in the fresh fruit and vegetable supply chain. According to León-Bravo et al.'s (2021) study findings, all 12 organisations involved in the fresh fruit and vegetables study recorded positive SC performances after the implementation of seven SFSCM practices classified under regulations, stakeholder and shareholder practices,

company environmental concern, company social concern, green image and global competitiveness (León-Bravo et al., 2021). The next section discusses the influence of SFSCM drivers on SFSCM performance.

6.3.9 RQ9: How do SFSCM drivers influence SFSCM performance?

Additionally, the study sought to establish the influence of SFSCM drivers on SFSCM performance. This objective was addressed through interview question 10. All 22 participants could easily concur that SFSCM drivers have a direct influence on SFSCM performance. A lot of rich explanations were provided as respondents went on to explain further that drivers alone without action will not yield any positive performance results. Five of the respondents did not hesitate to mention that corruption is so gross in the Zimbabwean food supply chain system and food industry; and therefore, weakening the effectiveness of the SSFSCM drivers.

Participants provided the following responses:

"To explain this, I would give an example of availability of resources like finance as a driver that enable an organisation to hire skilled and competent personnel required to improve production of nutritious food. In that way in means sustainable food supply chain management drivers have a positive effect on sustainable food supply chain management performance". (Participant 5, Female, Procurement and Logistics Manager, 16 years' managerial experience).

"All sustainable food supply chain drivers mentioned have positive influence on sustainable food supply chain management. For example, all laws enacted by EMA are meant to ensure that our environment is free from any hazardous impacts" (Participant 16, Female, Procurement Manager, 15 years' managerial experience).

"Various drivers if not all of them influence sustainable food supply chain management performance positively, for example media publicity may influence a food firm to initiate cooperate social responsibility to initiate food waste management and improve on environmental cleanliness" (Participant 19, Male, Supply chain Manager, 21 years' managerial experience).

Interesting to note was that all participants agreed that SFSCM drivers are a necessity on the road towards achieving SFSCM performance.

Participants belong to a number of food supply chain sectors, ranging from suppliers, producers, processors to wholesalers, retailers, and or consumer representative institutions. In this regard, the effects of SFSCM drivers were explained in different dimensions, mostly in line with what the organisation of participants focuses on. Most responses explained the long-term cost-serving, improved profitability, environmental impacts reduction, consistent food production, and food availability within the supply chain system.

Emamisaleh and Taimouri (2021) asserted that a managerial mindset is a significant driver in improving sustainable food supply chain management performance. This reflects the importance of internal organisations' drivers on the success of SFSCM performance. SFSCM drivers are therefore necessary tools towards the achievement of SFSCM performance even in the food industry. The next section provides findings on how SDCs influence SFSCM performance.

6.3.10 RQ10: How do SDCs influence SFSCM performance?

This study further sought to establish the influence of SDCs on SFSCM performance. This objective was addressed through interview question 12. Sixteen respondents explained that SDCs are necessary tools that give flexibility when it comes to the implementation of SFSCM. All 22 (including those who could not explain much) interviewees acknowledged that SDCs have an influence on achieving SFSCM performance. However, practically relating SDCs to real world food supply chain situations was an issue, which could be an indication that participants have not utilised SDCs in their strategic supply chain operations or day-to-day business.

Participants provided the following responses:

"The two variables must have a relationship because the way I see it, we need more evaluated information and more knowledge to enhance whatever practices we may have to sail through hardest times and remain resilient and sustainable in food supply chain management". (Participant 4, Male, General Manager,13 years' managerial experience).

"I think with these dynamic capabilities we can boost our sustainability performance in times like this when things don't seem to be working in our nation, for example our estate secured a partner from Malaysia who is coming with a complete pivot system,

and we are likely to produce more than double our normal hectarage output" (Participant 1, Male, Logistics Manager, 6 years' managerial experience).

"I can relate, our organisation has been surviving and also managing to produce food in reasonable quantities to feed our target population numbers, we mainly leveraged on partnership with the government and some of foreign organisations, which to me is a co-evolving capability that we used to achieve sustainable food supply chain management performance" (Participant 10, Female, Food Supply chain Analyst, 8 years' managerial experience).

The above findings concur partially with the conclusions of a research undertaken by Hong, Zhang and Ding (2018) to identify the relationships between SFSCM practices, SDCs, and SFSCM performance in 209 Chinese manufacturing enterprises. Hong et al.'s (2021) study findings revealed that SDCs only have a beneficial influence on environmental performance; they have no effect on economic or social performance. Overall, the findings highlighted the necessity of enhancing SC dynamic capabilities and adopting good SSCM practices as an enabler for SSCM performance, particularly those operating in developing nations. The next subsection provides additional relevant information given by the participants during the interviews.

- **Any other relevant information to the study**

Interview question 7 was meant to seek further information that supports any of the nine research questions answered by qualitative data. However, responses provided by participants could not align to any of the objectives as expected. Only three participants responded to the interview question.

The participants' responses are provided below:

"I really think that sustainable food supply chain management performance is affected more or less by other variables apart from those you asked in the entire interview. I really think the external environment affects it more in Zimbabwe than the variables you mentioned. Yes those you asked, they work in the developed world more than the developing world" (Participant 5, Female, Procurement and Logistics Manager, 16 years' managerial experience).

"Simulation modelling will enable an organisation to identify sustainable supply chain risks and institutions may get rid of such risks before implementing any solution, thus

saving the organisation from the real-world fall-out of those risks" (Participant 19, Male, Supply chain Manager, 21 years' managerial experience).

"I feel in the Zimbabwean food industry politics and corruption play major roles than anything else in sustainable food supply chain performance management. If we address the politics of the land, we are likely to have sustainable supply chain systems. Look at developed countries, they do not struggle with their supply chains because they have stable politics". (Participant 21, Male, Distribution Manager, 5 years' managerial experience).

The responses provided by participants could not align to any of the research questions well but may still be used for any further study focusing on factors affecting SFSCM. Participant 5 expounded that other than SFSCM drivers, SFSCM practices and SDCs, SFSCM performance is further influenced by the macro-environment variables. On the contrary, participant 19 emphasised the need to identify all possible risks using contemporary technology such as simulation modelling and then eliminate such risks to enable the smooth achievement of SFSCM. Lastly, participant 21 decried on the Zimbabwean politics as the main influencer of SFSCM. In this regard stable politics would be aligned to positive SFSCM performance whilst unstable politics would make it difficult to achieve SFSCM performance

A study conducted by Best (2022) on the sustainability of food supply chains in a politically unstable Ukraine found that with Ukraine being a war zone, food distribution has been severely impacted, with factories closing or operating at reduced capacity, logistics disrupted, and retail stores either closing or selling fewer items. According to Best's (2022) findings, a number of large food companies, including MHP (which accounts for 50% of Ukraine's chicken output), Nestle, and Metro food stores have closed. The immediate inference is that any positive SFSCM performance is hampered by insecure politics.

6.4 CHAPTER SUMMARY

The chapter focused on qualitative data analysis. Twenty-two participants were engaged for interviews during this study. Qualitative data was collected using a semi-structured interview guide. The data gathered was analysed using thematic analysis method. Themes were developed to answer each research question from the interview question responses provided by the participants. Findings were presented for all the

semi-structured interview questions on SFSCM drivers, practices, SDCs and performance. Research question one focused on drivers for SFSCM, and participants identified a number of drivers that were grouped as internal (those within a particular food organisation) and external (those outside the scope of an individual organisation). Research question two enquired about the SFSCM practices adopted within food industry, and the key findings from participants were categorised as economic, societal and environmental practices.

Further, research question three sought for key SDCs and participants provided numerous responses mainly categorised in three dimensions, namely sensing, seizing and reconfiguration capabilities. The fourth research question sought to establish the challenges faced by stakeholders in implementing SFSCM in the Zimbabwean food industry. All the challenges identified were broadly categorised as organisational and macro-economic, mainly based on whether they are within the organisation or outside of it.

The fifth research question sought to establish the influence of SFSCM drivers on implementation of SFSCM practices within food industry. Major findings pointed out that there is a positive relationship between SFSCM drivers and SFSCM practices. In addition, research question six asked for SFSCM drivers' influence on SDCs in the food industry. The majority of responses revealed that SFSCM drivers directly influence SDCs. Research question seven sought to establish the influence of SFSCM practices on SDCs in the food industry. The majority of study findings acknowledged that SFSCM practices have a direct and positive influence on SDCs. The eighth research question enquired how SFSCM practices influence SFSCM performance. Findings confirmed that SFSCM practices have a direct and positive influence on SFSCM performance.

Research question nine sought to establish SFSCM drivers' influence on SFSCM performance and the findings showed that SFSCM drivers have a direct and positive influence on SFSCM performance. The final question sought to establish the influence of SDCs on SFSCM performance. The findings revealed that SDCs have a positive influence on achieving SFSCM performance. The next chapter (Chapter 7) focuses on the quantitative data analysis.

CHAPTER 7
DISCUSSION OF QUANTITATIVE RESULTS

7.1 INTRODUCTION

The current study followed a fixed concurrent (convergent parallel triangulation) mixed research approach to answer the research problem and objectives investigated in this study. The previous chapter (Chapter 6) discussed the qualitative findings on SFSCM phenomena in the Zimbabwean food industry. The current chapter presents and discusses the quantitative (descriptive and inferential) results obtained from the various quantitative statistical analysis tests performed in SPSS Version 27 and AMOS version 26 to address the SFSCM phenomena in the Zimbabwean food industry. The chapter first presents the response rate, followed by descriptive results (in the form of graphs and tables) regarding the respondents' gender, age ranges, education level, supply chain food sectors, work experience, and awareness of sustainable food supply chain management in this study. The chapter further presents findings from a principal component analysis performed in SPSS Version 27 utilised to reduce the number of measurement items for the latent variables used in this study. The chapter also presents reliability and validity results performed to ensure the robustness of results. The chapter further presents and discusses the structural equation modelling (SEM) results, namely the confirmatory factor analysis (CFA) and path analysis performed in AMOS version 26. The CFA results were used to assess overall model fit while the path analysis results were used to test the study hypotheses. The next section discusses the descriptive analysis results for the sample profile.

7.2 DESCRIPTIVE ANALYSIS RESULTS

This section covers six distinct areas, which are discussed in further detail in the subsequent subsections. These include respondents' gender, age ranges, education attainment, supply chain food sectors to which they belong, work experience in the food supply chain industry, and respondents' understanding of sustainable supply chain management. These fundamentals have a significant impact on the performance of stakeholders in the food industry's sustainable food supply chain. The next

subsection discusses respondents' gender and how it influences sustainable supply chain variables.

7.2.1 Gender representation

Food supply chain internal stakeholders such as the supervisors or managerial procurement officers, managers in charge of logistics, supply chain coordinators, supply analysts and all employees involved in supply chain management from all functional departments can influence the development of a sustainable supply chain framework in the food industry. Thus, the first question asked about the respondents' gender and the results are shown in Table 7.1 below.

Table 7.1: Gender representation

Respondents' gender					
		Frequency	Percent	Valid percent	Cumulative percent
Valid	Male	193	66.1	66.1	66.1
	Female	99	33.9	33.9	100.0
	Total	**292**	**100.0**	**100.0**	

Source: Research results (2022)

According to Table 7.1, 66.1% of the respondents were males and 33.9% were females. The results indicate that women continue to trail behind males in the supply chain carrier workforce. As a result, women have a lower proportion of elite employment opportunities in supply chain management, sourcing, and logistics. This is consistent with prior research indicating that women hold around 5% of senior supply chain jobs (Eshkenazi 2014). Eshkenazi (2014) further connects women's lack of participation to their degree of education and experience in the supply chain. The following section discusses the respondents' age ranges

7.2.2 Respondents' age ranges

The following Figure 7.1 details the distribution of age ranges.

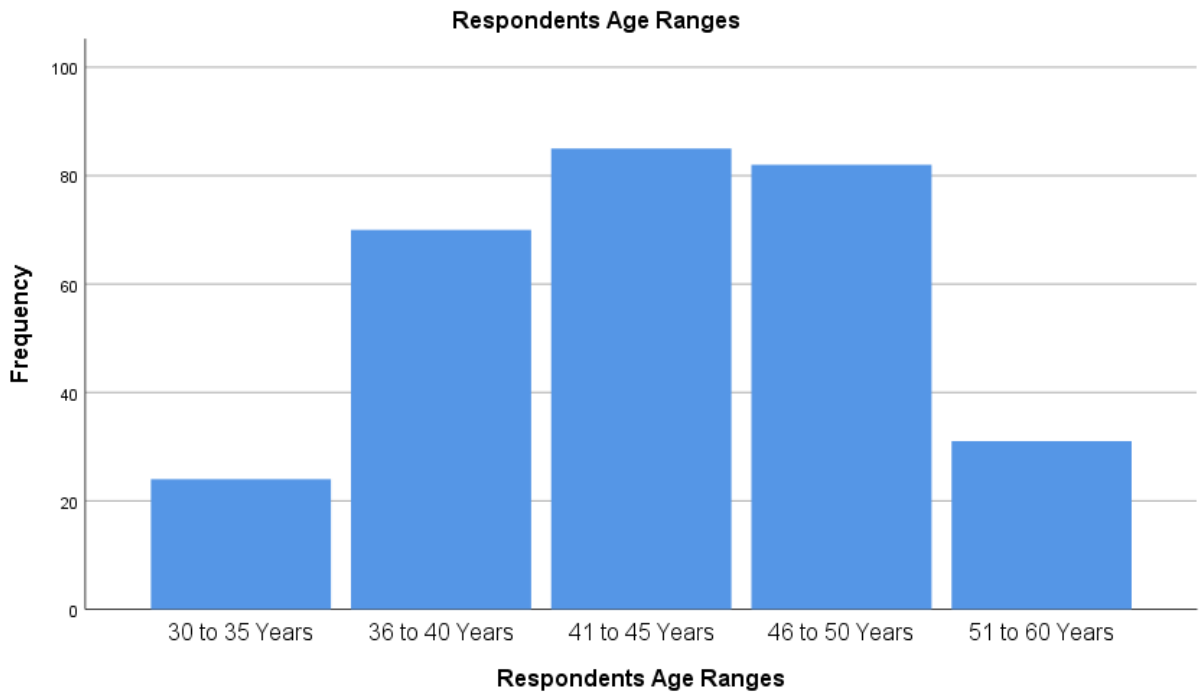

Figure 7.1: Respondents' age ranges

Source: Research results (2022)

According to Figure 7.1, the age range of 41 to 45 years was the most represented age range in the study, accounting for 29.1% of all respondents, followed by the age range of 46 to 50 years at 28.1%. The 36 to 40 years age group is the third most represented, while the 51 to 60 and 30 to 35 years age groups are the least represented. According to Beier, Torres, Fisher and Wallace (2020), the age ranges of respondents are related to the various subjects' expertise and knowledge. The next section discusses the respondents' educational attainment.

7.2.3 Education level attained

The educational backgrounds of supervisors and managers in FSCM can have an effect on their understanding of SFSCM and how stakeholders prioritise sustainable supply chain management as well as food security. As such, respondents were asked to disclose their educational levels. Figure 7.2 illustrates the highest educational levels attained by the respondents.

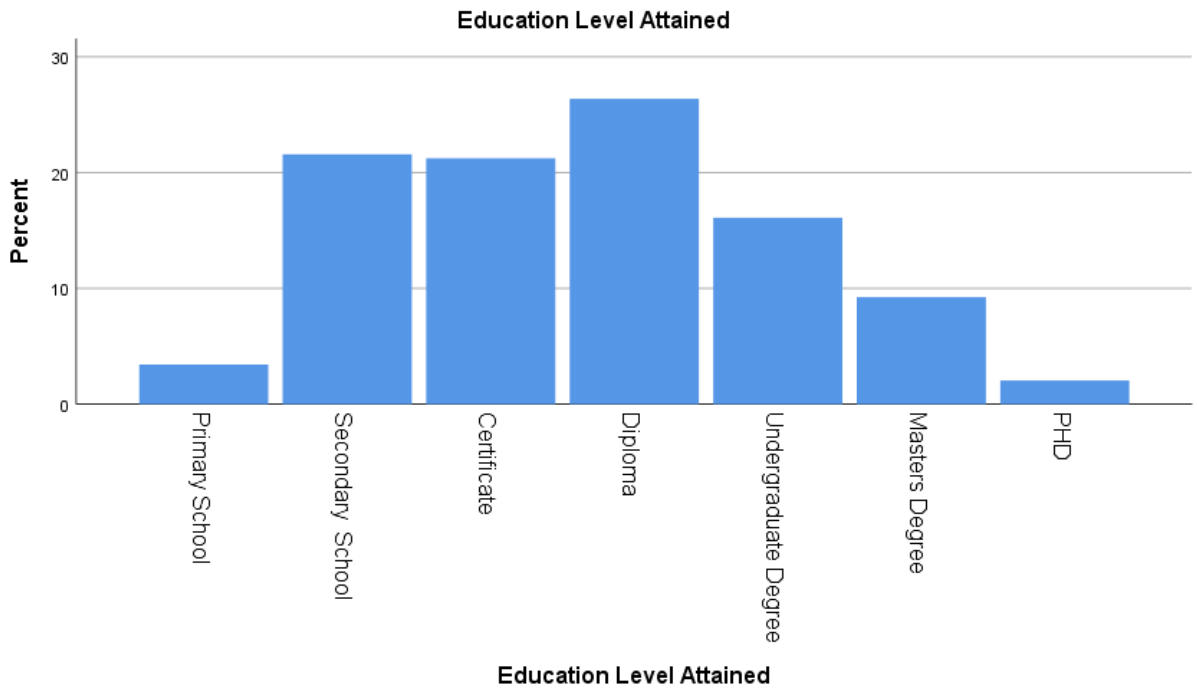

Figure 7.2: Highest educational level attained

Source: Research results (2022)

Figure 7.2 shows that the majority (75%) of respondents (supply chain professionals and business owners) have at least a certificate up to a doctorate level, while only 25% have only secondary and elementary education. These results corroborate recent research by Beier et al. (2020), which asserted that supply chain managers' levels of education and training influence their attitudes, specifically when it comes to the decisions made on sustainable food supply chains. The subsequent section describes the food sector in which the surveyed respondents work.

7.2.4 Respondents' food sector

Each respondent's food sector gives an indication of the appropriateness of the participant for the current research since the study sought to have a deeper understanding of SFSCM in different food sector areas. All food sectors that practise supply chain management are deemed fit to participate in SFSCM (Bhattacharya & Fayezi, 2021). Figure 7.3 illustrates the food sectors in which the surveyed respondents belong to.

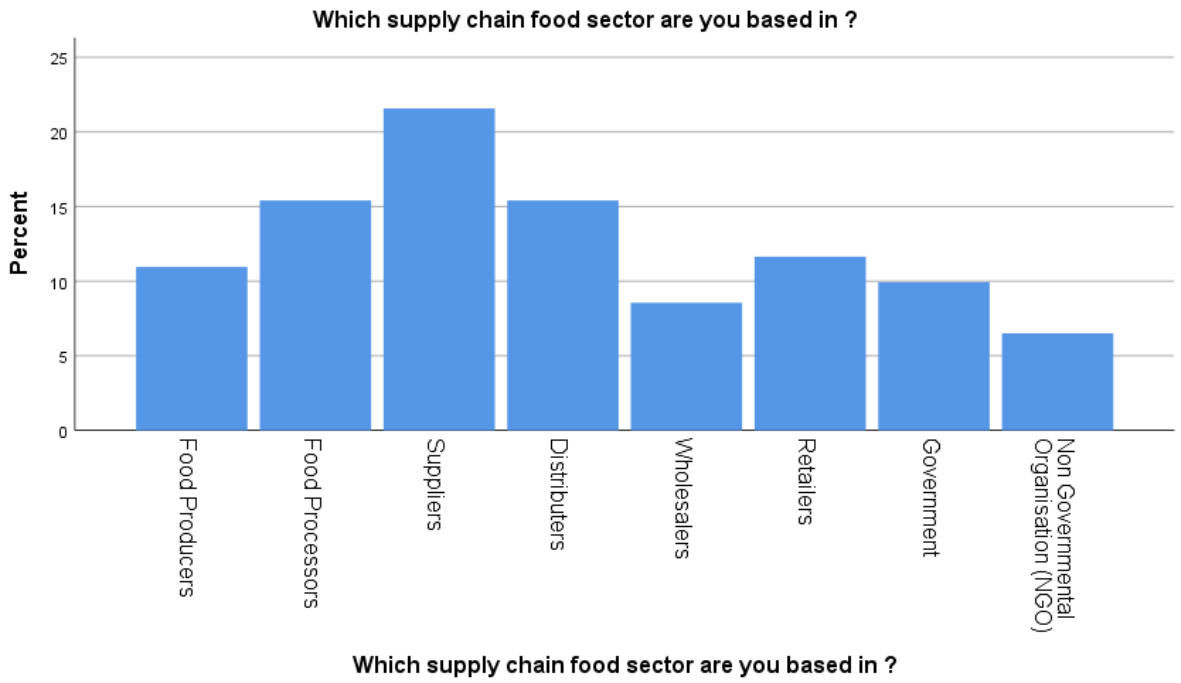

Figure 7.3: Respondents' food sector

Source: Research results (2022)

Figure 7.3 reveals that suppliers (21.6%), food processors (15.4%) and distributers (15.4%) comprised the bulk of the respondents surveyed in this study. Food producers and retailers had an average of 11.3% each, whilst wholesalers, government and non-governmental respondents were least represented (below 10% each). Bhattacharya and Fayezi (2021) acknowledged the existence of such stakeholders in more or less the same composition in a typical food supply chain system. The next section provides the respondents' years of experience in supply chain-related posts in the food industry.

7.2.5 Years of experience in supply chain industry

The work experience of respondents (managers and supervisors) has a direct relationship with how information-rich respondents are. According to Baliga et al. (2019), the more working experience a person has, the more knowledge the same person has for the specific industry in question. Figure 7.4 presents the surveyed respondents' years of experience in a supply chain post in the food industry.

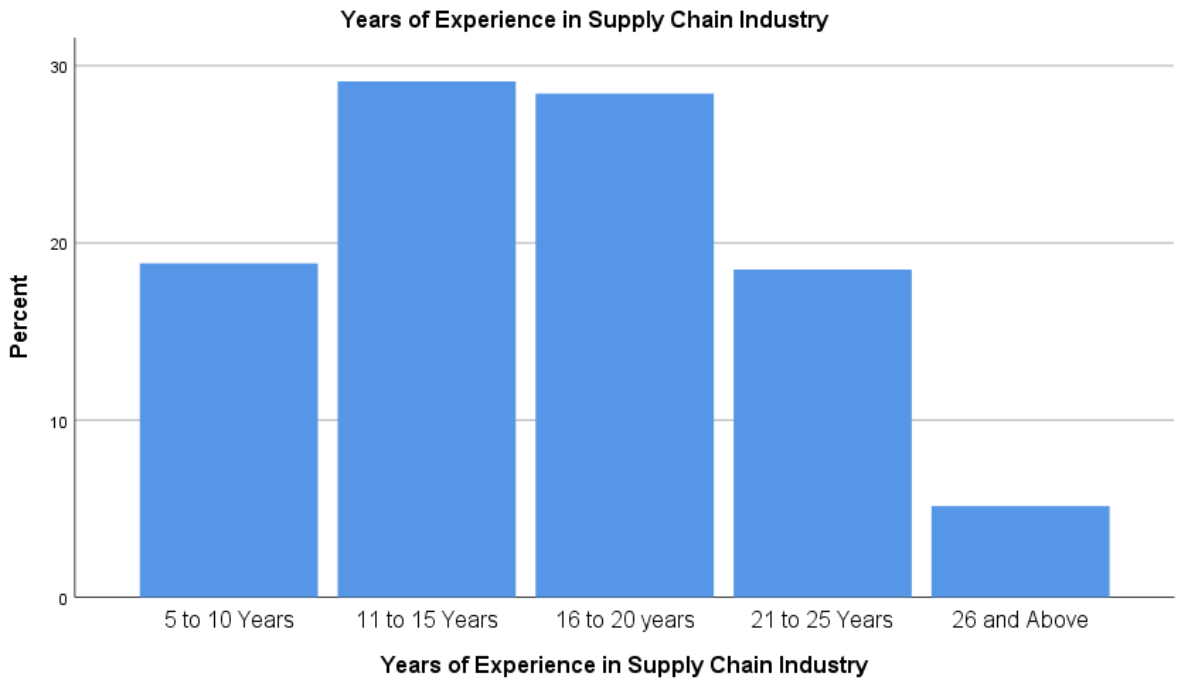

Figure 7.4: Years of experience in a supply chain post in the food industry
Source: Research results (2022).

According to Figure 7.4, the majority of respondents had 11 to 15 years of working experience in supply chain-related posts in the food industry. This range was followed by 16 to 20 years of experience (28.4%), whilst the five to ten and 21 to 25 years of working experience ranges had representation above 18% each. The least represented were those respondents with 26 or more years of experience in the supply chain related posts in the food industry. The next section focuses on the SFSCM awareness among the surveyed respondents.

7.2.6 Sustainable food supply chain management awareness

Internal stakeholders in the food supply chain, such as supervisors or managers, procurement managers, procurement officers, logistics officers, logistical support managers, supply chain coordinators, management staff, and supply analysts, as well as all employees involved in supply chain management across all functional departments, can all contribute to the development of a sustainable supply chain framework in the food industry. In that sense, they are required to have a working knowledge of sustainable food supply chain management. Figure 7.5 demonstrates an understanding of sustainable food supply chain management.

Figure 7.5: Sustainable food supply chain management awareness

Source: Research results (2022).

Figure 7.5 shows that 93.1% of respondents understand what sustainable food supply chain management means. A very insignificant portion of participants (6.9%) indicated that they do not understand sustainable supply chain management; however, their responses to succeeding questions indicated that they understand the subject in question. The assumption is that these respondents could not have understood the word sustainability and its relationship with food supply chain management. The next section focuses on principal component analysis results.

7.3 THE PRINCIPAL COMPONENT ANALYSIS RESULTS

Principal component analysis (PCA) is a multivariable exploratory analysis technique that is excellent for extracting systematic variation from noise (Kawachi, Otaka, Iwasaki, Takeshima & Ueda 2022:386). It enables the development of a reduced-dimensional space that retains all pertinent information from the original data and enables the display of scores and loadings (Kimmons, 2022). PCA requires multivariate data, which consists of several variables recorded on a large number of objects. The concepts of data, matrices, and vectors are defined, as well as a brief overview of the essential linear algebra (Mahmoudi, Heydari, Qasem, Mosavi & Band, 2021). As mentioned earlier in Chapter 5, this method was utilised in this study to

reduce and regroup the 105 questionnaire items (observed variables) used to test the study's six latent variables and to confirm their dimensional groupings. Additionally, PCA was used in this study to validate the survey questionnaire's measured variables for the six latent variables.

The maximum likelihood, Kaiser criterion (eigenvalues > 1), scree plot assessment, and varimax rotation methods were used in this work to derive the six latent variables' principal components or dimensions. The crucial and fundamental requirement for completing PCA, which needs a Kaiser-Meyer-Olkin (KMO) sample adequacy value of at least 0.5, was satisfied for all six latent variables in the research. The KMO coefficients were 0.932 for drivers of SFSCM in Zimbabwe, 0.941 for implementation of practices for sustainable supply chain management within Zimbabwe's food industries, 0.906 for challenges affecting stakeholders in implementing sustainable food supply chain management, 0.887 for approaches to reduce challenges affecting stakeholders in implementing sustainable food supply chain management, 0.943 for SDCs in the food industry, and 0.903 for sustainable food supply chain performance of stakeholders in the food industry. All the KMO scores for sample adequacy in each of these cases were less than 0.001 and were considered significant. Satisfying KMO values greater than 0.5 at all levels of significance mandated the continuing of PCA for factor reduction.

7.3.1 SFSCM drivers PCA results

This study sought to establish the drivers for SFSCM. A PCA was conducted to acquire eigenvalues and reveal the principal components. Further, a rotated component matrix was conducted to extract SFSCM driver items that are correlated. Total variance explained was performed through Kaiser's criterion for normalisation and eigenvalues for SFSCM drivers and the scores which were extracted are presented in Table 7.2.

Table 7.2: Drivers for SFSCM total variance explained

Drivers for SFSCM total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.439	76.714	76.714	8.439	76.714	76.714	7.072	64.291	64.291
2	1.142	10.382	87.096	1.142	10.382	87.096	2.509	22.805	87.096
3	0.362	3.294	90.390						
4	0.288	2.622	93.013						
5	0.205	1.862	94.874						
6	0.168	1.531	96.405						
7	0.126	1.148	97.553						
8	0.105	0.952	98.505						
9	0.075	0.680	99.185						
10	0,060	0.542	99.727						
11	0.030	0.273	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

The first eigenvalues generated from the SPSS version 27 statistical software program are shown in Table 7.2, indicating that the first two components (components 1 and 2) have eigenvalues greater than one. With an eigenvalue of 8.439, the first component explains 76.14% of the variance in the drivers for the SFSCM data set. With an eigenvalue of 1.142, the second component accounts for 10.38% of the variation in the SFSCM drivers' data set.

After generating initial eigenvalues for components greater than the suggested value of one, the next step is to choose measurement elements that have factor loadings of greater than 0.5. The examination of the principal components' findings revealing these high factor loadings are displayed in the tables below as the varimax rotated component matrix. According to Acal, Aguilera and Escabias (2020), varimax rotation is required in factor reduction since it enables a clear distinction between each measurement item's factor loadings when their principal dimensions are utilised. The findings of the rotated component matrix for the drivers of the SFSCM variable are shown in Table 7.3.

Table 7.3: Drivers for SFSCM

Drivers for SFSCM rotated component matrix[a]		
	Component	
	1	2
B1	0.928	
B2	0.885	
B3	0.827	
B4	0.897	
B5	0.815	
B6	0.859	
B7	0.894	
B8	0.905	
B9	0.853	
B10		0.918
B11		0.951
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Source: Research results (2022).

Varimax rotation results for the primary components or measurements SFSCM drivers, as well as the measured variables that strongly load into these dimensions,

are shown in Table 7.3. The first component had a high loading on nine measurement items, spanning from B1 to B9 inclusive, with factor loadings ranging from 0.815 to 0.927. Two measurement items (B10 and B11) significantly loaded into the second component, with factor loadings of 0.918 and 0.951, respectively.

The qualitative findings categorised the SFSCM drivers into two categories, namely internal and external drivers. Similar to the qualitative results, the quantitative PCA results extracted two principal components (1 and 2) with eigenvalues greater than one. However, given that there is mix of items (both internal and external drivers) loading under principal component 1, the quantitative result in this study further categorised the drivers into primary and secondary drivers. The items that load under principal component 1 (organisational culture, legislation, market pressure, organisational reputation and technology) are classified under primary SFSCM drivers. The two items (research and development, and stakeholder requirements) that load under principal component 2 are classified as secondary SFSCM drivers. Such categorisation of drivers is consistent with Saeed and Kersten’s (2019) study which also grouped SSCM drivers into primary and secondary drivers. The next subsection looks at SFSCM practices adopted within food industries.

7.3.2 SFSCM practices adopted within food industries PCA results

This study also sought to identify SFSCM practices adopted within the food industry. PCA was employed to extract principal components through identification of eigenvalues greater than one. Further, rotated component matrix was also conducted to extract SFSCM practices which are correlated. The Kaiser's criterion for normalisation was employed to extract eigenvalues for SFSCM practices and the scores are presented in Tables 7.4.

Table 7.4: Implementation of practices for SSCM within food industries

Implementation of practices for sustainable supply chain management within food industries total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.152	50.843	50.843	9.152	50.843	50.843	7.061	39.230	39.230
2	1.466	8.146	58.990	1.466	8.146	58.990	3.557	19.759	58.990
3	0.839	4.660	63.650						
4	0.728	4.042	67.692						
5	0.692	3.845	71.536						
6	0.630	3.497	75.034						
7	0.602	3.342	78.376						
8	0.573	3.181	81.557						
9	0.548	3.042	84.599						
10	0.476	2.642	87.242						
11	0.473	2.630	89.872						
12	0.428	2.380	92.252						
13	0.377	2.095	94.347						
14	0.337	1.872	96.219						
15	0.291	1.617	97.836						
16	0.212	1.180	99.016						
17	0.132	0.731	99.747						
18	0.046	0.253	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

As seen in Table 7.4, two components (components 1 and 2) exhibit initial eigenvalues greater than 1, as assessed by the statistical computing package SPSS 27. Component 1 has an eigenvalue of 9.152 and is responsible for 50.84 of the total percent of the variation in the food sector data set of SFSCM practices. The second component (2) has an eigenvalue of 1.466 and is responsible for 8.15% of the variation in the food sector data set of SFSCM practices.

Table 7.5: Implementation of SFSCM practices

Implementation of SFSCM practices **Rotated component matrix[a]**		
	Component	
	1	2
C1	0.592	
C2	0.672	
C3		0.928
C4		0.891
C5		0.921
C6	0.649	
C7	0.714	
C8	0.571	
C9	0.675	
C10	0.629	
C11	0.741	
C12	0.742	
C13	0.699	
C14	0.770	
C15	0.733	
C16	0.593	
C17	0.661	
C18	0.599	
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Source: Research results (2022)

As seen in Table 7.5, a varimax rotation indicates the presence of two significant dimensions or components of the adoption of SFSCM practices. The factor analysis empirically classified the measurement items for the adoption of SFSCM practices,

rotating the components as expected, and verifies the questionnaire's original dimensional groups (for further information, see Appendix B). The initial component had 15 variables with factor loadings ranging from 0.571 to 0.770. The second component was composed of three measurement items with factor loadings of 0.891, 0.921 and 0.928.

The qualitative findings discussed in Chapter 6 categorised the SFSCM practices into three dimensions which are economic, environmental and social sustainability practices. On the contrary, the total variance explained (quantitative PCA results) extracted two principal components (1 and 2) with eigenvalues greater than one which explains a different grouping criteria.

The categorisation of SFSCM practices into two dimensions as revealed by PCA eigenvalues greater than one is in line with Jum, Zimon and Ikram (2021) who classified SSCM practices as environmental and financial performance. Davis, Downs, and Gephart (2021) further explained that as long as environmental and financial performance sustainability practices are fully met, then the social sustainability practice automatically falls into the right place.

The rotated component matrix results in this study indicate two significant dimensional groups in line with eigenvalues which also extracted two principal components greater than one (component 1 and 2 in Table 7.5). However, the two-dimensional groups revealed by rotated component matrix are not in line with this study's qualitative findings presented in Chapter 6. The PCA results are also not in line with Jum et al. (2021) who classified the practices as either environmental or financial performance. Given that there is mix of items (environmental, economic/financial performance and even social sustainability practices) loading under principal component 1, the quantitative result in this study further does not have a defined way of categorising the SFSCM practices categories but randomly considers the practices to be either primary (principal component 1) or secondary (principal component 2). This lack of a defined way in categorising practices is similar with Lu et al.'s (2018) study, which grouped practices at random to satisfy study objectives aligned to help understand social network practices required to maximise SSCM adoption. The next subsection looks at key SDCs in the food industry.

7.3.3 Key SDCs in the food industry PCA results

This study further sought to identify the key SDCs in the food industry. A PCA was conducted to acquire eigenvalues greater than one and reveal the principal components. Further, a rotated component matrix was also conducted to extract key SDCs that are correlated. Total variance explained was performed through Kaiser's criterion for normalisation and eigenvalues for key SDCs in the food industry and the scores which were extracted are presented in Table 7.6.

Table 7.6: SDCs of in the food industry

SDCs of in the food industry total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.993	49.976	49.976	14.993	49.976	49.976	6.813	22.710	22.710
2	2.484	8.280	58.256	2.484	8.280	58.256	6.191	20.638	43.348
3	1.803	6.010	64.266	1.803	6.010	64.266	4.138	13.793	57.141
4	1.149	3.829	68.095	1.149	3.829	68.095	3.286	10.954	68.095
5	0.885	2.950	71.045						
6	0.765	2.549	73.594						
7	0.693	2.311	75.904						
8	0.632	2.108	78.012						
9	0.582	1.939	79.952						
10	0.554	1.847	81.799						
11	0.511	1.704	83.503						
12	0.490	1.634	85.137						
13	0.477	1.591	86.728						
14	0.416	1.385	88.113						
15	0.399	1.331	89.444						
16	0.373	1.245	90.689						
17	0.343	1.143	91.832						
18	0.323	1.078	92.910						
19	0.302	1.006	93.916						
20	0.284	0.946	94.862						

SDCs of in the food industry total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
21	0.258	0.861	95.722						
22	0.242	0.805	96.528						
23	0.222	0.741	97.268						
24	0.179	0.597	97.865						
25	0.154	0.513	98.378						
26	0.144	0.480	98.858						
27	0.122	0.405	99.264						
28	0.090	0.301	99.565						
29	0.071	0.238	99.803						
30	0.059	0.197	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

Based on the results presented in Table 7.6 four components (components 1, 2, 3, and 4) have initial eigenvalues greater than one. The first component (1) carries an eigenvalue of 14.993 and is responsible for 50% of the variance in the SDCs. Component two (2) with an eigenvalue of 2.484, accounts for 8.3% of variance in the data set. Components three (3) and four (4), with eigenvalues of 1.803 and 1.149, respectively, together account for 9.8% of the total variance.

Table 7.7: Rotated component matrix for SDCs in the food industry

SDCs in the food industry rotated component matrix[a]				
	Component			
	1	2	3	4
FA1	0.609			
FA2	0.713			
FA3	0.716			
FA4	0.618			
FA5	0.461			
FA6	0.737			
FA7				0.512
FA8	0.591			
FB1				0.807
FB2	0.671			
FB3	0.740			
FB4	0.813			
FB5	0.640			
FB6	0.641			
FB7			0.586	
FC1			0.864	
FC2			0.791	
FC3			0.795	
FC4			0.809	
FC5		0.676		
FC6		0.443		
FC7		0.870		
FD1		0.800		
FD2		0.718		
FD3		0.742		
FD4				0.833

SDCs in the food industry rotated component matrix[a]				
	Component			
	1	2	3	4
FE1		0.776		
FE2		0.753		
FE3		0.806		
FE4				0.483
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.				
a. Rotation converged in 6 iterations.				

Source: Research results (2022).

As seen in Table 7.7, the varimax rotation converged after three iterations and retrieved four significant components of the SDCs in the food sector. The first component has 12 measurement items having factor loadings spanning between 0.461 to 0.813. FA5 is loaded with a value less than the 0.500 standard. A loading is judged significant (over a specific threshold) when the sample size required for significance is greater than a particular value. A factor loading of 0.35 is required for significance when the sample size is between 250 and 350 (Hair, Black, Babin & Anderson, 2009; Le & Cheong, 2010). This explains why a factor loading of 0.461 is considered significant and appropriate for a sample size of 292 as per the current study. The second component has nine measurement items having factor loadings spanning between 0.443 to 0.870. Five measurement items with factor loadings varying between 0.586 to 0.864 constitute the third component. The fourth component has four measurement items with factor loadings of between 0.483 and 0.833.

The qualitative findings categorised key SDCs into three dimensions which are sensing, seizing and reconfiguration capabilities. On the other hand, both total variance explained based on eigenvalues greater than one (components 1, 2, 3, and 4) and rotated matrix from the PCA results revealed four components/dimensions of classifying key SDCs. These four groups are consistent with a study done by Vargas and Mantilla (2014) which highlighted that key SSCM dynamic capabilities are grouped as interpretation, integration, monitoring and communication capabilities. The next subsection looks at challenges faced by stakeholders on implementing SFSCM.

7.3.4 Challenges faced by stakeholders in implementing SFSCM PCA results

This study further sought to identify the SFSCM challenges faced by stakeholders in the food industry. A PCA was conducted to acquire eigenvalues greater than one and reveal the principal components. Further, a rotated component matrix was also conducted to extract SFSCM challenges faced by stakeholders in the food industry that are correlated. Total variance explained was performed through Kaiser's criterion for normalisation and eigenvalues for challenges faced by stakeholders on implementing SFSCM that are correlated, and the scores which were extracted are presented in Table 7.8.

Table 7.8: Challenges affecting stakeholders in implementing SFSCM

Challenges affecting stakeholders in implementing sustainable food supply chain management total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.762	51.541	51.541	8.762	51.541	51.541	6.092	35.835	35.835
2	1.763	10.371	61.912	1.763	10.371	61.912	3.088	18.164	53.999
3	1.139	6.699	68.611	1.139	6.699	68.611	2.484	14.612	68.611
4	0.825	4.855	73.466						
5	0.642	3.779	77.245						
6	0.602	3.543	80.788						
7	0.542	3.191	83.978						
8	0.463	2.721	86.699						
9	0.412	2.421	89.121						
10	0.386	2.269	91.390						
11	0.375	2.203	93.593						
12	0.316	1.858	95.451						
13	0.253	1.486	96.937						
14	0.185	1.087	98.023						
15	0.174	1.025	99.048						
16	0.123	0.724	99.772						
17	0.039	0.228	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

The eigenvalues estimated in the SPSS software package are shown in Table 7.8, and demonstrate that three components (1, 2, and 3) have eigen scores bigger than one. Component 1, which has an initial eigenvalue of 8.762, explains 51.54% of the variation in the data set related to the challenges faced by stakeholders while adopting SFSCM. Component 2, with an eigenvalue of 1.763, accounts for 10.37% of the variation in the data set. With an eigenvalue of 1.139, the third component accounts for 6.7% of the issues faced by stakeholders while adopting SFSCM. The following Table 7.9 lists the approaches to overcome challenges that stakeholders face while adopting SFSCM.

Table 7.9: Challenges affecting stakeholders in implementing sustainable food supply chain management

Challenges affecting stakeholders in implementing sustainable food supply chain management rotated component matrix[a]			
	Component		
	1	2	3
D1	0.869		
D2	0.693		
D3	0.732		
D4	0.623		
D5	0.738		
D6			0.850
D7	0.696		
D8	0.597		
D9	0.861		
D10	0.643		
D11	0.663		
D12	0.753		
D13		0.861	
D14		0.760	
D15		0.755	
D16		0.671	
D17			0.751
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.			
a. Rotation converged in 6 iterations.			

Source: Research results (2022).

The varimax rotation findings for the key dimensions are presented in Table 7.9 together with the measured variables that load strongly to these dimensions with the challenges affecting stakeholders in implementing SFSCM. Eleven measurement items has factor loadings ranging from 0.597 to 0.869 in the first component. The second component consists of four items of measurement with factor loadings ranging from 0.671 to 0.861. The third component consists of two measurement items with 0.751 and 0.850 factor loadings. Table 7.10 shows the rotated component matrix for approaches to reduce challenges affecting stakeholders in implementing SFSCM.

The qualitative findings presented in Chapter 6 identified a number of challenges faced by stakeholders on implementing SFSCM and these were broadly classified as organisational and macro-environmental challenges. On the contrary, the PCA quantitative results extracted three principal components (1, 2 and 3) with eigenvalues greater than one. However, given that there is a mix of items (both organisational and macro-environmental challenges) loading under principal component 1, the quantitative result in this study further categorises the challenges into three groups, namely resources and commitment, trust and governance and alignment challenges. The items that load under principal component 1 represent resources and commitment challenges (e.g. lack of top-level commitment, technology, finance, lack of stakeholder commitment and lack of knowledge). Items loading under component 2 (e.g. lack of stakeholder mutual trust, poor governance and poor information management) are classified under trust and governance category. Two items loading with component 3 (lack of knowledge and collaboration challenges) are classified under alignment challenges. Such categorisation of SFSCM challenges is closely related to a study conducted by Jell-Ojobor and Raha (2022) that grouped SSCM challenges as resources challenges, trust and governance, and supply chain alignment challenges. The next subsection looks at approaches to reduce challenges affecting stakeholders in implementing SFSCM.

7.3.4.1 Approaches to reduce challenges affecting stakeholders in implementing SFSCM

After identifying the challenges faced by stakeholders in implementing SCFSCM if was found necessary to identify approaches to address the challenges so that the primary objective of the research would be met. The current sub-objective sought to establish approaches to reduce challenges affecting stakeholders in implementing SFSCM.

PCA was employed to extract principal components through identification of eigenvalues greater than one. Further, a rotated component matrix was also conducted to extract approaches which are correlated. The Kaiser's criterion for normalisation was employed to extract eigenvalues for approaches to reduce challenges affecting stakeholders in implementing SFSCM and the scores are presented in Table 7.10.

Table 7.10: Approaches to reduce challenges affecting stakeholders in implementing SFSCM

Approaches to reduce challenges affecting stakeholders in implementing SFSCM total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.348	48.615	48.615	5.348	48.615	48.615	4.612	41.927	41.927
2	1.122	10.196	58.811	1.122	10.196	58.811	1.857	16.884	58.811
3	0.857	7.794	66.605						
4	0.816	7.415	74.020						
5	0.592	5.379	79.399						
6	0.545	4.953	84.352						
7	0.459	4.169	88.521						
8	0.430	3.910	92.431						
9	0.325	2.959	95.390						
10	0.295	2.681	98.071						
11	0.212	1.929	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

As seen in Table 7.10, two components (1 and 2) have preliminary eigenvalues greater than one, which is the minimum and tolerable number. Component 1, with an initial eigenvalue of 5.348, accounts for 48.62% of the variance in the ways to reduce problems faced by stakeholders when adopting SFSCM. Component 2 has an eigenvalue of 1.122 and contributes to 10.21% of the variation in the data set. The SDCs are discussed below.

Table 7.11: Approaches to reduce challenges affecting stakeholders in implementing SFSCM

Approaches to reduce challenges affecting stakeholders in implementing SFSCM rotated component matrix[a]		
	Component	
	1	2
E1	0.689	
E2	0.554	
E3	0.795	
E4	0.761	
E5	0.750	
E6		0.941
E7	0.656	
E8	0.765	
E9		0.711
E10	0.670	
E11	0.578	
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Source: Research results (2022).

As seen in Table 7.11, a varimax rotation converges after three iterations retrieved two essential dimensions of approaches to reduce challenges affecting stakeholders in implementing SFSCM. The first component consists of nine measurement items with factor loadings ranging from 0.554 to 0.795. The second component consists of two items of assessment with factor loadings of 0.711 to 0.941.

This study's qualitative data findings discussed in Chapter 6 revealed a number of approaches that are necessary to address the challenges faced by stakeholders in implementation of SFSCM. The findings were mainly aligned to organisational and non-organisational approaches. Similar to the qualitative findings, the quantitative PCA results extracted two principal components (1 and 2) with eigenvalues greater

than one. However, given that there is mix of items (both organisational and non-organisational approaches) loading under principal component 1, the quantitative PCA results in this study further group the approaches into stakeholder engagement and development, as well as finance and environment approaches. The items that load under principal component 1 (e.g. stakeholder communications plan, employee training, collaborations with renowned organisations, lobbying government and promoting information sharing with stakeholders) are classified under stakeholder engagement approaches. The two items (budget provision and organisational environment) that load under principal component 2 are classified as finance and environment approaches. Such classification of approaches to reduce challenges affecting stakeholders in implementing SFSCM corroborate Mogale et al.'s (2020) study which also grouped approaches to reduce sustainability implementation into stakeholder engagement and, finance and environment approaches. The next subsection looks at SFSCM performance.

7.3.5 SFSCM performance

The theoretical objective sought to evaluate SFSCM performance of stakeholders in the food industry. PCA was conducted to acquire eigenvalues greater than one and reveal the principal components. Further, a rotated component matrix was also conducted to extract SFSCM performance dimensions that are correlated. Total variance explained was performed through Kaiser's criterion for normalisation and eigenvalues for SFSCM performance that are correlated, and the scores are presented in Tables 7.12.

Table 7.12: SFSCM performance of stakeholders in the food industry

Sustainable food supply chain performance of stakeholders in the food industry total variance explained									
Component	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.007	50.058	50.058	6.007	50.058	50.058	4.335	36.127	36.127
2	1.054	8.784	58.841	1.054	8.784	58.841	2.726	22.714	58.841
3	0.754	6.282	65.124						
4	0.653	5.446	70.569						
5	0.641	5.341	75.910						
6	0.583	4.855	80.765						
7	0.556	4.631	85.396						
8	0.499	4.154	89.550						
9	0.451	3.760	93.311						
10	0.394	3.282	96.593						
11	0.344	2.866	99.458						
12	0.065	0.542	100.000						
Extraction method: Principal component analysis.									

Source: Research results (2022).

As seen in Table 7.12 above, two components have initial eigen scores larger than one. Component 1 has an eigenvalue of 6.007 and accounts for 50.06% of the variance in stakeholders' sustainable food supply chain performance in the food industry data set. Component 2 accounts for 8.78% of the variance with an eigenvalue of 1.054. These two components were rotated using the varimax method, and the results are presented in Table 7.13.

Table 7.13: Rotated component matrix for SFSCM performance of stakeholders in the food industry

SFSCM performance of stakeholders in the food industry rotated component matrix[a]		
	Component	
	1	2
G1		0.923
G2	0.727	
G3		0.933
G4	0.644	
G5	0.672	
G6	0.653	
G7	0.519	
G8	0.665	
G9	0.725	
G10		0.474
G11	0.691	
G12	0.681	
Extraction method: Principal component analysis. Rotation method: Varimax with Kaiser normalisation.		
a. Rotation converged in 3 iterations.		

Source: Research results (2022).

As indicated in Table 7.15, after three iterations a varimax rotation converged and retrieved two significant measures of SFSCM performance for stakeholders in the food industry. The first component has nine measurement items with factor loadings ranging from 0.519 to 0.727. The second component is composed of three measurement items with factor loadings of 0.474 to 0.933.

The qualitative results presented in Chapter 6 only revealed the relationships between SFSCM performance and other variables (SFSCM practices and SFSCM

performance; SFSCM drivers and SFSCM performance; SDCs and SFSCM performance). The quantitative PCA results established two dimensions of SFSCM performance though eigenvalues greater than one and two dimensions were also extracted from the rotated matrix. A point of convergence was reached as both qualitative findings and quantitative results revealed positive relationships between SFSCM practices and SFSCM performance; SFSCM drivers and SFSCM performance; SDCs and SFSCM performance. Such convergence indicates that although qualitative findings did not show specific SFSCM performance variables, there is still a notable alignment between the two data collection approaches used in this study as both approaches revealed similar relationships between SFSCM performance and other variables within the current study (as shown in subsections 6.3.8, 6.3.9, and 7.7.2). The next subsection looks at assessment of measurement accuracy (i.e. the tests for reliability and validity).

7.4 ASSESSMENT OF MEASUREMENT ACCURACY

The measurement accuracy evaluation involves testing of the measurement items' reliability and validity. These tests were especially important for this study since the initial six variables under study were adopted and adjusted to match the needs of the current study setting. The next section discusses reliability and validity tests conducted in this study.

7.4.1 Reliability tests

The term "reliability" refers to the degree to which an independent but comparable evaluation of a latent variable using similar items yields identical results across time intervals, groups of individuals, or instruments (Bashir & Marudhar, 2018). There are a variety of methodologies and tests available for determining the reliability of metrics. The split-half reliability coefficient, Cronbach's alpha, and item-total correlations are a few examples (Bashir & Marudhar, 2018). To assess measurement reliability, the current study used item-total correlation values and Cronbach's coefficient alpha.

7.4.1.1 Cronbach's coefficient alpha

Cronbach's coefficient alpha, commonly referred to as coefficient alpha, is a measure of internal consistency that is accustomed to determining the degree to which a collection of measurement items measure the same latent variable (Rose & Johnson, 2020). Cronbach's coefficient is a popular internal consistency measure for

determining the average reliability component for all feasible ways of dividing a collection of items in half (Bashir & Marudhar, 2018). Furthermore, Rose and Johnson (2020) argued that Cronbach's alpha is a more adaptable approach for instruments that include measurement items with more than three questions. Typical examples are the four-question essay assessment and Likert type problems. Since the current study also used Likert scale questions, a Cronbach's coefficient was deemed a suitable measure of variables' internal consistency.

Cronbach's alpha coefficients vary from 0.00 and 1.00 and indicate the degree to which the measurement items are internally homogeneous. On the contrary, a 0.00 value implies that the objects for measurement employed to measure a specific latent variable completely lack uniformity. In contrast, a score of 1.00 indicates that the measurement items for the latent variable are completely homogeneous. In some sense the nearer the figure is to one, the more reliable it is. When the figure is smaller, there may be little uniformity between the measurement items as a result of the measurement items being insufficiently numerous. It is critical to note, however, that guidelines have not yet been established for determining consistency considering reliability coefficients and the fact that it is mostly determined by the research goal (Black et al., 2019). The reliability technique in SPSS (version 27) was used to calculate the coefficient values for the study's six latent variables.

In this study, the internal reliability of all latent variable was assessed and determined using the standardised Cronbach's coefficient alpha. Cronbach's coefficient alpha values greater than or equal to one imply a better level of measuring item reliability. Additionally, the current study employed the greater item-total correlations to demonstrate statistical agreement between the tested items in addition to the Cronbach's coefficient alpha. The results of the reliability tests are presented in Table 7.14.

Table 7.14: Reliability tests results

Research constructs		Descriptive		Cronbach's test		Composite reliability	AVE	Factor loading
		Mean	Std Deviation	Item Total				
SFSCM drivers	B1	3.541	1.082	0.959	0.968	0.98	0.78	0.974
	B2			0.894				0.920
	B3			0.828				0.864
	B4			0.923				0.943
	B5			0.780				0.823
	B6			0.904				0.926
	B7			0.902				0.928
	B8			0.924				0.945
	B9			0.856				0.889
	B10			0.687				0.714
	B11			0.614				0.744
SFSCM practices	C1	3.625	1.018	0.554	0.942	0.95	0.52	0.599
	C2			0.667				0.709
	C3			0.718				0.755
	C4			0.713				0.750
	C5			0.666				0.708
	C6			0.614				0.658
	C7			0.700				0.743
	C8			0.615				0.661
	C9			0.633				0.676
	C10			0.610				0.654
	C11			0.697				0.739
	C12			0.723				0.760
	C13			0.693				0.735
	C14			0.747				0.785
	C15			0.752				0.790
	C16			0.620				0.665
	C17			0.653				0.698
	C18			0.677				0.720
Challenges affecting stakeholders in	D1	4.021	0.892	0.884	0.939	0.95	0.55	0.908
	D2			0.746				0.788
	D3			0.629				0.677
	D4			0.656				0.704

implementing SFSCM	D5			0.765				0.806
	D6			0.545				0.601
	D7			0.709				0.752
	D8			0.714				0.759
	D9			0.854				0.879
	D10			0.569				0.617
	D11			0.571				0.623
	D12			0.816				0.845
	D13			0.665				0.699
	D14			0.508				0.599
	D15			0.482				0.605
	D16			0.438				0.486
	D17			0.769				0.804
Approaches to reduce challenges affecting stakeholders in implementing SFSCM	E1	4.100	0.891	0.607	0.889	0.92	0.52	0.691
	E2			0.523				0.606
	E3			0.687				0.766
	E4			0.638				0.726
	E5			0.790				0.851
	E6			0.342				0.849
	E7			0.589				0.676
	E8			0.698				0.778
	E9			0.712				0.758
	E10			0.561				0.647
	E11			0.584				0.666
SDCs in the food industry	FA1	3.643	0.995	0.751	0.964	0.97	0.50	0.775
	FA2			0.802				0.824
	FA3			0.716				0.745
	FA4			0.811				0.831
	FA5			0.577				0.604
	FA6			0.573				0.605
	FA7			0.635				0.664
	FA8			0.649				0.677
	FB1			0.678				0.701
	FB2			0.660				0.689
	FB3			0.692				0.721
	FB4			0.781				0.802
	FB5			0.757				0.780
	FB6			0.751				0.776

	FB7			0.781				0.801
	FC1			0.732				0.748
	FC2			0.649				0.673
	FC3			0.506				0.560
	FC4			0.561				0.587
	FC5			0.632				0.658
	FC6			0.749				0.771
	FC7			0.769				0.789
	FD1			0.673				0.698
	FD2			0.612				0.641
	FD3			0.649				0.676
	FD4			0.601				0.627
	FE1			0.618				0.646
	FE2			0.656				0.684
	FE3			0.719				0.741
	FE4			0.595				0.622
SFSCM performance of stakeholders in the food industry	SFSCP1	3.638	1.072	0.700	0.908	0.92	0.50	0.764
	SFSCP2			0.604				0.674
	SFSCP3			0.667				0.736
	SFSCP4			0.633				0.700
	SFSCP5			0.575				0.645
	SFSCP6			0.637				0.702
	SFSCP7			0.592				0.661
	SFSCP8			0.618				0.686
	SFSCP9			0.661				0.727
	SFSCP10			0.572				0.642
	SFSCP11			0.687				0.753
	SFSCP12			0.724				0.784

Source: Research results (2022).

As seen in Table 7.14 the item-to-total ratios for SFSCM drivers vary between 0.614 and 0.959; for implementation of SFSCM practices within food industries, they ranged from 0.554 to 0.752. The item-to-total ratios for SFSCM challenges ranged from 0.438 to 0.884; while for approaches to reducing challenges affecting stakeholders when implementing sustainable food supply chain management, they ranged from 0.342 to 0.790. Further, the item-to-total ratios for SDCs ranged from 0.506 to 0.802. Lastly, item-to-total ratios for SFSCM performance of stakeholders were between 0.572 and

0.724. The item-to-total ratios for all measurement items representing the six latent variables were greater than the permissible threshold value of 0.3, and as such were deemed acceptable (Sürücü & Maslakci, 2020).

Additionally, Table 7.14 depicts that the Cronbach's alpha values for all six research latent variables ranged from 0.889 to 0.968. As a result, the Cronbach's alpha coefficients for all research parameters of the study exceeded the permissible threshold value of 0.7. Ultimately, the measuring variables employed in the current research were extremely reliable, since all item-to-total ratios were more than the required value of three while all Cronbach's alpha values were so close to one (Black et al., 2019). Apart from Cronbach's alpha, the study also assessed composite reliability as a measure of scale item internal consistency. Table 7.14 revealed composite reliability ranging between 0.92 to 0.98, exceeding the threshold of 0.7 (Kumar et al., 2021) signifying that internal consistency was achieved.

7.4.1.2 Construct validity

The phrase "structural validity" relates to the extent to which a measuring item is reliable when used to quantify a latent variable (Bashir & Marudhar, 2018). Rose and Johnson (2020) defined it as an accuracy metric that assesses the degree to which a conception, idea, or behaviour is modified or turned into a functional along with operational reality. Convergent and discriminant validity are two methods for determining the validity of a construct. Convergent validity is discussed in the next section.

- **Convergent validity**

Convergent validity relates to the degree to which the measuring items reflect the latent variable's homogeneity (Black et al., 2019). It demands a strong correlation between a measurement item and the other identical items that are used to test the same latent variable. For instance, this study's convergent validity anticipates a strong correlation between measurement items within the same latent variable (such as B1, B2, and B3) and the other measurement items that assess SFSCM drivers. In comparison, it is assumed that these criterion items pertaining to SFSCM drivers will have a low correlation with those pertaining to the SFSCM practices within the food industry, the challenges faced by stakeholders on implementing SFSCM, the approaches taken to mitigate the challenges faced by stakeholders when

implementing SFSCM, and SDCs in the food industry. Convergent validity was ascertained by checking if individual measurement items' factor loadings surpassed the suggested threshold value of 0.5 (Bashir & Marudhar, 2018).

Table 7.14 reveals that 11 measurement items for SSCM drivers (B1 to B11) had factor loadings that were larger than the permissible level of 0.5 and ranging between 0.714 and 0.974. Additionally, Table 7.14 includes 18 measurement items (C1 to C18) for SFSCM practices implementation (C1 to C18) with factor loadings larger than 0.5. Factor loadings varied from 0.599 to 0.790 for this variable. Table 7.14 also identifies 17 (D1 to D17) challenges faced by stakeholders on implementing SFSCM with factor loadings greater than 0.5 and ranging between 0.599 and 0.908. One item (D16) accounted for less than 0.50 loading, challenges faced by stakeholders on implementing SFSCM and was thus omitted from further statistical analysis. Table 7.14 summarises 11 items for approaches to reduce challenges affecting stakeholders in implementing SFSCM (E1–E11), with all factor loadings more than 0.5 and ranging from 0.606 to 0.851. Additionally, Table 7.14 identifies 30 (FA1-8, FB1-4, FC1-7, FD1-4, and FE1-4) items representing the SDCs with all factor loadings exceeding 0.5 and ranging from 0.560 to 0.824. Lastly, Table 7.14 shows 12 (G1 to G12) items for SFSCM performance, all with factor loadings above 0.5, ranging from 0.642 to 0.784. The observation that all six latent variables had factor loadings greater than 0.5 demonstrates that convergent validity was achieved in this study. The following section examines discriminant validity.

- **Discriminant validity**

Knezevic et al. (2020) defined discriminant validity as a method used to determine construct validity and it focuses on the extent of uniqueness between various indicators. To assess discriminant validity, this study used AVE values smaller than one. Discriminant validity demands that the pair-wise correlation values of the study variables be less than one when they are unrelated (1.0). According to previous research (Bashir & Marudhar, 2018; Dixon & Johnston, 2019), a correlation value between variables of less than 0.7 is sufficient to establish discriminant validity. As previously stated, AVE values less than one imply the presence of discriminant validity. All of the above-mentioned methods were used to assess the discriminant validity of the constructs in this study. AVE values in Table 7.16 indicate scores

between 0.45 and 0.51 and are significantly less than 1, thus confirming the presence of discriminant validity. Additionally, as seen in Table 7.16 the highest values of shared variance for all variables ranged between 0.32 and 0.40. All these values are smaller than the AVE scores varying from 0.45 to 0.51 in relation to their associated latent variables, indicating that the measurements for each of the six variables were truly unique and diverse (Fornell & Larcker, 1992). The next section discusses the measurement model's overall fit using CFA.

7.5 MODEL ACCEPTABILITY USING CONFIRMATORY FACTOR ANALYSIS

As previously stated in Chapter 5, CFA is a technique for confirming that existing measurement items load onto latent variables (Widodo, 2020). CFA performed in AMOS version 26 was used to determine the consistency and precision of the measuring items. To ensure an appropriate model fit and to check the validity and consistency of the measurement items, measurement items (B3 and 10; FC1–FC7, FD1 and FD2, FE1–FE4) were removed from CFA testing due to their factor loadings being less than the required threshold of 0.5.

Numerous model fit recommendations were created to aid in the comprehension of CFA and SEM assumptions used in the construction of diverse and complex models. According to Brown (2015), there is no single statistical test of significance for CFA and SEM fit indices that indicates a proper model for the supplied sample data. Thus, as recommended by Hamim Ashraf et al. (2020), 11 standards for model fit were used to assess the model's overall fit, beginning with the use of the chi-square index. The next sections addresses the remaining ten model fit indices utilised in this study.

Table 7.15 contains recommendations for determining the appropriateness of CFA model fits. As shown in Table 7.15, to provide an effective model fit, the chi-square to degrees of freedom (2/df) has to be between 1 and 3. Additionally, the comparative fit index (CFI), the incremental fit index (IFI), the Tucker-Lewis index (TLI), and the goodness of fit index (GFI) are all equal to or exceed 0.90.The root mean square error of approximation (RMSEA) should be equivalent to or less than 0.08, and the root mean square residual (RMR) should be smaller than 0.08 (for further information, see Table 7.15.

Table 7.15: Model fit indices

Goodness of Fit Criterion	**Acceptable Level**	**Level Interpretation**
Chi-square (^{2})	Low ^{2} value (relative to degrees of freedom) with significance level < .05	Value greater than .05 reflects acceptable fit. Values between 0.05 and 0.20 indicate a good fit. Non-significant & small values show good fit. Significant and large values show poor fit
Chi-square/df or CMIN	Ratio 2:1 or 3:1	Values close to 1 reflect good model fit, values < 3 reflect acceptable fit
Goodness of Fit Index (GFI)	.90 or higher	Values > .90 reflect good fit Shows the number of variances explained by model. It is the equivalent of R2 in multiple regressions
GFI (AGFI)	.90 or higher	Adjusted for the degrees of freedom Values > .90 reflect a good fit. Adjusts model fit for the degrees of freedom relative to the number of variables
Root Mean Square Residuals (RMSR) or RMS or RMR	.08 or lower	Values close to 0 reflect good fit, Marginal acceptance level is 0.08. Reflects the average amount of variances and covariances not accounted for by the model
Model Comparison and Relative fit measures		

Tucker- Lewis Index (TLI) or Bentler-Bonett Non-Normed Fit Index (BBNNFI)	Value close to 1	Values >.90 reflect a good fit, Compares an absolute null model with the theoretical model of interest, penalizes for model complexity
Normed Fit Index (NFI) or Bentler-Bonett Normed Fit Index (BBNFI) or DELTA 1	Value close to 1	Values below .90 indicate the need to respecify model
Incremental Fit Index (IFI) or BL89 or DELTA	.90 or higher	Values = or > .90 reflect a good fit
Relative Fit Index (RFI) or RH01	Values close to 1	Values > .90 reflect a good fit
Model Parsimony and Parsimonious fit measures		
Parsimony Ratio (PRATIO)	.90 or higher	Shows the extent to which good fit can be achieved by freeing constrained parameters
Parsimonious Fit Index (PCLOSE)	.90 or higher	Values close to 0 indicate no fit and values close to 1 indicate perfect fit; values > .90 reflect a good fit
Root Mean Square Error of Approximation (RMSEA) (measure of misfit), or RMS, RMSE, discrepancy per	< .08	Values < .05 reflect a good fit. Values between .05 and .08 reflect reasonable fit. Estimates how well the fitted model approximates the population covariance matrix.

Source: Jin, Vegelius and Yang-Wallentin (2020)

The next sections discusses the CFA results for the 11 model fit indices that were chosen (see Table 7.16).

Table 7.16: Measurement model fit indices

Fit index	Results
Chi-square/ d. f.	1.983
RMR (root mean square residual)	0.044
CFI (comparative fit index)	0.930
RMSEA (root mean square error of approximation)	0.058
NFI (normal fit index)	0.869
TLI (Tucker Lewis index)	0.925
IFI (incremental fit index)	0.930
RFI (relative fit index)	0.859
PRATIO (parsimony ratio)	0.933
PCFI (parsimonious comparative fit index)	0.868
GFI (goodness of fit index)	0.808

Source: Research results (2022).

Table 7.16 illustrates that the measurement model produced a chi-square value to the degree of freedom ratio of 1.983. The optimum range for the threshold is between 1 and 3. Additionally, Table 7.16 includes CFI, TLI, IFI, and PRATIO values (0.930, 0.925, 0.930, and 0.933, respectively) that are greater than or equal to the recommended threshold of 0.9. The NFI, RFI, PCFI, and GFI values of 0.869, 0.859, 0.868, and 0.812, respectively, are somewhat less than 0.90 but still adequate for model fit, as shown in Table 7.16 (Forza & Filippini, 1998; Greenspoon & Saklofske, 1998; Jin et al., 2020).

Additionally, Table 7.16 gives an RMR value of 0.044, which is less than 0.08 and so indicates a fair model fit. Additionally, the table indicates that the RMSEA value is 0.058, which is within the recommended range of 0.05 to 0.08 and hence indicates a satisfactory match. According to the model fit acceptance criteria shown in Table 7.15 and the specific CFA model fit results in Table 7.16, all 11 identified model fit indices reveal that the measurement model has an adequate degree of fitness for the provided sample data. The following section discusses the structural model results, beginning with its fit to the tested hypotheses using the SEM method.

7.6 SEM CONCEPTUAL MODEL FIT ASSESSMENTS

This section discusses the SEM model fit evaluations in depth and begins by creating an appropriate model fit using specified model fit indices (see Table 7.18 CFA model fit), which are detailed in full below. The next section discusses the chi-square.

7.6.1 Chi-square

The chi-square statistic is a widely used model fit metric in SEM that is used to determine the degree of discrepancy across the observed sample and the adjusted or predicted covariance matrices (Awang, 2012). According to Hamim Ashraf et al. (2020), the purpose of the chi-square is to achieve a modest disagreement between the sample variance-covariance matrix and the replicated inferred covariance matrix at a level of non-statistical significance. A value of zero for the chi-square indicates that there are no inconsistencies between the scores within the covariance matrix and the replicated implied covariance matrix, indicating a perfect model fit (Do & Huang, 2022). In other words, when the residual values in the residual matrix are near to zero, the chi-square result is close to zero or non-significant. This demonstrates that the observed conceptually prescribed model fits the observed facts precisely (Ashraf et al., 2020). The suggested chi-square threshold value is less than three with a smaller p value of under 0.05. To minimise its constraints of occasionally rejecting a fully defined model owing to inherent premise of multivariate normality and significant deviations from normality, the chi-square index should be used in conjunction with alternate model fit indices (Awang, 2012). The next section discusses the root mean square residual (RMR).

7.6.2 Root mean square residual (RMR)

The RMR is defined by Widodo (2020) as the average residual figure between the sample variance and the population variance computed from the data. It is determined quantitatively as the "square root of two times the sum of the averaged squared deviations between both the sample covariances and the predicted covariances (or variances)," multiplied by all the elements in the covariance matrix (Ashraf et al., 2020). The average residuals are represented using a correlation matrix metric utilised in the RMR in an easy-to-understand format. The output value of the matrix is equal to the sum of all standardised residuals between 0 and 1. Thus, when the RMR value approaches 0, the model's fit increases (Bashir & Marudhar, 2018). Ashraf et al. (2020)

propose a criterion in which values near to zero indicate a strong model fit and 0.08 or less indicates a moderately acceptable model fit.

7.6.3 The comparative fit index (CFI)

The CFI, alternatively referred to as the Bentler comparative fit index, is a modified version of the NFI that takes sample size into account. CFI is defined by Middleton (2020) as an incremental model fit index that compares research model fit to a null or baseline model. It assumes that all latent variables are statistically independent (null/baseline model) and compares the sample covariance matrix to the null model (Brown, 2015). CFI compares the null model to the observed covariance matrix to assess the degree of fit loss explained by switching to the study SEM model. It has a quantitative value between 0 and 1, with values closer to 1 being more significant, indicating excellent model fit. A decent model fit, according to Middleton (2020), is defined as a threshold value of 0.9 or more, which implies that the provided model can recreate 90% of the covariation in the data.

7.6.4 Root mean square error of approximation (RMSEA)

RMSEA, as defined by Middleton (2020), is a condensed metric of model misfit that estimates how closely the fitted model matches the population covariance matrix on a per-degree-of-freedom basis. It considers the population's estimate error. The RMSEA is mostly affected by the model's predicted parameter count. According to Perret (2018), the primary advantage of RMSEA in comparison to other indices is the ability to calculate the confidence interval surrounding the result. Over time, the acceptable threshold value for what constitutes a successful model fit has shifted downward. As Nye, Joo, Zhang and Stark (2020) remarked, in the early 1990s, a RMSEA value less than 0.10 was regarded to indicate a strong model fit, but values more than 1.0 suggested model fit that is poor. Brown (2015) also said that a RMSEA value of less than 1.0 indicates a satisfactory model fit. Nevertheless, Middleton (2020) proposed that RMSEA values less than 0.05 and between 0.05 and 0.08 indicate a strong model fit, while values more than 0.08 indicate a poor model fit.

7.6.5 Tucker Lewis index (TLI)

The TLI is often referred to as the non-normed fit index (NNFI) and is based on an index created by Tucker and Lewis in 1973. The NNFI eliminates some of the concerns associated with negative bias, and its values occasionally exceed the 0 to 1 range

(Brown, 2015). According to Awang (2012), both the NFI and NNFI values should be between 0 and 1, with a cut-off of 0.90 suggesting a successful model fit. The TLI is proportional to the average magnitude of the data's correlations. If the average correlation between variables is low, the TLI will also be low.

7.6.6 The incremental fit index (IFI)

The IFI is a comparable model fit index to the NFI, only that it takes degrees of freedom into consideration. Bollen (1990) created this index in order to solve the NFI's shortcomings in terms of parsimony and sample size. IFI's statistical value ranges from 0 to 1, with 1 indicating a perfect fit and 0 indicating no fit at all. Nonetheless, in some situations, the IFI value may surpass one (Hair et al., 2009). The appropriate guideline value for IFI that results in a successful model fit is 0.9 or more (Sideridis & Jaffari, 2021).

7.6.7 The normed fit index (NFI)

NFI, sometimes referred to as the Bentler-Bonnet normed fit index (BBNFI) or Delta 1, is a model fit index constructed in an eccentric manner in comparison to CFI. According to Sideridis and Jaffari (2021), NFI quantifies the model's contribution to total covariance. It quantifies how much in comparison to the null model, the research model enhances model fit (random variables). The statistics values for the NFI vary from 0 to 1, with 1 indicating a perfect fit, while 0.9 or above indicate a good match, and 0 indicates no fit at all. Hu and Bentler (1999) advised that an NFI value of 0.9 or more indicates a satisfactory model fit, but values less than 0.9 indicate the need to revise the research model. According to Forza and Filippini (1998), scores greater than 0.80 continue to indicate a satisfactory match. The next section describes the GFI.

7.6.8 Goodness of fit index (GFI)

GFI, as defined by Jin et al. (2020), quantifies the proportional variation indicated by population covariance estimates. GFI is a measure of the estimated model's resemblance to the observed covariance matrix (Sideridis & Jaffari, 2021). This measure of similarity is determined by examining the covariances and variances explained for by the model. GFI is a measure of the model's ability to account for a portion of observed covariances. It is analogous to R^2 in multiple regression, only that it cannot be taken as the model's proportion of error. This indicates that, while R square is concerned with error variance in multiple regression, GFI is focused on reproducing

the variance-covariance matrix with a certain degree of accuracy. Generally, the value of the GFI statistic ranges between 0 and 1; however, the index might theoretically provide nonsensical negative values in unusual situations (Nye et al., 2020). The index values rise in proportion to the size of the sample and the number of calculated parameters. According to Bollen (1990), a satisfactory model fit is attained when the GFI score is equal to or better than 0.90. Additionally, Forza and Filippini (1998) and Jin et al. (2020) said that any value greater than 0.80 is acceptable for model fit. GFI is overly sensitive, particularly with regard to sample size and the number of parameter estimates, and hence it is not applied in isolation when evaluating model fit. As such, the alternate model fit indices listed above are utilised in conjunction with the GFI. The next section shows SEM model fit results.

7.7 SEM RESULTS BASED ON THE CONCEPTUAL MODEL

Table 7.17: Structural equation model results

FIT INDEX	Results
Chi-square/ d. f.	1.971
RMR (root mean square residual)	0.041
CFI (comparative fit index)	0.932
RMSEA (root mean square error of approximation)	0.058
NFI (normal fit index)	0.871
TLI (Tucker Lewis index)	0.927
IFI (incremental fit index)	0.932
RFI (relative fit index)	0.862
PRATIO (parsimony ratio)	0.935
PCFI (parsimonious comparative fit index)	0.871
GFI (goodness of fit index)	0.808

Source: Research results (2022)

According to Table 7.17, the measurement model produced a chi-square value to the degree of freedom ratio of 1.971 which is within the optimum threshold range of between 1 and 3. Additionally, Table 7.17 indicates CFI, TLI, IFI, and PRATIO values (0.932, 0.927, 0.932, and 0.935, respectively) that are greater than or equal to the suggested threshold of 0.9. NFI, RFI, PCFI, and GFI values of (0.871, 0.862, 0.808) are reported in Table 7.19 which are somewhat less than 0.90 but still adequate for model fit (Jin et al., 2020; Forza & Filippini 1998; Greenspoon & Saklofske, 1998).

Further, Table 7.17 gives an RMR value of 0.041, which is less than 0.08 and indicates a fair model fit. Additionally, the table indicates that the RMSEA value is 0.058, which is within the acceptable range of 0.05 to 0.08 and hence indicates a satisfactory fit as well. According to the model fit acceptance standards in Table 7.15 and the actual CFA model fit results in Table 7.17 above, the 11 selected model fit indices offer a structural model with acceptable overall fitness to the required sample data.

7.7.1 SEM conceptual model

The study at hand hypothesised that SFSCM drivers, SFSCM practices in the food supply chain, and SDCs all have a beneficial effect on the SFSCM performance. SFSCM drivers and SFSCM practices were mediated by of SDCs, which had a substantial effect on SFSCM performance. This section discusses the linear connections proposed to demonstrate the effect of SFSCM drivers and SFSCM practices on SFSCM performance, as seen in Figure 7.6 below.

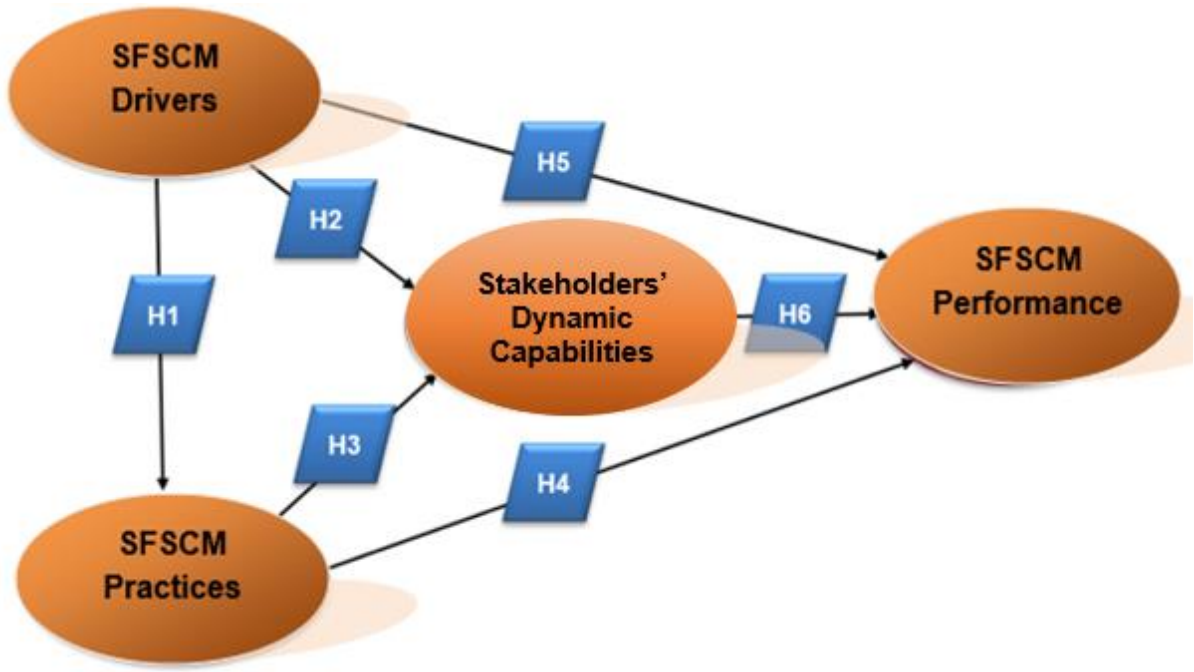

Figure 7.6: Research conceptual model

Source: Author's own compilation

The six proposed linear correlations between the four research latent variables, namely SFSCM drivers, SFSCM practices, SDCs, and SFSCM performance, are depicted in Figure 7.6 above. As previously mentioned, (in Chapter 4, Section 4.2, the conceptual framework for the research), the predictor variables are SFSCM drivers

and SFSCM practices, the mediator variable is the SDCs construct, and the outcome variable is SFSCM performance.

As seen in Figure 7.6, SFSCM drivers have a positive and significant effect on SFSCM practices (H1), as well as on SDCs (H2), SFSCM practices have a positive and significant impact on the SDCs (H3) and SFSCM performance (H4), SFSCM drivers have a positive and significant effect on SFSCM performance (H5). Finally, the figure demonstrates that SDCs have a positive, significant effect on SFSCM performance (H6). The results of the hypotheses tests are depicted in Figure 7.7 and explained in the next section.

7.7.2 The hypotheses testing and results

This section assesses the six hypotheses that were tested and determines their validity or non-validity using the SEM values listed in Tables 7.18, 7.19, 7.20, 7.21, 7.22, 7.23, 7.24, and Figure 7.7 below. After modifying the whole conceptual model, results were produced that supported the remaining assumptions. The following are the hypotheses outcomes:

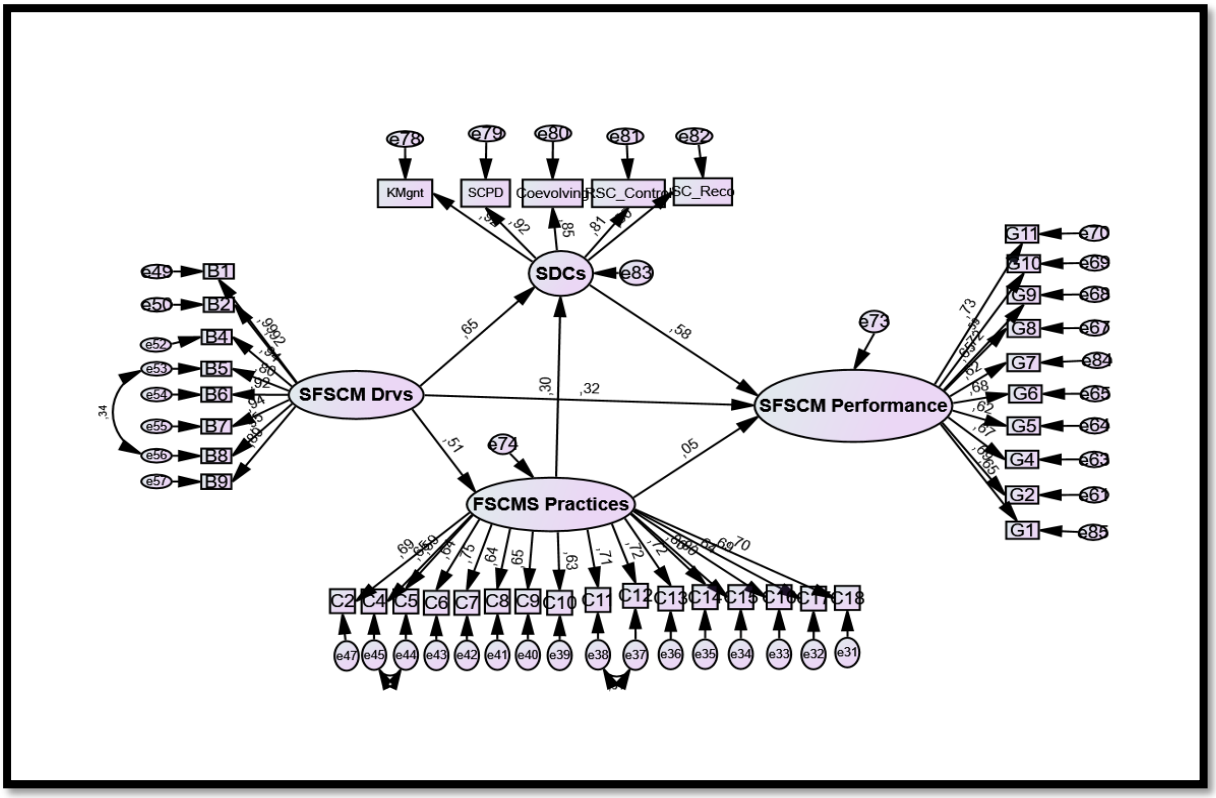

Figure 7.7: SEM model and results

Source: Research results (2022)

H_1: SFSCM drivers have a significant influence on implementing SFSCM practices.

A linear link (positive and significant) was hypothesised between SFSCM drivers and SFSCM practices (H_1). This hypothesis was developed in response to the objective of determining the effect of SFSCM drivers on implementing SFSCM practices. The results are shown in Figure 7.7 and Table 7.18.

Table 7.18: Hypothesis one SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Drivers	→	SFSCM Practices	H_1	0.51	0.058	7.949	C***

Source: Research results (2022)

As seen in Table 7.18, SFSCM drivers have a positive and significant linear association with SFSCM practices. The current study hypothesised that SFSCM drivers have a positive and significant effect on SFSCM practices, and the path analysis results validated this hypothesis. A positive path coefficient (0.51) reinforces the theory that SFSCM drivers have a positive influence on SFSCM practices. Thus, the validation of the positive influence of SFSCM drivers on SFSCM practices means that firms that effectively consider sustainable supply chain drivers are easily able to adopt SFSCM practices within the food supply chain industry. Zimon et al. (2020) reiterated that such firms have a high-level understanding of the triple bottom-line practices and what it takes to abide by them.

It is essential to highlight that the confirmation of any hypothesis under SEM is contingent upon two primary criteria. The initial criteria is concerned with the coefficients of the route (beta). In alternative sense, for a positive influence to be hypothesised, the path coefficient has to be positive and more than 0.5. For a hypothesised negative influence, the path coefficient must be negative and greater than -0.5. (Hair et al., 2006:79). The second one requires (***) p-value less than 0.001, (**)-p-value less than 0.05, and (*)-p-value less than 0.1. These p-values are used in conjunction with critical values (C.R.), most frequently referred to as the t-statistic. A t-value of 2.00 or above is considered as the cut-off for a significant influence or association.

The positive influence of SFSCM drivers on SFSCM practices was found to be statistically significant in this study, with a critical value of 7.949 and a p-value less than 0.001. As such, the moderate and positive path coefficient (0.51) in conjunction with the high levels of significance shown by the t-value and p-value, verifies and validates the initial hypothesis. Notable is the fact that these results confirmed and substantiated H1's claims. The validation and support for H_1 indicate that a significant linear relationship exists between SFSCM drivers and SFSCM practices. As a result, H_1 is valid and confirmed, necessitating the rejection of H01's null hypothesis, which asserts that SFSCM drivers have a negative influence on SFSCM practices.

To reinforce the quantitative results, qualitative findings discussed in Chapter 6 revealed that SFSCM drivers influence SFSCM practices either negatively or positively, implying that the two approaches both acknowledge the existence of a relationship between the variables. The quantitative results in this study showing a positive and significant influence of SFSCM drivers on SFSCM practices corroborate Micheli et al.'s (2020) theoretical argument that, on average, SSCM drivers motivate organisations to adopt sustainable practices, hence advancing enterprises toward sustainability. Such commitment towards sustainability enables organisations to analyse their supply chain partners' commitment to sustainability investments before opting to collaborate them.

H_2: SFSCM drivers have a positive significant influence on SDCs in food supply chain.

The study further claimed a positive significant influence of SFSCM drivers on SDCs (H_2). The SEM path analysis results that validate or fail to validate hypothesis two (H_2) are summarised in Table 7.19 below.

Table 7.19 : Hypothesis two SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Drivers	→	SDCs	H2	0.65	0.045	11.558	C***

Source: Research results (2022)

As indicated in Table 7.19, SFSCM drivers have a relatively strong positive and significant linear association with SDCs (C*** p-value less than 0.001; t-value of

11.558). The current study hypothesised a positive influence of SFSCM drivers on SDCs, which was validated by the results. A positive path coefficient (0.65) supports the premise that SFSCM drivers have a positive influence on SDCs. These results are in line with the qualitative findings discussed in Chapter 6 which also indicated that SFSCM drivers influence SDCs positively.

The H_2 results corroborate those of Raza et al. (2021), who discovered a positive significant relationship between two dynamic capabilities, supply chain risk management (SCRM) and network capability (NC), and SFSCM practices. Their research study results indicated that SSCM drivers have a significant positive influence on SCRM and network capabilities that have the propensity to boost supply chain performance. Additionally, the current study's results corroborate prior research by Kumar et al. (2018) indicating that dynamic capabilities (risk management capabilities and network resources) are key organisational resources. The current study's results contribute to the dynamic capability perspective, which states that when organisations purposefully alter, adjust, and reinstate organisational resources (Baliga et al., 2019), they can achieve a sustainable competitive advantage in an environment characterised by unpredictable and rapid fluctuations in competitiveness (Accorsi & Manzini, 2019).

The results of this investigation corroborated and supported H2, since both the significance level and the positive path coefficient requirements were fulfilled, thereby rejecting the null hypothesis ($H0_2$). Thus, this study strongly confirms and supports the assertion that SFSCM drivers have a positive and significant influence on SDCs (H_2), while rejecting the null hypothesis ($H0_2$), which asserts that SFSCM drivers have a negative influence on SDCs.

H_3: Sustainable food supply chain management practices have a positive significant influence on SDCs.

Additionally, this study hypothesised a positive influence of SFSCM practices on SDCs (H_3), and the SEM path analysis results to validate or fail to validate H_3 are presented in Table 7.20.

Table 7.20: Hypothesis three SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Practices	→	SDCs	H3	0.30	0.042	6.447	C***

Source: Research results (2022)

As is evident in Table 7.20, SFSCM practices have a significant positive linear relationship with SDCs. A weak positive path coefficient (0.30) verifies the positive influence of SFSCM practices on SDCs that was hypothesised in this study. Additionally, Table 7.20 demonstrates that SFSCM practices provide significant SDCs (C*** or p-value less than 0.001 and t-value of 6.447). A positive path coefficient of 0.30 is less than the permissible threshold value of 0.5, indicating that it has a weak influence. Additionally, the positive path coefficient, albeit weak, indicates that SFSCM practices should be complemented by other external elements in order to improve the overall supply chain performance. The weak positive influence of SFSCM practices on SDCs may be explained by the fact that some stakeholders appear to be conservative and would not alter their business practices in response to even a small amount of influence from new practices or an awareness campaign within the food industry. This might be done to avoid the disruptive and detrimental effects associated with shifting from the known to the unknown. These results are congruent with the findings of Chowdhury and Quaddus (2021), who discovered that bigger firms had delayed response times to new and modified practices, making it difficult for them to change their behaviour within a food supply chain system in a fair manner. Additionally, in the food supply chain business, dynamism is impacted not just by SFSCM practices but also by other factors such as the customer requirements (Lin, Hsu, Hsu & Chung, 2020). Chowdhury and Quaddus (2021) remarked that while these customer needs may not constitute SFSCM practices, they would nonetheless affect operational changes within the food supply chain system.

Thus, this study verifies and supports the hypothesis that SFSCM practices have a positive significant influence on SDCs (H_3), while rejecting the null hypothesis $H0_3$, which asserts that SFSCM practices have a negative influence on SDCs.

H_4: SFSCM practices have a positive significant influence on SFSCM performance.

This study also developed a hypothesis to analyse the influence of SFSCM practices on SFSCM performance (H_4). The SEM results that support or refute this hypothesis are presented in Figure 7.7 and in Table 7.21.

Table 7.21 : Hypothesis four SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Practices	→	SFSCM Performance	H4	0.05	0.047	1.078	0.281

Source: Research results (2022)

According to Table 7.21, SFSCM practices have a positive but weak positive and insignificant influence on SFSCM performance. As seen in Figure 7.7 and Table 7.21, the fourth path (H4) results indicate that SFSCM practices have a marginally positive (0.05 path coefficient) and insignificant (0.281ns or p-value larger than 0.1; t-value of 1.078) influence on SFSCM performance. According to popular belief, SFSCM practices should have a significant impact on SFSCM performance (Accorsi, 2018). This study reports a very weak positive and insignificant influence, which means SFSCM practices do not directly and insignificantly influence SFSCM performance. The findings indicate that while supply chain stakeholders may be aware of SFSCM practices, attaining SFSCM performance requires stakeholders to take action to put the principles into practice.

These findings are similar with the qualitative results which confirmed that SFSCM practices have a direct and positive influence on SFSCM performance. Further, these results corroborate those of Sundram et al. (2016), who noted that while some organisations have recognised the value of sustainable supply chain management methods, many in the supply chain have struggled to achieve sustainable supply chain performance. The findings also corroborate a study done by Zhang, Gunasekaran and Wang (2015), which discovered that via supply chain integration, sustainable supply chain practices have a strong indirect influence on sustainable supply chain performance. The current study revealed a weak direct effect of SFSCM practices on SFSCM performance. This might suggest that the majority of food industry suppliers

are encouraged to join in the supplier partnership and relationship management services offered by the main food production or manufacturing enterprises, such as producers of various food products or owners of original food brands. This partnership and involvement method will strengthen supplier integration and supplier-related quality and lead time performance, which will likely result in long-term supply chain performance. The current study's results contradict the hypotheses employed in this study and empirical evidence, indicating a significant influence. Given the insignificance of the critical region, which is less than the recommended threshold of at least 2, this study, using SEM results, fails to validate and support the claims of H_4. As a result, this study invalidates and renders no support for H_4, so the study does not reject $H0_4$, which claims that SFSCM practices have negative insignificant influence on SFSCM performance.

H_5: SFSCM drivers have a positive significant influence on achieving SFSCM performance.

The current study asserted that SFSCM drivers have a positive and significant influence on SFSCM performance. Table 7.22 presents the SEM results to support or refute H_5.

Table 7.22 : Hypothesis five SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Drivers	→	SFSCM Performance	H5	0.32	0.060	4.755	C***

Source: Research results (2022)

As seen in Table 7.22, SFSCM drivers have a positive and significant linear relationship with SFSCM performance. A weak positive path coefficient (0.32) supports the hypothesis that SFSCM drivers have a positive influence on SFSCM performance. Additionally, Table 7.22 demonstrates that SFSCM drivers have a significant influence on SFSCM performance (C*** or p-value less than 0.001 and t-value of 4.755). A positive path coefficient of 0.32 is less than the permissible threshold value of 0.5, indicating that it has a negligible influence. The weak influence of SFSCM drivers on SFSCM performance could be that available SFSCM drivers lack the appropriate steering into performance metrics necessary for SFSCM.

These results are in agreement with this study's qualitative findings discussed in Chapter 6 which confirmed that SFSCM drivers have a direct influence on SFSCM performance. The results also corroborate Micheli et al.'s (2020) assertion that while all sustainable supply chain drivers may be implemented, there is need for sustainability minds across stakeholders to leverage them for sustainable supply chain performance. The current study reveals that the relationship between SFSCM drivers and SFSCM performance is positively weak. This might indicate that only a small number of organisations are truly reacting to the drivers for SFSCM performance improvement. Raza et al. (2021) emphasised that stringent SFSCM drivers such as punishment and organisational sanctioning may result in retaliatory practices from stakeholders, and eventually it may fail to yield much in terms of SFSCM performance as organisations will only comply in the eyes of the sanctioning body. Such weak outcomes may also indicate a lack of stakeholder commitment in the food supply chain business. This study validates and supports the hypothesis that SFSCM drivers have a positive and significant influence on SFSCM performance (H_5); and rejects the null hypothesis ($H0_5$), which claims that SFSCM drivers have negative insignificant influence on achieving SFSCM performance.

H_6: SDCs have a positive significant influence on achieving SFSCM performance.

The current study hypothesised a positive influence of SDCs on SFSCM performance (H_6), and the SEM path analysis results that support or refute H_6 are presented in Table 7.23.

Table 7.23: Hypothesis six SEM results variables

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SDCs	→	SFSCM Performance	H6	0.58	0.091	6.447	C***

Source: Research results (2022)

As shown in Table 7.23, SDCs have a moderately positive and significant linear association with SFSCM performance (C*** p-value less than 0.001; t-value = 6.447). A path coefficient of 0.58 verifies the positive influence that SDCs are hypothesised to have on SFSCM performance. The results of this study corroborated and supported

H_6, since both the significance level and positive path coefficient requirements were met, therefore rejecting the null hypothesis (H06). Thus, this study strongly validates and supports the hypothesis which claims that SDCs have a positive and significant influence on SFSCM performance (H_6) and rejects the null hypothesis ($H0_6$) which states that SDCs have negative insignificant influence on achieving SFSCM performance.

Relatedly, the majority of interviewees (in this study's qualitative segment) acknowledged that SDCs have an influence on achieving SFSCM performance. Further, the study's SEM path analysis results above concur with those of Aslam and Azhar (2018), who discovered that SDCs have a significant direct influence on sustainable supply chain performance in the manufacturing industry. Additionally, this study's results corroborate earlier research by Li and Liu (2014) which established a clear link between SDCs and sustainable supply chain performance.

The current study's results demonstrated that a more comprehensive awareness of the market, including consumers, competitors, supply chain partners, and the environment, enables more informed decision-making about how to leverage on new SDCs that result in SFSCM performance. Li and Liu (2014) expounded on this by stating that enterprises' SDCs enable them to swiftly adjust the quality and quantity of products and services in response to consumer requirements. More so, firms employing SDCs are better equipped to absorb pressures caused by supply-side issues, which results in improved sustainable supply chain performance.

Table 7.24: Summary of SEM hypotheses results

Variables	Path	Variables	Hypothesis	Path coefficient	Standard error	Critical region	P-Value
SFSCM Drivers	→	SFSCM Practices	H1	0.51	0.058	7.949	C***
SFSCM Drivers	→	SDCs	H2	0.65	0.045	11.558	C***
SFSCM Practices	→	SDCs	H3	0.30	0.042	6.447	C***
SFSCM Practices	→	SFSCM Performance	H4	0.05	0.047	1.078	0.281^{ns}
SFSCM Drivers	→	SFSCM Performance	H5	0.32	0.060	4.755	C***

SDCs	→	SFSCM Performance	H6	0.58	0.091	6.942	C***

Structural model fits: χ2/df=1.971; RMR=0.041; CFI=0.932; RMSEA=0.058; TLI=0.927; IFI= 0.932; PRATIO=0.935; NFI=0.871; RFI=0.862; PCFI=0.871; GFI=0.808. Note: significance level= ***p-value<0.001, ns significant level- insignificant (p-value>0.1).

Source: Research results (2022)

The hypothesised linear relationships in Table 7.24 are as follows: SFSCM drivers and SFSCM practices (H1); SFSCM drivers and SDCs (H2); SFSCM practices and SDCs (H3); SFSCM practices and SFSCM performance (H4); SFSCM drivers and SFSCM performance (H5); and SDCs and SFSCM performance (H6). Five (H1, H2, H3, and H5 and H6) of the six proposed linear relationships were confirmed since they all exhibited positive path coefficients, p-values less than 0.001, and t-values greater than the suggested threshold of 2.00. H4 is the only hypothesis that was not supported or validated, owing to its very weak path coefficient being much closer to zero, a p-value more than 0.1, and a t-value less than 2.00. The next section focuses on the mediation effect analysis.

7.8 MEDIATION EFFECT ANALYSIS

Mediating effect analysis entails creating a hypothesised indirect relationship between constructs and determining the extent to which indirect effects via mediating variables affect the hypothesised direct paths. Four additional hypotheses (H7, H8, H9 and H10) in this study were assessed through mediation effect analysis. Hypothetical objective H7 assessed the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs (Figure 7.8). Hypothetical objective 8 (H8) assessed the mediation effects of SDCs on the relationship between SFSCM practices and SFSCM performance (Figure 7.9). Hypothetical objective 9 (H9) assessed the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance (Figure 7.10) whilst H10 assessed the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance (Figure 7.11).

According to Henseler, Hubona and Ray (2016), another critical aspect of evaluating a structural model is determining the direct and indirect links between independent and dependent latent variables. A mediating effect analysis can be used to analyse this direct and indirect link. This section evaluated just the importance of the mediating interactions. Kenny et al. (cited in Gilbert, Fiske & Lindzey, 1998) suggested that if a

large number of mediators are present, they may be investigated concurrently or individually. The advantage of investigating them simultaneously is that one may determine if the mediation effect of a mediating variable is independent of the actions of the other mediators (Robbins, Hintz & Moore, 2022). It is critical to keep the various mediators conceptually distinct and not too correlated. A multiple mediation analysis was performed in AMOS 26 using a SEM model in Figure 7.7. Bootstrapping analysis was also done at a 95% confidence interval. A bootstrap sample of 5000 was chosen as guided by Hayes (2013) and Hair, Black, Babin and Anderson (2014). According to Collier (2020), after performing mediation analysis the results may show three different relationships listed: (i) When both direct effect and indirect effect are significant (P=less than 0.05), the result is partial mediation. (ii)When the indirect effect is significant, and the direct effect is insignificant the resultant relationship is full mediation. (iii)Thirdly, when the indirect effect is insignificant and the direct effect is significant, the result is no mediation. A summary of the four mediation relationships is presented in Table 7.25.

Table 7.25: Mediation analysis summary

Hyp	**Relationship**	**Direct effect**		**Indirect effect**	**Confidence interval**		**T-stat**	**P-value**	**Conclusion**
		Esti-mate	**P-Value**	**Estimate**	**Lower Bound**	**Upper Bound**			
H_7	SFSCM practices- SFSCM drivers-SDCs	0.273	0.000	0.239	0.152	0.402	3.918	0,000	Partial mediation
H_8	SFSCM Practices-SDCs-SFSCM Performance	0.05	0.281	0.173	0.089	0.286	3.392	0.000	Full mediation
H_9	SDCs-SFSCM drivers-SFSCM Performance	0.634	0.000	0.148	0.065	0.309	2.508	0.000	Partial mediation
H_{10}	SFSCM drivers-SDCs-SFSCM Performance	0.284	0.000	0.331	0.216	0.489	4.797	0.000	Partial mediation

Source: Research results (2022)

H7: Assessing mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs.

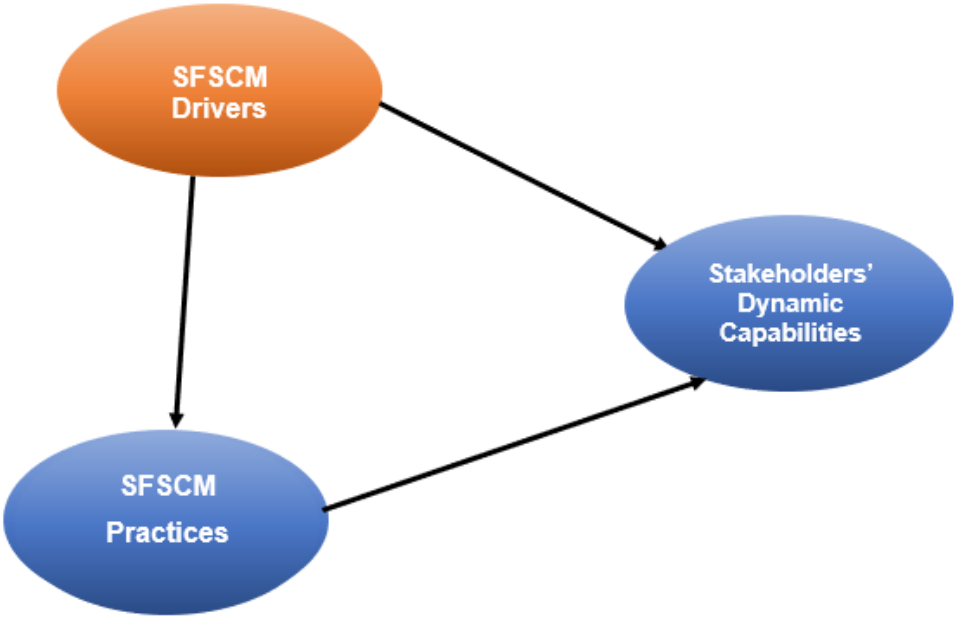

Figure 7.8: Mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs

Source: Research results (2022)

The current study assessed the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs (H_7). Figure 7.8 reveals the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs. As guided by Collier (2020), the results in the current study revealed a significant indirect effect of SFSCM practices on SDCs through SFSCM drivers (b=0.239, t=3.918, p=0.000) supporting H7. Furthermore, the direct effect between SFSCM practices and SDCs (b=0.273, p=0.000) was found to be significant. When both indirect effect and direct effect are significant (p= less than 0.05) it results in partial mediation (Collier, 2020). Mediation analysis results summary for H_7 are presented in Table 7.25. The partial mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs was supported by Chowdhury and Quaddus (2021) who expounded that despite the direct influence of SFSCM practices on SDCs, they are always intervening factors that may influence the same relationship indirectly. The results are also in sync with the Zimbabwean Minister of State who advised that good SFSCM practices are there, but they do not work alone for everyone, some stakeholders need some push through the government and law enforcement push for them to realise that they have potential

and capability to improve food security (Chikwati, 2021). This means practices need some driving force from either the internal or external environment to yied the relevent SDC. H_8 was assessed in the section below.

H8: Mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance

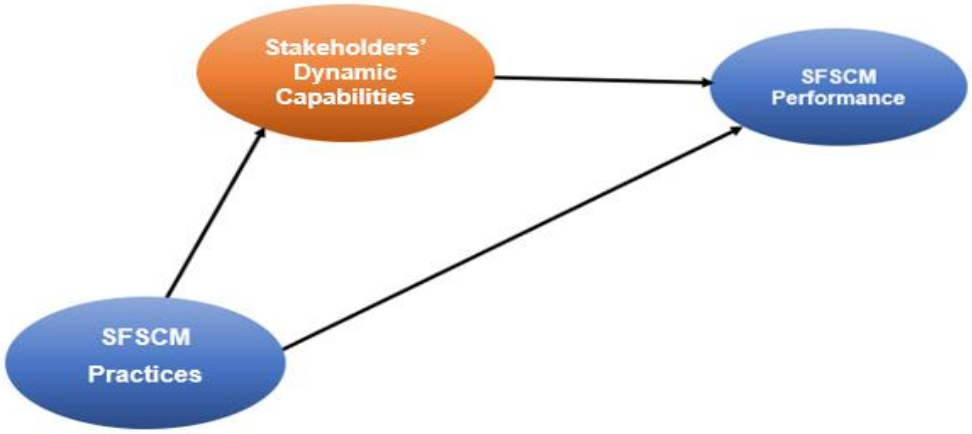

Figure 7.9: Mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance

Source: Research results (2022)

The current study assessed the mediation role of SDCs in the relationship between SFSCM practices and SFSCM performance (H_8). Figure 7.9 reveals the mediation of SDCs on the relationship between SFSCM practices and SFSCM performance. As guided by Collier (2020), the results in this study revealed a significant indirect effect of SFSCM practices on SFSCM performance through SDCs (b=0.173, t=3.392, p=0.000) supporting H_8. The direct effect between SFSCM practices and SFSCM performance (b=0.05, p=0.281) was found to be insignificant. When the indirect effect is significant while the direct effect is insignificant it results in full mediation (Collier, 2020). As such, the current study's results reveal that SDCs have a full mediation effect on the relationship between SFSCM practices and SFSCM performance. A summary of the SEM path analysis results for H_8 is presented in Table 7.25. The full mediation realised implies that the significant influence goes through the mediator which is the SDCs. In the current Zimbabwean environment, climate change and Covid-19 have very much affected almost all organisations as such organisations are not really pursuing sustainability but rather survival. In such a situation, SFSCM

becomes secondary as organisations are only struggling to thrive. This could be the reason why SFSCM performance is not directly coming from generic SFSCM practices but rather as an outcome of mediation enhanced by SDCs. SDCs augment many food organisations to be competitive and enhance their profitability, in the same process achieving positive SFSCM performance (Mutsvanga, 2021). The next subsection makes an assessment of H_9.

H9: Assessing the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance.

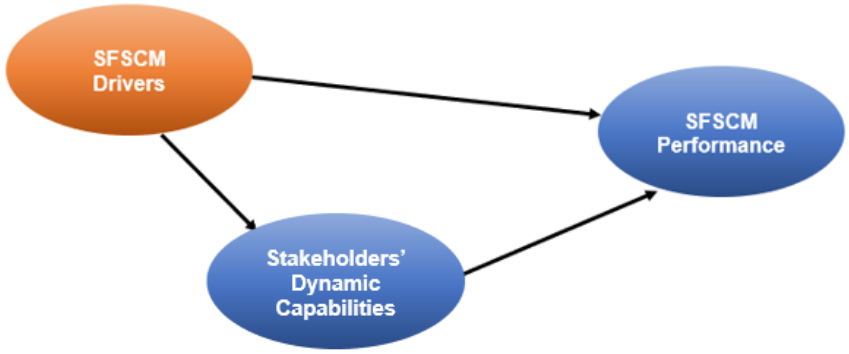

Figure 7.10: Mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance

Source: Research results (2022)

This study also assessed the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance (H_9). Figure 7.10 reveals the mediation of SFSCM drivers on the relationship between SDCs and SFSCM performance. The results in Table 7.25 reveal a significant indirect effect of SDCs on SFSCM performance through SFSCM drivers (b=0.148, t= 2.508 p=0.000) supporting H_9. Furthermore, the direct effect between SDCs and SFSCM performance (b=0.634, p=0.000) was found to be significant. Both indirect effect and direct effect are significant (p value= less than 0.05) (see Table 7.25), therefore indicating the presence of a partial mediation effect (Collier, 2020). The partial mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance is in line with Chinhema (2021), who reiterated that the Zimbabwean SSCM environment requires those who utilise key drivers and at the same time embrace competitive dynamic capabilities. This is key to achieving sustainability and at the same time being competitive in the food industry. More so, the Ministry of Lands, Agriculture, Fisheries

and Rural Resettlement is currently running a dialogue with the United Nations under the theme "Transforming agricultural production and food systems in Zimbabwe." Through this theme, the government has enacted many SFSCM driving forces so that sustainable national food systems will be achieved by the year 2030 (Chikwati, 2021). This means there are more driving forces being enacted in all directions, hence the significant mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance.

H10: Assessing the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance.

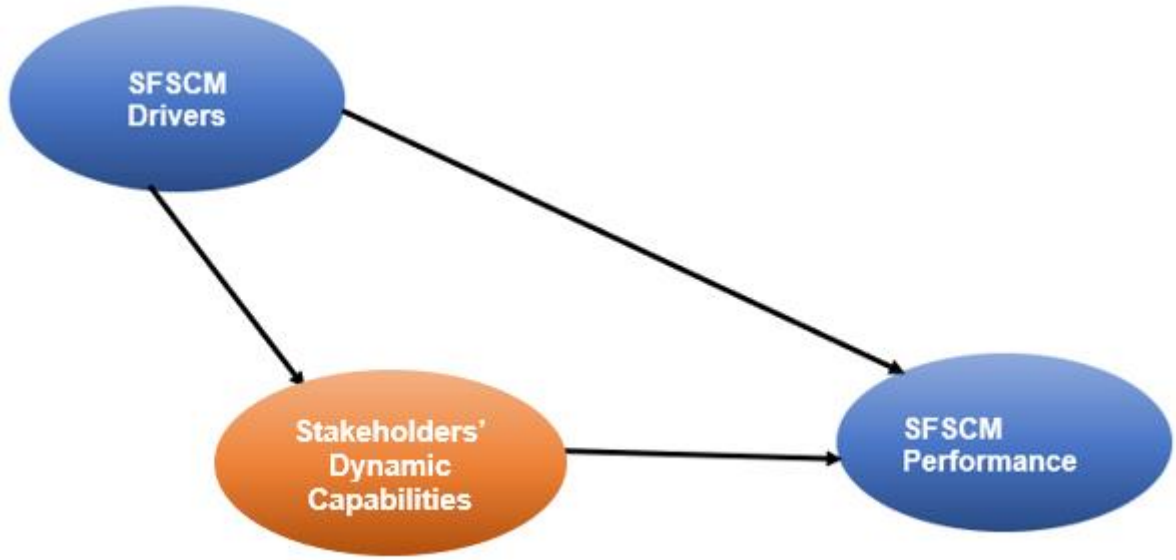

Figure 7.11: Mediation effect of SDCs on SFSCM drivers and SFSCM performance

Source: Research results (2022)

The study further assessed the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance (H_{10}). Figure 7.11 reveals the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance. The results in Figure 7.11 reveal a significant indirect effect of SFSCM drivers on SFSCM performance through SDCs (b=0.331, t=4.797 p=0.00) and therefore supporting H_{10}. The direct effect between SFSCM drivers and SFSCM performance (b=0.284, p=0.000) was found to be significant. When both indirect effect and direct effect are significant then there is a partial mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance (Collier, 2020). These results were

confirmed by a study conducted by Blome et al. (2013) who corroborated that SDCs are the fuel for SFSCM drivers in order to efficiently and effectively achieve sustainable supply chain management performance. Dynamic capabilities in their various dimensions are essential in a thriving economic system to enhance a profitable competitive advantage (Beske et al., 2014).

7.9 CHAPTER SUMMARY

The chapter focused on the analysis of the quantitative data of the study. This quantitative analysis focused on descriptive data analysis, linear hypothesis testing and mediation analysis. Five (H1, H2, H3, and H5 and H6) of the six proposed linear relationships were confirmed since they all exhibited positive path coefficients, p-values less than 0.001, and t-values greater than the suggested threshold of 2.00. H4 hypothesis was not supported or validated, owing to its very weak path coefficient being much closer to zero, a p-value more than 0.1, and a t-value less than 2.00. Further the chapter assessed the mediation relationships and these were H7, the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs; H8, the mediation effects of SDCs on the relationship between SFSCM practices and SFSCM performance; H9, the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance; and H10, the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance. H7, H9 and H10 were supported with partial mediation, whilst H8 was supported and with full mediation. The next chapter presents the mixed methodology results.

CHAPTER 8
DISCUSSION OF MIXED METHODS RESULTS

8.1 INTRODUCTION

Chapter 7 reviewed the quantitative data analysis focusing mainly on descriptive results, principal component analysis (measurements dimension reduction) and assessment of the accuracy of measurements using a number of tests. Further, the chapter used SEM CFA to determine model acceptance and for model fit assessments. The SEM path analysis was also used to test the hypotheses and obtain the study's needed results. Lastly, mediation analysis was performed and revealed results for all the mediating variables. The current chapter (Chapter 8) focuses on a detailed analysis of the results obtained from the mixed-method approach (qualitative and quantitative) used to collect data. Specifically, the chapter provides a synthesised discussion of results from the questionnaire survey, interviews, and literature sources reviewed. The analysis further justifies the reason why it was necessary to utilise the fixed concurrent mixed method approach as it provides areas of convergence, divergence and complementarity to enrich the study results. Furthermore, interpretation of the study results is done based on the outcomes from the qualitative, quantitative and literature results combined. The next section presents the study mixed method results based on study objectives.

8.2 MIXED METHODS RESULTS ANALYSIS

8.2.1 Objective 1: To establish the SFSCM drivers

This study sought to identify the SFSCM drivers using a mixed methods approach. On the one hand, the qualitative findings of the current study classified the SFSCM drivers into two broader categories which are internal and external drivers. Within these two broader categories various drivers were identified including market pressure, regulatory pressure, societal pressure, corporate objectives, organisational culture and availability of resources. On the other hand, the quantitative PCA results identified SFSCM drivers such as food security requirements; organisational culture; market pressure; government regulations; media pressure; the desire to save organisational reputation and goodwill; consciousness and responsiveness of stakeholders towards environmental concerns; the availability of affordable technology; macro-economic

changes; availability of adequate support for research and development on food security; and the influence/requirements of SFSCM stakeholders such as producers, suppliers, distributers and buyers. The PCA results further revealed two dimensions which categorised SFSCM drivers as primary and secondary, and this is in line with previous research done by Saeed and Kersten (2019). The mixed method approach findings and literature review, therefore, broadly classify SFSCM drivers in four distinct ways. The mixed method findings particularly classify SFSCM as either internal, external, primary or secondary, and such dimensions of drivers are consistent with the literature sources reviewed and previous research studies conducted by Zhu et al. (2018), Baliga et al. (2019) and Mogale et al. (2020) as discussed in Chapters 6 and 7.

8.2.2 Objective 2: To identify SFSCM practices adopted within food industries

To address objective 2, the qualitative data findings revealed that SFSCM practices adopted within the food industry are broadly classified as economic, environmental and social sustainability. The economic sustainability practices comprise cost reduction in food production and distribution, the practice to encourage farmers to cultivate various profitable crops for self-reliance, and the employment of competent and skilled personnel in the food supply chain to improve productivity in the food industry. Further economic practices include food organisations that provide employees with incomes that can sustain employees in all their food requirements. Social sustainability practices identified involve corporate social responsibility, human development on nutritious food consumption, and continuously conducting market surveys to know consumer tastes before food production. Lastly, the qualitative data findings identified environmental sustainability practices that range from green sourcing, efficient waste management, and reduction of carbon emission to transport optimisation and or water and energy conservation in food production. Practices such as re-use of food products, recycling of food waste products, and the reduction of non-recyclable packaging materials, along with the use of renewable energy such as solar power in food production across the food industry were also identified among environmental practices.

On the other hand, the quantitative results findings which represented with an average mean of 4 on a scale of 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree,

5=Strongly Agree, acknowledged existence of practices such as efficient management of energy resources, use of renewable energy and minimising water use in all food organisations' operations. The use of less weight and much simpler packaging material to minimise the carbon footprint of the food sector, and promoting re-cycling of packaging material used for our food products were other practices acknowledged by the quantitative results obtained in this study. Further, the quantitative results included enhanced safety and quality of our food products practices; use of decentralised food distribution centres to improve route efficiency and promoting easy physical and economic access to food; use of low energy consuming gadgets in warehouses; continuous training of all internal stakeholders on sustainable food production and handling; use of automated storage and retrieval systems to minimise carbon emissions ; use of pallet pooling services which allows for purchase, recover, transport, repair and store food product to minimise carbon emissions whilst fostering for food products' safety; use of cleaner fuels such as ethanol and Jatropha; constant and consistent maintenance of distribution vehicles; burying of food waste materials in a safe and legally controlled dumping cites; and use of wastewater treatment plants to treat and re-use large volumes of wastewater onsite throughout our food supply chains. The PCA results (as revealed by eigenvalues greater than one and rotated component matrix) further revealed that SFSCM practices were arbitrarily grouped to address the study objective. Such categorisation was supported by Lu et al.'s (2018) study, which grouped practices at random to satisfy study objectives aligned to help understand social network practices required to maximise SSCM adoption.

SFSCM practices obtained from literature sources consulted such as studies by Dhliwayo (2018), Lu et al. (2018), Jum et al. (2021) and Yan et al. (2022) further agreed with the findings from both qualitative and quantitative study approaches as provide in Chapter 3 (3.4). Practices from literature sources included food waste management, material and energy efficiency, water conservation, management of GHE emissions, supplier evaluations and assessment, abiding to human rights in food industries, fairness and human capital training, food safety and quality management, ethical responsibility in food SCM, efficient transport and warehouse management, improvement in organisational efficiency, fair food pricing, employee training, minimisation of non-renewable energy use, managing food packaging and use of decentralised food distribution.

As noted above, the convergence of this study's mixed method results (qualitative findings, quantitative results) and the literature review justifies that SFSCM practices do not really differ across nations. This idea is supported by research conducted by Hammond (2021) for International Standards Organisation (ISO) sustainability certifications. The study concluded that the behaviour, conduct and way of operation for ISO certified organisations are the same irrespective of where the organisation is situated on the globe.

8.2.3 Objective 3: To identify the key SDCs in the food industry

This study also sought to identify the key SDCs in the food industry. The key SDCs identified from qualitative data findings were the sensing, seizing and reconfiguration capabilities while the quantitative survey findings acknowledged (represented by a mean of 4 on a scale of 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree) key SDCs such as knowledge management, development of supply chain partners, co-evolving in sustainable supply chain management, responsive SSCM, and SC re-conceptualisation. Further, the PCA results in this study, in line with Vargas and Mantilla (2014), revealed that SDCs are classified in three dimensions which are interpretation, integration as well as monitoring and communication capabilities. Except for the dimensions that are different, the individual SDCs from the qualitative findings are similar to those identified by the quantitative results in this study. The study's literature review was also found to be in sync with the mixed methods findings as five SDCs, namely knowledge management, reflexive, partner development, coevolution, reconceptualisation and logistics leverage capabilities and these were identified by Teece (2012), Norberg (2019), Karman and Savaneviciene (2021) and Siems et al. (2021). This indicates that the dynamic capabilities reported by stakeholders in the Zimbabwean food industry are not different from those supported by literature.

8.2.4 Objective 4: To identify challenges faced by stakeholders on implementing SFSCM

A myriad of multidimensional challenges were mentioned. The participants identified the following organisational challenges: lack of resources, lack of top management commitment, lack of performance measurement, poor information sharing among stakeholders, lack of mutual trust among food stakeholders, inadequate funding and

budgets, lack of technology, and unmotivated employees. The participants also identified the following macro-environmental challenges: lack of stakeholder commitment and support, lack of government support, customers who are not supportive, poor customer demand for sustainable and healthy foods, corruption and poor governance of food distribution, economic hardships, ever-changing food regulations, and intermediaries causing inefficiencies e.g. inflating prices.

The quantitative survey results acknowledged the existence of the following SFSCM challenges (informed by a mean of 4 on a scale of 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree): lack of top-level management commitment; lack of commitment from stakeholders; lack adequate technology in our food industry; lack of financial resources; ever-changing and unpredictable stakeholder demands, environmental or scaling up with technology challenge; lack of knowledge on the importance of sustainable food supply chain management; inconsistent managerial approaches towards sustainable food supply chain management; lack of government support; lack of incentives for any of sustainable supply chain management efforts; lack of policies in place to encourage stakeholders to adhere to SFSCM practices; lack of performance measurement metrics or yardstick for understanding the organisation's level of performance on SFSCM; lack of proper planning for reverse logistics activities of food products; lack of mutual trust among stakeholders; poor governance for already existing food supply chain stakeholders; lack of employee motivation; poor information sharing amongst food supply chain stakeholders; and; collaboration challenges where intermediaries, tend to inflate prices, endanger the standard of quality and ultimately increase food waste and loss.

The PCA results grouped the same challenges faced by stakeholders on implementation of SFSCM in two dimensions which are trust and governance, and alignment challenges. The challenges identified in the qualitative and quantitative results are also supported by literature as seen in Chapter 3 (specifically 3.5). For instance, Muñoz-Torres et al.'s (2021) study identified lack of technology, lack of stakeholder commitment, lack of proper information sharing and lack of top-level management support. The notable trend is that qualitative and quantitative surveys conducted in Zimbabwe managed to bring about the same SFSCM challenges that are widely acknowledged by the world (through literature).

8.2.5 Objective 5: To establish the influence of SFSCM drivers on implementing SFSCM practices

Participants from the qualitative survey concurred that SFSCM drivers influence SFSCM practices either negatively or positively. Similarly quantitative survey results acknowledged that there is a relationship between SFSCM drivers and SFSCM practices through a moderate and positive path coefficient (0.51) with a notable level of significance shown by the t-value (7.949) and p-value (000) to verify and validate the hypothesis. The only difference realised in the findings was that the quantitative study was more accurate in defining the hypothesised relationship and revealed that SFSCM drivers had a positive significant effect on SFSCM practices. This is the strength of using two parallel methods when researching for the same phenomenon – they tend to complement each other, for example when the qualitative results failed to vividly bring the direction and strength of the relationship, the quantitative results managed to do so. The influence of SFSCM drivers on SFSCM practices was further supported by literature as provided in Section 4.3. However, it has been found that literature could also not provide the direction of the influence and the strength of such influence as revealed by quantitative data findings. For instance, a study done by Accorsi and Manzini (2019) indicated that SFSCM drivers directly influence SFSCM practices, without specifying if the influence is positive or negative.

8.2.6 Objective 6: To establish the influence of SFSCM drivers on SDCs in the food industry

The qualitative survey came up with two-dimensional findings. One of the dimensions (with majority of findings) indicated that SFSCM drivers directly and positively influence SDCs, whilst the other one reported a negative influence of SDCs. Participants described both variables as independent and also as dependent to each other. These explanations show that, generally, these two variables may influence each other in a bi-directional way.

On the other hand, the quantitative study only revealed one dimension that SFSCM drivers have a positive (0.65) and significant (t-value=11.558 and p-value=000) linear influence on the SDCs. The difference between qualitative and quantitative results is expected given that qualitative responses are based on individual responses whilst

quantitative data is only analysed as grouped data showing the most represented trend of the relationships between the variables (SFSCM drivers and SDCs).

The literature reviewed in Sections 3.7 and 4.3.2 of the study also acknowledged that there is a relationship between SFSCM drivers and SDCs in the food industry. For example, Micheli et al.'s (2020) study supported that SFSCM drivers influence SDCs. The acknowledged point of convergence was that both the mixed method approach and literature review agreed that there is a significant relationship between SFSCM drivers and SDCs.

8.2.7 Objective 7: To establish the influence of SFSCM practices on SDCs in the food industry

All the respondents from the qualitative survey confirmed that SFSCM practices have a direct influence on SDCs. In the same vein, quantitative findings revealed that SFSCM practices have a significant positive linear relationship with SDCs. This implies that the two variables really affect each other, and the Zimbabwean food industry needs to be able to know their practices and SDCs befitting to improve in SFSCM.

The relationship between SFSCM practices and SDCs has also been concurred with literature as shown in Chapter 4 (4.3.3) which revealed that SFSCM practices have a significant impact on SDCs. For example, a study conducted by Beske et al. (2014) revealed that SFSCM practices influence SDCs in a food industry.

8.2.8 Objective 8: To establish the influence of SFSCM practices on SFSCM performance

Qualitative survey findings revealed that SFSCM practices have a direct and positive influence on SFSCM performance. The qualitative findings were not corroborated by quantitative results which indicated that the influence of SFSCM practices on SFSCM performance is insignificant (t-value=1.078 and p-value=0.281). On the contrary, literature reviewed in Chapter 4 (4.3.4), as found in Baliga et al.'s (2019) study, SFSCM practices have a positive relationship with SFSCM performance. Note has to be taken that the mediation analysis further revealed that the relationship between SFSCM practices and SFSCM performance is significant when mediated by SDCs (as shown in Section 7.8.2). Therefore, the findings from the qualitative survey and literature review are still validated and are not far-fetched as they agree with the

qualitative results since the quantitative study still revealed a significant relationship of SFSCM practices on SFSCM performance through mediation of SDCs.

8.2.9 Objective 9: To establish the influence of SFSCM drivers on SFSCM performance

Findings from the qualitative study revealed that SFSCM drivers have a direct influence on SFSCM performance. The quantitative study also validated and supported the hypothesis that SFSCM drivers have a positive (0.32) significant (t-value=4.755 and p-value=000) influence on SFSCM performance. Further, literature sources reviewed, such as the studies of Aramyan (2014), Grant et al. (2017) and Emamisaleh and Taimouri (2021), also acknowledged that SFSCM drivers have positive influence on SFSCM performance. All the results are evident enough that SFSCM drivers play an important role in determining SFSCM in the Zimbabwean food industry

8.2.10 Objective 10: To establish the influence of SDCs on SFSCM performance

All 22 participants in the qualitative survey acknowledged that SDCs have a significant (t-value=6.447 and p-value=000) influence on SFSCM performance. A positive influence (0.58) of SDCs on SFSCM performance was also validated by the findings from the quantitative study. The literature review further supported the positive influence of SDCs on SFSCM performance. For instance, a study conducted by Accorsi and Manzini (2019) on sustainable food supply chain planning indicated that SDCs directly influence SFSCM performance. The convergence of literature sources, qualitative findings and quantitative results reflects that the findings are reliable and well rounded.

8.2.11 Objective 11: To assess the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs

Assessment of the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs was only carried out through the quantitative survey. Findings indicated that SFSCM drivers partially mediate the relationship between SFSCM practices and SDCs. Mediation analysis was not assessed through the qualitative survey since the author felt that it could be too complex to be revealed by an interview and could cause some research bias. Chapter 4.3.7 through Edwin et

al.'s (2021) study supported that there is a notable mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs.

8.2.12 Objective 12: To assess the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance

The objective sought to assess the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance. Results from the quantitative survey revealed that SDCs fully mediate the relationship between SFSCM practices and SFSCM performance. In the same vein, literature sources consulted (as shown in Chapter 4.3.8) such as Pham et al. (2020) revealed that SDCs mediate the relationship between SFSCM practices and SFSCM performance. The objective was only assessed through quantitative data analysis and the literature review as they were found to be the most appropriate approaches to determine the intended hypothetical outcome.

8.2.13 Objective 13: To assess the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance

The study assessed the mediation role of SFSCM drivers in the relationship between SDCs and SFSCM performance. The outcome of the study revealed that SFSCM drivers partially mediate the relationship between SDCs and SFSCM performance. The literature review (4.3.9) also hinted through Nasrollahi, Fathi, Sanouni, Sobhani, and Behrooz's (2021) study that SFSCM drivers have a mediating effect on the relationship between SDCs and SFSCM performance. The objective was achieved through quantitative (hypothetical) data analysis only.

8.2.14 Objective 14: To assess the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance

The quantitative study assessed the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance. Findings showed that SDCs partially mediate the relationship between SFSCM drivers and SFSCM performance. The notable trend was that SDCs were important variables in positively (partially or fully) mediating all assessed variables in the study. Validation of this study's mediation analysis was also supported by Liao and Widowati's (2021) study that revealed the mediation effect of dynamic capabilities on the relationship between SFSCM drivers and SFSCM performance in a dairy industry. The food industry in Zimbabwe and the

world should therefore consider the fundamental role played by SDCs in an effort to achieve SFSCM positive performance. The objective was also achieved through quantitative-hypothetical analysis only.

8.3 CHAPTER SUMMARY

The chapter merged the study findings from the qualitative data analysis with those from quantitative with the overall aim of synthesising and drawing any deviations, similarities or patterns from the two approaches' results. The sections of the chapter were presented to fully address each research objective based on the findings from the mixed methods. Ten objectives were addressed through the mixed method approach whilst four mediating objectives were entirely addressed through the quantitative data analysis. The study had a total of 14 objectives and ten objectives were thus assessed through the parallel convergence method (both qualitative and quantitative). The following chapter (Chapter 9) presents the summary of the study, recommendations and suggestions for further and future studies.

CHAPTER 9
SUMMARY, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

9.1 INTRODUCTION

The preceding chapter reported and discussed the fixed concurrent (qualitative and quantitative) approach empirical results. This chapter establishes the fundamental objective of all research variables to ascertain the theoretical and practical consequences of the results (qualitative and quantitative). The chapter begins with a perspective on how the study's objectives were met, followed by the conclusions drawn based on the findings and an assessment of the findings' theoretical and practical implications. Following that, recommendations are made for owners, managers and all stakeholders who are engaged in SFSCM. Recommendations also extend to academics and legislators who are pursuing the subject of SFSCM in Zimbabwe and the rest of the world. Finally, the chapter outlines the study's limitations and identifies areas in which more research should be explored in future (future research).

9.2 HOW THE OBJECTIVES OF THE STUDY WERE ACHIEVED

The primary objective of this study was to develop a stakeholder framework for SFSCM in Zimbabwe. As a result, other nations pursuing SFSCM may have a unique set of experiences and may develop a unique stakeholder framework (particularly in terms of the influence of SFSCM drivers on SFSCM practices, SDCs, and SFSCM performance; and SDCs on SFSCM performance).

The research was conducted utilising a hypothesised framework for SFSCM that was derived from a variety of models. The framework developed includes four primary variables: SFSCM drivers, SFSCM practices, SDCs, and SFSCM performance. To describe the link between SFSCM drivers and SFSCM practices and SFSCM performance, the dynamic capabilities theory was applied. On the other hand, institutional and stakeholder theories were employed to describe the study's relationships between stakeholders in the sustainable supply chain and the food industry. The study followed a fixed concurrent and converging mixed methods (qualitative and quantitative) approach which enabled the concurrent realisation of

objectives through qualitative findings and quantitative results used in a complementing manner. The study's primary aim was accomplished by the fulfilment of the following 14 secondary objectives as discussed in Chapters 6, 7 and 8. The next subsections discuss how the secondary objectives were achieved in this study.

9.2.1 Objective 1: To establish the drivers for SFSCM

The first secondary objective was to identify the SFSCM drivers. Theoretically, Chapters 2, 3 and 4 reviewed theories and literature on the drivers of SFSCM. The objective was also achieved empirically in Chapters 6, 7 and 8. Thus, this objective was accomplished through the use of the literature review, interview answers, and quantitative PCA results (mixed method findings). This study concludes that SFSCM drivers have been established.

9.2.2 Objective 2: To identify SFSCM practices adopted within food industries

Additionally, the research sought to identify SFSCM practices for the food industries. Theoretically, Chapters 2, 3, and 4 reviewed literature on SFSCM practices. Informed by the mixed approach findings presented in Chapters 6, 7 and 8, this study managed to identify the SFSCM practices. Thus, the objective was accomplished by a review of the literature, interview answers, qualitative and quantitative data collection. The study concludes that SFSCM practices were identified.

9.2.3 Objective 3: To identify the key SDCs in the food industry

Additionally, the research sought to identify key SDCs in the food industry. Theoretically, Chapters 2, 3, and 4 reviewed literature on SDCs, and the mixed method approach results in Chapters 6, 7 and 8 identified various SDCs. The objective was accomplished by a review of the literature, qualitative results, and quantitative data findings. The study concludes that SDCs were identified.

9.2.4 Objective 4: To identify challenges faced by stakeholders on implementing SFSCM

Additionally, the research was conducted to identify the challenges faced by stakeholders in the food industry as they implement SFSCM. Chapters 2, 3, and 4 reviewed literature on SFSCM challenges, while the empirical findings from the mixed methods approach discussed in Chapters 6, 7 and 8 discussed challenges of SFSCM implementation. The objective of the study was accomplished by a review of the

literature, interview answers, and the qualitative and quantitative data results. As a result, this study concluded that challenges faced by stakeholders in the food industry in implementing SFSCM were identified.

9.2.5 Objective 5: To establish the influence of SFSCM drivers on implementing SFSCM practices

The study sought to establish the influence of SFSCM drivers on the implementation of SFSCM practices in Zimbabwe.

Chapters 3, 4, 6 and 7 discussed the influence of SFSCM drivers on the implementation of SFSCM practices. Qualitative data reactions confirmed a positive relationship between SFSCM drivers and SFSCM practices. Additionally, the SEM empirical study in Chapter 7 demonstrates that SFSCM drivers have a fairly positive and significant influence on SFSCM practices. The fifth objective of this study was attained as a result of the above. This study concludes that SFSCM drivers have a direct and positive influence on SFSCM practices.

9.2.6 Objective 6: To establish the influence of SFSCM drivers on SDCs in the food industry

Further, the study aimed to establish the influence of SFSCM drivers on SDCs in the food industry. Chapters 3, 4 and 6 examined the theoretical implications of SFSCM drivers on SDCs in the food industry. Both the interview responses in Chapter 6 and the SEM empirical analysis in Chapter 7 indicated that SFSCM drivers had a positive and significant effect on the SDCs. The sixth goal of this study was accomplished as a result of the above.

9.2.7 Objective 7: To establish the influence of SFSCM practices on SDCs in the food industry

Additionally, the study intended to determine the effect of SFSCM practices on the SDCs in Zimbabwe food supply chain. Theoretically, Chapters 2, 3, and 4 explored the influence of SFSCM practices on SDCs. Chapter 6's interview responses and Chapter 7’s SEM analysis both indicate that SFSCM practices have a weak positive influence on SDCs. The seventh goal of this study was accomplished as a result of the above. As a result of this study, it is concluded that SFSCM practices have a significant positive influence on SDCs.

9.2.8 Objective 8: To establish the influence of SFSCM practices on SFSCM performance

Objective 8 intended to discover the extent to which SFSCM practices influence SFSCM performance in the Zimbabwe food supply chain industry. Theoretically, the influence of SFSCM practices on SFSCM performance was covered in Chapter 3, Chapter 4, and Chapter 6. The Chapter 7 SEM analysis shows that SFSCM practices have very weak positive and insignificant influence on SFSCM performance. In light of the aforementioned, the eighth study objective was accomplished. The qualitative study established that SFSCM practices have a positive and significant relationship with SFSCM performance whilst the path analysis revealed that SFSCM practices have weak positive and insignificant influence on SFSCM performance. Both qualitative and quantitative data analyses concluded that SFSCM has a positive influence on SFSCM performance.

9.2.9 Objective 9: To establish the influence of SFSCM drivers on SFSCM performance

Objective 9 sought to ascertain the influence of SFSCM drivers on SFSCM performance in the Zimbabwe food supply chain industry. Theoretically, Chapters 3 and 4 explored the influence of SFSCM drivers on SFSCM performance. Interview responses from Chapter 6 and the SEM analysis in Chapter 7 demonstrate that SFSCM drivers have a positive and significant influence on SFSCM performance. The 9th objective of this study was accomplished as a result of the above. This research study concluded that SFSCM drivers have a positive and significant influence on SFSCM performance.

9.2.10 Objective 10: To establish the influence of SDCs on SFSCM performance

The intention of the study for this particular objective was to ascertain the influence of SDCs on SFSCM performance in the Zimbabwe food supply chain industry. Theoretically, the influence of SDCs on SFSCM performance was discussed in Chapters 3 and 4. Both the interview responses and SEM analysis in Chapters 6 and 7 show that SDCs have a positive and significant influence on SFSCM performance. The 10th objective of this study was accomplished as a result of the above. This research study concluded that SDCs have positive and significant influence on SFSCM performance.

9.2.11 Objective 11: To assess the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs

The study sought to assess the mediation effect of SFSCM drivers on the relationship between SFSCM practices and SDCs. Mediation analysis in Chapter 7 showed that SFSCM drivers have significant partial mediation effect on the relationship between SFSCM practices and SDCs. The 11th objective of this study was accomplished as a result of the above. This research study concluded that SFSCM drivers have significant partial mediation effect on the relationship between SFSCM practices and SDCs.

9.2.12 Objective 12: To assess the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance

The study sought to assess the mediation effects of SDCs on the relationship between SFSCM practices and SFSCM performance. Mediation analysis in Chapter 7 showed that SDCs have significant full mediation effect on the relationship between SFSCM practices and SFSCM performance. The 12th objective of this study was accomplished as a result of the above. This research study concluded that SDCs have significant full mediation effect on the relationship between SFSCM practices and SFSCM performance.

9.2.13 Objective 13: To assess the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance

The study sought to assess the mediation effect of SFSCM drivers on the relationship between SDCs and SFSCM performance. Mediation analysis in Chapter 7 showed that SFSCM drivers have significant partial mediation on the relationship between SDCs and SFSCM performance. The 13th objective of this study was accomplished as a result of the above. This research study concluded that SFSCM drivers have significant partial mediation effect on the relationship between SDCs and SFSCM performance.

9.2.14 Objective 14: To assess the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance

The study sought to assess the mediation effect of SDCs on the relationship between SFSCM drivers and SFSCM performance. Mediation analysis in Chapter 7 shows that

SDCs have a significant and partial mediation effect on the relationship between SFSCM drivers and SFSCM performance. The 14th objective of this study was accomplished as a result of the above. This research study concluded that SDCs have significant partial mediation effect on the relationship between SFSCM drivers and SFSCM performance.

9.3 SUMMARY OF KEY FINDINGS AND CONCLUSIONS

9.3.1 Summary of key findings

The study identified SFSCM drivers, SFSCM practices, SDCs, and challenges faced by stakeholders in implementing SFSCM. The study also identified approaches that can be employed to address challenges faced when implementing SFSCM. The mixed methods approach (both qualitative and quantitative) findings identified regulatory pressure, market pressure, societal pressure, availability of resources, organisational culture and corporate objectives as some of the key SFSCM drivers. Additionally, the findings identified the following as the key SFSCM practices: waste management, carbon emission reduction, logistics optimisation, water conservation, energy conservation, cost reduction and price efficiency, employment of competent people, cultivation of profitable grain crops, corporate social responsibility, fair distribution of food, human development on nutritious food consumption, food donations and continuously conducting consumer tastes surveys. Further, the mixed methods approach findings cited the following key SDCs: sensing, seizing, reconfiguration, reflexive control, partner development, co-evolving and supply chain integration capabilities. Major challenges faced by stakeholders when implementing SFSCM were also identified and these involved lack of resources, lack of top management commitment, poor information sharing, lack of mutual trust amongst stakeholders, unmotivated employees, lack of government support, ever-changing food regulations, poor customer demand for sustainable and healthy foods, corruption and economic hardship challenges.

Additionally, key linear relationships were tested, and based on the mixed method approach findings, a positive influence of SFSCM drivers on SFSCM practices was reported. SFSCM drivers were also found to have a positive influence on SDCs in the food industry, whilst SFSCM practices have a positive influence on SDCs. Although quantitative findings revealed a positive and insignificant influence, the mixed method

approach findings generally reported a positive influence of SFSCM practices on SFSCM performance. The mixed method approach findings further found that SFSCM drivers have a positive influence on SFSCM performance and SDCs have a positive influence on SFSCM performance. Mediation analysis was performed using the quantitative study and found that SFSCM drivers partially mediate the relationship between SFSCM practices and SDCs. Furthermore, the study findings revealed that SDCs fully mediate the relationship between SFSCM practices and SFSCM performance. The outcome of the study further revealed that SFSCM drivers partially mediate the relationship between SDCs and SFSCM performance. Lastly, the findings showed that SDCs partially mediate the relationship between SFSCM drivers and SFSCM performance. The next section focuses on the study's conclusions.

9.3.2 Conclusions

The primary objective of this study was to develop a stakeholder framework for SFSCM in the food industry. Fourteen sub-objectives were developed to achieve the primary objective as posited in the introductory chapter (Chapter 1). The findings of the study's mixed methods approach indicated that SFSCM drivers positively influence SFSCM practices, SDCs, and SFSCM performance. This implies that to remain sustainable, food industry stakeholders have to really understand the sync amongst these variables in order to improve the performance of the food supply chains and the food industry in Zimbabwe.

The study further concluded that SFSCM practices influence both SDCs and SFSCM performance positively. Again, it is important for food industry stakeholders to really understand this relationship and implement appropriate practices that can be synchronised with, as well as enable the further development of the appropriate SDCs necessary to achieve significantly enhanced SFSCM performance in the Zimbabwean food industry.

Further, the study concluded that SDCs influence SFSCM performance positively, implying that stakeholders have to make use of different competencies within and outside their organisations to achieve improved SFSCM performance. Additionally, SFSCM drivers have a partial mediating role in the relationship between SFSCM practices and SDCs. This is so true in the Zimbabwean context as SFSCM drivers

such as legislation and government regulations may determine food nutrition, food production and distribution in a way to improve food security. SFSCM drivers also mediate the relationship between SDCs and SFSCM performance, whilst SDCs fully mediate SFSCM practices and SFSCM performance. Lastly, the study concluded that SDCs partially mediate the relationship between SFSCM drivers and SFSCM performance.

Based on the above, the current study concludes that SFSCM practices and approaches implementation are key and should be informed by the SFSCM drivers, challenges, and SDCs in the food industry. The study also concludes that SFSCM practices and approaches implementation is necessary to improve the performance of supply chains in the food industry and achieve food security in Zimbabwe. Furthermore, the study concludes that stakeholders within the food industry should make use of relevant SDCs to enhance sustainability within the food industry. Implementation of SFSCM can only be achieved when stakeholders employ the necessary approaches to address implementation challenges.

The next section discusses the contributions and implications of the study.

9.4 CONTRIBUTIONS AND IMPLICATIONS OF THE STUDY

This section highlights the key contributions and implications of the study.

9.4.1 Key contributions of the study

This study's research findings can be put to use to develop SFSCM in Zimbabwe and other countries or regions of the world where there are concerns with sustainable food supply chains. The study has contributed to the body of new knowledge by identifying SFSCM drivers, SFSCM implementation challenges, SDCs and suggested approaches to address these challenges in the food industry. The study has contributed greatly contributed to the researcher's improved understanding of the notion of SFSCM. The study's findings can also be used as a roadmap for future academics who want to look into the deficiencies found in food security and SSCM. The study's findings could be a significant contribution to policy or initiatives that can be developed to address the issues of food insecurity using SFSCM stakeholder framework.

The study 's results also identified practices and how stakeholders may use them to establish and maintain a sustainable supply chain that aids in the resolution of food security challenges in Zimbabwe and the other developing countries. The stakeholder framework is a significant contribution for SFSCM that was developed and proposed in this chapter to assist stakeholders in addressing and resolving food security concerns in Zimbabwe and other nations in the Southern African Development Community with the same structures as Zimbabwe.

The current study is anticipated to motivate more SFSCM research in the future. Additionally, the study is expected to assist owners, managers of food supply chain organisations and policymakers in understanding the benefits of implementing SFSCM. The recommendations are likely to benefit owners, managers of supply chain firms, employees, all stakeholders within the food supply chain as well as researchers and regulators.

9.4.1.1 Proposed stakeholder framework for SFSCM in the food industry

As previously seen in Chapter 2, the study used three theories, the institutional theory, dynamic capabilities theory and the stakeholder theory. The institutional theory assumes that firms are persuaded by other stakeholders to operate in a certain way and that food supply chain stakeholders react to external demands from other stakeholders to be sustainable (known as isomorphism). The theory was found to be limited in its capacity to explain stakeholders' roles with competing supply chain objectives and is unable to create a theoretical base for the classification of stakeholders and the degree of control. The criticism of the institutional theory resulted in the use of the dynamic capability theory.

The dynamic capability theory was used to understand and explain the proposed objectives for the influence of SFSCM drivers on dynamic capabilities of stakeholders in the food industry; the influence of SFSCM practices on dynamic capabilities of stakeholders in the food industry; and the influence of SDCs on SFSCM performance. Further, the theory also helped to understand the mediation effect of SDCs on the relationship between SFSCM practices and SFSCM performance. However, the DC theory was criticised for its lack of correlation between dynamic capabilities and SFSCM performance.

The stakeholder theory assumes that a business environment can be far more complex than just the concept of shareholder value but also have a fair concern regarding all stakeholders. Thus, the stakeholder theory requires that organisations operating in a highly turbulent and complex business environment, such as the food industry, be managed in a practically, cost saving, profitable, value adding, and in a responsible manner. The stakeholder theory was however found to have a deficiency in explaining the dynamics of power interactions between stakeholders or between enterprises and their partners from a network viewpoint. Derived from the three theories underpinning the study, the proposed stakeholder framework for SFSCM comprises SDCs, and various stakeholders necessary to achieve SFSCM within the food industry.

More so, based on the frameworks discussed in Chapter 4, the Framework of Sustainable Service Supply Chain by Liu et al. (2017:13) underscored the need for sustainability practices, supply chain stakeholders and focal food organisations to mutually relate so that SFSCM can be achieved. The framework however did not include SDCs and SFSCM drivers to also be part of the synchronisation to achieve SFSCM performance.

The hypothesised and proposed SFSCM framework holistically took into cognisance all necessary variables for SFSCM (SFSCM drivers, SFSCM practices and SDCs). Based on the study key findings (in Section 9.3.1), theoretical frameworks reviewed and review of literature from previous studies, the current study proposes the hypothesised stakeholder framework for SFSCM implementation in the food industry and food supply chains as shown in Figure 9.1.

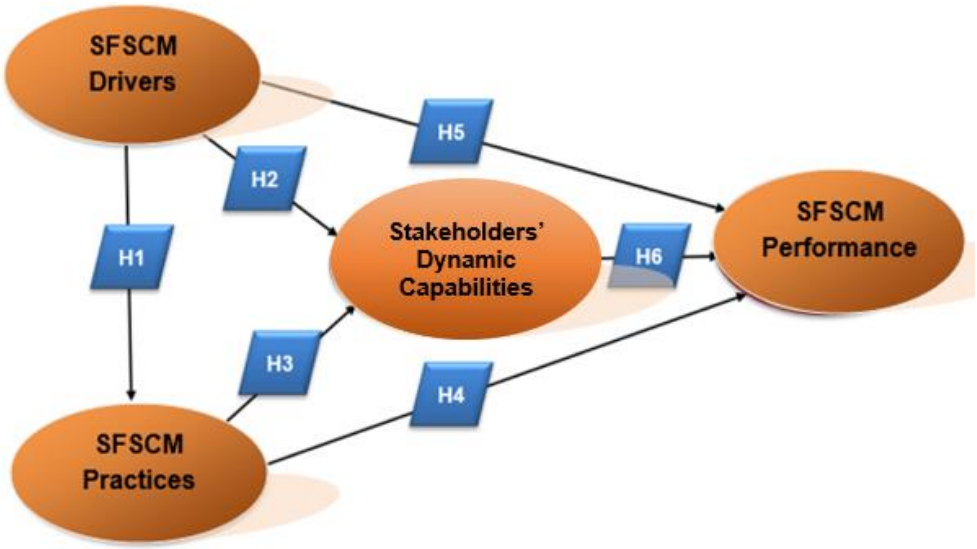

Figure 9.1: Hypothesised framework for SFSCM in the food industry

Source: Author's own compilation

Figure 9.1 above shows the hypothesised framework for SFSCM in the food industry. The findings of the study's mixed methods approach indicated that SFSCM drivers positively influence SFSCM practices, SDCs, and SFSCM performance; SFSCM practices influence both SDCs and SFSCM performance positively; and SDCs influence SFSCM performance positively. SFSCM drivers have a partial mediating role in the relationship between SFSCM practices and SDCs. SFSCM drivers also mediate the relationship between SDCs and SFSCM performance, whilst SDCs fully mediate SFSCM practices and SFSCM performance. Lastly, the study findings indicated that SDCs partially mediate the relationship between SFSCM drivers and SFSCM performance.

From the qualitative and quantitative results (after establishing the hypothesised linear paths using SEM empirical analysis), this study proposes the above hypothesised framework for acceptance in research. Figure 9.2 below presents the new stakeholder framework developed and proposed in this study for SFSCM implementation to improve food security in the food industry and food supply chains.

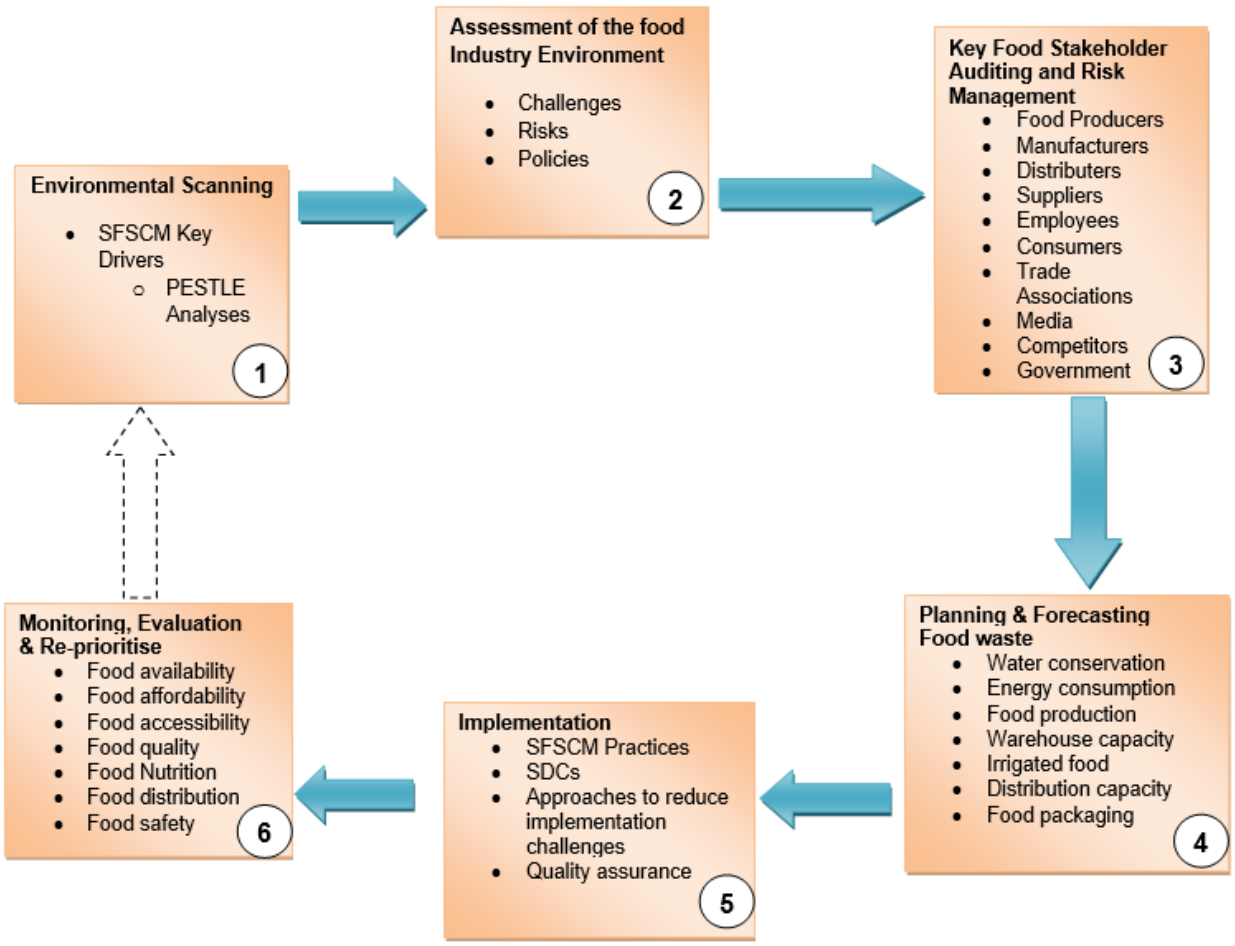

Figure 9.2: Proposed implementation for SFSCM stakeholder framework

Source: Author's own compilation

The current study established the necessity for an SFSCM stakeholder framework to assist in reducing food security issues related to supply chain management in the food industry. The current framework explains the need to manage food supply chain systems from producers to the final customer with sustainability efficiency. The new and proposed stakeholder implementation framework for SFSCM elaborates the role of SFSCM drivers, SDCs and, SFSCM practices, approaches against implementation challenges in achieving SFSCM performance. The implementation framework has a number of systematic stages to be followed as given below.

Step 1: Environmental scanning

The first step in the newly proposed stakeholder implementation framework requires stakeholders in the food industry to scan the environment for any factors, challenges, risks as well as drivers emanating from the business environment. The environmental

scanning must be carried out to assess stakeholder organisations' internal and external environment that affects the implementation of the framework. Stakeholders in the food industry and supply chains can use various tools to scan their environments, chief among which they can use the PESTEL and SWOT analysis frameworks. Using the PESTEL framework for environmental scanning will enable the food industry and supply chain stakeholders to be cognisant of environmental factors such as the political, environmental, social, economic and legal factors that can hamper the effective implementation of SFSCM in their industry and chain. Having knowledge on such external factors will enable the stakeholders to implement suitable approaches as well as gauge the required capacity and capabilities to help mitigate the unfavourable effects of such factors especially in ensuring food security. Some of the factors are discussed below

- **Political**

The political drivers of supply chain include the state of national politics where the country is either stable or unstable politically. Political stability depends on how well governed the country is. For instance, in a poorly governed country, protests and even wars are indicative of political instability. SFSCM performance tends to improve in stable nations more than where the nation is unstable. Fairness and resilience in supply chain also tend to be eroded when the politics are so unstable. When fairness and resilience no longer exist it results in supply chain disruption and affects SFSCM implementation negatively. The current Zimbabwean SFSCM is under a politically unstable environment characterised by inefficient flow of both food products and related information due to the political instability that has led to the long hand of corruption. This implies that currently the political driver is in divergence with SFSCM performance, and a lot needs to be addressed to enhance effective implementation of the SFSCM framework.

- **Legal and environmental**

Zimbabwe has great concern over anything that damages the environment. Several pieces of legislation have been enacted to protect the environment and the most significant of these include the Natural Resources Act (1941), the Forest Act (1949), the Hazardous Substances and Articles Act (1977), the Atmospheric Pollution Prevention Act (1971), the Water Act (1976), the Communal Land Act (1982) and

Environmental Management Act, amongst others. The food supply chain management is one such system that emits a lot to the environment. Food wastes through food disposal, food packaging disposal, energy consumption during food production, water pollution from food wastes, land degradation from poor farming methods, nutrition, health, and safety issues in food supply chain are all such hazards affecting the environment currently. It is expected that environmental legislation within the food supply chain be reinforced to ensure effectiveness of SFSCM implementation and the framework thereto.

- **Economic**

Currently, unemployment levels in Zimbabwe show an upward trend of 0.7% (from 5.0 to 5.7) comparing year 2019 and 2020 (International Labour Organisation, 2021). The implementation of the framework would be expected to improve national GDP, employment levels, food security and poverty reduction, standards of living and supply chain stakeholders' confidence. Implementation of the SFSCM framework would therefore enhance efficiencies in the SFSCM as many people would be employed within the food supply chain, which will improve productivity of food as well as disposable income to acquire the food.

- **Socio-cultural**

Traditionally, Zimbabwean families are brought together with the availability of food on the table and societies get to be functional and productive when they have enough food reserves. The implementation of the framework would improve food availability to families and therefore the levels of food stress reduces whilst happiness improves in families and societies.

- **Technological**

Technology is an important element that is required within SFSCM system to manage food production, food waste, food loss and food availability ranging from upstream of the supply chain to downstream. Technologies such as blockchain, artificial intelligence, big data, social media, and geographic information systems are examples of technological advancements that contribute to the digital transformation of the sustainable food supply chain management system and boost efficiencies within the entire food supply chain system.

Step 2: Assessment of the food industry environment

The second step in the proposed framework involves the assessment of the food environment for challenges and risks. This can be done using a SWOT analysis. Using the SWOT analysis will help the stakeholders to have an idea of their internal strengths and weaknesses, as well as the opportunities and threats posed by the external environment. This will help inform the stakeholders on the type of capacity development needed, and the best approaches to implement to maximise their potential in ensuring food security. The challenges are discussed below.

- **Challenges**

The major challenge currently facing the food industry is supply chain disruptions due to the Covid-19 pandemic, economic downturn and the wars, e.g. the current Russian-Ukrainian war. Stakeholders are expected to be as resilient as possible to be able to survive and keep on being operational. Lack of stakeholder commitment and poor information sharing are the other obstacles in the way of implementation of the framework. Further, consumers are not yet aware of the differences between food products produced through sustainable systems and the traditionally produced ones. Corruption along the food supply chain may be another challenge weakening the implementation of the framework in the Zimbabwean context. Addressing the above challenges through engagement of various stakeholders would be required before the framework can be implemented successfully.

- **Risks**

Major risks within the Zimbabwean food industry include food loss within the supply chain. The other risk could be that stakeholders such as consumers may not be willing to acquire food products produced from sustainable means (as they look at the product price attribute only) resulting in malperformance of some organisations practising sustainable food supply chain management.

- **Policies**

A number of policies would therefore be required to ensure the smooth implementation of the framework. These could be policies affecting food production and commerce, processing and packaging, pricing, distribution and procurement which offer potential to strengthen supply chains and use them to achieve health and nutrition goals.

Further, food security policies that promote increased availability of food, manage losses within the supply chain, promote post-harvest practices, enhance access of affordable and nutritious food, improve the competitiveness of food and agricultural supply chains are necessary during the implementation of the framework.

Step 3: Key food stakeholder auditing and risk management

The third step in the newly proposed stakeholder implementation framework involves auditing the key stakeholders in the food industry and chain to assess whether they are fulfilling their intended roles or not. Stakeholder auditing should also be done to check the capacity and capabilities of stakeholders in the food industry and chain. This will promote effective and efficient early risk management to avoid food insecurities caused by inadequate fulfilment of stakeholder roles emanating from lack of capacity and capabilities or due to any wastages along the food supply chain. In this step, bench marking tools can be used as these will enable stakeholders to be audited against the local food industry, regional, or global food industry standards. Depending on the audit outcome, remedial action as well the required capacity can be planned for in time to ensure food security.

Key primary stakeholders in the food supply chain involve suppliers, producers of food/manufacturers/food processors, distributers, wholesalers, retailers, employees and consumers whilst secondary stakeholders involve trade associations, media, competitors, government and non-governmental organisations. These key stakeholders play different roles when implementing the SFSCM framework as provided below.

- **Food producers**

The food industry's primary producers and suppliers of food in its raw state are farmers. Farmers grow, harvest, and sell a variety of cereal crops ranging from maize, wheat, rice, and oats to barley, rye, or sorghum. Sustainable and cost-effective farming methods such as dry irrigation have to be practised at a large scale. In dry regions or off-the rain season, farmers are required to produce crops such as wheat and maize using over-pumped water from water reservoirs. Post-harvest storage warehouses have to be provided to store bulky or packaged cereal produce for a while before the product can be transported to the next level in the supply chain (manufacturers or wholesalers).

- **Manufacturers or food processors**

Food manufacturing companies should have capacity to produce a wide range of food products to meet different consumer preferences. Energy use during manufacturing must be optimised with the use of alternative renewable energy sources such as solar or wind. Competent and skilled labour must be employed within manufacturing industries to ensure that food quality is a priority. This involves monitoring numerous processes involved in food manufacturing to ensure that quality and nutritional criteria are met, as well as ensuring that microbiological contamination is kept to a minimum. Additionally, cost effective methods of food processing must be preferred to ensure that the processed food items remain affordable to downstream levels in supply chain. Management of packaging has to start at this level making sure that packaging is eco-friendly such as that which can be re-cycled. Special storage facilities and appropriate food transport vehicles should be utilised when storing and distributing processed food to different stakeholders within the food supply chain to avoid food loss.

- **Distributers**

Food distributors should utilise appropriate vehicles which are mechanically sound and efficient to avoid unnecessary disruptions and delays in transit. Reliable personnel should be employed to handle food items during transit from one level to the other. Appropriate technologies should be provided to ensure that food quality remains healthy all the way from producers to wholesalers or retailers irrespective of longer distances and times between stakeholders. Ideally, distributers should continuously monitor that they utilise full-truck loads when transporting food items as a way of managing down carbon emissions and being cost effective.

- **Wholesalers and retailers**

Appropriate and adequate storage facilities should be provided by wholesalers and retailers. Inventory management systems should be used and strategic mutual relationships maintained with food producers to avoid stock-out situations that may result in food unavailability to the consumers. Efficient warehouse management systems should be employed to manage food quality and shelf life. Food stock varieties kept by wholesalers and retailers must meet the requirements of distinct consumers with various requirements, tastes, and expectations.

Step 4: Planning and forecasting

Planning and forecasting is the fourth step in the newly proposed stakeholders' framework for implementing SFSCM in a food industry. This step requires stakeholders to take into consideration their current and previous customers' food demand to forecast the future food demand. Stakeholders need to also plan for any additional capacity and capabilities that may be needed to ensure the successful implementation of SFSCM and enhance food security. Thus, when planning for SFSCM, stakeholders should consider embracing different technologies such as block chain (to improve traceability), embedded systems (to control agricultural water use and optimise energy use during processing), machine learning and artificial intelligence (to improve on production and process efficiency) and invest in modern machinery and process equipment (to reduce food waste while also reducing energy and resource use). Continuous research and development programmes and stakeholder engagement forums should be carried out on scheduled intervals to keep all food supply chain stakeholders updated with current knowledge and information with regards to best practices available within the industry.

Stakeholder organisations should plan to consider use of alternative energy sources that are renewable, for example solar systems since Zimbabwe has enough sunlight all year round. On the same note, all stakeholders who are not ISO certified should consider getting certification as a way of maintaining consistency within the food industry and supply chain.

Farmers capable of producing irrigated food crops should acquire all the necessary inputs and raw materials before the beginning of the season to avoid inconveniences during crop production time. The same applies to those producing annual crops from rainwater.

Step 5: Implementation

Once stakeholders have planned and forecasted all they will need, the next step is to actually implement the SFSCM framework. During this step, stakeholders need to first align their current capacity and capabilities to the SFSCM practices and approaches to be implemented throughout the various food processes. Stakeholders also need to do a thorough cost benefit analysis to inform their choice of prioritisation of SFSCM practices and approaches to be implemented, starting with those that have a higher

net benefit to the organisation and the entire food supply chain. Implementation of the SFSCM framework requires that food organisations follow an implementation plan which focuses on the appropriate SFSCM practices such as water conservation, food waste management, use of technologies in production and distribution of food, use of skilled and competent manpower in food production and handling, continuously sharing information on sustainability requirements with all stakeholders, handling and reducing customer and consumer complaints, acquiring food products and raw materials from competent and accredited stakeholders, as well as constantly creating awareness to consumers on the need to dispose of used packaging and food wastes appropriately.

Food organisations should further have an understanding of the appropriate SDCs that they may leverage on in case of urgent crisis situations such as the Covid-19 pandemic and any other related unexpected events. Implementation challenges must have been eliminated at this stage through engagements with various stakeholders and sharing of necessary information. In cases where training would be required, all the needy personnel would to have been trained to fill the different gaps. At this stage, organisations should ensure that resources needed in the process such as finance and skilled manpower are in place. Necessary support from different stakeholders such as the government would also have been sought after to ensure that the implementation process is cleared from all obstacles.

Step 6: Monitoring, evaluation and reprioritising

The last step in the newly proposed stakeholder implementation framework involves monitoring implementation success, customer demand and other developments and unexpected supply chain disruptions, evaluation and re-prioritisation of the SFSCM practices and approaches to be implemented. To ensure that food availability, affordability, accessibility, safety, nutrition and distribution are sustainable, all stakeholders should play their important roles diligently in monitoring and evaluating all processes. It is in this step that quality control measures should be put in place to ensure food safety and security. Food producers in Zimbabwe must be able to monitor their ability to produce food crops all year round utilising both rainwater and dam reservoirs (for irrigation) whilst practising crop production methods such as aeroponics and hydroponics (producing crops without soil use). Raw materials should be sourced from suppliers who are able to meet all the requirements of food sustainability such as

those ISO certified or approved through rigorous scrutinising processes, and those within the procurement functions of stakeholder organisations should monitor and see if this is really happening. Food crop varieties that mature quickly must be grown to avoid the effects of short seasons. Manual and mechanised food harvesting methods must be monitored to avoid wastes. Post-harvest food storage facilities must be adequate and provide conducive storage conditions such as temperatures and humidity and must not contribute to food waste through deterioration. Food inventory management and valuation methods must be followed systematically (such as first in first out etc.) to avoid overstoring some stocks which could result in decomposition. Proper lighting and pest control should also be done during post-harvest storage. Natural food preservatives must be preferred to chemicals. Food producer prices must enable producers to realise reasonable profits to reinvest into succeeding seasons while charging affordable prices to promote equal access to food to consumers and ensure food security.

As food is distributed from producers to various stakeholders such as suppliers, manufacturers, distributors, retailers and customers, enough care must be given to proper handling from warehouses (appropriate handling equipment must be used) into different transport vehicles. Loading and unloading processes should minimise food wastes and crews involved in such must have been trained on the proper way of doing it. Appropriate vehicle equipment such as tarpaulins, tie ropes or strings must be utilised to secure loads and avoid in-transit losses. Transport vehicles used must be efficient with minimum breakdown possibilities and weather element effects to avoid food losses from elements of weather and even theft from communities when vehicles are on breakdown for long.

Food manufacturers should have enough storage facilities to store inbound food raw materials before production. Renewable energy sources (such as solar and wind) are preferable in preserving food within warehouses before and after manufacturing. Food production methods used should reduce energy consumption and waste whilst maintaining healthy and quality food standards. Environmentally friendly plastics such as bioplastics and plant-based extracts that are biodegradable, reusable, and devoid of toxic chemicals (such as wheat, wood, and bamboo), must be used in food packaging. Food plants must be located closer to retailers and customers to reduce distribution costs which further optimise consumer food prices.

Wholesalers and retailers should do proper forecasting of food types and quantities needed by communities around them (to ensure food access). Picking, packing, and shipping must be done with the aid of appropriate technologies to minimise product obsolescence and spoiling. Proper handling methods must be utilised to manage stock movements so that there is no over or understocking done at any particular time. Food products must be competitively priced to ensure that consumers can afford basic foodstuffs. This should be done in a balance so that wholesalers and retailers are realising reasonable profits to keep on existing within the food competitive market.

On the consumer side, monitoring could be done through consumer surveys on food availability, accessibility and affordability. Monitoring must be done on a continuous basis for stakeholders to stay informed of any deviations from the intended plan. In cases of such deviations from the original implementation plan, stakeholders need to re-assess the environment, forecast and plan, evaluate the cost and benefits of each alternative, as well as prioritise or re-prioritise the SFSCM practices and approaches to be implemented to suit the new business environment's demands. Once this is done, stakeholders can implement the newly prioritised SFSCM practices and approaches, monitor implementation success and follow up.

9.5 RECOMMENDATIONS OF THE STUDY

The main objective of the study was to develop a stakeholder framework for sustainable supply chain management in the Zimbabwean food industry. This was only feasible following confirmation of the relationships between SFSCM drivers, SFSCM practices, and SDCs in the food industry. The recommendations below relate to sustainable food supply chain stakeholder firms as well as to policy makers.

9.5.1 Training and education

Internal organisation stakeholders such as employees, supply chain, logistics, procurement, purchasing managers and some non-supply chain but supporting staff such as the human resources personnel and others must enrol for sustainable seminars, formal courses or conferences on SFSCM to enhance their level of awareness and knowledge for effective implementation of SFSCM practices and approaches. This education programme should underline the significance of SFSCM practices, SFSCM drivers and the importance of different SDCs in food supply chain management. This enables them to maximise the benefits of adopting SFSCM

practices and the development of sustainable supply chain relationships successfully. Additionally, the training may assist business owners, managers, and staff in fully comprehending the significance and the benefits of SFSCM. SFSCM cannot be effectively used if the leadership does not have a thorough grasp of the subject or is not devoted to the establishment of sustainable partnerships. Thus, senior managers must assume responsibility for appreciating the opportunities and consequences of a sustainable supply chain system, more so in the Zimbabwean food industry.

9.5.2 Recommendations to policy makers

In general, policymakers are responsible for fostering a favourable environment for the development of all enterprises, regardless of size. Effective policies and strategies propel businesses forward, whereas badly designed policies and plans signal disaster and failure for businesses. The Zimbabwean government, like governments across the globe, is concerned with enhancing growth and sustainability of food supply chains as a way to combat hunger and improve food security. In line with the positive influence of SFSCM drivers on SFSCM practices and SFSCM performance, policy makers need to enforce some pertinent SFSCM drivers and practices through policy to guarantee food supply chain sustainability in the country.

9.5.2.1 Supply chain anti-corruption policy

Enforcement of anti-corruption within the entire food supply chain system is necessary and urgent. Note has been taken that sustainability is a contemporary subject in most business environments and hence the need to enforce both punitive and non-punitive measures to push for majority compliance. The hand of corruption has been rampant in the Zimbabwean industry and there is need to impose an anti-corruption law in supply chain. The legislation will focus on buyers, suppliers and producers of food products to comply with practices and drivers of sustainability all the time.

9.5.2.2 Introduce fair trading policy

Stakeholders, especially those who are business owners for food organisations should adopt fair trade policies and extend the same to their employees and consumers. Education should be given to all suppliers and buyers within the food supply chain on the benefits of fair-trade policy. All the stakeholders should be appraised of the long-term generational benefits that come with fair trade policy and SFSCM. If individual firms are able to educate their own employees and immediate stakeholders, then

development of sustainability synergies will be easy across the whole industry as all firms will be able to collectively abide by the policy and develop an SFSCM system.

9.5.2.3 Incentivisation of best performers in terms of SFSCM

SFSCM is still contemporary and new to the business environment, hence the need to create incentives for those individuals and firms who are at the forefront in promoting SFSCM sustainability. Such incentives may be in the form of tax breaks to reward success of sustainable food organisations in the industry. This will awaken even those institutions and individuals not yet ready to act accordingly. Incentives in this way will hasten the process of totally achieving sustainable food supply chains in Zimbabwe. The incentives programme should however run for a fixed period of time, for example two or three years only to encourage more players to come in and ride on the SFSCM idea, after which all stakeholders should understand the benefits without the need for any incentives.

9.6 STUDY LIMITATIONS AND FUTURE RESEARCH AVENUES

The study makes significant contributions to both theory development and the supply of ground-breaking empirical evidence on the establishment of a stakeholder framework for SFSCM implementation in the Zimbabwean food industry. There is no study without limitations and this study is no exception.

This study was conducted in the Zimbabwean food industry context, meaning the results may not be applicable in other contexts. Selection of study participants was based on those institutions affiliated to nine selected gatekeepers; the possibility exists that some equally deserving organisations were left out. Additionally, the philosophical positioning of the study may be criticised. Criticisms of the pragmatic paradigm are decades old; Kalolo (2015) warned of the consequences associated with pragmatism theory on the truth. He argued that pragmatism's main weakness emanated in its lack of view on what constitutes truth philosophically (Kalolo, 2015). Hence Quartey and Wells (2017) acknowledged these past criticisms of pragmatism calling them “intellectually naive” and “philosophically passe”. Another drawback is that pragmatism also accepts what ‘might be’ as a plausible outcome and this could turn out to be a flawed approach (Alaka et al., 2016). However, despite these criticisms, a pragmatist philosophy was the best avenue for effectively tackling the current study’s aims and objectives.

Additionally, the current study found that SFSCM practices had a negligible and minimal effect on SFSCM performance. Clearly, the possibility of methodological difficulties is eliminated. As a result of this study, future research should focus on the additional elements that influence SFSCM practices and further analyse what makes the direct relationship insignificant and weak. Future studies may also investigate other factors that affect SFSCM performance as a way of continuously improving SFSCM. Future studies can also conduct a longitudinal study to capture the long-term effects of SFSCM implementation.

9.7 CHAPTER SUMMARY

This chapter discussed how the study's 14 objectives were met and reported the study's results. Only one objective produced insignificant results against what was theoretically proposed through the quantitative hypothesis. Theoretical as well as practical consequences have been emphasised with the hope that stakeholders within the sustainable supply chain system (suppliers, buyers, distributors, wholesalers, food producers, firm owners, managers, general employees, the government, non-governmental organisations, food processors and policy makers) should benefit from the study. A new stakeholder framework for SFSCM implementation in the food industry was developed and proposed for acceptance. The study recommended stakeholders in the food industry to invest in employee training and education on SFSCM matters and processes aimed at enhancing awareness of sustainability to all stakeholders across the industry. Further, the study recommended policy makers to impose a number of measures and standards, which included a supply chain anti-corruption policy, introduction of fair-trading policy, and a policy on incentivisation of best performers in terms of SFSCM. All these policies would only work when the government and relevant ministries are in intervention. Future researchers were urged to do a further analysis on the relationship between SFSCM practices and SFSCM performance and find other factors that affect the two variables. This chapter assured that the main aim of the study was accomplished.

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APPENDICES

APPENDIX A: COVER LETTER

NELSON MANDELA UNIVERSITY

Dear Respondent

RE: Study Interview

My name is Shakerod Munuhwa, a student at Nelson Mandela University under the department of Logistics Management. I'm studying towards a PHD in Logistics and my topic is: a stakeholder framework for sustainable supply chain management in the Zimbabwean food industries. The purpose of the study interview is to solicit information from stakeholders in food supply chain regarding their thoughts on practices, challenges, drivers and dynamic capabilities of stakeholders towards achieving a sustainable supply chain management framework in food industries. In this regard you are invited to take part in this study as part of the interviewees and as part of the sample for this study. I therefore humbly request you to assist me by participating in this interview which must take approximately 30 to 60 minutes to complete. I will be grateful if you participate in this interview and please be assured that the information that you supply will remain confidential and used only for academic purposes and no single person will be identified by name in this study. You are allowed to withdraw from the research at any stage if you wish with no penalties and explanations.

Do you have any questions about what I have explained above? Feel free to ask.

Are you willing and do you consent to participate in this study? If yes, kindly sign below to give your informed written consent to participate and if no kindly leave it blank.

Yes, I give my informed written consent of participation	**No, I do not give my consent of participation**

Signature and Date ……..

Do you consent to this interview being recorded? If yes, kindly sign below to give your written consent to this interview being recorded and if no kindly leave it blank.

Yes, I give my informed written consent to have the interview session recorded	**No, I do not give my consent to have the interview session recorded**

Signature and Date ……..

Your participation is so important to me

My supervisor is Prof Progress-Hove Sibanda (Progress.Hove-Sibanda@mandela.ac.za)

Yours Sincerely

Shakerod Munuhwa
Email address: shakerodm@gmail.com

APPENDIX B: INTERVIEW GUIDE

1. In your opinion, which organisations or individuals are your organisation's key stakeholders? Do you think your organisation's stakeholders have an influence towards your organisation's ability to achieve sustainable food supply chain management *(supply chain aimed at addressing needs for food availability, affordability and accessibility, in diverse, ecologically sound and resilient circumstances enabling preservations for future generations)*?. In what way do your stakeholders influence your decisions towards the implementation of sustainable food supply chain management practices? Please explain.

2. Does your organisation implement any sustainable food supply chain management practices? If your organisation implements such practices, list those that you remember? To what extent are the sustainable food supply chain management practices implemented in your organisation? Please explain further.

3. In your opinion, what would you say are the major drivers of sustainable food supply chain management? Which amongst the ones you mentioned are directly affecting your organisation? Please explain.

4. What challenges are faced by your organisation when implementing sustainable food supply chain management practices? What has your organisation done to address the challenges you listed? Which of the approaches worked well in addressing the challenges you listed? To what extent were these approaches successful in addressing the listed challenges in terms of improving the level of implementation of the sustainable food supply chain management practices in your organisation and in your entire food supply chain? Please explain. What other approaches would you recommend to overcome such challenges? Why?

5. Stakeholder dynamic capabilities refer to the company's ability to build, integrate, and reconfigure internal and external resources and competences in context of adapting to changes in the business environment. They enable organisations to reactivate and reorganize their productive capacity to meet changing stakeholder needs.

May you list and explain on the key dynamic capabilities in your organisation? Which specific dynamic capabilities affect the food supply chain sustainability industry in Zimbabwe?

5a. Is stakeholder to stakeholder collaboration necessary in achieving sustainable food supply chain management? In what ways would you suggest that stakeholders collaborate to achieve a sustainable supply chain management in the whole food industry? Please explain making use of practical examples.

6. In your opinion, how have the sustainable food supply chain management major drivers you listed influenced the implementation of sustainable food supply chain management practices in Zimbabwe? Please elaborate on your response.

7. How have the sustainable food supply chain management major drivers you listed influenced the dynamic capabilities of your stakeholders in the food industry in Zimbabwe? Why do you say so?
8. How have the sustainable food supply chain management practices you listed influenced the dynamic capabilities of your organisation and stakeholders in the food industry in Zimbabwe? Please explain.

9. In your opinion, in what way has the implementation of the sustainable food supply chain management practices you listed influenced sustainable food supply chain performance (in other words the ability of the supply chain system to meet preservative social, economic, and environmental requirements of all stakeholders in the food industry) in Zimbabwe? Please explain.

10. How have the sustainable food supply chain management major drivers you listed influenced sustainable food supply chain performance in the food industry in Zimbabwe? Please explain.

11. In your opinion, in what way has the implementation of the sustainable food supply chain management approaches you listed influenced sustainable food supply chain performance in the food industry in Zimbabwe? Please explain.

12. How have the stakeholder dynamic capabilities you listed influenced sustainable food supply chain performance in the food industry in Zimbabwe? Pease explain

13. Is there anything more you would like to add

APPENDIX C: QUESTIONNAIRE

NELSON MANDELA
UNIVERSITY

QUESTIONNAIRE INSTRUMENT

Dear respondent, the Department of Logistics Management (Nelson Mandela University) is conducting a survey on Sustainable Supply Chain Management in the Zimbabwean Food Industry with the main objective of developing a stakeholder framework for sustainable food supply chain management (SFSCM). The purpose of the study survey is to solicit information from stakeholders within food supply chain regarding their thoughts on practices, challenges, drivers and dynamic capabilities towards achieving a sustainable supply chain management framework in food industries. The questionnaire takes approximately 25 to 35 minutes to complete. Kindly note that your participation is voluntary, and you can withdraw from the study at any time with no penalties. The information gathered will be kept in strict confidence and you will remain anonymous.

This study has received approval of the Research Ethics Committee (Human) (REC-H) from Nelson Mandela University Faculty of Business and Economic Sciences and the REC-H number is **H21-BES-LOG-132**

Name: Shakerod Munuhwa. Email: shakerodm@gmail.com

Phone Number : +26776109498

Signature: ... .

SECTION A: PERSONAL INFORMATION (Put an X below the appropriate block)

1.Gender

Female	Male

2. Respondents Age Ranges

30 to 35 Years	36 to 40 Years	41 to 45 Years	46 to 50 Years	51-60 Years

3. Highest Education Level Attained

Primary School	Secondary School	Certificate	Diploma	Undergraduate Degree	Master's degree	PHD

4. What food sector are you based in?

Food Producers	Food Processors	Suppliers	Distributers

Wholesalers	Retailers	Government	Non-Governmental Organisation (NGO)

5. How many years of experience do you have in the managerial/supervisory role you hold in the Food supply chain organisation or industry in which you are based in?

5 to 10 Years	11 to 15 Years	16 to 20 Years	21 to 25 years	26 Years and Above

6. Are you aware of Sustainable Food Supply Chain Management?

I am fully aware I am moderately aware I am not sure I know it I do not know about it

SECTION B: DRIVERS FOR SFSCM IN ZIMBABWE.

Please circle the level of agreement on each SFSCM driver below based on the situation of your organisation. There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

B1	In our food industry, sustainable food supply chain management is driven by food security requirements such as having access to sufficient and nutritious quantities of appropriate food available.	1	2	3	4	5
B2	In our food industry, sustainable food supply chain management is driven by organisational culture such as the shared beliefs and values established by leaders.	1	2	3	4	5
B3	In our food industry, sustainable food supply chain management is driven by market pressure e.g. pressure from competitors, customers, pressure groups, among others.	1	2	3	4	5
B4	In our food industry, sustainable food supply chain management is driven by government regulations such as those on labelling, packaging storing and inspection of food.	1	2	3	4	5
B5	In our industry, media pressure e.g. from social media and newspapers drives the move towards sustainable food supply chain management.	1	2	3	4	5
B6	In our food industry, sustainable food supply chain management is driven by the desire to save organisational reputation and goodwill.	1	2	3	4	5
B7	In our industry, consciousness and responsiveness of stakeholders towards environmental concerns drives the move towards sustainable food supply chain management.	1	2	3	4	5
B8	In our food industry, sustainable food supply chain management is driven by the availability of affordable technology.	1	2	3	4	5

B9	In our industry, sustainable food supply chain management is driven by macro-economic changes e.g. food prices, taxes, changing legislation, health and safety policies and changing demand etc.	1	2	3	4	5
B10	In our industry, sustainable food supply chain management is driven by the availability of adequate support for research and development on food security and sustainability throughout our supply chains.	1	2	3	4	5
B11	In our industry, food supply chain stakeholders (e.g. producers, suppliers, distributers, buyers) have made it a key requirement for us to adhere to the legislation such as the environmental management act (EMA); ISO 9000, ISO 14000) in order to promote the health of the environment.	1	2	3	4	5

SECTION C: IMPLEMENTATION OF PRACTICES FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT WITHIN FOOD INDUSTRIES IN ZIMBABWE.

Please circle the level of agreement on each of the items below based on the situation of your organisation or your knowledge. There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree.

	Sustainable food Supply chain management practices	**Responses**				
C1	In our food sector, we use energy resources such as electricity, coal and oil efficiently.	1	2	3	4	5
C2	We emphasise and promote the use of renewable energy such as solar power from production, transportation to warehousing of food products across our supply chains.	1	2	3	4	5
C3	We and our stakeholders in the entire food supply chain emphasise minimizing water use in all our operations to preserve natural resources.	1	2	3	4	5

C4	We use less weight and much simpler packaging material that can easily degrade without harming the environment as a way to minimize the carbon footprint of the food sector.	1	2	3	4	5
C5	We recycle the packaging material used for our food products	1	2	3	4	5
C6	We cooperate with packaging manufacturers to remanufacture any damaged packaging material used for our food products that has reached their end of useful life.	1	2	3	4	5
C7	We use protective packaging material on each production line for enhanced safety and quality of our food products.	1	2	3	4	5
C8	We use small, decentralized food distribution centres to improve route efficiency while promoting easy physical and economic access to food.	1	2	3	4	5
C9	Our food warehouses and distribution centres use low energy lights and sensors to reduce the unnecessary light usage and reduce energy waste.	1	2	3	4	5
C10	We train all our internal stakeholders on sustainable food production and handling.	1	2	3	4	5
C11	We use automated storage and retrieval systems to minimize our carbon emissions related to our food product returns due to human error.	1	2	3	4	5
C12	We use solar power to eliminate the dependency on fossil fuels and cut back our carbon emissions from food warehouses.	1	2	3	4	5
C13	We use pallet pooling services which purchase, recover, transport, repair and store food product pallets to minimize our carbon emissions and enhance foster our products' safety.	1	2	3	4	5

C14	We use cleaner fuels such as ethanol and Jatropha throughout our food supply chains to maintain a healthy environment.	1	2	3	4	5
C15	We frequently get our vehicles checked, serviced and well maintained to reduce our carbon emissions.	1	2	3	4	5
C16	Our policies prioritise the use of low carbon transport for our food products and waste to minimize our vehicle carbon emissions.	1	2	3	4	5
C17	We always bury our food waste materials in a safe and legally controlled dumping ground.	1	2	3	4	5
C18	We use waste water treatment plants to treat and re-use large volumes of waste water onsite throughout our food supply chains.	1	2	3	4	5

SECTION D: CHALLENGES AFFECTING STAKEHOLDERS IN IMPLEMENTING SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT.

Please circle the level of agreement on each of the items below based on the situation of your organisation. What is your level of agreement with the following challenges affecting sustainable food supply chain management (SFSCM). There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

D1	Lack of top-level management commitment with regards to sustainable food supply chain management is a major challenge in our food industry.	1	2	3	4	5
D2	In our food industry, lack of commitment from stakeholders is major challenge.	1	2	3	4	5
D3	We lack adequate technology in our food industry.	1	2	3	4	5
D4	In our food industry, we have lack of financial resources.	1	2	3	4	5
D5	In our industry, ever changing stakeholder demands such as investment, environmental or scaling up with technology are a major challenge.	1	2	3	4	5
D6	In our industry, lack of knowledge on the importance of sustainable food supply chain management is a huge challenge.	1	2	3	4	5
D7	In our industry, we struggle with inconsistent managerial approaches towards sustainable food supply chain management.	1	2	3	4	5
D8	In our food industry, lack of government support is a major challenge.	1	2	3	4	5
D9	In our food industry there are no incentives for any of sustainable supply chain management efforts, as customers are not willing to pay extra for any sustainability initiatives.	1	2	3	4	5

D10	In our industry, we have no policies in place to encourage stakeholders to adhere to sustainable food supply chain management practices.	1	2	3	4	5
D11	In our food industry, we do not have any performance measurement metrics or yardstick for understanding the organisation's level of performance on sustainable food supply chain management.	1	2	3	4	5
D12	Lack of proper planning for reverse logistics activities of food products e.g. expired or damaged food products is a major challenge in our industry food supply chains.	1	2	3	4	5
D13	In our food industry, lack of mutual trust among stakeholders is a major challenge.	1	2	3	4	5
D14	Our industry struggles with poor governance for already existing food supply chain stakeholders.	1	2	3	4	5
D15	In our food industry, lack of employee motivation to uphold sustainable food supply chain practices is a major challenge.	1	2	3	4	5
D16	Our food industry struggles with poor information sharing amongst food supply chain stakeholders.	1	2	3	4	5
D17	In our food industry, we struggle with collaboration challenges where intermediaries, tend to inflate prices, endanger the standard of quality and ultimately increase food waste and loss	1	2	3	4	5

SECTION E: APPROACHES TO REDUCE CHALLENGES AFFECTING STAKEHOLDERS IN IMPLEMENTING SUSTAINABLE FOOD SUPPLY CHAIN MANAGEMENT

Please circle the level of agreement on each of the approaches used to reduce challenges affecting stakeholders in implementing sustainable food supply chain management below based on your company. There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

E1	Our organisation has developed a stakeholder communications plan aimed at building positive stakeholder relationships	1	2	3	4	5
E2	Our organisation communicates sustainable supply chain expectations to stakeholders openly and on every step	1	2	3	4	5
E3	Our organisation developed training and capacity building programs aimed at improving sustainability and driving behavioural changes throughout the supply chain.	1	2	3	4	5
E4	The organisation joined food industry collaborations such as trade unions or National Employment Councils where common standards and best practices for sustainable food supply chain performance are shared.	1	2	3	4	5
E5	Our organisation's mission and vision incorporate sustainable food supply chain management aspects.	1	2	3	4	5
E6	Our organisation has a budget provision for food supply chain sustainability programmes	1	2	3	4	5
E7	Our organisation lobby for government support through highlighting benefits of food supply chain sustainability to the relevant ministries	1	2	3	4	5
E8	The organisation has collaborative and constant engagements with intermediary stakeholders on matters of food supply chain sustainability to have common interests and goals	1	2	3	4	5
E9	Our organisation creates welcoming work environment and recognise employees who are leading towards achieving food supply chain sustainability	1	2	3	4	5

E10	The organisation promotes open information sharing with internal and external stakeholders on any developments and awareness regarding food supply chain sustainability	1	2	3	4	5
E11	Our organisation promotes stakeholder associations such as supplier associations, intermediaries associations, CIPS, CILT, Food & Nutrition Council or national collaborations meant to improve sustainable food supply chain performance	1	2	3	4	5

SECTION F: DYNAMIC CAPABILITIES OF STAKEHOLDERS IN THE FOOD INDUSTRY.

Please circle the level of agreement on each of the supply chain capabilities below based on the situation of your company. There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Sustainable Food Supply Chain Knowledge Management		**Responses**				
FA1	We have sound knowledge and understanding of sustainable food supply chain management requirements.	1	2	3	4	5
FA2	We have the ability to collaborate with food label experts who own modern technologies to meet all the food safety standards and guidelines to be met when labelling our food products	1	2	3	4	5
FA3	We engage in third-party assessment, as is required for different international certification requirements such as ISO 9000 registration	1	2	3	4	5
FA4	We constantly meet with suppliers' top management teams to map insights into the extent to which a collaborative relationship with the purchaser is required	1	2	3	4	5
FA5	We have the ability to use modern technology to evaluate and compile the potential impact in each stage, from the raw materials, processing, use and disposal of our food products.	1	2	3	4	5
FA6	Our organisation has the ability to effectively use information sharing systems which use modern technology to provide real time information about our food products.	1	2	3	4	5
FA7	Our organisation has invested in research and development to continuously improve our knowledge and understanding of sustainable food supply chain management trends and benefits.	1	2	3	4	5

FA8	Our organisation allows information related to customer needs and behaviours, quality feedback, revenue, and trends or changes in the food supply chain environment to be accessed, shared and used to drive decision making along various segments of the organisation.	1	2	3	4	5
Development of supply chain partners such as partnership amongst suppliers, producers, distributers, or consumers		**Responses**				
FB1	Our organisation has a policy in place for supplier and partner involvement	1	2	3	4	5
FB2	Our organisation uses supplier interface management i.e., pre-selecting suppliers as a tool to promote product development collaboration	1	2	3	4	5
FB3	Our organisation has the ability to evaluate how much our stakeholders have developed.	1	2	3	4	5
FB4	We engage supply chain partners in food product development, where our supply chain partners directly contribute to the specifications of the new product.	1	2	3	4	5
FB5	Our organisation has developed a more inclusive relationship with our supply chain partners to reduce uncertainty in control of food distribution channels.	1	2	3	4	5
FB6	Our organisation continuously checks on and evaluates the performance of food supply chain partners such as suppliers, intermediaries and distributers to ensure that their performance towards sustainable food supply chain management does not lag from expectations.	1	2	3	4	5
FB7	Our customer centred approach enables open dialogue around fundamental performance metrics. This allows each party to develop relevant sustainable supply chain solutions that add new value and efficiency to our food supply chain.	1	2	3	4	5

Co-evolving in Sustainable Supply chain		**Responses**				
FC1	Our organisation's sustainable supply chain management function has proper systems in place which enables it to receive support from other internal departments such a finance, human resources to achieve its sustainable food supply chain management.	1	2	3	4	5
FC2	Our organisation's sustainable supply chain management function gives support to other internal departments such a finance, human resources for these functions to achieve their individual objectives.	1	2	3	4	5
FC3	Our organisation has proper systems in place which enables it to receive support from external organisations such as the government, privately owned organisations, or any other organisation to achieve its sustainable food supply chain management goals.	1	2	3	4	5
FC4	Our organisation gives support to external organisations such as government, Environmental Management Agency, Consumer Council of Zimbabwe or any other organisation with an objective to achieve sustainable supply chain management.	1	2	3	4	5
FC5	Our organisation drives and executes collaborations in sustainable supply chain management, e.g. wheat farmer collaborating with the flour producer.	1	2	3	4	5
FC6	We have the ability to collaborate and compete with our rivals, with the aim of co-achieving together with our food supply chain counterparts to improve sustainability.	1	2	3	4	5
FC7	We constantly measure our performance against our competitors in terms of growing together with our rivals towards sustainable food supply chain.	1	2	3	4	5
Responsive Sustainable Supply Chain Control		**Responses**				

FD1	Our organisation has always been mindful of its stakeholders' requirements and needs.	1	2	3	4	5
FD2	Our organisation has deployed advanced technologies in its collaboration with stakeholders to improve responsiveness of the organization as much as possible.	1	2	3	4	5
FD3	Our organisations take seriously any stakeholder complaint against our food products or operations. Complaints are dealt with promptly and feedback given to the stakeholder.	1	2	3	4	5
FD4	Our organisation has established a platform for smooth and ongoing communication with all stakeholders and partners, at all times, whether there are challenges or not.	1	2	3	4	5
Re-conceptualisation/Reconsidering Sustainable Supply Chain in all aspects of operations		**Responses**				
FE1	Our organisation always looks at better ways of ensuring food safety.	1	2	3	4	5
FE2	Our organisation has the drive to keep on looking for better ways to improving food quality.	1	2	3	4	5
FE3	Our organisation has set up teams who sit every now and then to re-look at the impact of food supply chain management on the economic, environmental and societal pillars around the organisation.	1	2	3	4	5
FE4	Our organisation has ways to constantly measure operational risks affecting food sustainability supply chain management and put appropriate measures in place to avoid such risks.	1	2	3	4	5

SECTION G: SUSTAINABLE FOOD SUPPLY CHAIN PERFORMANCE OF STAKEHOLDERS IN THE FOOD INDUSTRY.

Please circle the level of agreement on each of the sustainable food supply chain performance below based on the situation of your company. There is no right or wrong response, the question asks for your opinion. 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree

Sustainable Food Supply Chain Performance		**Responses**				
G1	Our pollution levels throughout the entire food supply chain have reduced significantly over the past three years	1	2	3	4	5
G2	We have reduced water waste in all our operations throughout our food supply chain over the past three years	1	2	3	4	5
G3	Over the past three years, our food supply chain's environmental carbon emissions have reduced significantly.	1	2	3	4	5
G4	We have experienced a growth in revenues because of us being certified for practicing sustainable practices throughout our food supply chain.	1	2	3	4	5
G5	Generally, we have experienced a decrease in total costs over the past three years due to our efforts to reduce our carbon footprint from production, packaging, transportation, storage and disposal of our food products.	1	2	3	4	5
G6	We have experienced a decrease in the cost for energy consumption throughout our food supply chain over the past three years.	1	2	3	4	5
G7	We have experienced a decrease in costs from waste water treatment over the past three years.	1	2	3	4	5
G8	Our firm has experienced a decrease in costs for waste disposal over the past three years.	1	2	3	4	5
G9	We have seen an increase in the number of our food products delivered on time as we choose shorter routes to transport our goods.	1	2	3	4	5

G10	Our food supply chain is now experiencing an increase in market share as a result of our clean environment initiatives which have created a very good image for us in the market.	1	2	3	4	5
G11	Having a policy of waste targets have made our food supply chain to improve the use of resources and improve food security.	1	2	3	4	5
G12	Focusing on the health of the environment has increased our customers' satisfaction.	1	2	3	4	5

THANK YOU FOR YOUR PARTICIPATION IN THIS SURVEY

APPENDIX D: ETHICAL CLEARANCE

NELSON MANDELA UNIVERSITY

PO Box 77000, Nelson Mandela University, Port Elizabeth, 6031, South Africa mandela.ac.za

Vice-Chairperson: Research Ethics Committee (Human)
Tel: +27 (0)41 504 2630
zoleka.soji@mandela.ac.za

Ref: [H21-BES-LOG-132] / Approval]

4 February 2022

Prof Hove-Sibanda Faculty: BES

Dear Prof Hove-Sibanda

A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY

PRP: Prof P Hove-Sibanda
PI: Mr S Munuhwa

Your above-entitled application served at the Research Ethics Committee (Human) (meeting of *24 November 2021)* for approval. The study is classified as a medium risk study. The ethics clearance reference number is **H21-BES-LOG-132** and approval is subject to the following conditions:

1. The immediate completion and return of the attached acknowledgement to Imtiaz.Khan@mandela.ac.za,
2. Approval for data collection is for 1 calendar year from date of receipt of this ethics approval letter.
3. The submission of an annual progress report by the PRP on the data collection activities of the study (form RECH- 004 available on Research Ethics Committee (Human) portal) by 15 November this year for studies approved/extended in the period October of the previous year up to and including September of this year, or 15 November next year for studies approved/extended after September this year.
4. In the event of a requirement to extend the period of data collection (i.e. for a period in excess of 1 calendar year from date of approval), completion of an extension request is required (form RECH-005 available on Research Ethics Committee (Human) portal)
5. In the event of any changes made to the study (excluding extension of the study), RECH will have to approve such amendments and completion of an amendments form is required PRIOR to implementation (form RECH-006 available on Research Ethics Committee (Human) portal).
6. Immediate submission (and possible discontinuation of the study in the case of serious events) of the relevant report to RECH (form RECH-007 available on Research Ethics Committee (Human) portal) in the event of any unanticipated problems, serious incidents or adverse events observed during the course of the study.
7. Immediate submission of a Study Termination Report to RECH (form RECH-008 available on Research Ethics Committee (Human) portal) upon expected or unexpected closure/termination of study.
8. Immediate submission of a Study Exception Report of RECH (form RECH-009 available on Research Ethics Committee (Human) portal) in the event of any study deviations, violations and/or

exceptions.

9. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of Research Ethics Committee (Human).

Please quote the ethics clearance reference number in all correspondence and enquiries related to the study. For speedy processing of email queries (to be directed to Imtiaz.Khan@mandela.ac.za), it is recommended that the ethics clearance reference number together with an indication of the query appear in the subject line of the email.

We wish you well with the study. Yours sincerely

Prof Z Soji

Vice-Chairperson: Research Ethics Committee (Human)

Cc: Department of Research Development Faculty Administration: BES

Appendix 1: Acknowledgement of conditions for ethical approval

ACKNOWLEDGEMENT OF CONDITIONS FOR ETHICS

I, **PROF P HOVE-SIBANDA**, (PRP) of the study entitled, **[H21-BES-LOG-132] A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY**, do hereby agree to the

following approval conditions:

1. The submission of an annual progress report by myself on the data collection activities of the study by 15 November this year for studies approved in the period October of the previous year up to and including September of this year, or 15 November next year for studies approved after September this year. It is noted that there will be no call for the submission thereof. The onus for submission of the annual report by the stipulated date rests on myself. I am aware of the guidelines (available on Research Ethics Committee (Human) portal) pertinent to the submission of the annual report.

2. Submission of the relevant request to RECH in the event of any amendments to the study for approval by RECH prior to any partial or full implementation thereof. I am aware of the guidelines (available on Research Ethics Committee (Human) portal) pertinent to the requesting for any amendments to the study.

3. Submission of the relevant request to RECH in the event of any extension to the study for approval by RECH prior to the implementation thereof.

4. Immediate submission of the relevant report to RECH in the event of any unanticipated problems, serious incidents or adverse events. I am aware of the guidelines (available on Research Ethics Committee (Human) portal) pertinent to the reporting of any unanticipated problems, serious incidents or adverse events.

5. Immediate discontinuation of the study in the event of any serious unanticipated problems, serious incidents or serious adverse events.

6. Immediate submission of the relevant report to RECH in the event of the unexpected closure/discontinuation of the study (for example, de-registration of the PI).

7. Immediate submission of the relevant report to RECH in the event of study deviations, violations and/or exceptions. I am aware of the guidelines (available on Research Ethics Committee (Human) portal) pertinent to the reporting of any study deviations, violations and/or exceptions.

8. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of RECH. I am aware of the guidelines (available on Research Ethics Committee (Human) portal) pertinent to the active monitoring of a study.

Signed: _____ Date: 4/02/2022

APPENDIX E: TABLES AND FIGURES FOR DATA ANALYSIS.

Confirmatory factor analysis: Summary of model fit

CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	87	1365,701	693	0,000	1,971
Saturated model	780	0	0		
Independence model	39	10576,226	741	0,000	14,273

RMR, GFI				
Model	RMR	GFI	AGFI	PGFI
Default model	0,041	0,808	0,784	0,718
Saturated model	0	1		
Independence model	0,446	0,115	0,069	0,109

Baseline comparisons					
Model	NFI	RFI	IFI	TLI	CFI
	Delta1	rho1	Delta2	rho2	
Default model	0,871	0,862	0,932	0,927	0,932
Saturated model	1		1		1
Independence model	0	0	0	0	0

Parsimony-adjusted measures			
Model	PRATIO	PNFI	PCFI
Default model	0,935	0,814	0,871
Saturated model	0	0	0
Independence model	1	0	0

FMIN				
Model	FMIN	F0	LO 90	HI 90
Default model	4,693	2,312	1,964	2,686
Saturated model	0	0	0	0
Independence model	36,344	33,798	32,667	34,951

RMSEA				
Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0,058	0,053	0,062	0,003
Independence model	0,214	0,21	0,217	0

AIC				
Model	AIC	BCC	BIC	CAIC
Default model	1539,701	1567,43	1859,578	1946,578
Saturated model	1560	1808,606	4427,868	5207,868
Independence model	10654,226	10666,656	10797,619	10836,619

ECVI				
Model	ECVI	LO 90	HI 90	MECVI
Default model	5,291	4,943	5,665	5,386
Saturated model	5,361	5,361	5,361	6,215
Independence model	36,612	35,481	37,766	36,655

HOELTER		
Model	HOELTER	HOELTER
	.05	.01
Default model	161	167
Independence model	23	23

Estimates (Group number 1 - Default model)							
Scalar estimates (Group number 1 - Default model)							
Maximum likelihood estimates							
Regression weights: (Group number 1 - Default model)							
			Estimate	S.E.	C.R.	P	Label
SFSCM_Practices	<---	SFSCM_Drvs	0,458	0,058	7,949	***	par_24
SDCs	<---	SFSCM_Drvs	0,522	0,045	11,558	***	par_34
SDCs	<---	SFSCM_Practices	0,273	0,042	6,447	***	par_36

SFSCM_Performance	<---	SFSCM_Practices	0,05	0,047	1,078	0,281	par_25
SFSCM_Performance	<---	SFSCM_Drvs	0,284	0,06	4,755	***	par_28
SFSCM_Performance	<---	SDCs	0,634	0,091	6,942	***	par_35

CHECK FOR SCALE RELIABILITY

SFSCM drivers reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised Items	N of Items
0,968	0,968	11

Item statistics			
	Mean	Std. Deviation	N
B1	3,49	1,101	292
B2	3,49	1,108	292
B3	3,51	1,073	292
B4	3,50	1,073	292
B5	3,70	0,984	292
B6	3,53	1,085	292
B7	3,50	1,089	292
B8	3,52	1,082	292
B9	3,53	1,072	292
B10	3,61	1,127	292
B11	3,58	1,105	292

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum /Minimum	Variance	N of Items
Item means	3,541	3,490	3,699	0,209	1,060	0,004	11
Item variances	1,171	0,967	1,270	0,302	1,313	0,006	11
Inter-item covariances	0,859	0,456	1,164	0,708	2,553	0,033	11
Inter-item correlations	0,734	0,419	0,944	0,525	2,251	0,023	11

SFSCM practices reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
0,942	0,943	18

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item means	3,625	3,541	3,767	0,226	1,064	0,004	18
Item variances	1,038	0,833	1,175	0,342	1,411	0,012	18
Inter-item covariances	0,493	0,282	1,075	0,792	3,807	0,010	18
Inter-item correlations	0,477	0,295	0,928	0,633	3,143	0,008	18

SFSCM implementation challenges reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
0,939	0,938	17

Item statistics			
	Mean	Std. Deviation	N
D1	3,89	1,051	292
D2	3,99	0,929	292
D3	4,07	0,833	292
D4	4,08	0,958	292
D5	3,98	0,929	292
D6	4,07	0,865	292
D7	3,92	0,886	292
D8	3,90	0,969	292
D9	3,91	1,035	292
D10	3,93	0,935	292
D11	3,97	0,926	292
D12	3,96	0,944	292

D13	4,17	0,757	292
D14	4,16	0,731	292
D15	4,20	0,755	292
D16	4,06	0,829	292
D17	4,10	0,825	292

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item means	4,021	3,894	4,195	0,301	1,077	0,010	17
Item variances	0,803	0,534	1,106	0,571	2,070	0,028	17
Inter-item covariances	0,383	0,098	0,984	0,885	10,015	0,027	17

Approaches to address SFSCM implementation challenges reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
0,889	0,890	11

Item statistics			
	Mean	Std. Deviation	N
E1	4,09	0,973	292
E2	4,04	0,844	292
E3	4,15	0,908	292
E4	4,08	0,919	292
E5	4,04	0,957	292
E6	3,95	0,981	292
E7	4,18	0,833	292
E8	4,15	0,881	292
E9	3,99	0,993	292
E10	4,19	0,806	292
E11	4,22	0,705	292

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item means	4,100	3,949	4,223	0,274	1,069	0,008	11
Item variances	0,801	0,497	0,986	0,489	1,986	0,023	11
Inter-item covariances	0,337	0,120	0,609	0,489	5,079	0,015	11

SDCs reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
0,964	0,965	30

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item means	3,643	3,524	3,798	0,274	1,078	0,003	30
Item variances	0,992	0,822	1,233	0,412	1,501	0,009	30

Inter-item covariances	0,469	0,244	0,913	0,669	3,743	0,012	30
Inter-item correlations	0,477	0,240	0,877	0,638	3,663	0,014	30

SFSCM performance reliability check

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of Items
0,908	0,909	12

Item statistics			
	Mean	Std. Deviation	N
G1	3,64	1,092	292
G2	3,60	0,998	292
G3	3,62	1,091	292
G4	3,65	1,059	292
G5	3,66	1,083	292
G6	3,76	1,110	292
G7	3,61	1,124	292
G8	3,64	1,108	292

G9	3,62	1,040	292
G10	3,59	1,040	292
G11	3,59	1,088	292
G12	3,65	1,029	292

Summary item statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item means	3,638	3,589	3,764	0,175	1,049	0,002	12
Item variances	1,150	0,996	1,263	0,267	1,268	0,007	12
Inter-item covariances	0,520	0,379	1,108	0,729	2,923	0,009	12

APPENDIX F: LANGUAGE AND TECHNICAL EDITOR'S LETTER

JEANNE ENSLIN
FREELANCE LANGUAGE PRACTITIONER

Editing certificate

TO WHOM IT MAY CONCERN

Language editing

I, Jeanne Enslin, acknowledge that I did the language editing of **Shakerod Munuhwa's** thesis in fulfilment of the requirements for the degree of Doctor of Philosophy (Logistics) at the Nelson Mandela University.

The title of the thesis is:

A STAKEHOLDER FRAMEWORK FOR SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN THE ZIMBABWEAN FOOD INDUSTRY

Feedback of all the language editing done has been provided to the student in writing and is evident in the version of the document in track changes and with comments. The quality of the final document, in terms of language, formatting and references, remains the student's responsibility.

Jeanne Enslin
Language editor
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Technical editing

I, Ronèl Gallie, acknowledge that I checked and corrected all in-text references and the reference, and did cross-referencing of **Shakerod Munuhwa's** thesis in fulfilment of the requirements for the degree of Doctor of Philosophy (Logistics) at the Nelson Mandela University. Detailed feedback has been provided.

Ronèl Gallie
Technical editor
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APPENDIX G: TURN IT IN REPORT

PHD Thesis 03 July 2022

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