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ASSESSING THE ROLE OF SUPPLY CHAIN INNOVATION IN FOOD PROCESSING SMES' EXPORTS IN ZIMBABWE

BY

TONDERAI KINGSTON GWATIDZO

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Abstract

This study is based on the objective to assess the role of supply chain innovation in enhancing export competitiveness among Small and Medium Enterprises (SMEs) in Zimbabwe's food processing industry. To begin with, supply chain innovation is the amalgamation that includes digitalization, lean management, and sustainability practices that improve operational efficiency and responsiveness. There is little to no doubt on the importance of innovation in global trade, but despite this notion, Zimbabwean SMEs face challenges such as poor infrastructure, limited financial resources, and fragmented supply chains that in turn affect their competitiveness and the ability to scale up internationally. To assess the role of supply chain innovation, this research adopted a mixed-methods approach, combining quantitative surveys and qualitative interviews to provide a comprehensive analysis of innovation adoption and its impact on export performance. A total of 257 SMEs were sampled using stratified random sampling, and data was collected through structured questionnaires and semi-structured interviews to ensure that there is reliability and depth of insights. The findings revealed that while supply chain innovations are moderately adopted, their impact on export competitiveness is statistically insignificant due to systemic barriers and lack of strategic integration. Innovations were primarily incremental and survival-oriented, rather than transformative. In the findings, the study concluded that supply chain innovation acts more as an enabler than a direct driver of export performance. To fully leverage innovation, SMEs must invest in other variables that include managerial capacity, system integration, and strategic planning, while other stakeholders such as the government and industry policymakers must provide coordinated support through policy, infrastructure, and financial incentives. These measures are essential to unlock the potential of supply chain innovation and enhance the global competitiveness of Zimbabwe's food processing SMEs in the long run.

Key words: supply chain innovation, export competitiveness, food processing, operational efficiency and market responsiveness.

Declaration Page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Tonderai Kingston Gwatidzo	20/10/25
tkgwatidzo	
Student's Full Name	Student's Signature (Date)
Dr. Farai Chigora	
	20/10/25
Main Supervisor's Full Name (Date)	Main Supervisor's Signature

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Dedication

This dissertation is dedicated to my Wife and Daughter, Tanatswa Kyree, and ZimTrade.

List of Acronyms and Abbreviations

AfCFTA	African Continental Free Trade Area
AI	Artificial Intelligence
ANOVA	Analysis of Variance
DCT	Dynamic Capabilities Theory
ERP	Enterprise Resource Planning
ICT	Information and Communication Technology
IOT	Internet of Things
RBV	Resource-Based View
SEM	Structural Equation Modelling
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for the Social Sciences
VRIN	Valuable, Rare, Inimitable, Non-substitutable

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The study examined the role of supply chain innovation in enhancing the export competitiveness of small and medium enterprises (SMEs) in Zimbabwe's food processing industry. Supply chain innovation refers to the combinations of new logistics systems, digitalization, lean production and sustainability initiatives (Scholten & Schilder 2015). The competitive pressure arising from globalisation and facilitating Small and Medium Enterprises (SME) access to international markets. Improving the export competitiveness of SME's has become important for both government and goods producers. However, SMEs in the food processing sector in Zimbabwe faced many challenges such as poor logistics, limited technological uptake and supply chain fragmentation, which hindered international competitiveness. This study aims to investigate how innovative supply chain strategies can address these issues, enhance cross border trade and allow Small and Medium Enterprises to break into global markets. In this chapter, there is the background and significance of the study, as well as the outline of the research objectives.

1.2 Background of the Study

In the food processing industry, supply chain modernization remains a serious challenge. Researchers have developed models to demonstrate how supply chain innovation can enhance efficiencies and competitiveness; however, many SMEs firms remain stuck in the past and this has negatively impacted their ability to be

agile and respond to marketplace needs while managing risks (Kumar & Saini, 2019). There are frameworks for encouraging agility, integration, and process improvements, but SMEs continue to be impeded by limited resources and management capabilities (Mwenda, Israel, & Mahuwi, 2023). The continued gap between academic literature and practitioners has an adverse impact on the overall performance of SMEs and, more significantly, their export capabilities.

Veteran export performance against disruptions in supply chain management for export industries relies heavily on resilience. An important consideration in this regard is the dynamic capabilities paradigm, which states that firms must continuously adjust and configure their resources and operations to respond to uncertainty and unexpected shocks (Wang & Zhang, 2021). Seeking to harness such dynamic capabilities, many SMEs have not yet developed a solid risk management strategy that will allow them to recover quickly from unexpected event (Jose & Shanmugam, 2020). Not only does this diminish operational stability, but it also undermines their reliability in international markets. To develop tomorrow's resilient export firms, SMEs must integrate resilience with their daily operations

Another crucial aspect for improving performance is adopting new technologies into supply chains. Emerging technologies like real-time data analytics, blockchain for traceability, and automation can help organizations to streamline their operations, lower costs, and provide transparency (Liu & Wei, 2021). Even though these benefits are readily identifiable, a shortage of financial resources and technical skills are challenges food processing SMEs face for adopting new technologies (Nguyen & Simkin, 2023). Finding an alignment between

technological adoption and business needs is essential for organizations to develop and exploit growth opportunities.

Scholten and Schilder (2015) are researchers from Germany who took part in supply chain information sharing in risk management. They utilized a quantitative research design along with examples from different industries they had previously studied and identified three main objectives. They concluded information sharing is pivotal for resilient supply chains and endorsed investment in digital communication platforms, strengthening relationships with partners, and improving processes continually.

Lee and Whang (2001) studied the use of e-business practices in supply chain operations within South Korea. Researchers examined e-business technology as a technological aspect of operations to improve productivity. Using a mixed-methods approach of surveys and case studies of selected companies, Lee and Whang had three overall objectives: measuring the impact of e-business adoption on operational performance, identifying technological inhibitors of integration, and proposing frameworks for the effective application of e-business in supply chain structures. Lee and Whang stated that e-business is a catalyst for changing the supply chain, and recommended an improved IT infrastructure, strategic approach, and training programs. Future research was recommended to investigate the cross-cultural effects.

Zhu and Kraemer (2005) researched the variation of post-adoption in usage and the effect of e-business to the organizational performance based on retail industry in China. Their objective was to determine how the use of e-business tool had transformed supply chain management practices and ultimately

provided value to the overall firm performance. The authors concluded that e-business adoption is a necessary practice for modernizing supply chains. Recommendations included supportive policies, additional IT training and investments in technology infrastructure.

Adeleye and Olayemi (2018) investigated supply chain management practices and how they impacted organizational performance among Nigerian SMEs. The study intended to explore the fundamental challenges and opportunities inherent in applying innovative supply chain systems in a developing economy. They recommended initial training strategy, upgrading current IT infrastructure, and recommendations for industry linkages. They recommended further research to improve their management of digital tools, identifying and integrating SCM improvements and best practices in-home based and for Nigerian SMEs.

Mhelembe and Mafini (2019), in their research examined the participation of supply chain risk management within the delivery on operational performance of SMEs in South Africa. The purpose of this study was to examine how risk management can moderate uncertainties and improve supply chains resilience to market fluctuations. They confirmed risk management as a pro-active approach to increase operational reliability, reduce impediments over time and increase effective decision making. They were able to propose future research to understand the longitudinal impact of practice taking in longer performance outcomes.

Kanyepe, Musasa, and Wilbert (2025) studied supply chain risk factors, technological capabilities, and firm performance among Zimbabwean SMEs. The research method was mixed, using surveys and qualitative interviews, with

three main objectives: identify supply chain risk factors, assess impact of technological capabilities in mitigating potential supply chain disruption and examine the impact supply chain risk and technological capabilities have on firm performance. In conclusion, they report technology and risk mitigation complement one another in enhancing competitiveness. Suggestions for future research included checking scalability and comparisons across sectors.

The socio-economic context in Zimbabwe is difficult yet motivating. It provides critical lessons in how innovative supply chain practices can enhance export abilities in small and medium-sized food processing companies. Zimbabwe has experienced economic shocks, delays due to infrastructure challenges, regulatory changes, and uncertain policies, forcing local entrepreneurs to adopt creative ways to remain in business (Mutekwe, Mafini, & Chinomona, 2020). In this setting, continuous innovation requires a flexible and creative approach to the supply chain, both to attain sustainable growth and competitive advantage.

1.3 Statement of the Problem

The food processing industry, especially SMEs, faces considerable pressures to be export competitive due to fragmented and inefficient supply chain systems. Globalization and consumers' increasing concerns around quality, traceability, and sustainability mean that supply chain innovation is essential for improving performance efficiencies, decreasing costs, and achieving international standards. However, many SMEs in the industry do not have good access to new logistics, computerized supply chain software, and adequate inventory control, which weakens their competitiveness in global markets. With the looming AfCFTA protocol, SMEs will continue to struggle with delays, waste, and non-

compliance as well as remain uncompetitive in global markets, missing out on export opportunities. According to Riaz et al. (2023) and Kim et al. (2023), an inefficient supply chain only exacerbates delays, and waste, and lack of compliance with international regulations that reduce competitiveness. For these reasons, this study will investigate the role of supply chain innovation in increasing SMEs export competitiveness, in the food processing and manufacturing industry. The research provides evidence-based insights and practical recommendations to help SMEs modernize their supply chains and compete internationally.

1.4 Research Objectives

The main research objective is to assess how supply chain innovation enhances export competitiveness among SMEs in Zimbabwe's food processing industry.

1.4.1 Sub-Objectives

(i) To identify supply chain innovations adopted by SMEs.

(ii) To link supply chain innovations to dynamic capabilities such as agility and reconfiguration.

(iii) To investigate the barriers that limit the implementation of supply chain innovations in Zimbabwe's food processing SMEs.

(iv) To evaluate the effect of supply chain innovation on market responsiveness, as a reflection of adaptive capability in volatile export environments.

(v) To analyze the relationship between innovation adoption and export performance, positioning innovation as a strategic resource for competitive advantage.

1.5 Assumptions and Hypotheses

1.5.1 Assumptions

This study is based on the following assumptions:

1. SMEs in the food processing industry are aware of supply chain innovation practices.
2. Respondents will provide honest and accurate information during data collection.
3. Supply chain innovation is measurable through technological, process, and organizational indicators.
4. Export competitiveness can be assessed through performance metrics such as market access, cost efficiency, and product quality.

1.5.2 Hypotheses

The study is guided by the following hypotheses:

H1: There is a positive relationship between supply chain innovation and export competitiveness among food processing SMEs.

H2: Barriers to innovation negatively affect the adoption of supply chain innovations.

H3: Supply chain innovation positively influences market responsiveness.

H4: The level of supply chain innovation adoption is positively associated with export performance.

1.6 Research Questions

1. What supply chain innovations are currently adopted by food processing SMEs in Zimbabwe?
2. What are the main barriers limiting the implementation of supply chain innovations in Zimbabwe's food processing SMEs?
3. How do supply chain innovations influence the market responsiveness of food processing SMEs?
4. What is the relationship between the level of supply chain innovation adoption and the export performance of food processing SMEs?

1.7 Significance of the Study

1.7.1 Significance to Practice

This research is important for practitioners, especially SME managers, policy makers, and supply chain consultants within Zimbabwe's food processing industry. The research will also help SMEs examine innovative supply chain methods such as lean management, digitalization, and risk management practices that improve their ability to export (Mhembwe & Dube, 2019). This research will help provide providers with evidence-based recommendations on how innovation could improve cost-saving efficiencies and responsiveness to international markets. Managers will be equipped to better make operational decisions, while policy makers will use the constant evidence to develop their

interventions for supply chain modernization and build capacity for SMEs. All these findings will give SME managers concrete findings they can implement to increase competitiveness, decrease operational bottlenecks and, hopefully, support sustainable growth for their business in export markets.

1.7.2 Significance to Theory and Knowledge

Theoretically, this study is meant to contribute to expanding the body of knowledge on supply chain innovation in emerging markets with a specific focus on sub-Saharan African SMEs. Research globally has uncovered supply chain models such as dynamic capabilities and supply chain integration frameworks (Wang & Zhang, 2021), but little research has considered and applied these models within Zimbabwe's socio-economic realities. This study will add to the existing body of knowledge about how supply chain innovation can increase export competitiveness in less-resourced settings. It will also contribute to the supply chain literature on how contexts such as technological hurdles, regulations, and quality of infrastructure have overlooked these concepts in favour of studies in developed economies. The conclusions will develop or advance current theories, provide new or alternate viewpoints based on the Zimbabwean business context and set new foundations for future research avenues in Southern Africa.

1.8 Delimitations of the Study

1.8.1 Conceptual Delimitations

This study considers supply chain innovation as a contributor to export competitiveness among Zimbabwe SMEs in the food processing industry.

Supply chain innovation is defined to include digitalization, lean management, sustainability, and logistics innovation. Therefore, the study ignores other factors affecting export competitiveness, such as macroeconomic policies, currency fluctuations, and trade agreements. This is conceptually justified because supply chain innovation is an actionable strategy that SMEs can drug together to influence competitiveness where larger economic factors may be beyond SMEs control. By narrowing the focus of the study, we were able to provide a detailed investigation into supply chain innovation without being clouded by unrelated external factors.

1.8.2 Spatial Delimitations

The geographical scope of this study has limited to Harare, the capital city of Zimbabwe. The study objective is limited to small and medium enterprises (SMEs) in the food processing sector of Harare. Harare is where many SMEs are found and is also the hub of Zimbabwe's economy. Limiting the study to Harare ensures that the context of the study is relevant and applicable to the stakeholders in Harare. Secondly, parameterizing the location allows for the collection and analysis of data with more control and assumes a level of homogeneity. Therefore, the findings and recommendations deriving from this study cannot be generalized to other locations, SMEs in other locations, or to other economic environments.

1.8.3 Temporal Delimitations

The rationale for not extending the focus back further in time is based on recent influential events that occurred during this period including rapid change in technology, global supply chain disruptions with the COVID-19 pandemic, and

fundamental changes to Zimbabwe's economic climate. Thus, it is important that there is a specified period of analysis which would allow an understanding of the findings in context based upon recent history. This period of analysis 2018-2024 would also help avoid drawing conclusions from outdated data yet provide a common understanding with respect to the 2025 context of the SMEs in food processing sector.

1.8.4 Methodological Delimitations

The research adopts a mixed-methods approach, using quantitative surveys and qualitative interviews. The rationale for this method is that using both quantitative and qualitative allows for a more comprehensive understanding of supply chain innovation by obtaining numerical data trends as well as rich qualitative perspectives. Nevertheless, the study does not employ experimental research or longitudinal case studies since these methods take time and resources that extend past the researchers' timeframe. Instead, with only a focus on cross-sectional data collection, the study was able to establish a practical way of gathering data while still being able to contribute valuable insight to SME supply chain innovation and export competitiveness.

1.9 Limitations of the Study

1.9.1 Participant Bias

In cases where SME managers and supply chain practitioners are asked to identify supply chain innovations and/or provide information on their adoption of such innovation, it is possible for socially desired responses to be provided rather than truthful information. To reduce the likelihood of this occurrence, the

research will maintain participant anonymity and stress the need to examine industry-wide trends rather than specific firms. In addition, triangulating interview responses with quantitative survey data will support the verification of the predictive validity of the research findings.

1.9.2 Generalisability of the Study

The results of this study are limited to the food processing industry in Zimbabwe, and it may not be appropriate to compare it to results from other countries or industries. The study was designed with the intention of providing information related to supply chain practices generally, but the differences in regulations, infrastructure and market characteristics amongst countries will determine if the results can be considered comparable. This limitation will be minimized by comparison to the other literature in other developing economies, to show similarities in results or different characteristics.

1.10 Definition of Terms

Supply Chain Innovation

For the purposes of this study, supply chain innovation is defined as the integration of new technologies, processes, and strategies aimed at improving the efficiency, responsiveness, and competitiveness of supply chain operations. This includes digital transformation, lean manufacturing, and sustainability practices that enhance business performance.

Export Competitiveness

In this study, export competitiveness shall be defined as the ability of a business or industry to successfully sell its products in international markets by meeting quality standards, reducing costs, and optimizing logistics to compete with foreign suppliers.

1.11 Chapter Summary

This chapter has presented the study's delimitations and limitations. It has outlined the conceptual, spatial, temporal, and methodological scope of this study. This study is limited to looking at supply chain innovation as an influence of the export competitiveness of Zimbabwean SMEs in the food processing industry and was executed using a mixed-methods data collection strategy. Furthermore, potential biases and issues of generalizability, along with mitigation strategies, have been identified. Definitions of key terms related to supply chain innovation and export competitiveness have been included to assist with conceptual clarity. The next chapter will provide a review of the literature that is relevant to this study, reflecting on studies on supply chain innovation and the role it plays in improving SME export performance.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews literature related to supply chain innovation and export competitiveness in SMEs, with a focus on the food processing industry. It draws on relevant theories, conceptual arguments, and empirical studies to establish what is already known and to identify existing gaps. The aim is to provide a clear foundation for the current study by analyzing how different types of supply chain innovations affect export performance, particularly in the context of Zimbabwean SMEs.

2.2 Theoretical Framework

2.2.1 Dynamic Capabilities Theory

The theory of dynamic capabilities remains key in theorizing how SMEs, specifically in the fast-paced food processing sector, can manage the complexities of export competitiveness through innovation in the supply chain. Scholars largely agree that the most fundamental proposition of dynamic capabilities theory is that organizations are required to build, integrate and reconfigure internal and external competencies to meet the challenges associated with rapidly changing environments (Teece et al., 1997; Eisenhardt & Martin, 2000; Roh & Xiao, 2024). This theoretical lens shows that firms can proactively develop their strategic and operational procedures, rather than having the reactive capacity to manage competition. Teece et al. (1997) state that capabilities are embedded in organizational processes and managerial know-how, and not just routines, that confront uncertainty and tumult within

international markets. It becomes increasingly significant to have the capacity to develop its' capability, due to perishability, compliance, and demand volatility, requiring the firm to act in a flexible but anticipatory manner.

Roh and Xiao (2024) build on this framework in contemporary contexts shaped by supply chain disruptions, i.e., pandemics, climate change, and geopolitical instability, by noting that dynamic capabilities also now include digital transformation, agile supply networks, and dynamic shipping. From this view, DCT provides a framework for understanding how dynamic capabilities can help position SMEs competitively through continuous innovation in their supply chain structures.

2.2.2 Resource-Based View

The Resource-Based View of the firm provides another important theoretical foundation for understanding the ways that and how SMEs in the food processing industry improve export competitiveness via supply chain innovation. The foundational premise of RBV is that firms can achieve an enduring competitive advantage by controlling valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991; Wernerfelt, 1984). Firms can control VRIN resources as both tangible resources (such as technology, infrastructures), and intangible resources (such as knowledge, reputation, and supply chain relationships). In the case of this study, RBV is important for understanding how internal resources related to innovation capacity, and competencies related to supply chain can be leveraged by food processing SMEs in exporting, with the assumption that strategic resources are not uniformly distributed across all firms, and firms that develop superior supply chain systems

and innovation frameworks can gain ag lasting competitive advantage in international trade.

Other researchers reinforce the RBV's use in examining export performance in SMEs. Safari and Saleh (2020) utilize the RBV and the contingency perspective to make the case that SMEs' ability to export will be influenced by internal capabilities, especially internal capabilities on supply chain integration, modifications of goods to the export market, and innovation.

2.3 Conceptual Framework

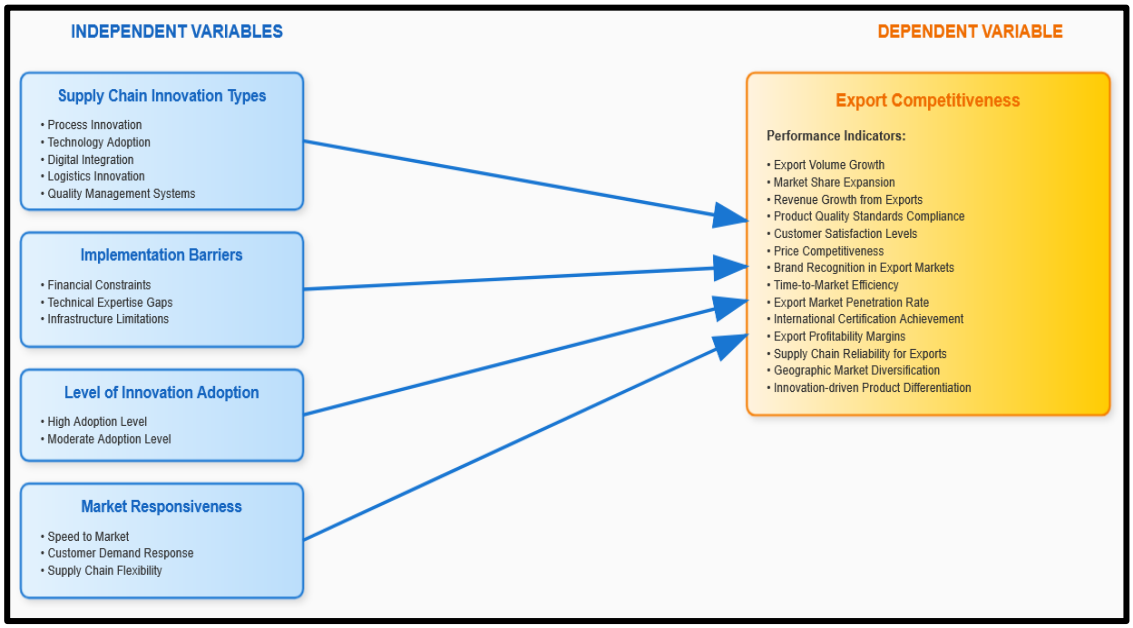

***Figure 2.3-1:*Conceptual Framework**

Researcher (2025)

The conceptual framework depicted in the above illustration shows how key independent variables relate to the dependent variable - export competitiveness in the context of food processing SMEs. The four independent variables will be, supply chain innovation types, barriers to implementation, level of innovation adoption, and market responsiveness. The independent variables are collectively

linked to export competitiveness with all the sample SMEs measured on performance outcomes like export volume growth, expansion of market share, compliance to product quality, customer satisfaction, and differentiation based on innovation. The framework indicates how various types of supply chain innovations, including process, technology, digital, logistics and quality systems innovation are contributing factors to the improvement of export competitiveness performance. Conversely, various barriers to successful implementation of innovations through different types of food processing SMEs can limit the ability to explore innovation opportunities; barriers will include lack of financial support, technical support, infrastructure and human resources. This Framework provides a rational and integrated model for the purpose of examining enablers to export success, through strategic supply chain innovation and the contextual readiness of the firm in the SME food processing sector.

2.4 Supply Chain Innovations in Food Processing Industry

Supply chain innovation has increasingly been contextualized as a strategic necessity for SMEs hoping to establish and embed export competitiveness in food processing businesses. There is a strong consensus among academia that supply chain innovation, regardless of whether it is technological, procedural, or managerial, is a vital capability for firms to situate themselves in rapidly dynamic export environments (Mwenda et al., 2023; Kamble et al., 2023; Ferraris et al., 2021). Nevertheless, the focus of the literature has mainly emphasised internal operational effectiveness at the cost of facilitating a fuller understanding of how they transform external competitiveness in export contexts. To elaborate, the development of the links between innovation, access

to export markets, certification, and distinctive value, remains weakly developed. This study seeks to challenge this narrow framing of innovation, by investigating the layers of an SME's supply chain innovation as an embedded tool for competitiveness rather than a mechanism for efficiency.

Recent studies have elevated digitalization as the leading form of supply chain innovation, particularly through technologies like blockchain, the IoT and data analytics. These technologies are said to offer enhancements in visibility, traceability, and coordination for the various actors in the supply chain (Subramanian et al. 2023). As such, it seems that the strategic value of digitalization is based less on if it exists and more about how it exists as part of the innovation practices that is wrapped around a unique value proposition in the export market.

Another area of debate is the role of decision-making and managerial skills in achieving innovative outcomes in supply chains. Innovation does not happen by itself; it relies on informed actors that can recognize, execute, and spread innovative solutions along the value chain. Namagembe and Mbago (2023) assert that managerial capacity establishes the quality of information flow, timeliness of decisions, and if innovations become aligned with market needs. However, too many studies view managerial competence as a background variable versus a primary variable explaining innovation success; the analysis of how managerial foresight clearly guides the types of innovations that either lead to product diversification, facilitate quicker permeation of markets, or foster international standard norms and certification - all fundamental to export competiveness has been limited. This study rectifies this gap, varying from other

perspectives by focusing on managerial agency as a key enabler of innovation's leverage over strategy in external markets.

Sustainability has also entered the innovation discourse with growing urgency, especially since export markets are increasingly requiring eco-compliance and traceability from their suppliers. The argument is that innovations like green procurement, energy efficient logistics and circularity in waste management are not merely ethical decisions but represent market imperatives (Kamble et al. 2023). Very few publications explore sustainability as a proactive positioning strategy within export markets. What this study is highlighting is a re-positioning of sustainability innovations as value-adding innovations, not just compliance responses. This helps to broaden the functional meaning of innovation in global supply chain.

A differing line of argument in the literature differentiates structural and adaptive supply chain innovation. Structural innovations, e.g., process reengineering, infrastructure improvements, and ERP integration, are usually defined as long-term investments that secure production and distribution (Ferraris et al., 2021). Namagembe and Mbago (2023) explain that if the responsiveness to market signals, such as changing export tariffs or changing consumer demand, can return value to the company it can improve their competitive standing immediately. However, the main drawback is that operational consistency may result without sufficiently robust systems and infrastructure. This study uses that tension to explore whether supply chain innovation can be both structurally embedded and adaptively mobilized in support of export performance in uncertain and rapidly evolving global contexts.

2.5 Barriers that Limit the Implementation of Supply Chain Innovations in Food Processing Industry

Barriers to implementing innovations in supply chains in the food processing industry have emerged as a significant topic of interest in academic literature, as innovation is being framed as increasingly critical to competitiveness and sustainability. There is agreement among some scholars who have examined this question that the barriers experienced by businesses, especially SMEs, are more than technological deficiencies but rather focusing on systemic, organizational, economic, and institutional issues (Kumar, Mangla, & Kumar, 2024; Zhao et al., 2024; Ghadge et al., 2021; Analysts, 2023). This research adopts the perspective that these barriers are not simply practical issues but reflect larger misalignments between innovation systems and the operational realities of SME-driven food supply chains.

One of the most consistently cited challenges is the financial inaccessibility of advanced technologies. Kaur, Kumar and Narkhede (2024) suggest many small and medium enterprises (SMEs) are financially constrained and cannot invest in innovations like blockchain. Even where financing exists, Zilberman, Reardon, Silver and Lu (2022) argue that lack of coherent innovation support frameworks deters adoption. Therefore, the argument is that innovative ecosystems have been framed too much for firms to operate in capital environments, ignoring the constraints of finance through which many food SMEs are operating. In absence of financial models that account for those limitations, innovations may be aspirational, but difficult to put into practice.

Technology, immaturity and lack of interoperability both present a serious limitation. Kumar, Mangla and Kumar (2024) state that most innovations developed to address food supply chains have not been designed with small and medium enterprises (SMEs) in mind and, as a result, are asking for technical capacity or digital infrastructure (that the firm does not have) to adopt the solution. Thus, if innovation is to resonate with SMEs that are seeking competitiveness via export orientation, innovation would need to be reinvented as incrementalism/adaptability as opposed to uniformly, agnostic and technological.

Culture and internal resistance also provide a key axis of limitations. Zhao et al. (2024) states that many organizations do not see the strategic advantage innovations provide and see them instead through the lens of disruption or an irrelevant practice. Kaur, Kumar and Narkhede (2024) argue that trust deficits within firms, and with supply chain partners, inhibit the data sharing and collaboration that blockchain technology requires. This study enhances that perspective by not seeing manager mindset and inter-organizational trust as soft variables, but rather as structural enablers of innovation.

The process of institutional and regulatory conditions as constraints is another layer of constraints. Analysts (2023) have highlighted how unclear, multiple and outdated food regulation can dissuade firms from investing in supply chain innovations because of the potential for future non-compliance. This is exacerbated for SMEs that operate across jurisdictions as regulatory incoherence equals high risk. Zilberman et al., (2022) have discussed how poor policy coordination and lack of specific incentives serve as disincentives to innovation

investment. Regulatory harmonization, legal clarity, and proactive policy signals should not be considered merely additional aspects of consideration for firms but as preconditions for innovation adoption, especially for SMEs operating in export markets with compliance with international standards.

A challenge lies in the scalability of supply chain innovations. Zilberman et al. (2022) assert that innovations can thrive in controlled situations or pilot studies but do not make a successful transition to wider commercial applications, which can be due not only to design or cost failures the innovative advancement can be hindered by coordination failures. The studies referenced here exemplify a systematic failure of logic in a lot of the body of literature that many of the authors assume that progress at the proof of concept will result in progress towards scalability. There is a complex suite of enabling factors that support scalability including training, partner commitment, data governance, financing and sustained policy support. This paper is going to consider those factors in the specific context of competitive outcomes.

2.6 Supply Chain Innovations and Market Responsiveness in the Food Processing Industry

Supply chain innovations and market responsiveness sit squarely at the center of a competitive and responsive food processing environment. There is substantial consensus in the academic literature that using advanced technologies, developing coherent supply chain communication and coordination, and creating agile supply chain processes, supports organisations' ability to sense and respond rapidly to adjustments in their market demand (Nazarian & Khan, 2024; Wicaksana et al., 2025; Alabi & Ngwenyama, 2023). These innovations are not

simply technological improvements; they are vital enablers of export competitiveness and resilience. However, the significant emphasis in the literature has primarily focused on what (i.e., adopting technology), not on how (a robust organisational and strategic context for how to implement responsiveness). This study seeks to shift the conversation by proposing that market responsiveness with supply chain innovations requires adoption of technologies, but also to consider the alignment of the organisations structure, systems, and culture.

Industry 5.0 innovations like artificial intelligence, robots, and the Internet of Things (IoT) provide real-time data, predictive analytics, and automated decision-making, all of which promise increased responsiveness. Nazarian and Khan (2024) talk about how this level of technology leads to enhanced tracking and adaptive control of perishables, allowing for greater speed and flexibility. However, it is important to note that the body of literature often assumes that this availability reflects upon impact. This oversights the question of whether SMEs specifically the requisite human capital, digital literacy or managerial vision must act on this insight in a timely manner. In this respect, it can be argued that responsiveness does not represent a routine capability but ultimately an aspirational capability without supporting leadership or an internal integrative approach.

In terms of integration, researchers have suggested that market responsiveness is reliant on embedded coordination across suppliers, internal operations, and customer interfaces as well. Wicaksana et al. (2025) argue that effective, seamless supply chain integration is not only a lever of operational performance,

but also a choice of strategic management to "enable dynamic adoption of innovative ideas." Similarly, a literature scoping review on digital technologies within food chains also notes that agility is linked to ecosystems integrating IoT, cloud computing and blockchain technologies to quickly align supplies to changing demand signals. But this alignment is often short-lived, as most firms are in a race to adopt point solutions without interconnectivity for a complete, systematic approach.

Despite a huge consensus on the need for responsiveness, the concept remains empirically underdeveloped. Nazarian and Khan (2024) requested operationalized definitions related to decision cycles, and lead time, among other elements, but this request has remained largely unanswered outside of prescriptive cases. This gap will require empirical clarity, and this study clarifies that lack of paradigm by linking supply chain innovation to established measurable export performance dimensions, pertaining to time-to-market, order fulfillment dependability, and customer satisfaction.

2.7 Supply Chain Innovation Adoption and Export Performance

Innovation in supply chain management has become increasingly regarded as a strategic driver of export performance in the context of changing global markets and evolving consumer demands. There is a consensus by scholars such as Ayoub and Abdallah (2019), Mukasa (2023), Talukder and Tripathi (2021), Zhang and Sun (2024), among others, that innovative supply chain practices, including agility, responsiveness, digital incorporation, and sustainability, are critical for firms with competitive intentions in exporting.

A key debate in this literature involves the distinct roles played by agility and responsiveness in enhancing export performance. Mukasa (2023) supports this view, with the argument that agility acts as a key moderator and enhances the relationship between technology orientation and export success. Yet the arguments differ in priority where Ayoub and Abdallah (2019) explicitly consider responsiveness as the variable of interest and Mukasa's (2023) arguments provide a framework with agility as the enabling variable. This is what we will address in this research by considering the strategic importance of either innovation or agility within the specific context of SMEs operating in emerging markets.

Another contested theme in the literature concerns the technological orientation of supply chain innovation. Talukder and Tripathi (2021) argue that the application of technology to supply chains delivers a statistically significant improvement in export capability. While Talukder and Tripathi (2021) embrace linear causality and predictability, Mduma and Khamis (2022) argue for context-sensitive adaptability. The difference reveals an important limitation of prescriptive models that do not adequately acknowledge the complexity and unpredictability of export ecosystems, especially in emerging economies. This study draws on both perspectives but places more emphasis on contextual dynamism and how it changes the role of supply chain innovation methods.

Zhang and Sun (2024) argue on a national level that supply chain innovation policies can greatly impact export and firm-level outcomes, especially for Chinese firms operating in industry. Nonetheless, to be excessively policy-oriented raises some issues concerning the replicability of such models in non-

obligatory state-led innovation contexts. Conversely, studies such as Mukasa (2023) et al. place less value on performance variables from a policies perspective and concentrate on how internal capabilities such as agility and innovation drives export success thus privileging endogenous over exogenous channels. This study better represents the latter view as it helps us to understand how firm-level innovation practices and policies constrain export outcomes in non-structured environments.

Similarly, sustainability-oriented innovation is frequently discussed in literature when it comes to its effect on not just financial but also export utilisation. Mwenda, Israel and Mahuwi (2020) argue that sustainable supply chain practices including green with respect to procurement and ICT practices have a positive impact on, or contribute towards, financial sustainability and export per capita potential. The argument that whilst financial advantages may occur because of relatively cost-saving innovations, export potential requires the establishment of entirely different capabilities, notably responsiveness to international quality standards, legislation and regulatory compliance. Therefore, whilst the relationship between sustainability and exporting is posited, most studies do not adequately theorize this.

Interest in the space of digitally enabled transformation, and its role in innovation related to supply chains, is growing. Wamba and Queiroz (2022) consider blockchain adoption and contend that blockchain's role specifically in disclosure and traceability will be transformative for global export chains. Their empirical work is informative, however their focus on dichotomies of developed-developing countries sometimes oversimplifies the more nuanced intra-regional

differences in the readiness to adopt. This study makes a careful contribution in extending this conversation by examining how these digital and non-digital innovations interact with one another to shape export trajectories in emerging economies.

A repeated but underdeveloped theme about the role of innovation as an integrator across supply chain nodes—procurement, production, distribution, and customer interface. Ayoub and Abdallah (2019) prioritize internal agility and responsiveness; Talukder and Tripathi (2021) develop a model based on performance dimensions; however, recently very few scholars articulate how innovations flow and integrate across the entire supply chain ecosystem. As argued here, the current study focuses away from individual bounded dimensions by examining innovation configurations composed of varying combinations of agility, responsiveness, and sustainability to examine the degree to which those elements collectively influence export performance.

2.8 Empirical Review

In Europe, Nazarian and Khan (2024) examined the impact of Industry 5.0 technologies—AI, IoT, and robotics—on supply chain agility and competitiveness in medium-sized manufacturing organizations. They utilized quantitative research in Germany and France using SEM to analyze how smart technologies allow for improved operational coordination, lead-time reduction, and adaptive/flexible manufacturing to achieve export readiness. However, the research largely incorporates a technology input perspective rather than exploring the organization or human capability requirements for innovation continuity. The exclusion of SMEs in the food processing context provides

opportunity for studies like this one to assess how such advanced technologies are engaged in resource-constrained SME situations.

The working paper by Ferdi (2025), explored how supply chain integration into global value chains (GVCs) has improved food manufacturing exports in selected African countries (Ethiopia, Ghana and Kenya.) The results, based on longitudinal data and in-depth interviews on three case studies, showed that SMEs involved in contract farming, certified sourcing and just-in-time processing, all made access to premium export markets available to them. This leaves a gap in modelling how common, internally driven, supply chain innovation occurs in SMEs and how this engagement in a diversity of supply chain management competences can harness export competitiveness of some of these regional Southern African Economies.

Uwamahoro et al. (2024) undertook a study in Rwanda, examining how supply chain collaboration and innovation affect SME performance in the manufacturing sector. The study employed structured questionnaires and case study analysis and showed that shared logistics systems, cloud-based inventory systems, and co-processing operations substantially enhanced SME agility and responsiveness which are key enablers of export competitive advantage. Although collaboration mechanisms are well investigated, the authors do not differentiate between internal and external innovation sources, nor do they isolate the food processing sector. This lack of specificity creates a gap in understanding what form of innovation matters specifically food-processing SMEs, especially those operating in export-constrained contexts which this study directly addresses.

Ojubanire et al. (2024) studied the role of awareness and readiness for Industry 4.0 tools on supply-chain innovation and export orientation among small and medium agribusinesses in Nigeria. They used a mixed-methods approach combining surveys and interviews with 120 firms. The authors discovered that IoT-enabled traceability systems and semi-automated processing lines significantly improved market responsiveness and adherence to export requirements. They conclude that technological readiness and limited capital investment can enhance export-axis competitiveness. However, they noted that the uptake was limited due to problematic technical expertise and infrastructure. This leaves a gap for future research to better integrate forms of innovation that are not just automation, especially in another context that has similar structural constraints such as Zimbabwe.

In Zimbabwe, Mashizha, Gumbo, and Chimwe (2023) researched the barriers and enablers of international trade among SMEs. Using qualitative interviews of food and non-food SME exporters, their study highlighted that as SMEs innovated in product development, packaging, and distribution channels, their competitive advantage in export markets improved. However, the study was primarily diagnostic and did not present a structured framework of how supply chain-specific innovations connect with these broader capabilities. The as-yet unexplored aspects of innovation and capability provides an opportunity for this study to investigate supply chain aspects, which are closely linked to food SMEs' export potential.

Simuka (2023) considered the impact of technological innovation on the performance of manufacturing SMEs within Harare. Utilising a quantitative

survey of 150 SMEs, the study showed that firms that adopted some form of product or process innovations had higher export volume and customer retention rates. Whereas the study provides a strong contribution of empirical evidence, it does not elaborate on any aspects of supply chain functionality such as vendor management, logistics efficiencies, or collaborations. This limitation hinders its scope on how innovations in the supply chain ecosystem contribute to export competitiveness. As a result, the current study expands Simuka's contribution to SMEs, by directing attention towards the operational innovations that occur along the supply chain in the food processing industry.

2.9 Research Gap Analysis

The existing literature on supply chain innovation and export competitiveness has made significant strides in identifying the relevance of agility, technological advancement, sustainability, and responsiveness in enhancing firm performance. The studies reviewed across global and within the African context highlight important conclusions that, logistics innovation, digital development, and supply chain integration still underpin SME competitiveness. Dynamic Capabilities Theory and the Resource-Based View have helped frame these elements, providing focus on responsiveness and internal capabilities as enablers of export improvement. However, critical gaps still exist. First, much of the literature is not fine-tuned to be industry specific; moreover, food-processing SMEs represent a unique landscape with respect to perishability, regulation, and poor infrastructure. Finally, there is still uncharted territory in how manager's agency, contextual constraints and strategic alignment influence firms' innovation adoption. This study takes a first step in addressing these gaps by exploring how

food processors in Zimbabwe operationalize specific food-processing innovations, and the influence on export competitiveness.

2.10 Chapter Summary

This chapter examined the theoretical and empirical background for studying supply chain innovation as a determinant of export competitiveness among food processing SMEs. Utilizing Dynamic Capabilities Theory and the Resource-Based View, this chapter framed the concept of innovation as corresponding to both a capability and a resource. The review of innovation types was not, however, exhaustive, nor were the barriers affecting implementation, including financial, technological, and organizational constraints. The review also highlighted the dearth of study addressing food-processing SMEs in emerging markets, particularly in relation to the industry's own strategies, integration, and degree of managerial agency. The chapter concluded by reiterating the need for this type of context-sensitive inquiry, focused on how SMEs in Zimbabwe could exploit or leverage supply chain innovation as a means of benefitting their export performance.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the methods used to examine how supply chain innovation improves the export competitiveness of SMEs in the food processing industry in Zimbabwe. It lays out the philosophical underpinnings, research paradigm, approach, design, population, sampling techniques, data collection techniques, and data analysis techniques. The chapter primarily serves to enhance methodological coherence in responding to the three research objectives.

3.2 Research Philosophy

The research was based on a pragmatist philosophical position. This philosophy guides mixed methods of research by prioritizing practical solutions over philosophical purity. Pragmatism rejects the dichotomy of positivism and interpretivism and promotes a problem-based approach to research that combines objective and subjective knowledge (Morgan, 2014). Pragmatism was appropriate for this study because it allowed the researcher to utilize quantitative data to measure any impacts of supply chain innovation on export competitiveness while simultaneously providing qualitative data exploring stakeholders' perspectives. The emphasis was on methods appropriate for addressing practical challenges faced by real-world SMEs rather than consistency of philosophy (Teddlie & Tashakkori, 2015). Practicalism provided a solid framework for topical inquiry of operational efficiencies and barriers to innovation from multiple data perspectives.

Pragmatism also recognizes that knowledge is made through experience and action, which on reflection aligned with the nature of this research. Zimbabwe's food processing SMEs operate in unpredictable, dynamic settings, which mean that real-time decisions and contextual adaptation are vital. Pragmatism provided epistemological flexibility to grapple with this reality through numerical trends and stakeholder stories (Biesta, 2010). The philosophy allows pluralism in the methods of data collection and ways of interpreting the data, which was important when considering the multiplicity of the impact of supply chain innovation on SMEs competitiveness. Consequently, the philosophical position supported the applied nature of combining complementary methods to address the study's objectives.

3.3 Research Paradigm

This study was supported by a pragmatic research paradigm, with an ontological stance that equally embraces objective realities and subjective interpretations. Pragmatism is ontologically neutral, neither strictly promoting a single, knowable reality as positivism does, nor fully endorsing relativism as interpretivism does. The pragmatist ontology recognizes there can be singularity and multiplicity of reality, with respect to context and the methodology used to investigate it (Shannon-Baker, 2016). This ontological position therefore corroborated a mixed methods integration from a pragmatic standpoint, allowing both perspectives to exist side-by-side and inform and augment understanding (Creswell, 2015).

From an epistemological perspective, this study acknowledged the possibility of both objective and subjective knowledge to tackle real-world complex problems.

Pragmatism, in respect to epistemology, is permissive of methodological pluralism, where both quantitative means (e.g., number of innovation practices for exporting) and qualitative means (e.g., respondents' understanding of barriers to innovation were both valid sources of data) (Tashakkori & Teddlie, 2010). The researcher consulted with respondents not just to collect data concerning facts, but to make meaning of the choices and behaviors of respondents in their operating environment. Conducting the study from both knowledge angles added more depth and breadth to the findings, improving transferability to both theory and practice (Feilzer, 2010). Hence, the epistemological stance, as taken in this research, enhanced the ability to comprehensively examine innovation dynamics among Zimbabwean food processing SMEs.

3.4 Research Approach

This research used a mixed methods approach that combined qualitative and quantitative methods to study the complex phenomena of supply chain innovation in food processing SMEs (Plano Clark & Ivankova, 2016). The quantitative component of the study focused on determining patterns, frequencies and statistical relationships between the supply chain innovation practices and export competitiveness. The qualitative component sought to explore the contextual realities, operational challenges and perceptions of various stakeholders. Combining quantitative and qualitative methods is important because supply chain innovation is not only a technical or financial phenomenon, but also a socially- and managerially embedded process (Ivankova & Creswell, 2015). Numerical and narrative methods together provided a more

comprehensive picture of supply chain innovation and contextualize the findings and allow generalizable conclusions to be drawn across the study sample.

3.5 Research Design

The methodology in this study follows an explanatory sequential design to an extent where the quantitative phase was first in investigating the measurable aspects of supply chain innovation, and then to deepen knowledge and explain recurring patterns in the quantitative analysis in the qualitative phase (Saunders et al, 2019). The quantitative phase was descriptive research design, an appropriate design to systematically study the occurrence of supply chain innovation practices and the influence of supply chain innovation practices on operational efficiency and export competitiveness among Zimbabwean food processing SMEs. The descriptive nature of the methods allowed me to collect similar data through structured questionnaires, therefore enabled me to investigate statistical patterns for example frequency of innovation adoption, types of technologies adopted, performance indicators reflecting the export activities (Creswell, 2015). It aligned closely with the second research objective that assessed how to measure the impact of innovation on market responsiveness and operational performance.

After the quantitative phase, the study undertook a qualitative inquiry with an exploratory design to uncover the contextual and human factors influencing supply chain innovation. The objective of this phase was to explain the findings from the quantitative results: for example, providing explanations as to why certain innovations were common, or why some SMEs claimed limited benefits from engaging with modern supply chain practices (Yin, 2016). An exploratory

design was relevant for generating rich understanding - and informative data - through semi-structured interviews with managers and personnel working for SMEs in the supply chain. Using exploratory interviews meant obtaining rich, narrative data on barriers to implementation, (Guest et al., 2020). These insights were important for first and third research objectives which both need a more interpretive dataset to explore what types of innovations were used, and the subsequent challenges following implementation.

The explanatory sequential structure produced where both designs had separate and interrelated purposes. The descriptive design gave a broad quantitative picture. The exploratory design then advanced that picture into understanding the why for the variance in trends. This sequenced approach allowed the researcher to prioritize generalizability in the broader exploratory phase (Creswell & Plano Clark, 2018). The methodological framework strengthened the study's internal cohesion and ultimately provided a more complete method of examining the impact of supply chain innovation on export competitiveness.

3.6 Target Population

The population for the quantitative component encompassed all registered SMEs covered under Zimbabwe’s food processing industry by the Ministry of Industry and Commerce and are into the export market. According to 2021 report by the Ministry of Industry and Commerce, in total there were approximate 720 registered SMEs in Zimbabwe. The population was SME owners, senior managers, and supply chain officers who had a minimum of two years’ experience in operations or management of exports.

Inclusion criteria: SMEs that were food exporters and were registered with the regulatory bodies.

Exclusion criteria: SMEs that were food processors but not formalised, SMEs that were food processors but not exporters, and SMEs that were operating for less than 18 months were regarded as irrelevant to this study.

Sample Size Determination

To determine the sample size for the quantitative survey, Yamane's (1967) formula was applied:

$$n = \frac{N}{1 + N(e)^2}$$

Where N=720, and margin of error e=0.05e = 0.05e=0.05.

$n=7201+720(0.05)^2$

=257

Thus, it was necessary to identify a sample of 257 respondents to adequately reflect the quantitative population, and the qualitative portion of the study would involve fifteen participants which were selected according to the principle of saturation wherein after a certain point in the interviews no new data was forthcoming (Guest et al., 2006). This amount was sufficient for an exploratory inquiry focused on recurring themes and rich descriptions.

3.7 Sampling Techniques

3.7.1 Probability Sampling

The stratified sampling method allowed the researcher to capture a fair distribution of SMEs operating in different environments. This captured geographical diversity and concurred with the quantitative objectives to explore innovate impact across varied environments. The stratified sampling also aided logistical considerations, as it meant that the questionnaire could be administered. Based on this criteria, the number of individuals employed per company in the targeted demographic groups, as well as the plausible sample size required to obtain reliable and valid information the study targeted companies in 8 geographical strata, that is, Harare (48), Manicaland (6), Mashonaland East (9), Mashonaland West (3), Midlands (1), Matabeleland South (2), Bulawayo (2), Unspecified/Multiple (15). These companies were identified as listed on zimbabweyp.com and as listed by Trade Zimbabwe and in the ZimTrade database. (2024, May).

3.7.2 Non-Probability Sampling

Potential participants for the qualitative interviews were obtained through purposive sampling. In other words, the researcher targeted individuals working in food processing SMEs who were in managerial positions or senior supply chain positions. Specifically, individuals were chosen who were known to be involved in some form of exporting or changing something related to an innovation. The researcher respectively employed purposive sampling with the intent of gathering rich information from informed informants (Palinkas et al., 2015). This sampling method aligned well with the exploratory purpose of

identifying barriers and experiences of food processing SMEs managers and the supply chain innovation initiative. With purposive sampling also gained thick information from a group of respondents directly related to the decision-making process of the supply chain innovation, it was evident that naturally a set of group individuals will naturally provide valuable data in relation to their own unique supply chain decision making process. Furthermore, purposive sampling provided access to participants to discuss not only what innovations were utilized, but a reason/ why some strategies were or were not executed which contributed toward these studies third research objective.

3.8 Sources of Data

3.8.1 Surveys

This study's quantitative data was gathered using survey design with structured survey instruments as a survey, a sample of food processing SMEs located across Zimbabwe were targeted. Survey design was selected due to its efficiency of quickly getting standardized responses from nearly anyone (replicability) within a defined time on a given theme and ratio data was to be analysed for purposes of making inferences about supply chain innovations, and export competitiveness (Bryman, 2016; Creswell & Creswell, 2018). Surveys data were perfectly positioned to assess quantifiable indicators such as how frequently innovations are used, levels of operational effectiveness and perceived levels of export performance. Moreover, as a structured instrument, it assisted in collecting consistent data from respondents, a very important quality for the researcher as it wanted to conduct reliable statistical analysis using SPSS software.

The survey was administered digitally via Email, WhatsApp, QR Code links and in person as convenient to both the researcher and the respondents. Online questionnaires were emailed to the SMEs based in provinces that had reliable internet access, while printed copies were hand delivered to SMEs based on proximity. This method of delivery added accessibility to the tool and allowed for a higher response rate. The instrument contained closed-ended questions that were aligned with the research objectives in the areas of supply chain technology use, collaboration practices, and export outcomes (Saunders et al., 2019; Dillman et al., 2014). Survey responses were received over a four-week period, with sufficient time for follow-ups with non-respondents to enhance participation.

3.8.2 Interviews

The qualitative component of the study relied on in-depth interviews to elicit (what Weiss, 1994) calls deeper meanings, context, and perceived barriers regarding the adoption of supply chain innovation in SMEs. By using this approach, the researcher was able to gather important contextual information that could not be obtained through the survey method alone. The researcher could elicit complex narratives about the subject matter through probing and follow-up questions to generate the groundwork towards a better understanding of the phenomena.

Semi-structured interviews were conducted with 12 purposively selected SME owners, managers, and supply chain officers based on their knowledge of supply chain practices and involvement in innovation decision-making via telephone. Interviews were conducted with an average duration of 30–45 minutes, and based on a flexible, open-ended question guide. This methodology ensured

consistent attention to key themes while enabling respondents to speak in-depth about issues pertaining to their specific context (Marshall & Rossman, 2016; Tracy, 2019). Five interviews were conducted face-to-face, while 7 other interviews were conducted remotely via telephone calls and video and audio-conferencing digital platforms such as zoom, Teams and WhatsApp. Participants received a briefing on the research objectives prior to the interviews, as well as assurance of the confidentiality and anonymity of their responses.

The interview data were recorded through handwritten field notes. Transcriptions were completed immediately after each session, maintaining fidelity and better understanding context. The qualitative data derived also provided rich detail explaining patterns observed with the survey results and provided detail on why certain innovations were highly adopted or used infrequently also demonstrated how internal or external barriers limited adoption. This explanatory function conformed to the explanatory sequential approach of the study as well as fulfilling the first and third objectives of the study (Creswell & Plano Clark, 2018). At the end of the day, interviews were an essential part of the study to explicate the human and contextual elements that fuel statistical trends.

3.9 Research Instruments

This study collected data with two primary instruments. The quantitative instrument was a structured questionnaire specifically designed to obtain standardized data regarding supply chain innovation practices and their perceived impacts on export performance. The questionnaire utilized multiple-choice questions and Likert-scale questions that aligned with the research

objectives. The questionnaire was organized into sections containing firm demographics, types of innovation, efficiency metrics, and export market engagement. The instrument was pre-tested with a small group of SMEs prior to deployment for phrasing and reliability. It was based on common and standard survey questions in the field of SMEs. It was delivered electronically and in hard copy, provided flexibility in the methods of delivery, and the possibility of different modalities for different respondents.

For the **qualitative phase**, a semi-structured interview guide was prepared to enable in-depth exploration of the most critical issues. The interviewer used the quantitative survey results to further explore areas that would be worth additional clarification or elaboration. The semi-structured interview guide was fashioned appropriately with several open-ended questions related to them such as the reasoning behind adopting selected innovations, experiences with the implementation, and perceived barriers from the university or market. The semi-structured interview guide permitted the interviewer to adjust the flow of the conversation depending on the participants, while still focusing the conversation on the core themes of the research (Tracy, 2019; Gill et al., 2008). This instrument was important as it captured the lived experiences and complexities of the perspectives of supply chain actors in the SME sector.

3.10 Data Analysis and Presentation Methods

Quantitative data obtained via the structured questionnaires were analyzed using SPSS Version 22, a statistical package that possesses a wide array of components for data examination and assessment. In this study, descriptive components such as frequencies, percentages, and means were utilized to summarize the key variables, whereas correlation and regression analysis constituted the inferential tools used to establish the extent of association between supply chain innovation and the new venture's export competitiveness (Field, 2017; Pallant, 2020). These methods facilitated the objective evaluation of trends across the sample and arguably directly related to the second research objective. Qualitative data was drawn from interviews and analyzed with Braun and Clarke (2013) thematic analysis, identifying, coding, and cataloging anything emerging across the transcripts. The approach involved using six steps from Braun and Clarke (2013): familiarization and initial coding; developing and examining themes; as well as revision and considerations for final definition and related feedback.

Using Braun and Clarke's (2013) approach was the preferential choice of meaning of complex qualitatively subjective responses and conclusions to mind with an organized and transparent framework suited to an exploratory study. Themes produced explained or otherwise added in respect of the statistical results, as grounded in the literature, and they ultimately increased any depth of explanation of SME innovation behavior. Quantitative results were presented using tables, charts, and bar graphs, which allowed for the data to be clear, visible, and comparable across variables and their relatedness to interpretability for the reader. Qualitative results were presented narratively with the themes and

texts and in support of the narratives, with verbatim quotes from participant for authenticity and voice. Thus, duality of table figures and explanatory narrative approaches were designed to bring clarity and completeness to inform the readers of both reporting of patterns in numbers as well as reporting experiences.

3.11 Validity and Reliability

To ensure validity and reliability of the quantitative instrument, the questionnaire was pre-tested with a small sample of SMEs to detect ambiguities and optimize question wording. Construct validity was enhanced as questions were aligned to address the research objectives and key concepts from theoretical frameworks. Reliability was tested employing Cronbach's alpha to assess internal consistency of the instrument, with a coefficient of above 0.70 deemed acceptable (Pallant, 2020; Saunders et al., 2019). Feedback from the pilot test was used to revise the instrument before full distribution, thereby enhancing the overall dependability of the instrument.

In the qualitative aspect, credibility was achieved through prolonged engagement with participants and members checking to validate interpretations. Providing thick, contextual accounts of SMEs and supply chain contexts supported transferability and allowed readers to judge applicability to their contexts. Dependability was ensured through an audit trail specifying each step of the data collection and analysis process. Confirmability was enhanced by maintaining reflexive field notes and secure maintaining transcripts to ensure findings were rooted in participants' stories and not researcher bias (Lincoln & Guba, 1985; Shenton, 2004). These strategies helped to support the trustworthiness of the qualitative findings.

3.12 Ethical Considerations

The study strictly adhered to ethical principles applicable to both quantitative and qualitative research. These included:

Informed consent: All participants were briefed about the study's purpose and gave written or verbal consent before participation.

Confidentiality: Personal and company identifiers were excluded from published data, and all records were stored securely.

Anonymity: Responses were coded to ensure participants could not be linked to their data.

Voluntary participation: Participants were informed of their right to decline or withdraw at any stage without consequence.

Right to withdraw: Respondents could discontinue their participation at any time, and their data would be excluded if requested.

The ethical clearance was obtained from a recognized institutional review board, and participants were treated with respect and fairness, ensuring the study met accepted norms for social science research.

3.13 Chapter Summary

This chapter has provided an overview of the research process employed to investigate the impact of supply chain innovation on export competitiveness between food processing SMEs in Zimbabwe. The research study utilized a mixed methods approach, specifically an explanatory sequential design, to

address the research objective holistically. The quantitative part used structured surveys to provide measurable data, and the qualitative part used semi-structured interviews to provide contextual data. The data analysis used SPSS package to conduct statistical tests, and the qualitative analysis used thematic analysis with coding. The research study adhered to the established benchmarks for validity and reliability and ethicality in relation to both strands. The following chapter presents the main findings derived from both research methods and will connect to the study's initial research questions.

CHAPTER 4: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This study sought to examine the role of supply chain innovation in enhancing the export competitiveness of small and medium enterprises (SMEs) in Zimbabwe's food processing industry. The study sought to answer the following questions: What supply chain innovations are currently adopted by food processing SMEs in Zimbabwe? What are the main barriers limiting the implementation of supply chain innovations in Zimbabwe's food processing SMEs? How do supply chain innovations influence the market responsiveness of food processing SMEs? What is the relationship between the level of supply chain innovation adoption and the export performance of food processing SMEs? The previous chapter outlined the methodology used in conducting this study. This chapter presents, analyses and interprets the data from which study conclusions were drawn.

4.2 Response Rate

The overall response rate of 75%, comprising 77.2% for questionnaires and 60% for interviews, is considered adequate for reliability and representativeness at a 95% confidence level and a 5% margin of error, as recommended by Yamane (1967) and Israel (2013). A response rate of 70% and above ensures that there is no bias in the responses and that they reflect the target population. The twelve successfully conducted interviews were sufficient for qualitative analysis because they reached data saturation, meaning no additional information would probably be obtained from more participants (Guest, Bunce & Johnson 2006).

(Creswell and Plano Clark, 2018). Thus, the final response rates were adequate to meet both quantitative and qualitative research standards.

Table 4.2-1: Response Rate

Data Collection Method	Target Sample (N)	Actual Responses (n)	Response Rate (%)	Remarks
Questionnaires	237	182	**77.2%**	Completed and returned questionnaires from SME managers and officers
Interviews	20	12	**60.0%**	Successfully conducted semi-structured interviews
Total	**257**	**194**	**75%**	Overall response rate for the study

Primary Data (2025)

4.3 Demographic Characteristics of Respondents

Below are tables and charts summarising the demographic characteristics of the study respondents (N = 194). All counts are in absolute numbers.

Professional Roles of Respondents

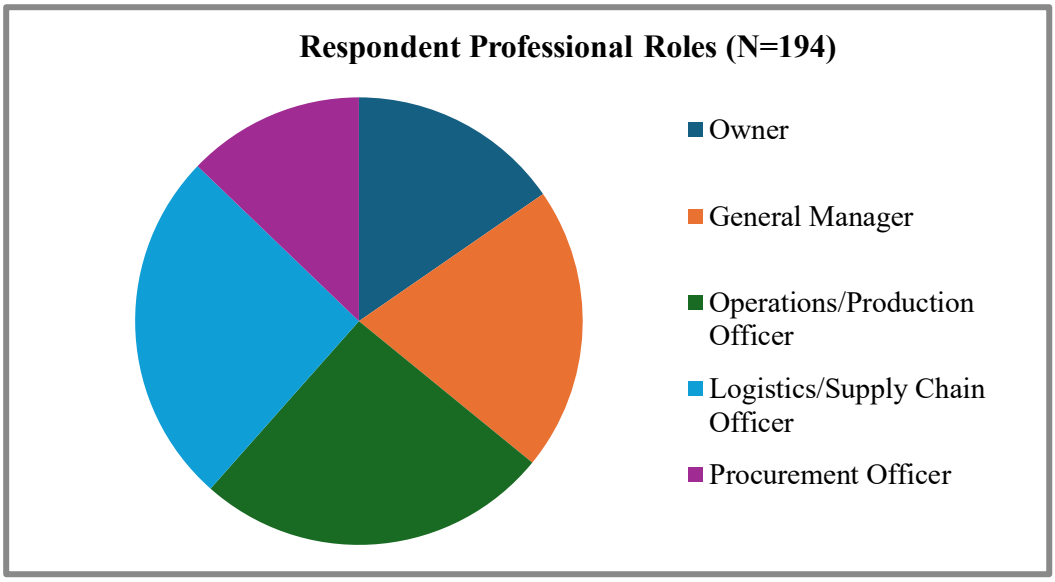

Figure 4.3-1: Demographic Characteristics of Respondents by Professional Roles.

Primary Data (2025)

As presented above, the chart reports respondent professional roles, that is, Owners 30; General Managers 40; Operations/Production Officers 50; Logistics/Supply Chain Officers 49; and Procurement Officers 25, with a total of N = 194. This mix intentionally captures strategic and operational perspectives necessary to study supply chain innovation adoption. The owners and general managers talk about strategic, financial and market decisions, while operations and logistics officers explain implementation processes and constraints. Procurement officers, which speak to suppliers and sourcing. Clear role counts also enhance internal validity and triangulation in the sense of enabling readers to evaluate whether findings are rooted in the managerial or operator levels of the organisation (Bryman, 2016). These role-specific responses add depth and dimension to the study findings. This has implications for the robustness of data interpretation in the subsequent analysis.

Years of Experience of Respondents

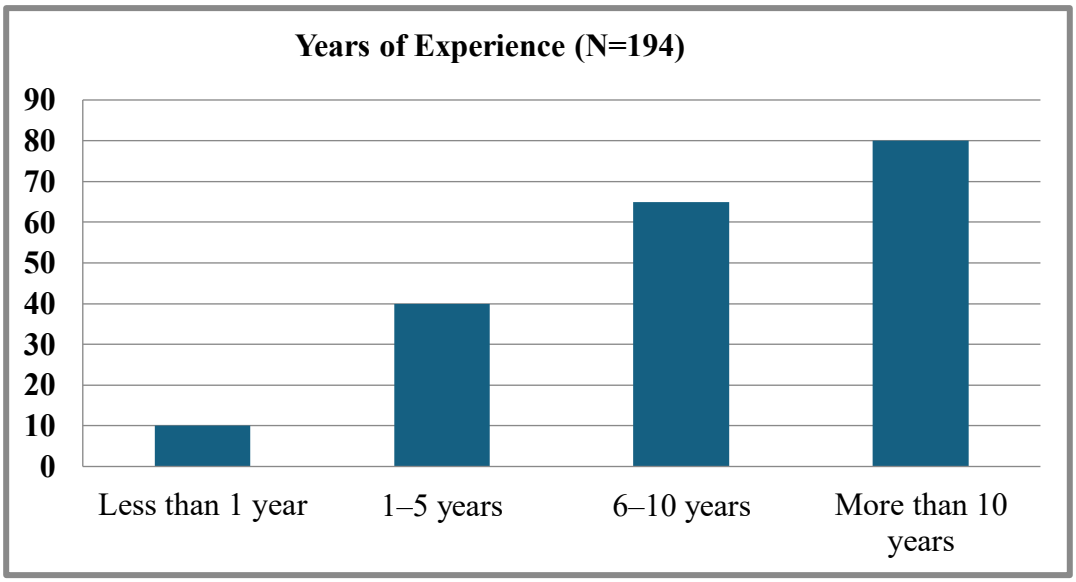

Figure 4.3-2: Demographic characteristics of respondents by years of experience

Primary Data (2025)

As presented above, Figure 4.3.2 shows the participants according to the years they have worked in their respective companies. Ten participants reported less than one year of experience, forty reported one to five years, sixty-four reported six to ten years and eighty reported more than ten years, making a total of 194. The maturity of the respondents is further emphasized by the fact that a majority (50 percent) had held their current positions for more than six years. The few respondents from lower tenure bring fresh insights into the study of supply chain innovation. Experience levels assist in understanding the respondents' ability to assess the effects of operational efficiency, decision-making and innovation capacity in their companies (Creswell & Plano Clark, 2018). This diversity is crucial in promoting the validity of research findings since it provides a balanced view from both highly experienced and relatively new nurses.

Engagement with Export Activities by Respondents

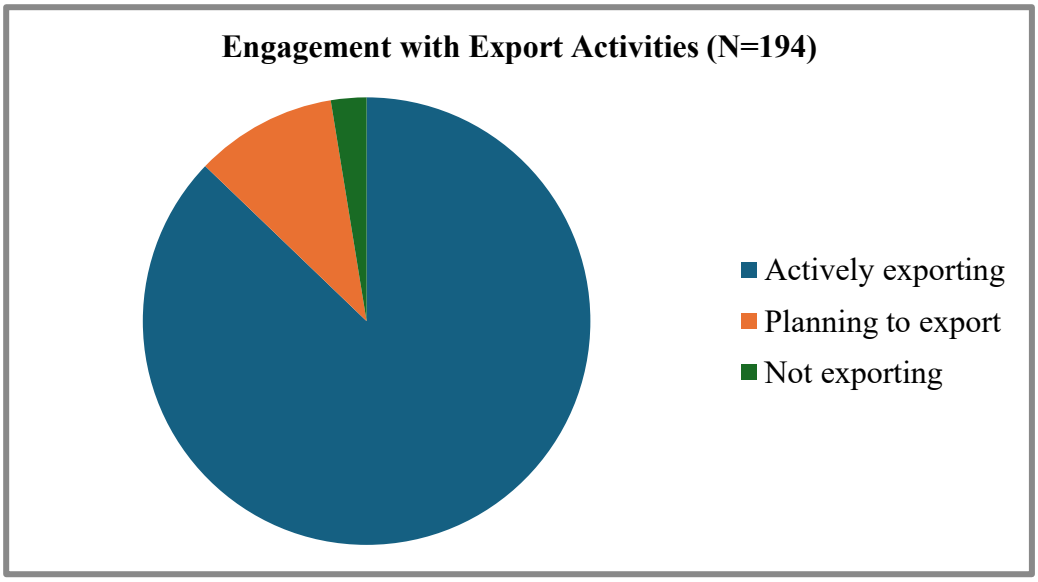

Figure 4.3-3:Demographic characteristics of respondents by engagement with export activities

Primary Data (2025)

Figure 4.3.3 illustrates the frequency of participants' engagement in export activities within their organisations. Out of the 194 respondents, 169 indicated that their companies were actively engaged in export operations, 20 respondents indicated that their companies were preparing to enter export markets and 5 indicated that their companies were not yet involved in exports. The predominance of practitioners over theoreticians is due to many respondents being actively engaged in export activities. Despite the low number, we consider the responses from those intending to export because they add depth and breadth to those already exporting. "Export involvement" refers to the employees' exposure to export operations and logistics, which affects the understanding of international requirements and innovation opportunities (Dillman et al., 2014). The distribution criterion aimed at ensuring that the questionnaires were filled by individuals with credible knowledge of export competitiveness.

Management Responsibility and Team Size of Respondents

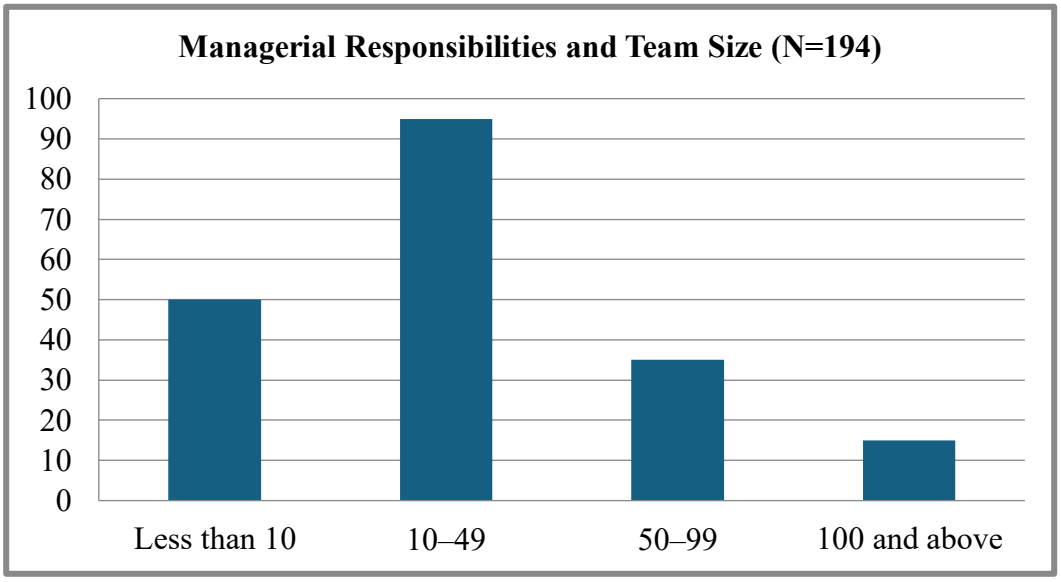

Figure 4.3-4:Demographic characteristics of respondents by managerial responsibility and team size.

Primary Data (2025)

The figure above presents data on the number of full-time employees that each respondent manages or supervises. Fifty participants were from firms with fewer than ten employees, ninety-five from businesses with ten to forty-nine workers, while thirty-four and fifteen participants belonged to the two remaining categories. These figures total 194. This variation meant that the respondents were employed by organisations of different sizes and hence could discuss management issues from an informed perspective. Managers of larger teams highlighted issues related to coordination, technology application and strategic decision-making. In contrast, those from smaller units focused on flexibility and resource limitation issues. The number of employees supervised by a manager also helps to understand the scope of the leadership and the ability to influence the implementation of innovations (Dillman et al., 2014). This diversity enhances the interpretative analysis and findings' representativeness.

Industry Sub-sector Representation of Respondents

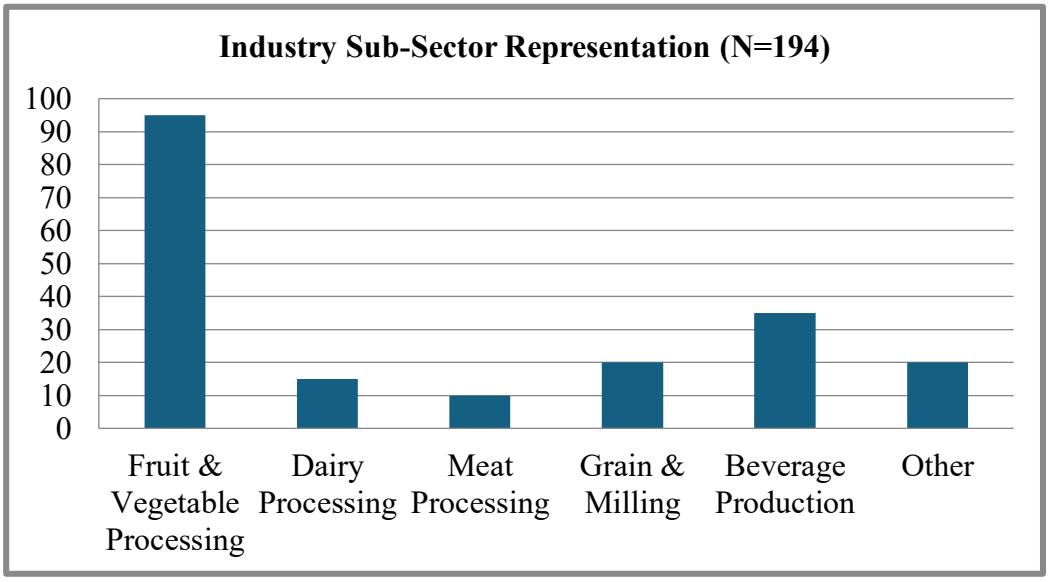

Figure 4.3-5:Demographic characteristics of respondents by industry sub-sector representation.

Primary Data (2025)

The figure above shows how participants are distributed according to the food processing sub-sectors. There were 94 respondents from fruit and vegetable processing, 15 from dairy, 10 from meat, 20 from grain and milling, 35 from beverage production and 20 from other categories making a total of 194 respondents. The higher numbers from horticulture and beverages are a reflection of the nature of the Zimbabwe food export industry. Sub-sector identification is essential because it shows how the experiences of participants differ according to production type, nature (perishable and non-perishable) and quality requirements. These variations will affect the respondents' perception of the company's innovativeness, logistics performance and export readiness (Bryman, 2016). This distribution ensures an adequate representation of perspectives in the food processing industry.

4.4 Data Presentation and Analysis

This section presents and analyses the results and findings obtained from the study. The quantitative results were analysed using SPSS Version 21 while the qualitative data was analysed using thematic analysis.

4.4.1 To establish the supply chain innovations currently adopted by food processing SMEs in Zimbabwe

The descriptive statistics was used to test the relationship and correlation using Pearson. This table presents the descriptive statistics for the study variables: supply chain innovations and food processing SMEs in Zimbabwe. The analysis summarises the central tendency (mean), dispersion (standard deviation), and the distribution range (minimum and maximum values) based on responses from 182 participants.

Table 4.4.1-1: Descriptive Statistics: Supply Chain Innovations adopted by food processing SMEs in Zimbabwe

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Supply chain innovations (B4)	182	1	5	4.37	.874
Food processing SMEs Zim	182	1	5	3.72	.936
Valid N (listwise)	182				

Primary Data (2025)

The descriptive results show that supply chain innovations scored a mean of 4. 37 (SD = 0.874), implying that most respondents agree that food processing

SMEs in Zimbabwe embrace innovation. “Performance of SMEs in Food Processing had a mean of 3” Which one did you use for the analysis of the data? The narrow standard deviations for both variables suggest that the responses were not widely dispersed from the mean, indicating a general consensus among respondents.

The findings show that while innovative solutions are widely incorporated and applied in the hotel sector, the respondents are less enthusiastic about their contribution to SME performance. This implies that, although firms are implementing the technology, it is not necessarily leading to improvements in productivity or profitability. Additionally, it’s possible that the innovative technologies introduced have not yet been adequately harnessed. Additionally, the fact that the two means are almost equal implies that other macro-environmental factors such as infrastructure and financing might have a higher depressing effect on innovative firms’ performance.

Pearson Correlation

The table provides Pearson correlation results between supply chain innovations and the performance of food processing SMEs in Zimbabwe. The correlation coefficient (r) and significance value (p) are given for the total sample of 182 respondents.

Table 4.4.1-2:Pearson Correlation: Supply Chain Innovations adopted by food processing SMEs in Zimbabwe

Correlations			
		Supply chain innovations (B4)	**Food processing SMEs Zim**
Supply chain innovations (B4)	Pearson Correlation	1	-.056
	Sig. (2-tailed)		.457
	N	182	182
Food processing SMEs Zim	Pearson Correlation	-.056	1
	Sig. (2-tailed)	.457	
	N	182	182

Primary Data (2025)

The results show that the link between supply chain innovations and SME performance is statistically insignificant, weak and negative (r = -0.056, p = .457). It indicates that as innovation adoption increases, SME performance does not significantly improve and may even slightly decline. However, the p-value is above the conventional threshold of 0. 05, the relationship might not be statistically significant.

Critically, this finding contradicts the widely held view in the literature that innovation positively influences firm performance. It can also imply that the food processing SMEs' innovations are yet to be aligned with the business goals or that contextual factors hinder the realization of benefits from innovation for SMEs. The negative coefficient also implies that the innovations could be resource-demanding and costly to implement, adding pressure on SMEs rather than improving their performance.

Model Summary

This table shows the regression model summary between supply chain innovations and food processing SMEs' performance. The indicators used in the correlation analysis include the correlation coefficient (R), the coefficient of determination (R^2) and adjusted R^2.

Table 4.4.1-3: Model Summary: Supply Chain Innovations currently adopted by food processing SMEs in Zimbabwe

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.056[a]	.003	-.002	.875

a. Predictors: (Constant), Food processing SMEs Zimbabwe

Primary Data (2025)

The findings reveal that the model has a very weak explanatory power (R = 0.056), with R^2 = 0. 003 and adjusted R^2 = -0. Could you provide more details or context for "002"? This means that supply chain innovations generate only 0. 3% of the variance in SME performance, leaving 97. 7% is unexplained by the model. The negative adjusted R^2 indicates that the model might fit worse than a horizontal line representing the mean of the dependent variable. This value is relatively high in comparison to the mean values presented earlier.

Critically, the construct ascertains that supply chain innovation does not adequately predict SME performance in Zimbabwe. This finding suggests that other factors need to be considered, such as access to capital, markets,

infrastructure and regulatory environments. It also hinted that perhaps a more nuanced approach, such as considering types of innovation (process vs product) or other moderating variables like firm size and sector competition, might yield better results.

Qualitative data sought enhanced understanding of the supply chain innovations adopted by food processing SMEs in Zimbabwe. The quantitative results had shown that although innovation adoption was generally high, the link with performance appeared weak. The twelve interviews held with SME owners, senior managers and supply chain officers showed that whereas most SMEs had introduced practices broadly definable as innovative, the precise nature, scope and strategic purpose of these innovations were firm specific.

Participants noted the increasing application of digital tools, collaborative sourcing setups, process upgrades and logistics modifications as the key innovation targets. Most companies had already switched to affordable digital platforms in their interactions with suppliers and customers. One participant said that:

> *We now use WhatsApp groups for supplier coordination and mobile payments for raw materials which make things faster even if it is not a big system. (P3)*

It was the basic, incremental digitalisation that happened across the economy and society rather than anything related to big, technological systems.

Several SMEs reported implementing new ways of sourcing and distributing products through cooperation with nearby businesses. One of the interviewees stated that:

We have partnered with two other local bakeries to bulk-buy flour and share transportation. It also cuts down on delivery expenses and ensures stock availability. (P6)

Some other examples were given by speakers which include informal partnerships, warehousing and joint purchasing. But rather as a tool to survive in a hostile economic environment. The idea that firms use creativity to stretch limited resources, known as frugal innovation, was also strongly evident in the interviews. The respondents mentioned partial automation on packaging and processing and machinery upgrades. One of the production managers noted that their firm had recently installed a semi-automatic sealing machine to reduce waste and speed up the packaging process (P10). However, the country's endemic power outages and lack of skilled personnel hampered technological development. Another participant explained, *"Innovation here is a process of adjustment; we take what works for our scale and adapt it"* (P1).

Some stated that *"we have come a long way"* while others questioned whether it was enough for the business to be competitive. She stated that *"sometimes we innovate just to survive not necessarily to compete globally"* (P8). Another common pattern is the reliance on external training support or donor programmes. P5 stated that *"most of our changes came after a training funded by a development agency, but after that we could not sustain the same momentum."*

The overall picture emerging from the interviews is that the food processing SMEs in Zimbabwe are engaging in modest and mostly reactive supply chain innovations. The quantitative results indicated a high innovation mean score of

4. In addition, the interviews can provide insights into what is happening in an organization. This is because most practices are operational as opposed to being strategic. SMEs predominantly innovate to ensure continuity of day-to-day operations due to the economic pressure rather than using innovation as a tool for export expansion and competitiveness. This means that insufficient financial resources, poor infrastructure and lack of technical skills are among the factors limiting supply chain innovation in SMEs.

4.4.2 To investigate the barriers that limit the implementation of supply chain innovations in Zimbabwe's food processing SMEs

Descriptive Statistics

Table 4.4.2-1 provides a descriptive summary of respondents' ratings regarding two key barriers that potentially constrain supply chain innovation in Zimbabwe's food processing SMEs: poor ICT infrastructure and unreliable internet, and lack of government incentives for SME modernisation. The table displays measures of central tendency (mean) and dispersion (standard deviation), alongside the observed minimum and maximum values on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Table 4.4.2-1: Descriptive Statistics: Barriers that limit the implementation of Supply Chain Innovations in Zimbabwe's food processing SMEs

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Poor ICT infrastructure and unreliable internet (C4)	182	1	5	3.04	.951
Lack of government incentives for SME modernization (C6)	182	1	5	2.97	1.095
Valid N (listwise)	182				

Primary Data (2025)

The results show that poor ICT infrastructure and unreliable internet scored a mean of 3. (SD = 0.951) and a range from 1 to 5. This result suggests that inadequate ICT facilities and inconsistent connectivity moderately impede innovativeness in universities. The relatively small standard deviation of 0. The standard deviation is 951, which means that there was not much variation in the views of the respondents. "Lack of government incentives for SME modernisation" had a mean score of 2. 97 (SD = 1.095), also skewed toward agreement. A slightly higher dispersion (SD = 1.095) underscores potential heterogeneity in perceptions, possibly due to varying experiences with government programs and policy awareness.

From a critical standpoint, these descriptive results show that the issues in technological and policy domains are not unanimously acknowledged as

problematic by SME management. The means below 3. 5 suggest that while the barriers exist, they are not overly severe. Perhaps they did not rely on the government's technological investments but rather sought private alternatives to boost their efficiency. The fact that the overall scores were close to the midpoint indicates that universities in Nigeria lack adequate facilities and institutional support. This implies that government support and facilitation are limited and the digital infrastructure is poorly developed to ensure the efficient operations of SMEs.

ANOVA[a]

The ANOVA table tests the combined influence of three predictors, poor ICT infrastructure and unreliable internet, financial limitations, and lack of government incentives for SME modernisation, on the dependent variable, lack of knowledge about available technologies. The analysis evaluates whether the variation in technological knowledge among SMEs can be statistically explained by these barriers.

Table 4.4.2-2: ANOVA Table: Barriers that limit the implementation of Supply Chain Innovations in Zimbabwe's food processing SMEs

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.118	3	.039	.035	.991[b]
	Residual	201.667	178	1.133		
	Total	201.786	181			

a. Dependent Variable: Lack of knowledge about available technologies (C2)

b. Predictors: (Constant), Lack of government incentives for SME modernization (C6), Financial limitations prevent adoption of innovations (C1), Poor ICT infrastructure and unreliable internet (C4)

Primary Data (2025)

The results show that the regression sum of squares is 0. 118 and a residual sum of squares of 201. 667, resulting in a total of 201. “786” The F statistic is 0. 035 (p = 0). 991. The very low F value and the high level of significance show that the relationship between independent variables and a dependent variable is not statistically significant. In practical terms, this means that the model accounts for almost none of the total variation in SMEs lack of knowledge about technology. The mean square for the regression is 0. 039 compared to 1 133 for the residual.

These results suggest that the factors tested in this model do not adequately explain the technological knowledge gap among SMEs. The extremely high significance level of 0. What does it mean when the Pearson correlation is .991? This implies that knowledge challenges could be emanating from other sources such as the employee’s level of education, or exposure to research institutions and managerial positions in organizations. Thus, the likelihood that barriers to practice are not directly related to knowledge is high. In other words, poor infrastructure and limited incentives for SMEs would primarily impact the implementation of innovative strategies rather than their awareness. This implies that efforts to improve knowledge diffusion, such as addressing poor linkages between firms and universities, need to go beyond the apparently obvious issues of inadequate funding or infrastructure.

Coefficients[a]

This table provides the regression coefficients showing how each predictor variable contributes individually to explaining the lack of knowledge about available technologies. The coefficients measure the expected change in the dependent variable when each independent variable changes by one unit, while the others are held constant.

Table 4.4.2-3: Coefficients Table: Barriers that limit the implementation of Supply Chain Innovations in Zimbabwe's food processing SMEs

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	4.247	.418		10.168	.000
Poor ICT infrastructure and unreliable internet (C4)	.017	.084	.015	.202	.840
Financial limitations prevent adoption of innovations (C1)	.018	.079	.017	.225	.823
Lack of government incentives for SME modernization (C6)	-.003	.073	-.003	-.040	.968

a. Dependent Variable: Lack of knowledge about available technologies (C2)

Primary Data (2025)

The findings show that poor ICT infrastructure and unreliable internet have a coefficient of 0. 017 (standard error = 0). 084 and a significance of 0. ``` 840. ```

Financial barriers: 0. 018 (SE = 0. 079 and a significance value of 0. Do you love me? Lack of government incentives has a coefficient of -0. 003 (standard error = 0. 073 and a significance value of 0. 968. None of these predictors are statistically significant because their significance values are all greater than 0. 05 threshold. The constant term is 4. 247 with a significance level of 0. 000). This means that the technological knowledge gaps remain high even when the predictors are equal to zero.

The absence of statistically significant coefficients corroborates that these barriers do not predict SME managers' technology knowledge. The coefficients are very small and close to zero, meaning that the knowledge level does not change much with the shifts in ICT access, financial resources and government support. This implies that although firms identify them as barriers, they do not directly dictate whether managers or employees are aware of new technologies. The constant value was significant, which implies that the knowledge gaps exist in all firms regardless of their conditions. This means that SMEs in developing markets may have poorer access to research institutions and inadequate employee training systems. This further calls for innovation support programs to build human capacity and foster knowledge transfer rather than focusing on infrastructure and funding.

The qualitative findings also revealed that the barriers are deep-rooted and systemic, while the enablers are not adequately institutionalised. The data indicated that despite the consensus on innovation's significance for competitiveness, poor financial, infrastructural and institutional backing weakens the foundation upon which it thrives. Financial constraints emerged as

the most persistent and debilitating barrier. Participants observed that the cost of capital is high and there are no adequate financing structures to support innovation in developing countries. P2 noted that:

> *We cannot afford licenses or new machinery, so most of us rely on the manual system.*

It also hampered their confidence in the potential returns from investing their scarce resources into innovative technology. The consequence is an aversion to risk that entraps companies in low-innovation cycles, perpetuating inefficiency and reliance on obsolete practices.

Infrastructure and technological deficits were considered one of the chronic barriers to innovation in the country. They explained how power outages, insufficient internet connectivity and lack of digital infrastructure constantly stifle the most basic technological advances. P7 explained that:

> *There are times we go for hours without electricity or the network is down.*

This fear significantly hampers technological advancement and product innovation in the supply chain. Additionally, the government does not provide adequate support to the local companies. Several participants lamented the fact that policy efforts aimed at promoting innovation among small businesses were largely “rhetorical” and uncoordinated.

The findings explain why the quantitative analysis reported weak and statistically insignificant links between barriers and innovation knowledge or performance. The lack of statistical significance does not necessarily mean the effect is absent or irrelevant. Rather, it highlights the institutional voids and

infrastructural deficiencies which dilute innovative efforts. Financial limitations, infrastructural deficiencies and policy incoherence significantly impact the strategy's implementation. This state of affairs can aptly be referred to as "innovation inertia," where the desire to innovate exists but is hampered by the organization's systemic structure. It would be futile to address the individual barriers in isolation. What is required is coordinated action on multiple levels to address the structural impediments to innovation.

4.4.3 To ascertain supply chain innovation's influence on the market responsiveness of food processing SMEs

Descriptive Statistics

This table presents the descriptive summary of variables related to supply chain innovation and their influence on market responsiveness among food processing small and medium enterprises in Zimbabwe. The measures include the mean, standard deviation, and the range of values from one to five, representing the level of agreement by respondents regarding the use of various digital and automated tools within their firms.

Table 4.4.3-1: Descriptive Statistics: Supply Chain Innovation's influence on market responsiveness of food processing SMEs

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Use of mobile apps or SMS-based supplier systems (B6)	182	1	5	3.73	1.061
Use of automated inventory and stock control tools	182	1	5	4.46	.851
Integration of ERP systems across departments (B3)	182	1	5	3.71	.932
Valid N (listwise)	182				

Primary Data (2025)

The use of automated inventory and stock control tools had the highest mean score of 4. 46 with a standard deviation of 0. 851, indicating widespread practice. This value is relatively high (close to upper limit of a 5-point scale), which means that the respondents strongly agreed that automated processes enhance operational and market responsiveness. The use of mobile applications or short message service supplier systems had a mean of 3. 73 with a standard deviation

of 1. 061, indicating generally moderate to high acceptance with a slightly wider data spread. Integration of enterprise resource planning systems across departments had a mean of 3.71 and a standard deviation of 0. 932. The sample size for all measures was 182, confirming a reliable representation of firms in this sector.

The findings show that implementation of technology in supply chains linked with three types of innovation is moderately high. The highest mean value for automated inventory systems suggests that firms may prioritise innovations that support the core operations of their businesses. Slightly lower scores of ERP integration and mobile systems suggest that companies may still struggle with cross-departmental coordination and real-time supplier communication. The relatively higher standard deviation for mobile systems also means that firms are unevenly adopting the technology. The data, therefore, show that the innovation process is still not fully advanced because only some automated technologies are fully integrated and can interact in real-time in most food processing firms.

ANOVA[a]

This table presents the results of an analysis of variance that tested the combined effect of selected supply chain innovations on the use of mobile and SMS-based supplier systems, which serve as an indicator of market responsiveness. The analysis examines whether variables such as automated inventory tools, ERP integration, cloud-based procurement systems, and real-time tracking significantly predict the use of these communication technologies.

Table 4.4.3-2: ANOVA Table: Supply Chain Innovation's influence on market responsiveness of food processing SMEs

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.356	4	.339	.296	.880[b]
	Residual	202.451	177	1.144		
	Total	203.808	181			

a. Dependent Variable: Use of mobile apps or SMS-based supplier systems (B6)

b. Predictors: (Constant), Real-time product tracking and traceability tools (B5), Integration of ERP systems across departments (B3), Cloud-based platforms for procurement or logistics (B2), Use of automated inventory and stock control tools

Primary Data (2025)

The regression sum of squares was 1.356 compared with a residual sum of squares of 202.451, giving a total of 203.808. The mean square for the regression was 0.339 while that for the residual was 1.144, resulting in an F statistic of 0.296 and a significance level of 0.880. This means that the combined influence of the independent variables on the dependent variable was statistically insignificant. The very high p-value of 0.880 indicates that there is an 88 percent probability that the observed relationship occurred by chance, confirming that the model explains almost none of the variation in the dependent variable.

From a critical perspective, the results demonstrate that supply chain innovations such as automation, ERP systems, and cloud-based tools do not collectively have a statistically measurable influence on the use of mobile or SMS supplier

systems among SMEs. The insignificant F statistic indicates that these technologies, though implemented in some firms, may not yet be sufficiently integrated or leveraged to improve market responsiveness. This lack of significance may also reflect structural barriers such as limited internet connectivity, lack of system interoperability, or insufficient training in technology use. The findings suggest that while individual innovations may contribute to internal efficiency, their combined impact on external market communication and responsiveness remains weak. This points to the need for a more holistic innovation strategy that links internal systems with supplier and customer communication platforms to enhance real-time decision-making and responsiveness.

Coefficients[a]

This table presents the regression coefficients that show the individual contribution of each supply chain innovation variable to the dependent variable, which is the use of mobile applications or SMS supplier systems. The coefficients measure how much the dependent variable changes for every one-unit change in the independent variables while the others remain constant.

Table 4.4.3-3: Coefficients Table: Supply Chain Innovation's influence on market responsiveness of food processing SMEs

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.380	.654		5.165	.000
	Use of automated inventory and stock control tools	-.050	.099	-.040	-.503	.616
	Cloud-based platforms for procurement or logistics (B2)	.038	.080	.036	.472	.638
	Integration of ERP systems across departments (B3)	.077	.088	.068	.880	.380
	Real-time product tracking and traceability tools (B5)	.034	.087	.030	.386	.700

a. Dependent Variable: Use of mobile apps or SMS-based supplier systems (B6)

Primary Data (2025)

The results show that the constant term had a value of 3.380 with a t value of 5.165 and a significance level of 0.000, confirming that the baseline use of mobile or SMS systems is statistically significant even without the influence of other variables. The use of automated inventory and stock control tools had a coefficient of negative 0.050 with a standard error of 0.099 and a significance value of 0.616. The use of cloud-based procurement or logistics platforms had a coefficient of 0.038 with a standard error of 0.080 and a significance value of

0.638. Integration of enterprise resource planning systems across departments had a coefficient of 0.077 with a standard error of 0.088 and a significance value of 0.380. The use of real-time product tracking and traceability tools had a coefficient of 0.034 with a standard error of 0.087 and a significance value of 0.700. All the predictors have p-values greater than 0.05, showing that none of them have a statistically significant influence on the dependent variable.

Critically, the coefficients confirm that individual components of supply chain innovation contribute very little to explaining variations in mobile or SMS-based supplier engagement. The small magnitude of all coefficients, together with their high significance values, indicates that these innovations do not exert meaningful predictive power on market responsiveness. The slight negative relationship for automated inventory tools may suggest that firms focusing heavily on internal automation have not yet extended those efficiencies into external communication systems. Similarly, the small positive coefficients for ERP and cloud systems imply that integration and cloud adoption have potential but remain underdeveloped. The dominance of the constant term indicates that the use of mobile technologies is already common practice, possibly driven by basic communication needs rather than advanced innovation. Overall, the statistics suggest that while food processing SMEs are embracing digital tools, these efforts have not yet evolved into cohesive systems that link innovation with real-time market interaction and responsiveness.

The qualitative findings revealed that while many food processing SMEs in Zimbabwe have begun to adopt supply chain innovations, their influence on market responsiveness remains inconsistent and often limited in scope. Participants acknowledged that innovations such as automated inventory

management, digital communication platforms, and basic enterprise integration tools have improved operational visibility and reduced delays in some instances. However, these changes have not fully translated into greater agility or responsiveness to market shifts. P4 observed that:

> *Automation has made it easier to monitor stock levels and plan deliveries faster, but it has not yet helped us respond quickly to new customer demands or export opportunities.*

Most participants explained that innovations were primarily oriented toward internal efficiency rather than dynamic market adaptation. P9 pointed out that firms often *"use technology to fix production problems rather than to track or anticipate customer trends."* This suggests a reactive rather than proactive approach to innovation, where digital tools are implemented as problem-solving mechanisms rather than as enablers of market intelligence. Other participants added that fragmented system integration limited the ability to link supplier, production, and customer data in real time. Several firms used separate software for inventory control, ordering, and accounting, which constrained the flow of information necessary for quick decision-making. P12 noted that the absence of cross-functional coordination meant that *"different departments work with their own systems, so we still rely on phone calls to confirm urgent orders."*

These findings provide valuable insight into the quantitative results, which showed no statistically significant relationship between supply chain innovations and indicators of market responsiveness. The interviews illuminate why this is the case: although automation and digital tools are present, they often function in isolation and are not strategically aligned with market feedback mechanisms.

The firms' innovations seem operationally focused, targeting efficiency gains without necessarily enhancing their capacity to sense and respond to shifts in customer preferences, supply disruptions, or export demands. The weak statistical correlations observed in the quantitative phase therefore mirror a deeper structural issue revealed in the qualitative data. Innovation, in most cases, has been confined to process optimisation rather than full supply chain synchronisation. The evidence suggests that without integration across systems, departments, and market interfaces, supply chain innovation remains an inward-looking exercise that improves internal control but fails to yield meaningful improvements in external responsiveness. What emerges is a pattern of partial innovation, where digital adoption occurs, but the strategic logic connecting technology, information flow, and market agility is still largely underdeveloped.

4.4.4 To determine the relationship between the level of supply chain innovation adoption and export performance.

Descriptive Statistics

This table provides a descriptive summary of the two variables used to evaluate the relationship between the level of supply chain innovation adoption and export performance among food processing small and medium enterprises in Zimbabwe. The table summarises the central tendency and dispersion for each variable, showing the minimum, maximum, mean, and standard deviation across 182 valid responses.

Table 4.4.4-1: Descriptive Statistics: Relationship between Supply Chain Innovation Adoption Level and Export Performance.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Innovation has opened new international market channels (E5)	182	1	5	3.85	.933
Export costs have decreased due to operational efficiency (E4)	182	1	5	3.03	.997
Valid N (listwise)	182				

Primary Data (2025)

The item measuring whether innovation has opened new international market channels recorded a mean of 3.85, a minimum of 1, a maximum of 5, and a standard deviation of 0.933. This indicates that on average, respondents tended to agree that innovation has enabled them to access new export markets, with relatively moderate variability in responses. In contrast, the item measuring whether export costs have decreased due to operational efficiency reported a mean of 3.03, a minimum of 1, a maximum of 5, and a standard deviation of 0.997. The difference of 0.82 between the means demonstrates that the perceived benefit of innovation is stronger in terms of market expansion than in cost reduction. The full range of responses for both variables, from 1 to 5, suggests a wide spread of opinions among firms, reflecting heterogeneity in innovation levels and export outcomes across the sector. The coefficients of variation,

computed as standard deviation divided by mean, are approximately 24 percent and 33 percent respectively, confirming that perceptions of market expansion are more consistent across firms than perceptions of cost reduction.

Critically, these descriptive results indicate that while innovation adoption appears to be positively associated with export opportunities, the same cannot be said for efficiency-driven cost advantages. The relatively high mean for market expansion demonstrates that innovations such as improved logistics systems, traceability technologies, or digital communication platforms have enhanced access to new international buyers. However, the lower mean for cost reduction implies that operational efficiencies have not yet fully translated into measurable reductions in export-related expenses, possibly due to persistent infrastructural costs, high transport charges, or import duties on technology. The difference in variability between the two measures further indicates uneven diffusion of innovation benefits, where larger or better-capitalised firms may experience stronger export advantages than smaller counterparts. Overall, the descriptive statistics reveal that while innovation adoption contributes to outward market reach, its economic efficiency benefits remain only partially realised across Zimbabwe's food processing SMEs.

Pearson Correlation

This table presents the Pearson correlation coefficient that measures the strength and direction of the linear relationship between innovation opening new international market channels and the reduction of export costs due to operational efficiency. The correlation was computed from 182 observations, with a two-tailed significance test assessing whether the observed relationship is statistically different from zero.

Table 4.4.4-2: Pearson Correlation: Relationship between Supply Chain Innovation Adoption Level and Export Performance.

Correlations

		Innovation has opened new international market channels (E5)	Export costs have decreased due to operational efficiency (E4)
Innovation has opened new international market channels (E5)	Pearson Correlation	1	-.084
	Sig. (2-tailed)		.262
	N	182	182
Export costs have decreased due to operational efficiency (E4)	Pearson Correlation	-.084	1
	Sig. (2-tailed)	.262	
	N	182	182

Primary Data (2025)

The computed Pearson correlation coefficient is negative 0.084, with a significance value of 0.262. This coefficient suggests a very weak negative linear relationship between the two variables, meaning that as export costs decrease, the reported level of market channel expansion tends to decline slightly, although the effect is extremely small. The squared correlation value, which indicates the proportion of variance in one variable explained by the other, is 0.007, meaning less than one percent of the variance in market expansion is associated with changes in export costs. The significance value of 0.262 exceeds the conventional threshold of 0.05, indicating that the relationship is statistically insignificant. The sample size of 182 ensures adequate power to detect moderate

correlations, so the observed non-significance further reinforces that the relationship is negligible in practical terms.

From a critical standpoint, this correlation result implies that reductions in export costs are not directly correlated with the ability of firms to open new international markets. The weak negative coefficient may reflect that while some firms gain market access through innovation, they may simultaneously face higher initial costs linked to technology acquisition, compliance, or logistics adjustments. In other words, innovations may first increase operational expenditure before cost efficiencies are realised. Moreover, the absence of statistical significance indicates that market expansion and cost reduction may operate through different innovation pathways. Market channel growth could be driven by digital marketing, product traceability, or quality certification systems, whereas cost efficiencies may depend more on process optimisation and supply chain integration. Therefore, innovation appears to enhance export competitiveness through strategic positioning rather than immediate cost savings, suggesting a lagged or indirect relationship that a simple bivariate correlation cannot capture.

ANOVA[a]

This table reports the results of an analysis of variance designed to test whether reductions in export costs significantly explain variations in the perception that innovation has opened international market channels. The ANOVA separates the total variance into regression and residual components to evaluate the explanatory power of the model.

Table 4.4.4-3: ANOVA Table: Relationship between Supply Chain Innovation Adoption Level and Export Performance.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.102	1	1.102	1.267	.262[b]
	Residual	156.590	180	.870		
	Total	157.692	181			

a. Dependent Variable: Innovation has opened new international market channels (E5)
b. Predictors: (Constant), Export costs have decreased due to operational efficiency (E4)

Primary Data (2025)

The regression sum of squares is 1.102, the residual sum of squares is 156.590, and the total sum of squares is 157.692 across 181 total degrees of freedom. The mean square for the regression is 1.102 while that for the residual is 0.870, yielding an F statistic of 1.267 and a significance value of 0.262. The computed R squared value derived from the ratio of regression to total sum of squares equals approximately 0.007, meaning that only 0.7 percent of the variance in the dependent variable is explained by the predictor. With a significance level greater than 0.05, the test confirms that the model is not statistically significant. These numerical results therefore indicate that export cost efficiency does not exert a measurable linear influence on firms' perceived ability to open new market channels through innovation.

The critical interpretation of these results reinforces the correlation finding that operational cost reductions and market expansion outcomes are not linearly

related in this sample. The low F statistic and minimal R squared show that almost all variability in the dependent variable is due to unexplained factors, suggesting that innovation's contribution to market access is mediated by other variables not included in this model. Such variables could include product quality improvements, technological capability, export marketing strategies, or the availability of international distribution networks. Furthermore, the lack of statistical significance could reflect structural challenges in Zimbabwe's export environment, such as high logistics costs and policy constraints, which limit the observable benefits of efficiency improvements. The ANOVA results therefore imply that while innovations may enhance export readiness, they do not independently determine the degree of international market penetration, highlighting the multifaceted nature of export performance in developing economies.

Coefficients[a]

This table presents the regression coefficients estimating the direction and magnitude of the effect of export cost reduction on the perception that innovation has opened international market channels. The unstandardized coefficients quantify the expected change in the dependent variable for each one-unit increase in the independent variable, while standardized coefficients allow for comparison in relative terms.

Table 4.4.4-4: Coefficients Table: Relationship between Supply Chain Innovation Adoption Level and Export Performance.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	**(Constant)**	4.084	.222		18.394	.000
	Export costs have decreased due to operational efficiency (E4)	-.078	.070	-.084	-1.126	.262

a. Dependent Variable: Innovation has opened new international market channels (E5)

Primary Data (2025)

The constant term is 4.084 with a standard error of 0.222, yielding a t value of 18.394 and a p value less than 0.001, indicating that even in the absence of cost reductions, the baseline level of agreement that innovation opens international markets remains significantly high. The unstandardized coefficient for export cost reduction is negative 0.078 with a standard error of 0.070, producing a t value of negative 1.126 and a p value of 0.262. The standardized beta coefficient is negative 0.084, consistent with the correlation result, showing a small inverse association between the two variables. The magnitude of this coefficient implies that a one-unit increase in cost reduction perception would lead to only a 0.078 decrease in the perception of new market opening, which is statistically insignificant.

Critically, these coefficient estimates reveal that the relationship between cost efficiency and export market expansion is not only weak but also lacks statistical credibility. The negative direction, although small, could reflect the transitional cost pressures that accompany innovation implementation before long-term benefits materialise. The high and significant constant term suggests that most firms already perceive substantial market benefits from innovation regardless of short-term efficiency outcomes. The standard error for the slope term is nearly as large as the coefficient itself, indicating imprecision and further confirming that the estimated effect is trivial. Overall, the regression model accounts for virtually none of the variation in the dependent variable, reinforcing the conclusion that innovation's contribution to export performance may arise through qualitative improvements and strategic repositioning rather than through immediate cost savings. These findings highlight the importance of modelling innovation as a multidimensional construct involving technological, organisational, and strategic aspects that interact to influence export success in complex ways.

The qualitative findings revealed that the relationship between the level of supply chain innovation adoption and export performance among food processing SMEs was complex and often mediated by contextual factors such as firm size, financial capacity, and access to international markets. The participants generally agreed that innovation enhanced export potential, particularly through improved visibility, traceability, and compliance with international standards. However, they also noted that such improvements did not automatically translate into increased export volumes or reduced costs. P07 remarked that their firm's adoption of automated systems had *"made it easier to meet export*

documentation and traceability requirements demanded by South African buyers," reflecting how innovation fostered credibility and access to foreign markets rather than direct cost savings. Similarly, P03 noted that while their digital tracking system had improved shipment monitoring the costs of maintaining these systems and software subscriptions sometimes offset the benefits in the short term.

P09 explained that:

> *Innovation is a double-edged sword for small exporters. It helps us open new doors, but it also increases our operating expenses before we start seeing any tangible export gains.*

This illustrates the temporal and financial trade-offs that accompany innovation-driven strategies. P11 echoed a similar view, observing that firms which had *"invested in ERP systems and e-logistics platforms were better positioned to engage international buyers,"* yet such investments were not always matched by export growth due to market volatility and currency risks.

Critically, these findings reinforce and contextualise the quantitative results, which indicated a weak and statistically insignificant relationship between supply chain innovation and export performance. The interviews suggest that while innovation adoption enhances export readiness and credibility, its benefits manifest more through qualitative dimensions such as reliability, product quality, and international compliance rather than immediate cost efficiencies. This means that innovation functions as an enabler of export competitiveness rather than a direct determinant of performance outcomes. The perceived disjunction between innovation and measurable export gains may be due to the lag in realising

innovation returns, the capital intensity of technological upgrades, and structural inefficiencies in Zimbabwe's export logistics system. The evidence therefore implies that innovation in supply chains must be embedded within broader strategic frameworks that integrate market intelligence, financing, and policy support to yield sustained export competitiveness for SMEs.

4.5 Discussion and Interpretation

Supply chain innovation had a high mean score (M = 4.37). However, it demonstrated a weak and negative correlation with SME performance ($r = -0.056$, $p = .457$; $R^2 = 0.003$). The dynamic capabilities theory (Teece, 2007) posits that although the SMEs have implemented new practices, they have not yet developed the dynamic capabilities necessary to innovate and integrate these practices for export competitiveness. Additionally, the resource-based view (Barney, 1991) posits that innovation only enhances performance if it enables a company to achieve and sustain competitive advantages based on rare, valuable, inimitable and non-substitutable resources. However, as the qualitative findings revealed, most innovations implemented by Zimbabwean SMEs such as digital communication tools and shared logistics lack strategic uniqueness and consequently, they do not provide sustainable export advantage. As Schumpeter (1934) posited, an innovation that does not lead to the creative destruction of the existing order is merely an adaptation. Consequently, the study demonstrates that innovations in Zimbabwean food processing SMEs focus primarily on functional operations rather than transformation.

In line with Chinomona and Sandada (2018), Zimbabwean SMEs innovate for survival rather than competitiveness, while Mutingi (2016) notes that weak

systems constrain supply chain innovation in Southern Africa. Moreover, the results are in line with those of Gunasekaran et al. (2001). (2017), who posit that innovation improves competitiveness only when it is integrated into the supply chain system based on managerial competence and knowledge-sharing networks. The weak link also contradicts Porter's (1990) Competitive Advantage Theory, which views innovation as a driver of export performance, because contextual barriers such as resource scarcity and institutional inefficiencies dilute this effect in developing economies. Additionally, the "frugal innovation" notion identified in interviews is consistent with Prahalad's (2005) framework and links the Bottom of the Pyramid perspective to adaptive rather than growth-focused innovation. Thus, although effective innovation takes place, it is not fully integrated into the strategic processes that can create export competitiveness in the Zimbabwean food processing SMEs.

The regression analysis revealed that poor information communication technology infrastructure (mean =3.04) and limited government incentives (mean= 2.97) had no statistically significant effects on the determinants of innovation adoption by SMEs in Zimbabwe, as evidenced by regression findings, F= 0.035 and p= .991. This paradox shows that while the SMEs are aware of the obstacles, the latter undermines knowledge and innovation capability through multiple layers. This weak explanatory power suggests that the technological learning and awareness processes are constrained by broader environmental rigidities rather than just lack of structural access. Qualitative evidence showed that participants were financially excluded and lacked consistent electricity and internet access due to policy inconsistencies. These factors interlinked into a phenomenon called innovation inertia. The lack of

government support and poor digital infrastructure also constrain innovativeness in SMEs due to the limited flexibility and continuity of the innovation processes, as firms tend to innovate only to sustain their operations.

Refer to the theoretical and empirical literature in Chapter 2. According to the RBV (Barney, 1991), SMEs lack valuable, rare and inimitable capabilities to convert infrastructural inputs into a competitive advantage. Teece's (2007) Dynamic Capabilities Theory also explains that most firms do not possess the capacity to integrate and reconfigure internal and external competences, which is characteristic of many SMEs because of their weak absorptive and managerial capabilities. These findings are also in line with Chinomona and Sandada (2018) and Mutingi (2016), who found that the poor state of infrastructure, erratic policies and limited access to funds hampered SMEs in Zimbabwe from adopting innovative practices. Similarly, Gunasekaran et al. (2017) argue that the lack of institutional support for supply chain systems leads to innovation failures. Conversely, the weak statistical effect contradicts Porter's (1990) theory that government support and innovation enhance competitiveness, highlighting the impeding effect of contextual and structural barriers in Zimbabwe. Collectively, these results demonstrate that the country's institutional environment negatively impacts the capacity of supply chain innovation to drive export competitiveness.

Most striking was the disjunction between wide adoption of internal automation tools (mean for automated inventory = 4.46) and a complete lack of effects on market responsiveness (ANOVA $F = 0.296$, $p = .880$; all coefficients non-significant). This confirms that automation is more a matter of internal efficiency

than of market agility. Qualitative evidence confirms this: companies are able to track precise in-store stock levels but cannot promptly react to consumer demand fluctuations. The obstacle lies in the software operating in silos, the data flows being fragmented and insufficient interdepartmental connectivity. The dynamic capabilities theory (Teece et al., 1997) and the resource-based view (Barney, 1991) suggest that SMEs lack reconfiguration routines and firm-specific VRIN resources to gain agility from automation. The reviewed studies also note automation only confers such efficiencies if the company leadership has adequate absorptive capacity and the systems meet interoperability requirements.

H_2 sought to establish the relationship between improved market access and cost reduction in Zimbabwean firms. The results show a weak, negative and insignificant correlation ($r = -0.084$, $p = .262$) between the two variables. This would mean that the effort improves traceability, compliance and customer confidence rather than immediate cost-related factors. Teece (2007) states that a firm will have a competitive advantage from innovation if it can integrate, build and reconfigure its internal and external resources to address the rapidly changing business environment. Barney (1991) in the Resource-based view similarly posits that competitive advantage is only possible if innovations are rare, valuable and inimitable. The reviewed works of literature by Simuka (2023) and Ojubanire et al. (2022) (2024) also found that technological innovation tends to enhance export readiness and credibility before promoting operational cost efficiency, indicating a lagged economic effect of the latter in low-market settings.

Additionally, the results show that innovations help firms to enter export markets not through operational but rather strategic channels. While respondents agreed that innovations increased access to new markets, the fact that the regression analysis was insignificant ($F = 1.267$, $p = .262$) shows that the two factors are independent. The study by Chinomona and Sandada (2018) also established that due to poor infrastructure and weak institutions, Zimbabwean SMEs were not able to use innovation to improve their export performance. Similarly, Gunasekaran et al. (2022) note that… (2017) concluded that supply chain innovation enhances organisational competitiveness only when systems are fully integrated and interoperable. The reviewed studies (Ayoub & Abdallah, 2019; Zhang & Sun, 2021) indicated that innovation's contribution to export competitiveness rests on managerial absorptive capacity, technological maturity and environmental stability factors still developing in Zimbabwe's food processing industry.

4.6 Chapter Summary

This chapter has presented, analysed, and interpreted data on how supply chain innovation influences export competitiveness among Zimbabwe's food processing SMEs. The results revealed that although innovation adoption was high, its relationship with SME performance, market responsiveness and export competitiveness was weak and statistically insignificant. The qualitative insights further showed that SMEs' most common innovation practices are incremental and survival-focused, such as digital communication, shared logistics and basic automation. Key barriers to sustainable innovation include financial constraints, poor ICT infrastructure and limited government support. The chapter established

that supply chain innovations impact firms' operational efficiency more than the actual performance in export markets. This finding corroborates the reviewed literature on the need for enhanced dynamic capabilities, absorptive capacity and institutional support to improve the competitiveness of firms in international markets.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the key findings of the study, draws conclusions, discusses implications, and provides recommendations. Its purpose is to evaluate how supply chain innovations affect the export competitiveness of food processing SMEs in Zimbabwe, highlight barriers to effective adoption, and suggest practical strategies for improving performance and international market access.

5.2 Summary

The study investigated the role of supply chain innovation on export competitiveness in the food processing SMEs in Zimbabwe. Quantitative data showed that the mean score for innovation was 4. 37 for technology use and 3. 72, indicating moderate growth and efficiency. Correlation and regression analyses confirmed a very weak and statistically insignificant relationship between the two variables. Thus, the innovations do not drive competitiveness on their own. The qualitative results indicated that firms adopted incremental and frugal approaches to innovation, such as digital coordination, joint procurement, or partial automation, predominantly driven by the need to survive rather than to grow. The study found that although Zimbabwean SMEs are innovative, the financial constraints, poor infrastructure and lack of adequate technical capacity hinder the competitiveness of their products in international markets.

The study identified that the barriers are multifaceted and deeply rooted within the country's economic and structural setup. The correlation and regression analyses indicated that the issues of poor ICT infrastructure and lack of government incentives were not statistically significant predictors of technology knowledge. Qualitative insights further revealed that poor financial resources, inconsistent electricity and internet supply and lack of coordinated government support constrain SMEs from investing in new technologies for sustainable product innovation. SMEs mostly rely on improvisation, which points to the need for harmonised efforts to improve financial and infrastructural support.

It also examined the effect of supply chain innovation on market responsiveness by food processing SMEs in Zimbabwe and noted that despite technological adoption, the enterprises' external markets remain less agile. The results indicated that automated inventory and stock control tools were the highest (mean = 4.46, SD = 0.851), followed by mobile or SMS-based supplier systems (mean = 3.73, SD = 1.061) and ERP system integration across departments (mean = 3.71, SD = 0.932). Regression and ANOVA results indicated that none of the innovations had a statistically significant impact on mobile or SMS supplier systems usage. Qualitative results revealed that SMEs introduced innovations to improve internal efficiency rather than focusing on market monitoring and customer needs. Multiple systems are not integrated and there is no close interaction among company departments. Digital tools helped companies enhance operational control, but holistic supply chains were not created.

The study showed that supply chain innovation positively influences a company's ability to compete in export markets but does not directly affect the

overall performance parameters such as cost reduction or export volumes. Quantitative findings established that product innovations that facilitated entry into new international markets had a mean score of 3. 85 (SD = 0.933). The responses on operational efficiency and reduction of export costs had a lower mean of 3. 03 (SD = 0.997), hinting at the employees' insignificant economic benefits. Regression analysis demonstrated that the coefficients were statistically insignificant and therefore had no predictive value. Qualitative data further indicated that technology-enhanced marketing and credibility access the global market, but the costs of innovation limit cost or volume benefits. Supply chain innovation is an enabler rather than a driver of competitiveness, requiring coordinated efforts in enhancing market intelligence capabilities and institutional support.

5.3 Conclusions

The study established that while food processing SMEs embrace supply chain innovations, they do not necessarily gain competitiveness and improved performance. Quantitative analysis showed a high mean adoption score of 4. 37, but the SMEs' performance was still moderate at 3. 72 and the correlation analysis showed no statistically significant relationship between innovation and performance. Qualitative findings suggested that SMEs are employing incremental, frugal and survival-oriented innovations focusing on digital coordination, shared procurement and partial automation. These types of innovations are mainly aimed at ensuring business continuity and are not sufficient for the company to be competitive in the local and export markets. Thus, clearly the mere implementation of innovations without their integration

into operational processes, management involvement and training and investments into infrastructure will hardly result in a notable performance improvement.

The study also identifies that systemic barriers severely limit the capacity to implement innovations within the supply chain. Poor ICT infrastructure and internet connectivity, limited financial resources, lack of government incentives and support were some of the major barriers widely identified by SMEs. Qualitative data indicate that the barriers create risk aversion, curtail investments into novel technologies and cause "innovation inertia." This means that other factors like lack of policy, institutional and structural support also need to be addressed for the innovation to be fully operational in the country.

Thirdly, the study concludes that supply chain innovations have a limited effect on market responsiveness. Technologies like automated inventory control, ERP systems and intra- and inter-departmental communication tools aim at enhancing operational efficiencies within an organisation. These systems are highly fragmented and there is very little coordination between departments. As a result, an organization cannot ensure that its innovations enable it to make real-time decisions and improve export performance. Thus, supply chain innovation needs to be integrated across all functions and linked with external market information for effective product positioning in the global marketplace.

The study also finds that supply chain innovations affect export performance indirectly rather than directly. Innovation enhances firms' credibility, traceability and compliance with international standards, a requirement for accessing new markets. However, the immediate effect of cost reduction or the boost of export

volume is still low due to high implementation costs and poor infrastructure. This means that innovation primarily acts as a strategic enabler or enhancer of export competitiveness rather than as a direct determinant of export performance. To achieve export competitiveness, the firm should ensure financial stability as well as the sustainability of financial resources that will facilitate its continuous learning and innovation.

5.4 Implications

The findings have important implications for SMEs in the food processing industry. First, innovation should not be viewed in isolation as a source of competitiveness; firms need to develop the requisite complementary capacities such as managerial and technological skills and systems integration to translate innovations into performance. This places emphasis on the need for SMEs to adopt strategic planning measures that link product innovation, market targeting and operational efficiencies.

Additionally, the study emphasizes the necessity of systemic support from government and industry institutions. What do you mean? Thus, it is imperative for development agencies to consider coordinated policy interventions that address the structural challenges that impede SME innovation in export markets.

5.5 Recommendations

- SMEs need to simultaneously apply all three types of innovations in their supply chains. By prioritizing firm-level innovations such as traceability and real-time communication with suppliers, companies will enhance their competitiveness in the export market.

- SMEs need to seek government incentives for modernization. Leverage the available grants, subsidies and tax relief programs.
- SMEs need to invest in training and capacity building to enhance digital literacy, managerial skills and supply chain knowledge. Skilled employees are necessary to utilize the opportunities presented by technological innovation.
- SMEs should form a strategic partnership with financial institutions to enhance access to affordable financing for technology investments. Manufacturers can utilize low-interest loans or leasing options to purchase equipment. Innovation-focused credit facilities can also be used to enhance the supply chain.
- Additionally, SMEs should partner with technology providers and industry associations to enhance the reliability of internet, electricity and cloud systems. Collaboration can ensure the innovation is scalable and adequately integrated for wider company operations.

5.6 Suggestions for Further Research

The future studies should consider investigating the impact of supply chain innovations on SMEs' performance and export competitiveness over an extended period. Comparative studies between firms from different regions and industries would be necessary to establish possible differences in innovation implementation. Investigating the moderating effect of factors such as firm size, managerial expertise, or international market conditions on the relationship between innovation and internationalization would offer valuable insights. Furthermore, it would be beneficial to analyze the effects of collaborative innovation strategies, like inter-firm partnerships and clusters, on export

performance. Additionally, scholars could examine the cost-benefit analysis of specific technological innovations in SME supply chains to guide policymakers and managers on the best ways to enhance their firms' competitiveness.

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Appendix 1:Questionnaire

Introduction

Greetings! I am a student at Africa University, currently conducting a study on *"Assessing the Role of Supply Chain Innovation in Enhancing Export Competitiveness for SMEs in the Food Processing Industry."* This questionnaire is designed to gather relevant information to achieve the study's objectives. Participation is voluntary and all responses will be treated with the utmost confidentiality. You may withdraw at any time without any consequences.

Your honest and thoughtful responses will be greatly appreciated.

SECTION A: DEMOGRAPHIC INFORMATION

A1. What is your current position in the organization?

☐ Owner

☐ General Manager

☐ Operations/Production Officer

☐ Logistics/Supply Chain Officer

☐ Procurement Officer

A2. How long has your SME been operational in the food processing industry?

☐ Less than 1 year

☐ 1–5 years

☐ 6–10 years

☐ More than 10 years

A3. What is your company's current export status?

☐ Actively exporting

☐ Planning to export in the near future

☐ Not exporting

A4. How many full-time employees does your SME have?

☐ Less than 10

☐ 10–49

☐ 50–99

☐ 100 and above

A5. Which sub-sector best describes your business?

☐ Fruit & Vegetable Processing

☐ Dairy Processing

☐ Meat Processing

☐ Grain & Milling

☐ Beverage Production

☐ Other (Specify): _____

SECTION B: CURRENTLY ADOPTED SUPPLY CHAIN INNOVATIONS

Please rate the extent to which your company has adopted the following innovations.

Supply Chain Innovation Type	1	2	3	4	5
Use of automated inventory and stock control tools					
Cloud-based platforms for procurement or logistics					
Integration of ERP systems across departments					
Use of supplier/customer collaboration platforms					
Real-time product tracking and traceability tools					
Use of mobile apps or SMS-based supplier systems					

SECTION C: BARRIERS TO SUPPLY CHAIN INNOVATION

Please rate how much you agree with the following statements about the barriers to implementing supply chain innovation in your SME.

Barrier to Innovation Implementation	1	2	3	4	5
Financial limitations prevent adoption of innovations					
Lack of knowledge about available technologies					
Limited access to skilled personnel or ICT expertise					
Poor ICT infrastructure and unreliable internet					
Resistance to change among employees or management					
Lack of government incentives for SME modernization					

SECTION D: IMPACT ON MARKET RESPONSIVENESS

Please rate the following statements regarding how supply chain innovation has affected your responsiveness to market demands.

Impact on Market Responsiveness	1	2	3	4	5
Faster response to changes in customer demand					
Improved delivery timelines and lead time reliability					
Ability to tailor products to meet export market standards					
Easier coordination with distributors and suppliers					
Increased flexibility in sourcing and distribution					

SECTION E: SUPPLY CHAIN INNOVATION AND EXPORT PERFORMANCE

Please indicate the extent to which you agree with the following statements.

Impact on Export Competitiveness	**1**	**2**	**3**	**4**	**5**
Product quality has improved due to innovation adoption					
There is growth in export volumes linked to innovation					
Order fulfilment and reliability have improved					
Export costs have decreased due to operational efficiency					
Innovation has opened new international market channels					

Thank you for participating in this study!

Appendix 2: Interview Guide

Topic: Assessing the Role of Supply Chain Innovation in enhancing Export Competitiveness for SME's in the Food Processing Industry

Introduction

This interview is part of a study titled: "Assessing the Role of Supply Chain Innovation in enhancing Export Competitiveness for SME's in the Food Processing Industry". The purpose of this interview is to gather detailed, practical and strategic information from owners, senior managers and supply chain officers about the types of supply chain innovations in use, barriers to adoption, impacts on market responsiveness, and the relationship between innovation adoption and export performance. Your responses will be treated confidentially and used only for academic research. The interview will take approximately 30–45 minutes. With your permission the interviewer may take notes and/or audio-record the session to ensure accuracy.

Interview metadata (to be filled by the interviewer):

Interview ID:

Date:
Location:

Respondent name (optional):

Respondent role (Owner / Senior Manager / Supply Chain Officer):

Firm name (optional):

Position/title:
Years in role:

Consent to record (Yes / No):

Note to interviewer:

This is a semi-structured interview guide intended for use with SME owners, senior managers and supply chain officers in the food processing industry. Use the same core

questions for all respondent types but adapt the wording and follow-up probes to reflect the respondent's role (strategic for owners/managers, operational/technical for officers). Always ask open-ended questions, allow the respondent to speak freely, and use probes such as 'Can you give an example?', 'Can you elaborate?', or 'What happened next?' to elicit richer detail.

Section A: Familiarity and Awareness

Purpose: Establish the respondent's familiarity with the concept of supply chain innovation and general awareness of its relevance to the food processing sector.

1. How would you describe your general understanding of the concept of supply chain innovation in the food processing industry?
2. In your view, how important is supply chain innovation for the competitiveness and growth of SMEs involved in food exports?
3. Could you share any examples of innovative supply chain practices or technologies you are familiar with or have observed in the local food industry?

Section B: To establish the supply chain innovations currently adopted by food processing SMEs in Zimbabwe

4. What types of supply chain innovations has your enterprise implemented in recent years (e.g., technological, logistical, process, organizational)?
5. How were these innovations introduced or developed within your company, and what motivated their adoption?
6. How have these innovations changed day-to-day operations, cost structure, or the firm’s ability to meet export requirements?

Section C: To investigate the barriers that limit the implementation of supply chain innovations in Zimbabwe’s food processing SMEs

7. What challenges or barriers have you encountered when trying to introduce or adopt supply chain innovations in your firm?
8. How do financial, technological, regulatory, or human resource constraints affect your ability to implement innovative supply chain solutions?
9. What external supports (e.g., policy, finance, training, infrastructure) would most help SMEs adopt supply chain innovations for exports?

Section D: To ascertain supply chain innovations' influence on the market responsiveness of food processing SMEs

10. In what ways has supply chain innovation helped your company respond to changes in customer preferences or international market demands?
11. How have innovations in your supply chain improved product quality, traceability, delivery reliability, or compliance with export standards?
12. Can you describe a specific instance where a supply chain innovation enabled faster response to a market opportunity or threat?

Section E: To determine the relationship between the level of supply chain innovation adoption and export performance

13. How would you describe the relationship between the extent/level of supply chain innovation adoption and your firm's export performance (sales, market access, new markets)?
14. Can you provide examples where increased adoption of supply chain innovations coincided with measurable improvements in export outcomes (e.g., export volumes, on-time delivery, customer retention)?
15. What internal or external factors moderate the relationship between innovation adoption and export performance (e.g., firm size, managerial capacity, access to finance, market conditions)?

Conclusion

Thank you for participating. Is there anything else you would like to add that we have not covered? Would you be willing to be contacted for a short follow-up, if needed?

Appendix 3: Informed Consent Guide

INFORMED CONSENT GUIDE- Glytime Foods, Zimbabwe

My name is Tonderai Kingston Gwatidzo, a final year (EMBA) student from AU. I am carrying out a study on "Assessing the Role of Supply Chain Innovation in enhancing Export Competitiveness for SME's in the Food Processing Industry." I am kindly asking you to participate in this study by filling in the attached questionnaire.

What you should know about the study:
Purpose of the study:
The purpose of the study is to assess how supply chain innovation enhances export competitiveness
among SMEs in Zimbabwe's food processing industry. You were selected for the study because your company has become one of the established SMEs in the food processing industry.

Procedures and duration
If you decide to participate, you will be asked to complete a structured questionnaire based on your
company's operations, strategies, and experiences related to supply chain innovation and exports. It is
expected that this will take approximately **5 to 10 minutes** to complete.

Risks and discomforts
There are no foreseeable physical, psychological, legal, or economic risks associated with this study. However, should you feel uncomfortable answering any of the questions, you are free to skip them. Every effort will be made to ensure that your participation is as comfortable and respectful as possible.

Benefits and/or compensation
There is no monetary compensation for participating in this study. However, the insights gained from the research may help shape future strategies and policies to support SMEs in enhancing their export competitiveness through supply chain innovation. Your participation could contribute to knowledge that benefits the broader food processing sector in Zimbabwe.

Confidentiality
Any information obtained in the course of this study that can identify you or your organization will be kept strictly confidential. Names and other personal identifiers will **not** be collected or recorded in the questionnaire. All responses will be used for academic purposes only and will be presented in aggregate form to protect individual identities.

Voluntary participation
Participation in this study is completely voluntary. If you decide not to participate, your decision will not affect your current or future relationship with your organization or any other institution. If you choose to participate, you are free to withdraw from the study at any point without any penalty or negative consequences.

Offer to answer questions
Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

Authorization
If you have decided to participate in this study, please sign this form in the space provided below as an indication that you have read and understood the information provided above and have agreed to participate.

Lesly Marange _____ 24 July, 2025 _____

Name of Research Participant (please print) Date

Signature of Research Participant or legally authorized representative

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

Name of Researcher : Tonderai Kingston Gwatidzo (EMBA)

Appendix 4:AUREC Approval form

"Investing in Africa's future"

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 Website: www.africau.edu

Ref: AU3412/25

1 August, 2025

TONDERAI KINGSTON GWATIDZO
C/O Africa University
Box 1320
MUTARE

RE: **ASSESSING THE ROLE OF SUPPLY CHAIN INNOVATION IN ENHANCING EXPORT COMPETITIVENESS FOR SME'S IN THE FOOD PROCESSING INDUSTRY**

Thank you for submitting the above-titled proposal to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

- **APPROVAL NUMBER** AUREC 3412/25
  This number should be used on all correspondence, consent forms, and appropriate documents
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** August 1 2025
- **EXPIRATION DATE** August 1, 2026
- **TYPE OF MEETING**: Expedited

- **TYPE OF MEETING**: Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU
FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE