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**IMPACT OF UPSTREAM SUPPLY CHAIN COORDINATION ON THE  
PERFORMANCE OF ZIMBABWEAN AGRO-PROCESSING  
ORGANIZATIONS**

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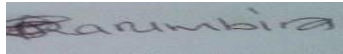
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## ABSTRACT

The study assessed the impact of upstream supply chain coordination on the performance of Zimbabwean agro processing organisations and developed a framework that can bridge existing practical and theoretical knowledge gaps in the coordination of supply chains in the country. Seventeen hypotheses were proposed and tested. The main objective of the study was to assess the impact of upstream supply chain coordination on the performance of the agro processing organisations and developing a supply chain framework model that could be used by Zimbabwean agro-processing companies to gain competitive advantage and improve organisational performance. The study proposed a Conceptual Framework for Upstream Supply Chain Coordination as a way to bridge existing practical and theoretical knowledge gaps in supply chain coordination. The Buyer-Seller Framework for Supply Chain Coordination was proposed to improve the relationship and interactions among Zimbabwean agro processing organisations. Other objectives of the study were; describing the nature of the agro processing organisations in Zimbabwe, identification of the antecedents of supply chain coordination among Zimbabwean companies, evaluating the consequences of supply chain coordination among the Zimbabwean agro processing companies. The convergent parallel mixed methods research design was adopted as the guiding model for the data collection, analysis and interpretation process in this study. The study utilised quantitative and qualitative data collection procedures such as the questionnaire and semi-structured interviews. The Statistical Package for Social Sciences (SPSS) version 21.0 and STATA14 quantitative software packages were used to analyse quantitative data while NVivo 11 and UCINET qualitative software packages were used for analysis of qualitative data respectively. The findings show that the sector has adopted supply chain coordination as a business strategy and that the Zimbabwean agro processing organisations' supply chains use contractual agreements, vertically integrated as well as transactional in nature. Coordination mechanisms used in the sector include contracts and price. The study identified antecedents of supply chain coordination as trust, communication, commitment, and information sharing, technology, and collaboration and transaction specific investments. The research findings through hypothesis testing show that trust and communication, have a significant impact on supply chain coordination, while transaction specific investments have no impact. The findings also show that trust, coordination and transaction specific investments have an impact on organisational performance in support of the transaction cost theory applicability to Zimbabwean agro processing organisations. On the other hand, the findings show that communication has no impact on the performance of the organisations. The findings also show that the information sharing has an impact on supply chain coordination but collaboration has no impact on coordination. The variables coordination, information sharing and collaboration have a significant impact on organisational performance showing that the resource-based theory is applicable in the sector. The findings also show that technology has a significant impact on supply chain coordination, but supplier relationship characteristics have no impact. However, the findings show that supply chain coordination, supplier capabilities and technology all have an impact on performance of the Zimbabwean agro processing organisations, supporting the applicability of the network theory to the sector. The study findings show the type of relationships that exist in the sector and their workings by highlighting the power and density of the relationships and their impact on coordination activities. The research findings show that coordination of the supply chain has both positive and negative impacts on organisational performance in the sector. The positive impacts included; profitability, investments, competitive advantage and innovation. The negative impact included; opportunism, political interference and mistrust. Challenges faced in the sector included; financial, resources and lack of government support. The existing supply chain coordination do not capture the impact of coordination in the Zimbabwean agro processing organisations due to the complex nature of the industry. The study concluded that the Zimbabwean agro processing organisations have adopted supply chain coordination as a business strategy, coordination is done through contractual arrangements with suppliers, vertical integration and partnerships. Implications of the study were for managers who could make use of the study to coordinate their supply chains while policymakers could use it to formulate a policy to improve coordination activities in the sector through training and technical assistance to organisations. Implications for further studies were to focus on engagement of policymakers in the regulation and development of a framework to guide the operations of the sector, and validation of the conceptual frameworks proposed in this study

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## LIST OF ABBREVIATIONS

AMA- Agricultural Marketing Authority  
AVE-Average Variance Extracted  
CFU- Commercial Farmers Union  
CGA- Commercial Growers Association  
CFA-Confirmatory Factor Analysis  
CMB- Cotton Marketing Board  
CPA-Crop Producers Association  
CPFR-Collaborative Planning, Forecasting and Replenishment  
CSO-Central Statistical Office  
Cottco- Cotton Company of Zimbabwe  
CT-Coordination Theory  
CYMMIT- International Maize and Wheat Improvement Center (Spanish- Centro Internacional de Mejoramiento de Maíz y Trigo)  
CZI- Confederation of Zimbabwe Industries  
DMB- Dairy Marketing Board  
DZL- Dairiboard Zimbabwe Limited  
ECR-Efficient Consumer Response  
EDI-Electronic Data Interchange  
EHZ- Eastern Highlands of Zimbabwe  
FAO -Food and Agricultural Organisation  
FTLRP- Fast Track Land Reform Programme  
GAT- Goal Alignment Theory  
GDP-Gross Domestic Product  
GMB- Grain Marketing Board  
HOC-Higher Order Constructs  
HSFZ- Hippo Valley Sugar Farmers Association of Zimbabwe  
IT- Institutional Theory  
LAP- Learning Actor Process  
LMAC-Livestock and Meat Advisory Council  
LOC- Lower Order Constructs  
LVC-Latent Variable Correlations  
LPLS- Latent Variables Partial Least Squares  
MFA-Mkwase Farmers Association  
MLE-Maximum-Likelihood Estimation  
MoA- Ministry of Agriculture  
MOU- Memorandum of Understanding  
NBZA- National Bakers Association of Zimbabwe  
NGO- Non-Governmental Organisation  
NT -Network Theory  
OLS-Ordinary Least Squares  
PLS-Partial Least Squares  
PLS-SEM- Partial Least Squares –Structural Equation Modelling  
QR -Quick Response  
RBT-Resource Based Theory  
RBV-Resource Based View  
RBZ- Reserve Bank of Zimbabwe  
RV- Relational View  
SAP-Situational-Actor Processes  
SASSCO-  
SC- Supply Chain  
SCC-Supply Chain Coordination  
SCM-Supply Chain Management  
SCOR- Supply Chain Operations Reference-Model  
SME- Small to Medium Enterprises  
SNA-Social Network Analysis  
SNV- Netherlands Development Organisation  
SPSS-Statistical Package for Social Scientists  
TCT-Transaction Cost Theory  
TQM-Total Quality Management  
*U.K- United Kingdom*

USAID- United States Agency for International Development  
VIF- Variance Inflation Factor  
VMI- Vendor Managed Inventory  
ZEPARU- The Zimbabwe Economic Policy Analysis and Research Unit  
ZGMA- Zimbabwe Grain Millers Association  
ZFCU- Zimbabwe Commercial Farmers Union  
ZFU- Zimbabwe Farmers Union  
ZITF- Zimbabwe International Trade Fair  
ZNFU- Zimbabwe National Farmers Union  
ZimStats- Zimbabwe Statistical Office  
Zimtrade- Zimbabwe Trade Directory  
ZTA - Zimbabwe Tobacco Association  
ZIMVAC- Zimbabwe Vulnerability Assessment Committee

## **CHAPTER 1: INTRODUCTION TO THE STUDY**

### **1.0 Introduction**

The purpose of coordination is to achieve collective goals that individual companies cannot achieve. The need for coordination is evident in supply chains, as companies forming a supply chain are dependent on the performance of other organisations. There has been an emphasis on supply chain coordination as a strategy through which firms can achieve competitive advantage in markets (Collins 2003). A number of theories have been advanced to explain coordination by scholars but these fail to explain the absence of coordination within the supply chain. Since a number of theories of coordination exist, but do not address coordination in supply chains, therefore this study was carried out to assess the nature of supply chain coordination and explore coordination strategies that could be adopted for the creation of sustainable competitive advantage for the Zimbabwean agro-processing organisations. The study contributes to the body of knowledge through designing a framework for coordination that can be adopted by Zimbabwean agro-organisations and other developing countries.

### **1.1 Background to the Study**

The Zimbabwean agro-processing organisations rely heavily on the agricultural sector for raw materials since agriculture is the backbone of the Zimbabwean economy accounting for 18 percent of the GDP and 22.8 percent of the foreign exchange earnings by 2006 (Mahofa 2007). The sector also contributed about 23 per cent of formal employment. Major raw materials such as grain, meat (beef and pork), fruits and vegetables, sugar, oilseeds such as soybean and sunflower and milk have traditionally been produced in Zimbabwe. Before the land reform in 2000 resources have been concentrated on improving the performance of agriculture in the communal lands through supporting cotton and maize production (Mahofa 2007). The commercial area, which before and after 1980 has highly contributed to the production of cotton, grain and other products has shrunk significantly as a result of the Fast Track Land Reform Programme (FTLRP). Since 2001 agricultural output has been on a negative trend and this has impacted negatively on the performance of agro-processing organisations. Availability of raw materials has a huge bearing on productivity in these organisations. Production has gone down in the last few years due to lack of continuity on the farms after the land reform programme and the shortage of inputs like seed and fertilisers. The amount of rainfall received during the cropping season has also affected the quantity and quality of the inputs for the sector. The sector has some big companies that are slightly gaining market share and are now improving their production efficiency to enable themselves to fight competition, for example, Delta Beverages managed to acquire new bottling line machines for alcohol (beer) and soft drinks that gave the company an edge to outcompete imports from the market. Other vital raw materials for the sector include packaging materials, additives and preservatives. Although there has been an improvement in the operating environment, the sector still fails to meet the demand and retailers have resorted to imports to cover the gap that is left.

There seems to be lack of proper coordination of activities among Zimbabwean agro-processing organisations, which has culminated in local producers charging exorbitant prices that are beyond the reach of the customers. March and Simon (1958) cited by Ulf and Karin (2005) suggest that there are three activities necessary to perform coordination, i.e. coordination through standardisation, planning, and feedback, activities that seem not to be considered important by local agro-processing companies. These three activities call for a common unity of purpose, where organisations in the chain have to agree on industry standards and procedures, coordinated planning and useful feedback for all actors in the supply chain. The study was inspired by the views of Shukla *et al.* (2013) who suggest that members of the supply chain need to work in harmony towards a unified system and coordinate with each other in order to improve the overall performance of the supply chain. In order to provide a theoretical basis on how companies can manage business processes across the supply chain, a number of theories were investigated for this study of upstream supply chain coordination. Since it was difficult to discuss coordination principles in a single theory, a review of coordination theory, Transaction Cost Economics, Institutional Theory, Resource-Based Theory and Network theory were discussed to provide the theoretical framework for this research.

Malone (1988) defined the coordination theory, “as a body of principles about how the activities of separate actors such as organisations and people can be coordinated to achieve the same set of goals.” Malone and Crowston (1994) identified four types of dependencies which are: shared resources, producer/consumer relationships, simultaneity constraints and task/subtasks. In addition to these generic dependencies, they also added communication and group decision-making. Coordination theory is then applied to synchronise the decisions of different agents, by taking into account their associated dependencies in order to align the incentives that motivate the supply chain partners and achieve a synchronised supply chain. To support the coordination theory, Gittel and Weiss (2004) came up with the theory of relational coordination, where coordination occurs through frequent, high-quality communication supported by relationships of shared goals, shared knowledge and mutual respect which enables organisations to better achieve their desired outcomes. Although coordination theory suggests various coordination mechanisms, that include incentive alignment, trust, commitment, and transparency to manage different types of interdependencies, it has its own weaknesses. The theory assumes that all actors in the supply chain have an equal resource base which is not always the case. It also assumes that the actors are willing to participate and share the resources without considering individual characteristics, values, norms, culture, attitudes and interests. The assumptions are that all employees have tasks that are routine and similar, therefore, organisational cultures, norms and values are similar so it becomes easy to coordinate activities in such organisations. The theory has been applied to developed countries and results generalised but the economic and political set up in developed countries is not the same with developing countries, so generalisation of the findings without taking cognizance of the different operating scenarios will not yield the same expected results.

Another weakness of the theory is the assumption that all the actors have the same knowledge, yet they might be at different levels in terms of exposure and technology. The findings of the research cannot be generalised to all industry sectors since the findings were all from the service industry sector which has different characteristics with other industries. Xu and Beamon (2006) are of the view that coordination theory does not provide guidance for selecting coordination mechanisms, nor consider the operating environment of the organisation. Another weakness of the theory is that it fails to predict coordination within the supply chain. Through this study, the researcher intends to come up with a framework to address these weaknesses highlighted from the coordination theory and consider the environmental factors that affect the industry under study and propose a research framework that is suitable to developing countries under distressful conditions.

Since the coordination theory fails to address the issue of coordination within the supply chain, the transaction cost was reviewed to address the problem. Transaction cost theory concentrates on the relative efficiency of different exchange processes. Transaction costs could be defined as the costs of acquiring and handling the information about the quality of inputs, the relevant prices and the supplier's reputation. The basic framework was enriched by Williamson (1971) when he introduced the concepts of bounded rationality and opportunism. Williamson suggests that human beings have limited cognitive competencies and fail to comprehend each future contingency; therefore, all contracts turn out to be in some way incomplete. This limitation suggests that managers may not be able to take rational decisions all the times. Coase (1937) suggests that the transaction cost theory helps firms to evaluate the relative costs of alternative governance structures for managing transactions. Firms emerge as a way of economising on transaction costs in a world of uncertainty, where contractual arrangements are too expensive. The assumptions that contracts are incomplete and that trading parties often end up with lock-in relationships fails to address the issue of resource ownership. The theory lacks a satisfactory treatment of the disadvantages of vertical integration and the boundaries of the firm are not precisely defined. The theory also assumes that the actors in the relationship have an equal resource base which is not always the case. It fails again to explain coordination in supply chains.

Since the coordination and transaction cost theory fails to explain coordination, the institutional theory was reviewed to compliment the two in explaining coordination. The institutional theory reviews the work of social scientists such as Weber, Max and applies their models to organisational setup. The theory regards social structures, (schema, rules, norms and routines) as authoritative guidelines for social behaviour. In this theory, organisations are regarded as rationalised systems that work together for a common purpose. The aim of the institutional theory is to explain and account for the existence of norms and legal institutions in organisations. Scott (2003) suggests that the institutions are composed of cultural cognitive, normative and regulatory elements, composed of associated activities and resources to provide stability and meaning to social life. The theory assumes that organisations operate within a social framework of norms, values, and assumptions about what constitutes appropriate behaviour. This assumption is a weakness as organisations have different players with different backgrounds, values and norms. It also assumes that actors are at the same level in terms of resources and are willing to share. It fails to address



the issue of opportunistic tendencies that can be displayed by the actors. The weaknesses make it difficult to explain coordination since it fails to predict coordination in the supply chain.

Since the above-discussed theories fail to address the issue of coordination on their own, the resource-based theory was applied to address the weakness of unequal resources. The basic tenets of this theory are that firms can access resources in their environments. It also describes how resource scarcities force organisations to pursue new innovations that use alternative resources. Organisations make active choices to achieve objectives. The theory assumes that organisations respond to demands made by other actors in the environment. Organisations try to minimise their dependence on resources on which they are heavily dependent. Although the resource-based theory supplements the coordination, institutional and transaction cost theories, it fails to consider networks within the supply chain. Although companies in the supply chain may share resources, it is necessary to understand the behavioural dimensions of parties in a chain to appreciate how information exchange impacts on coordination.

The Network theory was also used to describe the behavioural dimensions of supply chain members. The firms which are interlinked with each other develop a relationship network. Håkansson and Ford (2002) define a network as a structure where a number of nodes are related to each other by specific threads. Business networks as the interdependent systems of organisations and relations that are involved in carrying out all the production and marketing activities involved in creating and delivering value in the form of products and services to consumers. According to Gadde *et al.* (2003), a network is a source of information, resources, markets and technologies for the firm. A network relationship depends on economic and social dimensions and has a potential dark side and may lock firms into unproductive relationships (Gulati *et al.* 2000). The behaviour of actors influence relationships in a business network since it is characterised by shared risks, responsibilities and rewards on an equity, commitment and trust (Bititci *et al.* 2004). If the actors' behaviour is collaborative, then equity, commitment and trust will increase, while opportunistic behaviour decreases them.

This study was carried out to assess the impact of upstream supply chain coordination on organisational performance and assess its contribution to the creation of sustainable competitive advantage for Zimbabwean agro-processing organisations. It sought to increase knowledge on how Zimbabwean companies can apply the existing theories to coordinate their supply chains for sustainable competitive advantage and improve the profitability of agro-processing organisations.

## **1.2 Statement of the Problem**

There is limited Zimbabwean literature on supply chain coordination, especially on agro-processing organisations. Zimbabwe, having emerged from a decade-long economic crisis with macroeconomic instability, with the formation of the inclusive government, customers expected a change in product availability and quality. Although there have been significant changes and improvements in the operating environment, agro-processing companies in Zimbabwe continue to struggle. There seems to be a problem in the coordination of the upstream suppliers hence

shortages on the market due to a shortage of raw materials. The capacity utilisation remains very low; production is subdued due to high per-unit cost of production. The situation has been worsened by the uncertainty in the political and economic environment which makes it difficult to plan and coordinate activities. Zimbabwe, being an agro-based economy, has been affected by the land grabbing (uncoordinated land redistribution) since 2000, a move that has led to many white farmers who were the sole suppliers to the agro-processing companies, leaving the country with the new farmers (briefcase farmers) taking over. This land grabbing, still in progress has affected the coordination that used to be existing between companies and their upstream suppliers. There is very little coordination between farmers, training and extension institutions and agro-processors which have resulted in poor research prioritisation, outdated training materials and extension messages. The role of the private sector in this area has been undermined, with the government taking the centre stage in determining producer prices on cash crops and other agricultural products. Lack of an institutional framework to translate policy instruments continues to slow down agricultural recovery and thereby leading to negative effects on the agro-processing sector. It is against this background that this thesis sought to assess the importance of upstream supply chain coordination among Zimbabwean agro-processing companies and its contribution to organisational performance. This study, therefore, contributes towards bridging knowledge gaps of supply chain coordination literature and develop coordination mechanisms that Zimbabwean agro-processing companies can adopt to attain competitive advantage and increase profitability.

### **1.3 Purpose of the Study**

The purpose of this study was to explain and assess the impact of upstream coordination among agro-processing companies by focusing on its contribution to organisational performance in the Zimbabwean agro-processing supply chain. The study also sought to assess the contribution of upstream coordination on the effectiveness and efficiency of the Zimbabwean agro processing companies and their supply chains.

### **1.4 Research Objectives**

#### **1.4.1 Key Research Objective**

The main objective of this study was to assess the impact of upstream supply chain coordination on the performance of Zimbabwean agro-processing companies through designing a framework for coordination that can bridge existing knowledge gaps in supply chain coordination and can be adopted by Zimbabwean agro-processing companies. This was achieved by:

2. Describing the nature of supply chain coordination among Zimbabwean agro-processing organisations.
3. Identifying the antecedents of supply chain coordination used by Zimbabwean agro-processing organisations.
4. Evaluating the impact of supply chain coordination on the performance of Zimbabwean agro processing organisations.

## **1.5 Research Questions**

### **1.5.1 Main Research Question**

The main research question that the study sought to address is:

*How does supply chain coordination impact on the Zimbabwean agro-processing organizations' performance?*

### **Subsidiary Research Questions**

1. What is the nature of supply chain coordination among Zimbabwean agro-processing organisations?
2. What are the antecedents of supply chain coordination in Zimbabwean agro-processing organisations?
3. What is the impact of supply chain coordination on the performance Zimbabwean agro processing organisations?

## **1.6 Hypothesis of the Study**

H1: Trust among supply chain players has a positive influence on Supply Chain Coordination

H2: Communication among supply chain players has a positive influence on Supply Chain Coordination

H3: Transaction Specific Investments in the supply chain has a positive influence on Supply Chain Coordination

H4: Supply Chain Coordination among supply chain players has a positive influence on Organisational Performance

H5: Trust among supply chain players has a positive influence on Organisational Performance

H6: Communication among supply chain players has a positive influence on Organisational Performance

H7: Transaction Specific Investments in the supply chain has a positive influence on Organisational Performance

H8: Supplier resources and capabilities of supply chain players have a positive influence on Supply Chain Coordination

H9: Technology levels of supply chain players have a positive influence on Supply Chain Coordination

H10: Supply chain coordination has a positive influence on Organisational Performance

H11: Supplier resources and capabilities of supply chain players have a positive influence on Organisational Performance

H12: Technology levels of supply chain players have a positive influence on Organisational Performance

H13: Information sharing among supply chain players has a positive influence on Supply Chain Coordination

H14: Collaboration among supply chain players has a positive influence on Supply Chain Coordination

H15: Supply chain coordination has a positive influence on Organisational Performance

H16: Information sharing among supply chain players has a positive influence on Organisational Performance

H17: Collaboration among supply chain players has a positive influence on Organisational Performance

### **1.7 Significance of the Study**

The research can contribute immensely to the study of coordination in Zimbabwe particularly in developing and improving supply chain performance in light of increasing competition from foreign manufactured products in the market. The research can also help small and upcoming businesses in coordinating their supply chains to ensure product availability and customer satisfaction. The results from the research can assist companies in competitive positioning and strategy formulation. It can assist organisations in the effective management of the supply chain in cost reduction and improved profitability. Results from the study can contribute to the improvement of organisational performance. The research can stimulate further research in the area of supply chain coordination in manufacturing companies in Africa.

### **1.8 Limitations of the Study**

The study was conducted on a part-time basis. Normal work duties and the research demands were competing for the limited available time. This exerted a lot of pressure on the researcher and may have had some bearing on the quality of the study. From a methodological point of view, the literature source which provided a theoretical framework to the study was not written from a Zimbabwean perspective. The data produced by semi-structured interviews and questionnaires may be too abstract and general for direct application to complex business relationships associated with supply chain coordination among Zimbabwean agro-processing organisations. However, like all mixed methods research work, this study was labour and capital intensive since it used multiple methods. It is also difficult for a single researcher to have expertise in both qualitative and quantitative methods, hence the researcher engaged research assistants with their associated high

costs, to complement the researchers' efforts. In addition to this, mixed methods research approaches are a relatively new design and as such, some of the methodological details remain to be worked out fully by research methodologists. Another limitation considered was the fact that most companies in Zimbabwe are not fully operational due to financial constraints and this made it difficult for the researcher to collect the much-needed information from these companies. There is uncertainty in the Zimbabwean economy which might hinder production. Some companies are scaling down their operations in Zimbabwe, confidentiality of the information required and non-availability on supply chain coordination on Zimbabwean agro-processing companies in general to which one can refer to.

### **1.9 Delimitations of the Study**

The study focused on all companies that are in the agro-processing sector in Zimbabwe. The research also focused on community agro-processors that are sponsored by non-governmental organisations (NGOs), small to medium enterprise agro-processors (SMEs) and the well-known big players in the industry. The study covered the ten provinces of the country as outlined in Table 1.1 according to products produced:

**Table 1.1: The Ten production provinces**

PROVINCE	AREA OF FOCUS	PRODUCE
<b>Matabeleland South</b>	Gwanda, Plumtree	Cattle ranching
<b>Matabeleland North</b>	Binga, Lupane,	Fishing, cattle ranching.
<b>Mashonaland West</b>	Kadoma, Chegutu, Sanyati, Mt Darwin, Kariba	Cotton, Ginning and Weaving, Horticulture
<b>Mashonaland East</b>	Chivhu, Murehwa, Mutoko	Tobacco, Dairy, Grains
<b>Mashonaland Central</b>	Mazowe	Fruits- oranges, Grains, Dairy
<b>Manicaland</b>	Chipinge, Nyanga, Middle Sabi	Forestry, timber, horticulture, fishery, Tea, Coffee, Cotton
<b>Masvingo</b>	Chiredzi, Mkwesine, Triangle, Hippo Valley	Sugar plantations and processing, cattle ranching, Ethanol, Cotton
<b>Midlands</b>	Gokwe	Cotton, groundnuts
<b>Harare</b>		Cigarettes, Foodstuffs, Stock-feeds.
<b>Bulawayo</b>		Beef, foodstuffs, detergents, stock- feeds, cattle ranching, poultry.

Source: Agritex website

## 1.9 Definition of key terms

**Agro-Processing-** The processing of raw materials and intermediate products derived from the agricultural sector and transforming them to finished products through value addition and manufacturing.

**Coordination-** is the relationship and interactions among different actors operating within the business environment to achieve a common objective/ goal.

**Supply Chain-** A network of organisations from suppliers through to customers through provision of products, services and information to achieve customer satisfaction.

**Supply Chain Management-** Coordination of independent enterprises in order to improve the performance of the whole SC by considering their individual needs.

**Supply Chain Coordination-** Coordination is the management of upstream and downstream activities and processes that enable supply chain participants to achieve common goals and objectives of customer satisfaction through cost reduction activities.

**Performance-** Performance is the completion of a task with the application of knowledge, skills and abilities.

**Supply Chain Performance-** performance as the degree of engagement in behaviour that adds value to the overall SC performance

## 1.11 Thesis Structure

This thesis is composed of seven interconnected chapters.

**Chapter 1: Introduction:** The chapter introduces the research problem and its setting. It focuses on defining the research problem and discussing the contextual issues upon which the study is grounded.

### **Chapter 2: The Zimbabwean Agricultural Industry and Selected Chains Backgrounds**

This chapter gives an overview of agriculture in Zimbabwe and outlines developments that have taken place in the agricultural sector over the years. It also provides the background of selected agro-processing supply chains in Zimbabwe (Tobacco, Meat-poultry, pork, beef, and crocodile, Cotton, Sugar, Tea, Milk and Timber).

**Chapter 3: Theoretical framework:** The chapter covers the theoretical framework upon which the study is premised. It introduces the important concepts and theories relevant to supply chain coordination in general.

**Chapter 4: Literature Review and Conceptual Framework:** This chapter provides a review of the relevant literature on supply chain coordination among agro-processing organisations in general and the upstream supply chain coordination among Zimbabwean agro-processing companies in particular. This chapter also discusses the conceptual framework of the study.

**Chapter 5: Research Methodology:** This chapter discusses and justifies the methodology used in the study.

**Chapter 6: Results:** The results of the empirical study are presented and analysed in this chapter.

**Chapter 7: Discussion of Findings:** The chapter provides a detailed discussion of the empirical data present in chapter 5. New insights and conceptual frameworks emerging from the study are also presented and discussed in this chapter.

**Chapter 8: Summary, Conclusions and Recommendations:** The chapter summarises the whole process of the study and draws conclusions on the basis of the empirical findings on each of the research questions of the study. In addition, the chapter presents the theoretical and practical implications of the study as well as future research opportunities in supply chain coordination among Zimbabwean agro-processing companies.

## 1.12 Chapter Summary

In this chapter, the context of the research was laid down. The background to the research problem was introduced by discussing the main purpose of the study; the research questions and objectives; as well as the significance, theoretical framework, scope and limitations of the study. The next chapter focuses on contextualising supply chain coordination and its theoretical constructs.

## **CHAPTER 2: THE ZIMBABWEAN AGRO- INDUSTRY AND SELECTED CHAINS**

### **BACKGROUND**

#### **2.0 Introduction**

The previous chapter presented the research problem and contextual issues upon which this study is grounded. This chapter gives an overview of the agro industry in Zimbabwe and outlines developments that have taken place in the agricultural sector over the years. The chapter outlines the history of the agricultural sector and sets the context for the research study.

Zimbabwe covers an area of 390 757 km<sup>2</sup> and is a landlocked country located in Southern Africa with a population of 13 061 239 (Zimbabwe Statistical Office Census (ZimStats) report 2012). The country is bordered by Zambia to the north where the Zambezi River is the boundary and South Africa in the south with the Limpopo River defining the two countries. Mozambique is in the east and northeast, and Botswana in the south-west.

#### **2.1. The Zimbabwean Agricultural Sector**

The economy of the country is essentially agricultural-based. The backbone of the Zimbabwean economy is generally acknowledged to be agriculture. In common with most developing countries, agriculture is the mainstay of the bulk of the population as well as an important source of inputs for agro-based and manufacturing industries. Zimbabwe is an agro-based country where 80 percent of the population depends on agriculture for a living. A total of 70% of the country's population resides in rural areas. Major crops produced are maize, cotton, tobacco, wheat, soya beans and sugar cane. The contribution of the agricultural crops to Gross Domestic Product (GDP) include tobacco (25%), maize (14%), cotton (12.5%), beef and fish (10%), sugar and horticulture (7%) and livestock (24%) (Zimtrade 2015).

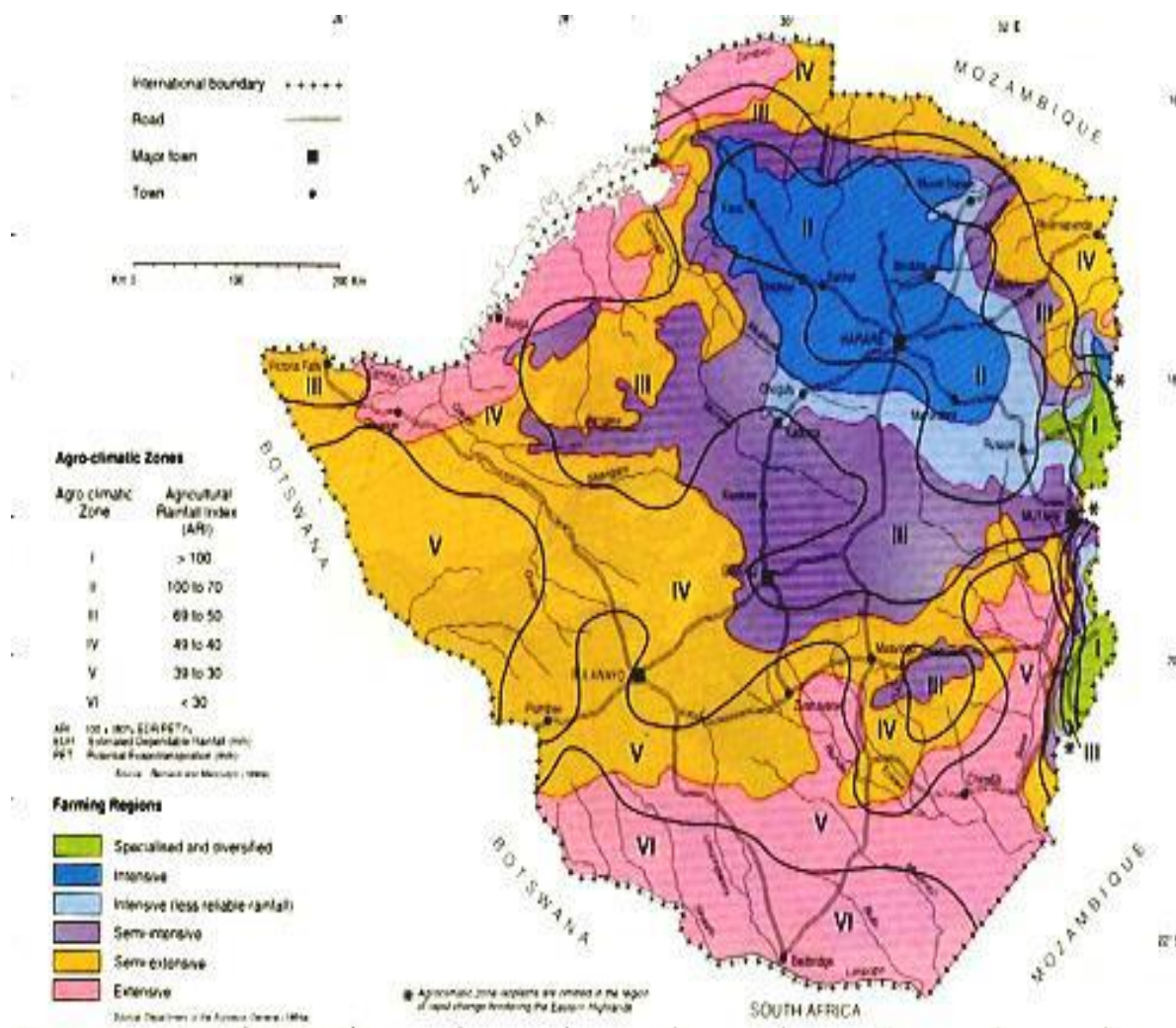
The government's land reform programme and the collapse of the agricultural sector had a tremendous effect on the agro-processing sector which saw many companies that rely on agro produce closing shop (Richardson, 2004). Because of the land reform programme, between 2000 and 2008 Zimbabwe's GDP declined by more than 71% (Robertson, 2011), while agricultural production declined by 30% over the same period (Sukume and Gueveya, 2009) with the ripple effects impacting on the agro-processing sector. Agricultural exports account for over 40 percent of total exports and agriculture provides employment for over a quarter of the total wage-labour force.

The Zimbabwean economy has been supported by an agricultural sector that has been very successful. The success of agriculture has provided opportunities for agro-processing and value addition of agricultural produce. Agriculture contributes about 20% of GDP, providing employment to approximately 70% of the population and contributes 40% towards export earnings (Zimtrade 2015). Apart from the FTLRP, producers in the agricultural sector have been strongly influenced by the indirect effects of political, economic, social and technological wide policies (Muzara, Zivenge, Chagwiza and Chirimubwe, 2011).



Zimbabwe is divided into five agro-ecological regions according to differences in effective rainfall (Vincent and Thomas 1960). The country has three main seasons which are: a hot wet season from mid- November to March (summer); a cold dry season from April to July (winter), and a hot dry season from August to mid-November (spring). During each season, different agro products' are produced to cater for the growing market. Figure 2.1 shows the Zimbabwean ecological regions with a focus on the agro-climatic zones.

**Figure 2.1: Agro-ecological regions of Zimbabwe**



**Adapted From: Zimbabwe Statistical Office (ZimStats 2000)**

From Figure 2.1 region I is characterised by an average annual rainfall, low temperatures, high altitude and steep slopes. The region is suitable for intensive livestock and crop production and occupies only 2% of the total agricultural land. Region II is found in the middle north of the country and is characterised by a fairly reliable rainfall per annum and generally good soils. It comprises of 15% of total agricultural land and is designated for agriculture, intensive grain production and livestock production as the main agricultural activities. Region III is found mostly in the mid-altitude areas of the country and is characterised by mid-season dry spells and high temperatures agricultural activities in this region include semi-extensive livestock production, small-scale ranching and the growing of drought-resistant crops.

**Region IV** is the largest region of the agricultural land area, located in the low-lying areas in the north and south of the country. It suffers from severe dry spells and frequent seasonal droughts. The characteristic farming systems in the area comprise semi-extensive livestock production and the growing of some drought resistant crops. **Region V** is the agro-ecologically poorest region in Zimbabwe. It is located in the low-lying areas in both the north and south of the country, with the poorest agricultural land. It experiences a highly erratic rainfall pattern. The commercial farmers of this region practice extensive beef production and ranching while the smallholder farmers are mostly into livestock (Food and Agricultural Organisation (FAO) 2008).

### **2.1.1 Nature of the Zimbabwean Agro-processing Sector**

The Zimbabwean agro-processing sector consists of companies involved in value addition in the agriculture sector, such as meat processing, fish processing, food processing, fruit juice manufacturing, horticulture and floriculture, processing of cotton lint, cigarette manufacturing sugar milling and timber processing. Upstream activities include the production of food and cash crops, primary horticulture, game, wildlife ranching, livestock, poultry farming, fishing and fish farming. In the tobacco, cotton, sugar and seed production industries, farmers are contracted by companies to produce for them. This trend has also expanded to other agricultural crops where farmers are contracted to produce by multinational companies. Contract farming is also done in cotton, sugarcane, sorghum, paprika, piggery, poultry and soya beans. Although contract farming is practiced, farmers who are not on contract are free to sell their produce to anyone. As a result, the Zimbabwe agro industry operate on a dual system.

### **2.1.2. The Zimbabwean Agro-processing Sector**

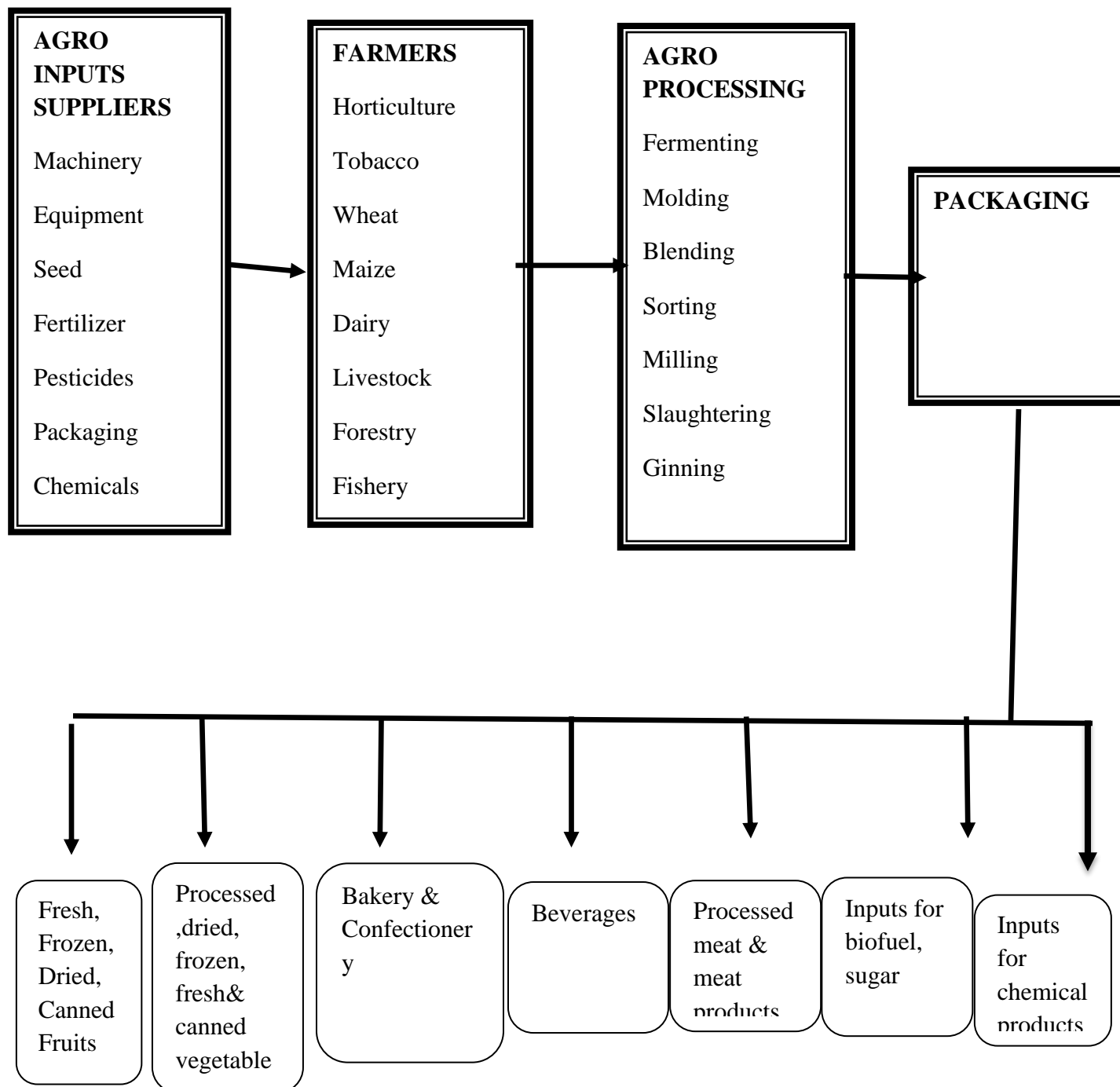
Currently, there are over 150 processors in this sector. Production facilities are located in the main cities of Harare, Bulawayo, Mutare and Gweru. The concentration of factories is high in Harare (about 63% of the total number) and the other cities share 37%. Processes that are common in Zimbabwe include; Canning, Baking, Brewing, Milling (Grinding), Forestry, Fishing, Drying and Oil expressing (Zimtrade 2015). Besides linkages to the agricultural sector, agro-processing organisations also have other strong backward/forward linkages with sectors such as packaging, technology, transport and distribution.

### **2.1.3 The Zimbabwean Agro-processing Supply Chain.**

The Zimbabwean agricultural sector is one of the key drivers of the economy and has grown by 23.4% in 2014, up from -2.6% realised in 2013 (Zimtrade 2015). The agro processing organisations have benefited from the 2013/14 season which was favourable in terms of rainfall and also support from the government and cooperating partners that facilitated preparations for the 2013/14 agricultural season (Reserve Bank of Zimbabwe (RBZ) report 2014). The growth in agricultural output was driven by increased production of maize, tobacco, sugarcane, groundnuts, soya beans, sorghum and poultry. Maize output increased due to the good rainfall and various financing arrangements put in place by the government and donor community. Tobacco output

also increased due to an increase in the number of growers and increased financing for the crop from contracting companies in the tobacco industry. Wheat output increased because of improved access to financing and inputs by some A2 farmers, through contractual arrangements with private millers, commercial loans and government support.

**Figure 2.2: The Zimbabwean agro-processing chain**



**Adapted from:** Louw *et al.* (2007)

## 2.2 Meat Chain

The meat chain is comprised of beef production, poultry, fish and pork. Between January and October 2015, there were no live cattle imports as compared to the same period in 2014, where an equivalent of 1,032mt of beef meat (1,984mt live-weight of cattle) was imported. The beef industry is one of Zimbabwe’s foremost economic activities. There is an ever-increasing demand for

livestock products in Zimbabwe due to the prevailing harsh economic and climatic conditions. The local demand for beef is higher compared to other meats. Frozen beef and liver imports continue filtering in, following the same pattern as 2014 but with varying volumes and values for each comparative month (Livestock and Meat Advisory Council (LMAC) 2015).

Poor beef production practices have resulted in low-quality carcasses that cannot compete effectively in the local market. The beef industry is collapsing, for example, beef production declined by 9%, from 99 000 tonnes in 2003 to 90 000 tonnes in 2004 (CSO, 2006). In 2014 Zimbabwe slaughtered 284 000 animals, a sharp decline from the 600 000 the country used to slaughter when it was exporting beef in 2001. The country's estimated beef consumption per capita has declined from over 13 kilogrammes to less than four kilogrammes per annum. Cold Storage Company chief executive told the Parliamentary Portfolio Committee on Lands, Agriculture, Mechanisation and Irrigation that there has been a decline in livestock production as a result of lack of capital.

The beef market has changed, from quality cuts and exports focus to the supply of a growing urban domestic market. The emergence of new farmers who are supplying beef via a range of private abattoirs, butcheries, supermarkets and informal meat traders has worsened the situation by compromising on quality (CSO, 2006). The whole chain has transformed in ways that have resulted in employment. Meat processors and abattoirs no longer rely on one source for their slaughter needs; but have a number of options at their disposal ranging from the producers (farmers), rural council auctions to networks of cattle buyers employed on contract at the abattoir or from individual cattle buyers and from the communal farmers. The national beef cattle population has increased from 5.4 to 5.5 million head with more than 90% of cattle in the smallholder farming areas. However, slaughters in abattoirs that are monitored by the Meat Graders Section of the Department of Livestock Production and Development show that the number of cattle slaughtered has been declining. It is believed that the reason for the slowdown in beef demand is because of low disposable income as well as competition from lower-priced chicken in household diets. The drought being experienced in Zimbabwe is likely to reduce dry season natural grass resources in the main beef producing areas of Matabeleland, Masvingo, Midlands and northern parts of Mashonaland provinces. The drought, coupled with the shortage of human food resources, could lead to massive destocking of the beef herds and also lead to increases in mortalities.

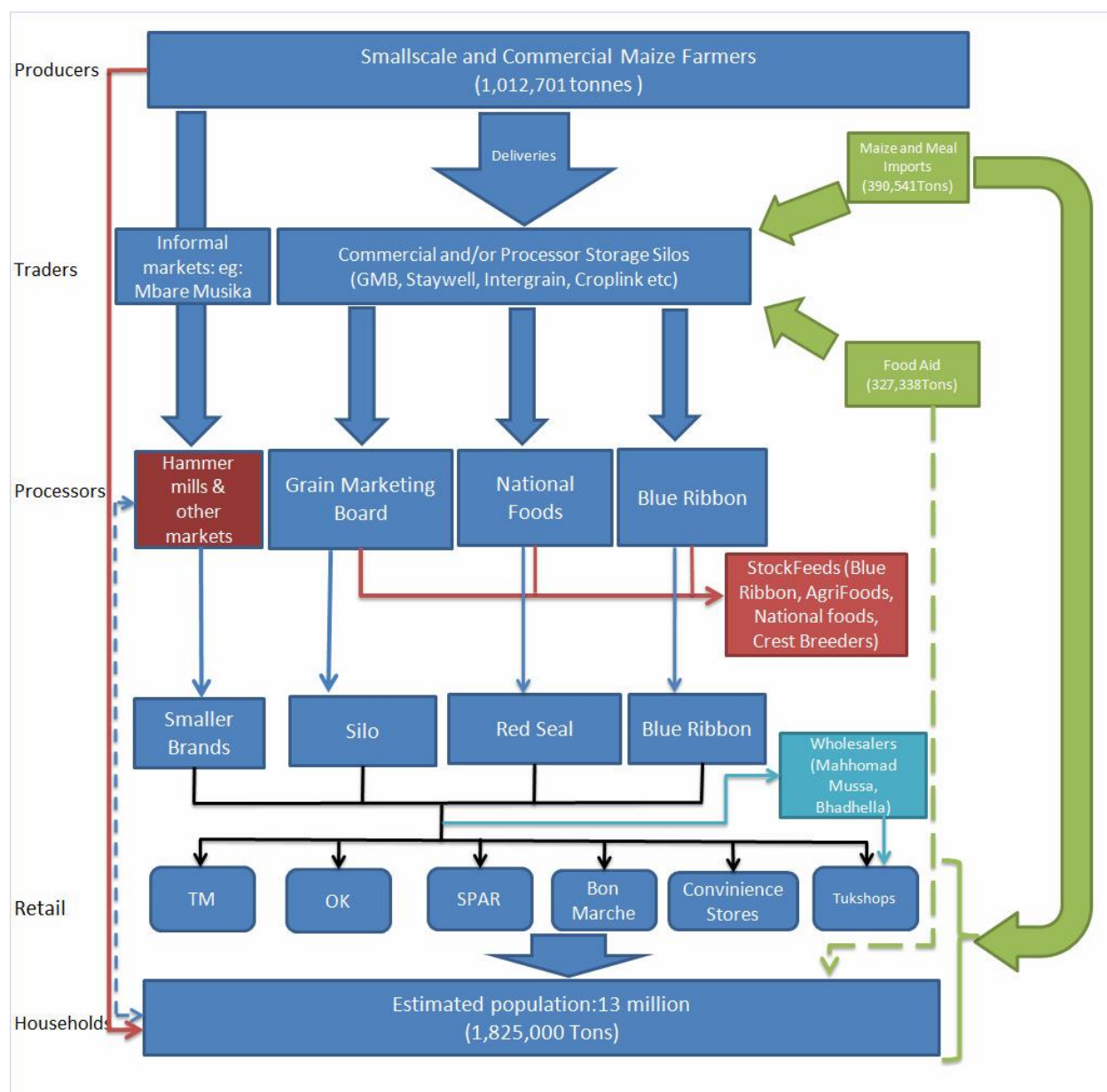
On the other hand, the poultry sector is in crisis as a result of reduced sales, the build-up of broiler meat stocks and the plunge in prices has created decreased production. The industry is cognisant of a number of factors that are not conducive to business such as the erratic electricity supply, job losses and delays in wage payments. Breeding and hatchery operations dependent on locally produced and imported fertilised eggs to produce day-old chicks have also increased to support the growth of the broiler sector.

### **2.3 The Grain Chain in Zimbabwe**

Grain crops and food staples account for more than half of Zimbabwe's cultivated land area and overall agricultural output. According to Moyo (2008), the fast track land reform policy resulted in a dualistic grain producing sector consisting of the large-scale commercial farming sector and smallholder farmers. Maize is the most important grain crop in Zimbabwe since it is a staple food for the majority of the population. In a report by FAO (2008) maize and its products accounted for 43% of the total dietary energy supply between 2003 and 2005. Maize can be consumed as raw grain maize and can also be processed into maize meal or used to make other by-products, which include flour, oil, maputi, samp and grit used in the making of snacks as well as stock feed. Due to the drought experienced in the 2014/15 season, maize has been imported from January 2015. The country from January, imported 390,000 metric tonnes (mt) from Zambia.

Maize and wheat brans are key inputs in the manufacture of poultry, pig and ruminant feeds. They are by-products of the milling industry and are dependent on the performance of millers. Though maize bran was largely available in the 2014 production year, the looming lean 2015 season is of concern to the feed manufacturing sector. If the government encourages the importation of processed maize and wheat products for human consumption, this will lead to local shortages of brans which will necessitate importation at high prices.

**Figure 2.3: Zimbabwe Maize Grain Flow**



**Adapted From:** Kapuya *et.al* (2010)

In Zimbabwe, there are mainly two farmers associations, mainly Commercial Farmers Union (CFU) and the Zimbabwe Farmers Union (ZFU) that represent farmers’ interests. The objectives of these associations are promoting, advancing and developing production. These farmer associations facilitate horizontal linkages among maize producers and traders in the industry and provide a variety of technical and advocacy support services including research and extension, agronomic and grain quality management techniques (Kapuya *et.al* 2010).

### 2.3.0 Processing

Processes maize to maize meal for human consumption and stock feed, while the wet milling sector processes the grain for beer manufacture. Maize can also be processed into the following: samp, maputi, grit and oil. Farmers use processing / milling systems for maize ranging from manual to motorised shellers or threshers for cereals. Most of this technology is manufactured in Harare, Norton and Bulawayo with distribution networks in major cities, towns and rural service centres.

### 2.3.1 Wheat Supply Chain

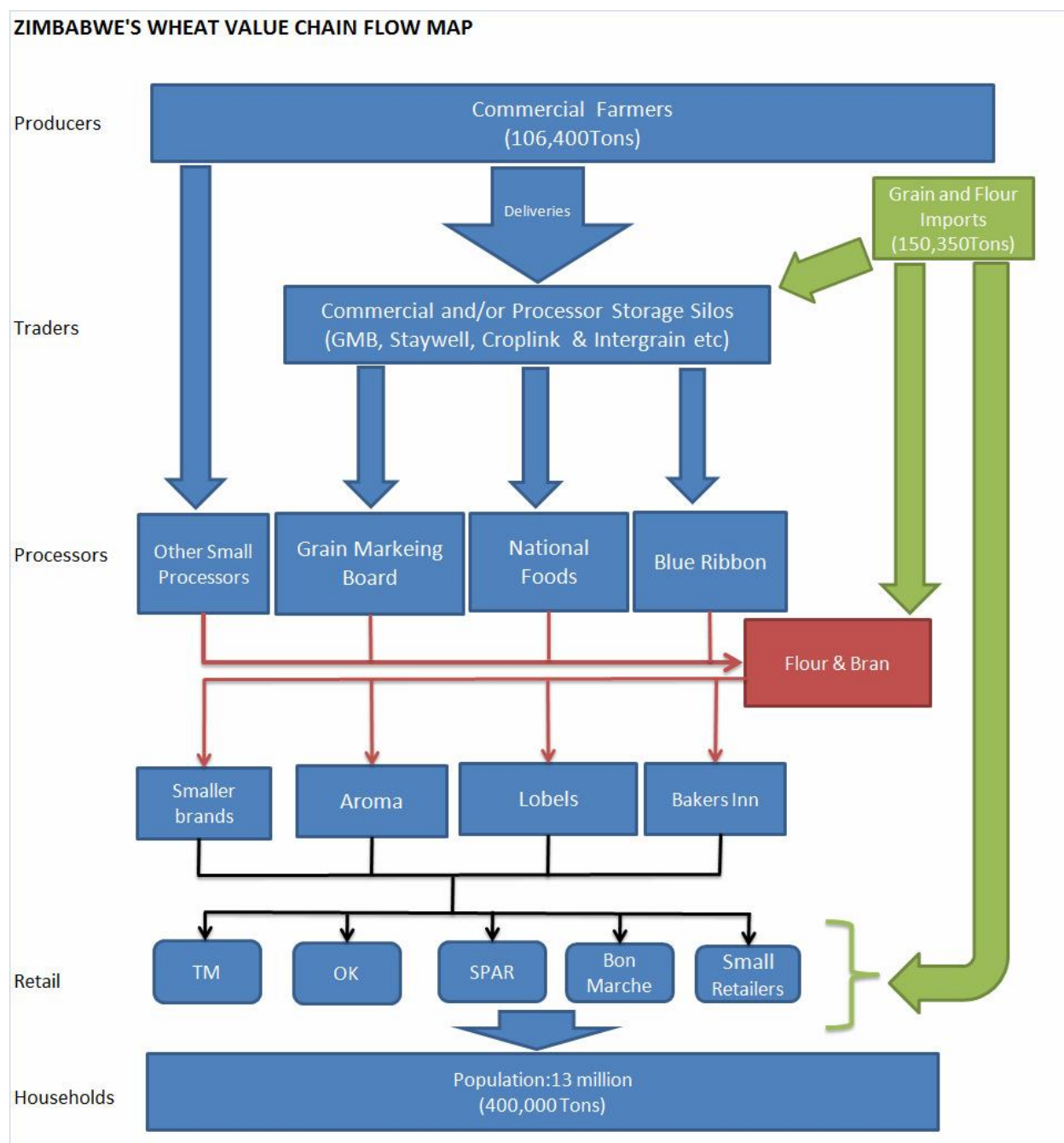
The wheat chain is comprised of input suppliers, producers, traders, processors and end markets consumers. Wheat produced in Zimbabwe is grown under full irrigation during winter from May to August of every year, with deliveries to markets normally taking place anytime from September to February whereas land preparation usually takes place just after the rainy season from March to May. Wheat was introduced into the country in 1960. The years 1960 to 1990, saw an upward trend in wheat production. Prior to Zimbabwe's independence in 1980, because of the Unilateral Declaration of Independence, by Ian Smith (the then president of Southern Rhodesia) in 1965, the country was placed under international sanctions but adopted managed to sustain the increase in wheat production during the 1960 to 1980 era. This was so because, according to Herald, (02/10/12), the Smith regime adopted a strategy that emphasised heavy subsidised investment in irrigation projects, subsidised operating loans throughout the commercial farming areas, accompanied by research, development and extensive extension. Due to this strategy, there was a rationalisation of foreign currency and increased wheat production such that by 1978 there was excess production and wheat was exported to neighbouring countries. With the advent of independence in 1980, these investments in this sector started declining, government budgetary constraints increasing, and wheat production also declined. The situation was worsened by the Fast Track Land Reform Programme (FTLRP) from 2000 onwards. From 2003 wheat production has been on the decline because of the land grabbing and exit of white commercial farmers from the farms.

According to Kapuya *et al.* (2010), wheat farming has become a major cropping activity and has become a highly valued commodity because of its importance in the production of bread, which has become a key staple food in Zimbabwe, making it the second most important crop after maize. Because of its strategic importance and popularity with the urban population, wheat has become the second most important food security crop in Zimbabwe after maize. Wheat contributes about 4% to the GDP of Zimbabwe (RBZ 2009). The immediate wheat products are flour and bran. Flour is the main ingredient for making bread and other confectioneries consumed daily by mostly urban Zimbabweans while wheat bran is mainly used in the stock-feeds manufacturing sector.

Although wheat has become one of the strategic food security crops in Zimbabwe, 2000 to date its production has been declining and imports have been increasing in response to a resulting shortfall in the domestic market.



**Figure 2.4: Wheat chain in Zimbabwe**



**Adapted from:** Mutambara *et al.* (2013).

### 2.3.3 Input Suppliers

Wheat production requires capital inputs such as fertilisers, crop chemicals, farm machinery, lubricants, oils, fuels, electricity and water. The input suppliers include public and private institutions for example; fertilisers, seeds, chemicals, and machinery and irrigation water are provided by monopolies and monopolistic institutions. Suppliers are horizontally integrated into suppliers of most crops and livestock inputs to achieve economies of scale.



### **2.3.4 Wheat Producers**

Since wheat is grown during dry winter season irrigation is a prerequisite for its production in Zimbabwe. Although there were investments in the 1960s and 1970s in the large-scale white commercial farming sector, there was no investment in large-scale irrigation schemes after 1980. Due to the depreciation of the physical infrastructure coupled with disinvestment caused by the FTLRP from 2000 and factors, there has been a drastic decline in wheat production. Other factors that have led to the decline include high electricity tariffs, unreliable electricity supplies, and poor marketing. The CFU through the Crop Producers Association (CPA), ZFU, Zimbabwe Commercial Farmers Union (ZCFU) and Zimbabwe National Farmers Union (ZNFU) represent wheat producers in Zimbabwe. Zimbabwean wheat producers face challenges like high production costs, lack of finance, low producer prices and competition from wheat imports and it has become generally cheaper to import wheat than producing. Locally produced wheat has poor baking quality, landed while imported wheat prices are below market prices causing wheat millers and processors to prefer wheat imports than domestically produced wheat. This has seen processor preferring import since the cost of production is very high compared to the regulated prices of the final product bread. In Zimbabwe, most of the products from agriculture have gazetted prices thus disadvantaging producers who are at the receiving end.

### **2.3.5 Traders**

The Grain Marketing Board (GMB) owns most of the facilities used for wheat storage and previously farmers sold all their produce to the GMB. Trade in grains within and outside the country has been dominated by GMB, a statutory until 2009. The deregulation of grain trade in 2009 resulted in the emergence of new private players both local and foreign participating in storage and trade of grains and lands other agro products. The deregulation has led to the emergence of private grain intermediaries such as Denote enterprises, Crop Link, Intergrain (Paperhole Investments) and Staywell (Oregon Corporation) competing with GMB. The GMB has an established storage infrastructure consisting of silos and depots with a capacity to hold 5 million metric tonnes of grains throughout the country. The facilities are also leased to private traders or large farmers. The foreign trade sector affects the wheat industry at each level in the marketing chain. The informal sector is also very active in local wheat trade through Mbare Musika in Harare and other urban and rural service centres (Mutambara *et. al.* 2013, Kapuya *et.al.* 2010).

### **2.3.6 Millers/ Processors**

The wheat processing or milling industry is dominated by four major processors, i.e. National Foods Private Limited, Blue Ribbon Foods Limited and Victoria Foods and GMB with more than 80 percent of the wheat market. The deregulation of the grain sector in 2009 has led to the proliferation of small millers in settlement areas. According to the Zimbabwe Grain Millers Association (ZGMA) (2009), there are 38 enterprises currently involved in the wheat processing sector. These millers mill the wheat into flour and wheat bran and the flour goes into the baking industry while wheat bran is used mainly in animal feed manufacturing. The major constraints

millers are facing is the availability of wheat grain for processing, lack of working capital, expensive borrowing costs due to the general illiquidity conditions in the market. Further, millers are facing stiff competition from wheat and flour imports depressing domestic prices.

### **2.3.7 Bakers**

The National Bakers Association of Zimbabwe (NBAZ), a part of the Confederation of Zimbabwe Industries represents bakers. Major bakeries in Zimbabwe are Bakers' Inn, Lobels, Proton, Perfect Bake, Super-bake and in-house bakeries in supermarkets, restaurants and hotels. 90% of the flour used in baking industry is used for bread making while the other proportion goes into other baking products such as cakes, scones, buns and others. There is no significant competition with imports in the banking industry since bread is a perishable. Some bakeries actually import wheat or flour. Households also buy flour for home baking.

### **2.3.8 Consumers**

Wheat products such as flour, bread and other confectionery products are mainly consumed by urban households and other consumers such as hotel guests, restaurants guests etc through the numerous wholesale and retail outlets in mostly urban and growth points areas. Wheat bran is used for manufacturing livestock feed. Although bread used to be regarded as a luxury product among the urban and rural poor, it has evolved to become a staple food. Bread is an important source of carbohydrates for the majority of urban households since it has substituted maize meal (sadza) and other sources of carbohydrates such as rice and potatoes.

## **2.4 Timber Chain**

Timber production is done in the Eastern Highlands of Zimbabwe (EHZ). Major players in timber production are; Allied Timbers, Boarder Timbers, Wattle Company and other small players. The players in the timber industry are also involved in the processing, value-adding into furniture, distribution, wholesale and retail of the products in Zimbabwe. The types of timber produced include teak, wattle, saligna, pine and gum trees. Allied Timbers operate a two-tiered Inclusive Business component of which the first tier involves the outsourcing of milling activities to 34 milling contractors who are required to pay 50% of the sawn timber to Allied Timbers with the contract millers keeping the other 50%. Contracts are renegotiated annually with Allied Timbers. The second tiers of millers, which include a community equity component, retain 60% of sawn timber as opposed to the 50% that the first tier operators retain (SNV 2014). The second tier model has started operating in 2011 and 3 of the 34 outsourced milling operations have been upgraded to the second-tier model. The Inclusive Business model was initiated after the realisation that the local ex-commercial farmers were in a position to offer skills, equipment and in some cases, capital for Allied Timbers milling operations. At the time, Allied Timbers was short of operating capital and was struggling under prevailing conditions to raise affordable capital. On the other hand, the other players, Border Timbers and The Wattle Company engage in vertical integration where they own the timber farms and do their own milling and timber processing.

## **2.5 Sugar Supply Chain**

Sugarcane growing estates in Zimbabwe include Triangle, Hippo Valley, Mkwesine including Chapiwa (a resettlement scheme) and Mpapa consisting of 17 farmers. Mkwesine Estates is farmed by small-scale farmers who are contacted by Triangle. The Triangle operation is the biggest sugar operation in Zimbabwe, with a crushing capacity of around 2.5m tonnes of cane per year and producing up to 300,000 tonnes of raw sugar per year. Hippo Valley is the second-largest operation and has the capacity to produce approximately 50% of the local sugar industry output. Brown sugar is produced by the two sugar mills, Hippo and Triangle. In addition to sugar, the mill produces molasses, which is a by-product of the process. Molasses is used as an ingredient for stock feed and for the production of alcohol. The bagasse produced during the milling season is used for the generation of electricity. There are two stand-alone sugar refineries in Zimbabwe, owned by Star Africa Corporation Limited, located in Bulawayo and Harare. Sugar pricing varies in accordance with market demand and supply. Several competitor brands also enter the market from the region.

Before the FTLRP in 2000, the sugar industry accounted for 1.4% of the country's GDP. The sugar production sector has been dominated by two companies Hippo Valley Estates and Triangle Limited that contributed 85% of the total sugar output. The country's processing capacity was 600000 tonnes of raw sugar and 260 000 tonnes of white refined sugar against a historically high national white sugar demand of 230 000-250 000 tonnes per annum during the 1990s (Chidoko and Chimwai 2011). Sugarcane is planted in southeastern Zimbabwe, and before 2000, smallholder out-growers (contract farmers) occupied 28% of the land and by 2009 their land occupancy had increased to 41% ([www.tongaathullets.co.zw](http://www.tongaathullets.co.zw)).

## **2.6 Tobacco Supply Chain**

Zimbabwe is the world's fourth-largest producer of tobacco and internationally regarded as a source of high-quality flue-cured tobacco. Tobacco is the most important cash crop produced in the country and a major earner of foreign exchange. Tobacco is the most important of Zimbabwe's agricultural export commodities. Processing companies purchase tobacco from farmers at auctions and prepare it for export. Zimbabwe's climate is favourable to the growing of tobacco. The crop produces good yields on sandy loam soils where most grain crops would require a lot of fertilisers. Zimbabwe tobacco exports once accounted for 20% of the world's flue-cured tobacco, the main ingredient in cigarettes. Tobacco has also been a springboard for the production of other crops. Tobacco provides the best economic return per hectare among all the major annual crops grown in Zimbabwe. Income from tobacco is used by growers to develop their farms, cattle production, and irrigation schemes.

Contract farming between processors and farmers has been a recent development. Since 2000 there had been an increase in the number of contracted smallholder farmers. The Commercial Growers Association (CGA), the Zimbabwe Tobacco Association (ZTA), have played an important role in linking groups of smallholder farmers to tobacco processing companies. By 2009 companies willing to contract farmers to produce certain crops were required to sign a Memorandum of

Understanding (MOU) with various departments within the Ministry of Agriculture (MoA). The MOU usually specified that contracting companies would provide farmers with extension services, farming inputs including seed, chemicals, tillage, and harvesting, curing and marketing resources to a specified value. The agreement also addressed pricing, grower selection, contract documents and security of land tenure for the currency of the scheme.

### **Production Trends 2009 – 2013**

Period characterised by rapid recovery of production and increase in grower base

58.5 million kg at US\$174.5 million in 2009

123.5 million kg at US\$355.7 million in 2010

132.5 million kg at US\$361.5 million in 2011

144.5 million kg at US\$540 million in 2012

166.7 million kg at US\$610 million in 2013

**Source: Tobacco Industry Marketing Board (TIMB 2014)**

## **2.7 Dairy Supply Chain**

The dairy industry of Zimbabwe comprises all stakeholders from input suppliers, milk producers, processors, transporters and other service providers but excludes the informal chain players. According to Mupeta, (1996), commercial dairy production in Zimbabwe was a privilege of the large-scale commercial farmers since 1912. Because of this privilege, policies were crafted to ensure that Dairy Marketing Board (DMB) became a monopolistic parastatal with tight control over the processing, distribution and marketing of dairy products with no or little value added (Mupeta, 2000). In 1937 the then Rhodesian government enacted The Dairy Act while the DMB now Dairiboard Zimbabwe Limited (DZL) was established in 1952 to spearhead the development of the dairy industry. According to the Zimbabwe Vulnerability Assessment Committee (ZIMVAC), (2012), before the 2000 FTLRP Zimbabwe was self-sufficient in milk production and the surplus was exported to the neighbouring countries. The FTLRP led to the collapse of commercial dairy sector leading to a reduction in the size of dairy herds together with their genetic quality, skilled personnel, milk quantity and quality. Currently, Zimbabwe has a huge deficit in milk production leading to large imports and contributing to the current account deficit facing the economy.

The industry has five major players who fight for control and engage contract farmers. Dairiboard is the key player in the industry, having been operational for more than 60 years and contract farmers to produce milk for delivery to their depots which are in every city. The other players are, who are close competitors are located in different cities, e.g. Alpha and Omega (Mazowe), Dendairy (Kwekwe), Kelshmer (Bulawayo) and Sedgemoor (Bulawayo). These are the big players in the industry who engage farmers on a contract basis. There are also small players who are insignificant when it comes to competition and these produce dairy products on their farms.

## 2.8 Tea Supply Chain

Zimbabwe tea, most of it black, is grown along the very eastern border and marketed to the United Kingdom (U.K.) for use in blended tea bags. The first tea plantation in Zimbabwe was planted in 1924 on an estate known as New Year's Gift in the Chipinge district of the EHZ. The seeds for these plants were from Assam. Most Zimbabwean tea is grown in the eastern part of the country. The two main tea-growing regions are the Honde Valley and Chipinge which is situated in the south-east. The winter weather is too cold to allow year-round production. The tea bushes are pruned back in the fall and lie dormant until the first flushing in the following spring. One of the biggest growers and producers of Zimbabwe tea is Tanganda Tea. Tanganda Tea is one of the best-selling brands of tea in central Africa. The company also exports bulk tea leaves world-wide. From this small beginning, Tanganda has developed the country's largest tea company in Zimbabwe. Tanganda Tea Company Limited is the largest producer, packer and distributor of tea products in Zimbabwe. Tanganda is a subsidiary company of the Meikles Group which owns hotels and supermarkets plus departmental stores. Tanganda was established as a company in 1930, known as the Rhodesia Tea Estates Limited. The name Tanganda, so intimately connected with the prosperity of the original estate at New Year's Gift, is now known for its quality, strength, freshness and full flavour qualities which are constantly being improved as a result of continuous care and research. Tanganda Tea Company was established from these humble beginnings, and now comprises six estates; New Year's Gift, Ratelshoek (established 1932), Jersey and Zona (established 1944) and Avontuur/Petronella (established 1990) with a combined yield of 10,000 tonnes of tea per annum ([www.tanganda.co.zw](http://www.tanganda.co.zw)).

The Tanganda Tea Company (Beverage Division) now consists of a blending and packaging plant in Mutare with sales and distribution depots in Harare, Bulawayo and Mutare. Products are distributed to wholesale and retail outlets on both the domestic and export markets. The administration and financial controls for the division are located in Harare. Major company brands include the following: Stella, Tanganda, Silver, Joko, Special Blend Teabags, Tanganda Tips, Classic Gifts, Fresh Leaves and Rooibos.

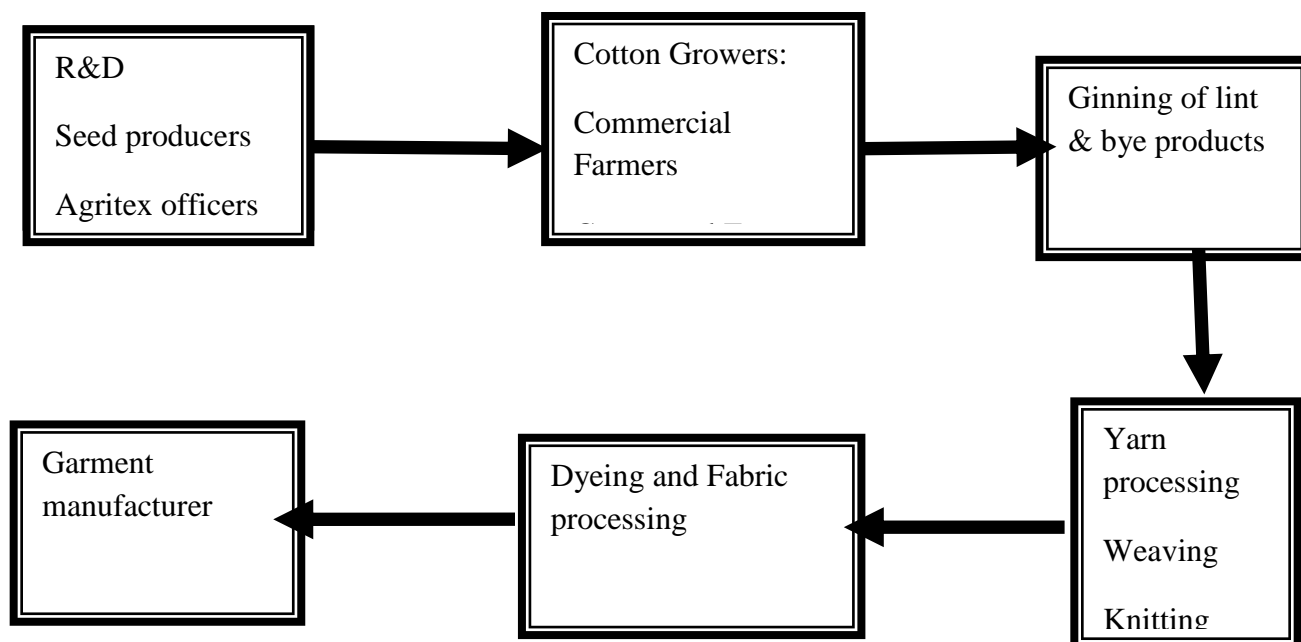
The 1960s saw the entry of Southdown Holdings in Chipinge and, Eastern Highlands Plantations Ltd., and Aberfoyle Plantations in the (Honde Valley) Hauna District in the 1950s. Woodend (2003) notes that smallholder out-grower tea production can be traced as far back as the 1960s in the EHZ comprising of farmers whose lands bordered the large-scale commercial tea estates. An out-grower scheme is a form of contract farming where growers/landholders have a contractual partnership with a processing company for the production of a commercial plant produce (Food and Agricultural Organisation (FAO, 2008). In the late 1960s, TILCOR (now the ARDA started Katiyo Tea Estate in the Honde Valley. In 1960 the tea out-grower (contract) scheme was introduced and spread to other districts in Manicaland and, by the late 1960s, Southdown Holdings and Tanganda Tea Company were running out-grower projects in Chipinge District. The attainment of Zimbabwe independence brought about new changes with the Rusitu Valley Smallholder Tea Project starting in Chimanimani District. The majority of tea out-growers depend on the tea companies, the buyers, for transport and agricultural inputs. They are forced to sell their

tea to the tea companies because they do not have a factory of their own. The companies do not entirely depend on the out-growers for their supply of tea since they have their own estates from which they can get sufficient supply to feed their factories (Woodend 2003).

## 2.9 Cotton Chain in Zimbabwe

Zimbabwe is the largest cotton producing country in sub-Saharan Africa and is renowned for its high-quality hand-picked cotton lint. Cotton is the second most important cash crop after tobacco. The cotton, textile and clothing sector has been a major employer of labour in Zimbabwe. The years 2009-2012 saw textile giants as David Whitehead, Kadoma Textiles, Cone Textiles/Modzone, Merlin and Qualitex/Cotton Printers collapsing leaving only Zimspin as the major textile firm in the spinning and weaving industry. Cotton plays a pivotal role in uplifting the livelihoods of families and communities as well as eliminating poverty among them. The primary activities of the Cotton supply chain in Zimbabwe are depicted in Figure 2.5.

**Figure 2.5: Zimbabwean Cotton chain**



**Adapted From: The Zimbabwe Economic Policy Analysis and Research Unit (ZEPARU) (2014)**

According to the Cotton Research Institute, one of the most widely used varieties today is the **SZ9314**, first released in 1998. The research institute describes the seed as a ‘medium staple variety’ grown in 85% of the country in regions 3, 4 and 5 with good yield and fibre quality characteristics. Cotton has been grown under contract by smallholder growers and the industry contracts communal farmers. Before 1992 the Cotton Marketing Board (CMB) controlled and coordinated the cotton industry from primary purchase and delivery of seed at the farm gate to sales of lint. With the entrance of the Cotton Company of Zimbabwe (Cottco) in 1992, the CMB’s monopoly came to an end in the 1993/94 growing season. The liberalisation of the cotton industry brought in new players such as Cargill (a US-based multinational) entering the industry in the 1998/99 season capturing 21% of the market share while Cottco controlled 67 % of market share. Quton, a wholly owned subsidiary of Seedco Company contracted large-scale commercial farmers,

but after the commencement of the FTLRP in 2000, Quton’s grower base changed significantly through contracting smallholder farmers to grow cotton seed. Contract farming has become the main mode of financing since in the 1970s when the government had a monopoly over cotton production and marketing (Nyamwanza *et al.*, 2014).

The entry of new players such as Sino-Zimbabwe Cotton, China-Africa Cotton, Graffax Cotton and ETG Parrogate has led to new ways of doing business as all these companies seek to control the production process. The coming of new companies into the sector has resulted in two impacts first of which was the increased credit provision and input supply to several farmers. That has created competition among contracting companies to the beneficial of the industry (Nyamwanza *et al.*, 2014). All these companies now engage in contract framing in the areas they are operating in. Cotton contract farming in Zimbabwe has led to the accessibility of production inputs (seed, fertilisers and chemicals) to farmers on loan from the contractors, thereby increasing crop production to about 98% in the 2014/2015 farming season (United States Agency for International Development (USAID) agricultural service report 2015).

The government of Zimbabwe registered eight ginners and merchants in the 2014/2015 season as contractors, a decrease from the previous year. In Zimbabwe, the Agricultural Marketing Authority (AMA), which is the regulatory authority, ensures that the production environment and marketing of seed cotton is fairly done. The regulatory authority requires all contractors to sign contracts with individual growers specifying the area supported by the contractor and volumes expected.

**Table 2.1: Cotton production trend since 2007 to 2016**

Area (h)	Prod.(t)	Yield(t/ha)	Year
398000	253000	0.637	2007
390 000	223 746	0.574	2008
370 000	246757	0.73	2009
315 000	172129	0.66	2010
379689	220219	0.58	2011
432901	254888	0.59	2012
241849	133011	0.55	2013
201678	143 098	0.710	2014
146 544	104 988	0.716	2015
75 000	28 598	0.386	2016

**Source: Agriculture Marketing Authority (2016)**

Table 2.1 shows that the area under cotton has been increasing in aggregate with the highest area planted is in 2012. Production of cotton in the country increased with low figures obtained in the 2008 high inflation year. The cotton industry has suffered from low productivity, poor extension services provided by unmotivated extension officers due to low salaries, and weak marketing institutions (Mutenga 2016). Despite the reduced levels of production of cotton in the past two years due to low international prices, current production has been adequate to meet local feed company demands and local oilseed expressors have been supported by feed companies to export surplus production. Cotton meal, cake and hulls are important ingredients in cattle and sheep feeds.

## **2.10 Chapter Summary**

This chapter gave an overview of the Zimbabwean agricultural industry. It also discussed the different players in the Zimbabwean agro-processing industry and the different chains that guide this study. The next chapter focuses on contextualising supply chain coordination and its theoretical constructs.



## CHAPTER 3: THEORETICAL FRAMEWORK OF THE STUDY

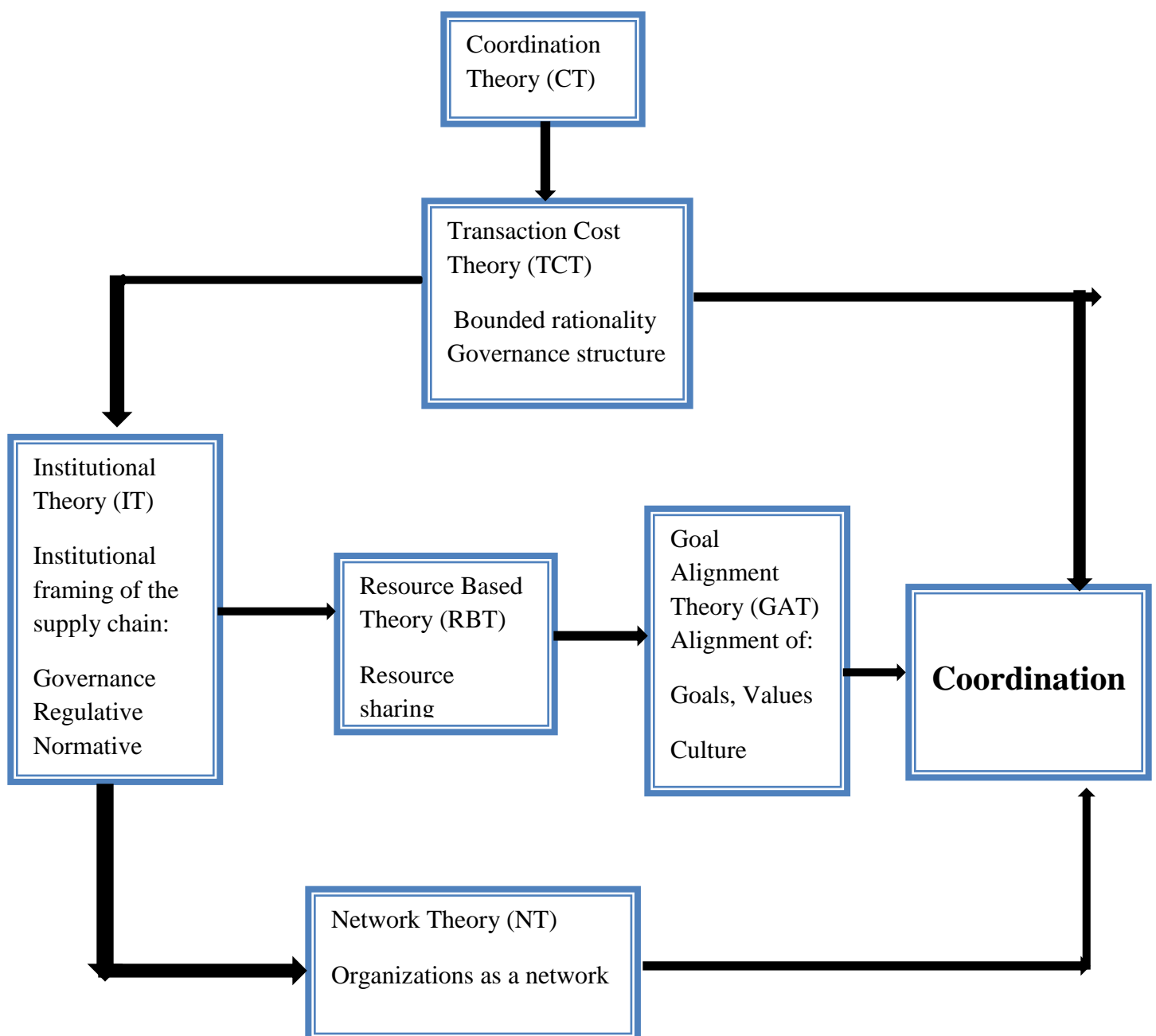
### 3.0 Introduction

The previous chapter gave an overview of the agricultural sector in Zimbabwe and discussed the different selected chains. This chapter outlines the theories that guide this study and their weaknesses. The theoretical background of this study includes coordination theory, transaction cost theory, institutional theory, and resource-based theory, goal alignment and network theory. The second section focuses on the literature on supply chain coordination in general. The ultimate aim is to identify the knowledge gaps upon which to ground the study.

### 3.1 Theoretical Review

This section presents theories of coordination from the supply chain management perspective. The theories used in this study were also reviewed from the perspective of their applicability to Zimbabwean agro-processing organisations.

**Figure 3.1: Theoretical Framework of the study**



### **3.1.1 Coordination Theory (CT)**

Malone and Crowston, (1990), define coordination as the act of managing interdependencies between activities performed to achieve a goal. Malone (1988) argues that the definition suggests that, a set of two or more interdependent actors, who perform their assigned tasks, are required to be coordinated in order to achieve a common goal. Coordination can lead to the alignment and control of various factors such as price, quantity, quality, and terms of exchange. Malone and Crowston (1994), suggest that coordination theories are the focus on studying the interdependence between activities, a view supported by Chang and Shen (2009) when they define coordination as an approach to managing a business by cooperating the interdependence in organisations. However, Wong (2004) views coordination as different parts of an organisation in the supply chain working together to achieve mutual benefits. From the definitions of coordination, it can be noted that single companies cannot efficiently perform all the operations in the manufacturing process of a product from raw material to finished product. These companies depend on other supply chain participants; therefore coordination of activities is required to ensure adequate flow of information, materials and financial flow among members. The definition of coordination suggests that if there is no interdependence there is nothing to coordinate.

Coordination Theory views coordination as the combination of these coordination mechanisms in different ways to achieve the desired goals (Tilson 2005). The coordination theory was applied by Piplani and Fu (2003) when they found out that the coordination framework reduces the supply chain inventory holding cost, achieved through cost sharing and service level contracts. The results also indicated that not all supply chain partners experienced lower inventory costs in the absence of a proper incentive alignment mechanism. Usuga *et al.* (2012) carried out a similar study in the Colombian agrifoods supply chain, one of the challenges in coordinating this supply chain was lack of proper coordination between the farmers and other participants in the supply chain. According to the findings, Usuga *et al.* (2012) noted that the lack of coordination among farmers and their customers had an impact on the performance of the whole agrifoods supply chain. This study, therefore, sought to assess the applicability of the coordination theory in coordinating supply chains in Zimbabwe. It also sought to assess the contribution of supply chain coordination to performance of Zimbabwean agro-processing organisations.

### **3.1.2 Transaction Cost Theory (TCT)**

Since the coordination theory fails to address coordination, the transaction cost theory was used to support the coordination theory in addressing coordination in the supply chain. Coase (1937) is credited with the creation of the concept of the TCT which lacked elaboration until Williamson (1975 and 1979) proposed and used the term ‘transaction cost economics’ (TCE). TCE recognises that markets do not always operate under perfectly competitive conditions. Transaction costs could be described as the costs of acquiring and handling the information about the quality of inputs, the relevant prices, and the supplier’s reputation. TCT was propounded by Williamson (1971), who identified three determinants which include:

A) The agents' bounded rationality that emanates from incomplete contracts due to lack of foresight, in the contracting moment and future contracts. In support of this view, Grover and Malhotra (2003), suggest that managers in organisations are affected by uncertainty in the operating environment which limits their rationality decision-making.

(b) Opportunism that originates when one of the partners pursues his own short-term self-interest. On the aspect of opportunism, management behaviour such cheating, lying and violating agreements could increase transaction costs through monitoring and safeguarding specific assets against such conceivable practices (Grover and Malhotra, 2003).

(c) The assets specificity occurs when owners of production factors incur costs if they deviate the assets to another use and leads to the conclusion that the best use is improved by internalisation.

Having studied the work of Williamson, Jones (1998) adopted a positive or entrepreneurial view when he argued that bounded rationality and uncertainty are not problems to be managed and overcome, these should be taken as opportunities to be taken advantage of. The theory also maintains that many transactions are characterised by imperfect information, either incomplete information or asymmetric information and conditions of asset specificity are widespread (Williamson, 1986b). Williamson, (1985) suggests that there are costs to "drafting, negotiating, and safeguarding any exchange or transaction" that are impeding smooth transactions. TCT claims that companies should take note of the costs of transacting as they have the same importance in driving the organisation as production costs. Transactions costs comprise the costs of searching and information, drafting and negotiating an agreement, and costs of safeguarding the agreement. Other costs proposed by Williamson (1985), incurred after the agreement include costs of evaluating the input, measuring the output, and monitoring and enforcement. TCT considers the firm as a hierarchy that adds value, by economising on transaction costs. Similarly, Jones (1998) proposes that efficiency in TCT is conceptualised as Pareto efficiency where governance modes are compared according to their ability to facilitate transactions until the point at which it is impossible to make one party better off without making the other party worse off. On the other hand, Williamson (1919, 1981 and 1975) investigated how governance structures could be used to minimize transaction costs and proposed possible ways of handling relationships among economic actors. He suggested that transaction costs could be minimized through the signing of contracts and move towards vertical integration using a hierarchy.

The TCT is criticised for lack of sufficiently tested hypotheses. Granovetter (1985) criticised the assumption of opportunism for ignoring the contextual grounding of human actions and presenting it under the socialised view of human motivation and over socialised view of institutional control. The theory deals exclusively with economic aspects and fails to include personal and social relations. TCT is a normative or prescriptive theory and if opportunism with guile assumption is taken seriously by managers there will be negative consequences for organisations. Application of TCT will increase the occurrence of opportunism rather than decreasing it. Ghoshal and Moran (1996) on the other hand, criticised the TCT for failing to provide a solution on how opportunism could be reduced through alternative governance structures. Williamson's theoretical model views

people as being passive and defensive when confronted with the challenges of an uncertain environment. He also treats environmental uncertainty as a threat that must be managed through the governance structure that allows managers to economise on transaction costs. Conversely, Pereira (2008) is of the opinion that, TCT limits its scope to the level of relations between a company and its transactions with other companies with whom it has a close relationship. It does not consider companies that are not in the relationship.

From the discussion of TCT, it can be noted that bounded rationality and opportunism, combined with environmental factors (uncertainty, asset specificity & small number trading) lead to higher transaction costs. This study, therefore, sought to identify ways that can be used by Zimbabwean agro-processing organisations to minimise transaction costs and recommend strategies for dealing with environmental uncertainties.

### **3.1.3 Institutional Theory**

Institutions are defined as: “a set of formal (laws, contracts, political systems, organisations, markets, etc.) and informal (norms, traditions, customs, value systems, religions, sociological trends, etc.) Rules of conduct that facilitate coordination or govern relationships between individuals or groups,” Scott (1995). The theory developed from social sciences and also borrows from economics, political science and sociology. The first models were for analysis of educational systems but were later generalised to apply to a wide range of organisations. According to DiMaggio and Powell, (1983), the institutional theory recognises organisations as rationalised systems with a set of roles and activities laid out. Scott (1995) defines an institution as, “social structures that have attained a high degree of resilience” that are “composed of cultural cognitive, normative, and regulative elements that, together with associated activities and resources, provided stability and meaning to social life.” Organisations adopt practices that are considered acceptable and legitimate in their organisational field. In addition, Scott (1995) views the institutional theory as a description of how an organisation adopts practices that are considered acceptable and legitimate within its organisational field. The theory assumes that organisations operate within a social framework of norms, values, and assumptions about what constitutes appropriate behaviour. It also assumes that socially constructed beliefs and role systems exert a strong influence over organisations’ structure and conduct, including internationalisation. According to the theory, social behaviour is anchored in rule systems and cultural schema.

Although the institutional theory can be used to explain coordination in the supply chain, it assumes that all the actors have equal resources and that there is political and economic stability, which is not always the case. The theory ignores conflicts that may arise and other environmental factors that may impact on coordination of the supply chain. The theory also fails to take cognizance of the individual actors involved who have conflicting goals, values, culture and beliefs. This study, therefore, sought to address this theoretical gap by developing a model that would take cognizance of all the organisational actors and environmental factors that affect the topic under study.

### 3.1.4 Resource-Based Theory

The resource-based view (RBV) provides important insights for understanding how competitive advantage within firms is created and how such advantage is sustained over time (Ponomarov 2001). Barney (1998) and Wernerfelt (1984) are of the view that competitive advantage of a company is based on its ability to control its tangible and intangible resources. A great deal of work on the RBV influence on coordination is attributed to the work of Primrose (1959) who used the theory in strategic management. The RBV is based on the premise that the fundamental sources and drivers of competitive advantage and superior performance for a firm are largely a function of the resources and capabilities at its disposal (Mills, Platts and Bourne 2003; Peteraf and Bergen, 2003). The RBV hinges on the primary assumption that the ultimate objective of the firm is to achieve a competitive advantage over its rivals. According to Rugman and Verbeke (2002) in order to confer this competitive advantage, the set of resources have to possess the following characteristics;

- A) They have to be valuable; being able to exploit opportunities and or neutralise threats in the firm's environment
- B) They have to be rare among a firm's current and potential competitors
- C) They must be perfectly inimitable
- D) There should not be strategically equivalent substitutes for the resources

Barney and Arikan (2001) define a resource as “tangible and intangible assets firms use to conceive of and implement their strategies.” The theory assumes that organisational choice is constrained by multiple external pressures and that organisations are concerned with building legitimacy and acceptance. The resource-based theory focuses on a firm's need to access resources from other actors in the environment and describes how resource scarcities force organisations to pursue new innovations that use alternative resources (Pfeffer and Salancik 1978; Sherer and Lee 2002). Within the resource-based theory, the firm is viewed as a chain of resources that is not freely bought and sold in a spot market (Barney 1991; Conner and Prahalad 1996; Wernerfelt 1984). Amit and Schoemaker (1993) and Grant (1991), are of the view that if these firm-specific resources yield capabilities that are durable, not transparent, not transferable, and not replicable, these capabilities may be potent sources of sustained competitive advantage. These resources have been described as distinctive competence; core competence (Prahalad and Hamel 1990), firm-specific competence (Pavitt 1991) and organisational capital (Tomer 1998) and have sometimes been equated with capabilities (Stalk *et al.* 1992). Similarly, Grant (1991) classifies resources using traditional management functions, such as financial resources and human resources, whereas Conner (1991) made distinctions between tangible and intangible resources. His examples of tangible resources are human, capital, and physical asset while intangible resources are reputation, culture, and know-how. However, Barney (1997) differentiates between assets such as location, contracts and licenses and skills or competencies such as efficient manufacturing while Prahalad and Hamel (1990) extend the concept of resources further when they define core competencies as

a bundle of resources that can be exploited in a market. These resources if shared and coordinated properly will give members of the supply chain a competitive edge. The RBV has had such a significant impact in coordination literature and practice. Rugman and Verbeke (2002) argue that the theory has illuminated and enhanced understanding of the nature and determinants of sustainable competitive advantage. It has led to the appreciation of the fact that not all resources in an organisation are important- but rather, some are more important than others for the overall success of the organisation.

Although the RBV remains a relevant and valuable theory in coordination, it has its own weaknesses. The theory also assumes that organisations make active choices to achieve objectives and respond to demands made by other actors in the environment. It assumes that organisations try to minimise their dependence on resources on which they are heavily dependent. While the traditional RBV approach emphasises the fact that a firm's resources are the sources of competitive advantage, Akio (2005) argues that it is not so much in the resources, but rather in the capabilities of an organisation that sustainable competitive advantage can be generated. Capability is the firm's ability to deploy resources, usually in combination, using organisational processes in order to produce the desired outcome.

Stalk *et al.* (1992) presented a comprehensive distinction between competencies and capability, citing that competencies refer to the technological and production expertise at specific points along the value chain while capabilities encompass this expertise along the entire value chain. It is capabilities that facilitate the use of resources in the creation of output. Therefore, resources are the sources of a firm's capabilities while capabilities represent the main source of a firm's sustainable competitive advantage. It is therefore not enough for a firm to have unique and strategic resources at its disposal, rather, it is the ability to deploy them that sustainable competitive advantage can be attained (Akio 2005). The RBV ignores the fact that resources are accumulated and developed over time. The implication is that a firm has to make investments into this process and incur costs as a result (Ainuddin *et al.* 2007; Akio 2005).

Witteloostuijn and Boone (2006) suggest that the resource-based theory focuses on the firm's ability to establish relationships to access resources. The other weakness of the resource-based theory according to Dyer and Singh (1998), is that it is not relational. This theory has limitations in that, its level of analysis focuses on the internal aspects of companies and neglects other factors. The study seeks to analyse the relationship between resource-based theory and the execution of a winning competitive strategy. Since the resource-based theory fails to address the issue of relationships in the coordination of the supply chain, the Network theory was discussed to address the issue.

### **3.1.5 Network Theory**

Having discussed other theories of coordination and their weaknesses, the Network Theory will be used to explain coordination in the supply chain. The network approach spans a broad range of disciplines that include sociology, social psychology, mathematics, political science,

communication, anthropology, economics, and epidemiology. A network consists of a set of actors or nodes along with a set of ties of a specified type (such as friendship) that link them. The basic principle of the theory is that individual companies need resources controlled by other companies and that interaction between companies provides access to these resources. Network theory describes the relationships among companies, suppliers, customers and buyers. The network perspective views any system as a set of interrelated actors or nodes. The actors can represent entities at various levels of collectivity, such as persons, firms, countries. Wilkinson (2001) defines business networks as the interdependent systems of organisations and relations that are involved in carrying out all the production and marketing activities involved in creating and delivering value in the form of products and services to consumers.

Harland (1996) in addition to Wilkinson (2001), defines the network as a specific type of relation linking a defined set of persons, objects or events, while Chang *et al.* (2012), suggests that a supply chain network is a complicated network and its context depends on the relationships among the network members. Similarly, Thorelli (1986), views a network as two or more organisations involved in long-term relationships. From the definitions, it can be deduced that networks involve relationships and interaction among members of the organisations in the network. Håkansson and Ford, (2002) are of the view that networks are beneficial for every company involved in the investments and actions of the other counterparts involved in the process.

According to Håkansson and Ford, (2002), the assumption of the Network theory is that companies embedded within a network cannot freely decide how to act towards their own aims, nor can they operate in isolation from each other. The organisation's actions and operations with other firms in a network are assumed to be fully understood as a fragment of significant counterparts as well as strategic relationships. Håkansson and Snehota (1989) claim that if a company was able to attract other firms to do business with, and they share a common interest and a certain business environment with each other, the company is embedded in relationships with other organisations, and thus be part of a network. Conversely, Shook *et al.* (2009) identify a weakness of the Network theory when they suggest that, the Network theory does not provide an explanation for companies of when to and where to buy from and when to choose a partner. Salancik (1995) highlighted another weakness of the theory when he points out that, it involves a large number of decision-makers, resulting in coordination failure. Since the number of decision-makers involved is large, managers may focus attention on their organisations and neglect coordinating activities within the supply chain. In addition to Salancik's view, Nagurney *et al.* (2005) also highlighted the weakness of alignment when they suggest that the Network theory does not address the issue of goal alignment since managers are challenged to serve the demands of partners, they tend to ignore the issue of aligning organisational goals with the goals of the members of the chain. Chopra and Meindl (2003) also argue that the deepening of relationships leads to the alignment of the individual strategies of the links in the supply chain with the competitive strategies of the whole chain, a view that is not addressed by the Network theory. Having discussed the Network theory, the study also evaluates the contribution of the Network theory to supply chain coordination among Zimbabwean agro-processing organisations.

### **3.1.6 Goal Alignment Theory**

Jarvenpaa and Ives (1993) define alignment as the extent to which organisational dimensions meet theoretical norms of mutual coherence. Hyndman et al (2008) suggest that to achieve coordination two conditions are necessary: the players' decisions are aligned, and alignment occurs at a point that maximises system profits. However, Chorn (1991); Gattorna and Walters (1996) argue that the alignment theory presents a causal relationship in that specific organisational cultures and leadership styles are only appropriate in given strategic conditions the human element is the common factor in each of the competitive situations, affecting both culture and leadership and strategy is seen as an outcome. In Supply chain management (SCM), the alignment theory allows the linkages to have a human element through the behavioural characteristics of the various elements functions of the supply chain.

In the Zimbabwean context, alignment seems to be difficult because of the prevailing economic conditions, lack of trust, opportunistic tendencies and lack of top management support. With aligned strategies, common goals, culture and aligned objectives, organisations will be able to coordinate activities within the supply chain.

### **3.1.7 Theories Applied in this Study**

Although the above theories have been discussed in detail, it was noted that all could not be applicable in the context of the study. For the purpose of this study, the transaction cost theory, resource-based theory and network theory were found suitable and applicable to Zimbabwean agro processing organisations under study.

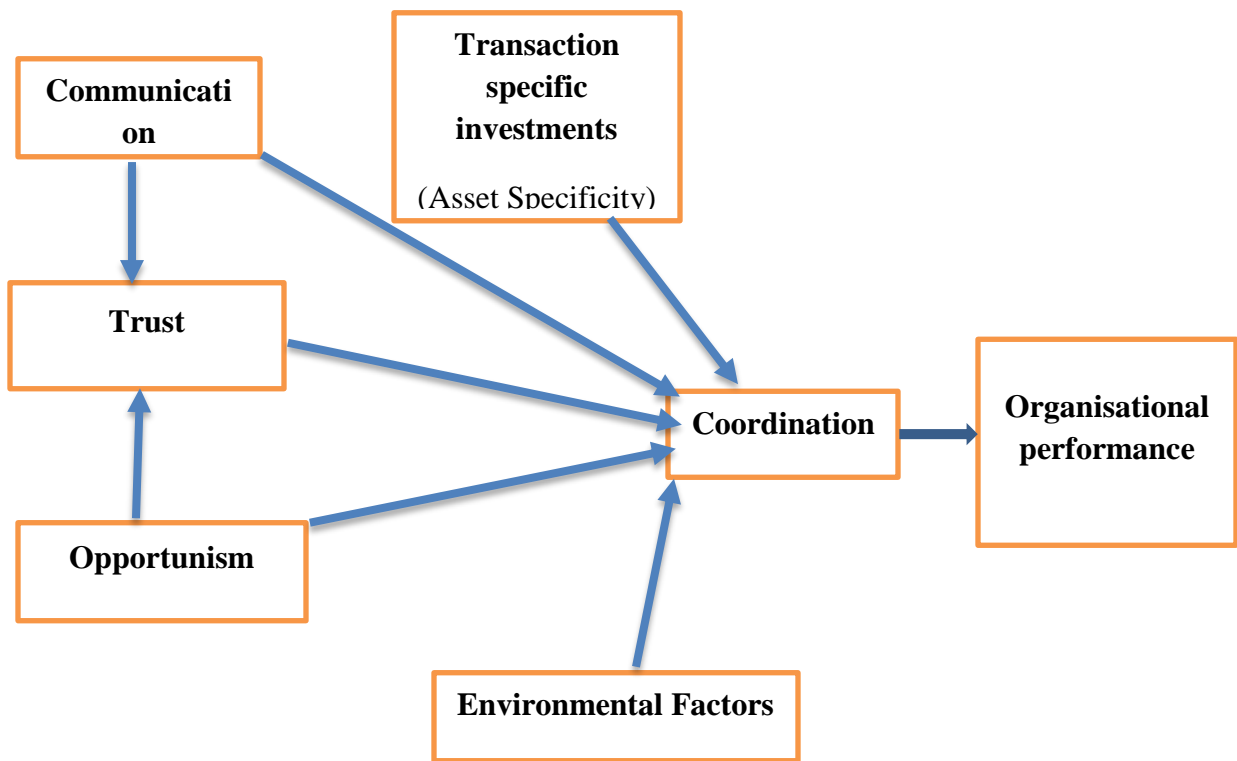
#### **3.1.7.1 Factors from TCT that impact on coordination**

Although the TCT has its weaknesses, there are factors from the theory that impact on supply chain coordination. Antecedents of supply chain coordination that were deduced from TCT are highlighted in Figure 3.2. From the Figure, factors that influence the coordination of activities among supply chain partners include communication, trust, opportunistic behaviour, transaction specific investments and environmental factors. Communication plays an important role as actors in the relationship have to come together to find ways of minimizing transaction costs. Communication among actors reduces asymmetric information and conditions of asset specificity are widespread (Williamson, 1986b). Communication has an impact on trust as continuous engagement builds trust which will enable organisations to effectively coordinate their supply chain activities.

Opportunistic behaviour also impacts on trust. Actors who tend to advance their personal interests build mistrust among the players which will in turn affect coordination of the entire supply chain. Trust plays a mediating role between communication and opportunistic behavior in coordinating the supply chain. Environmental factors also affect the coordination of supply chain as changes in the operating environment will negatively or positively impact on coordination activities. A volatile environment makes it difficult for companies to coordinate and manage their supply chain.



**Figure 3.2: Factors from TCT and their impact on coordination and organisational performance**



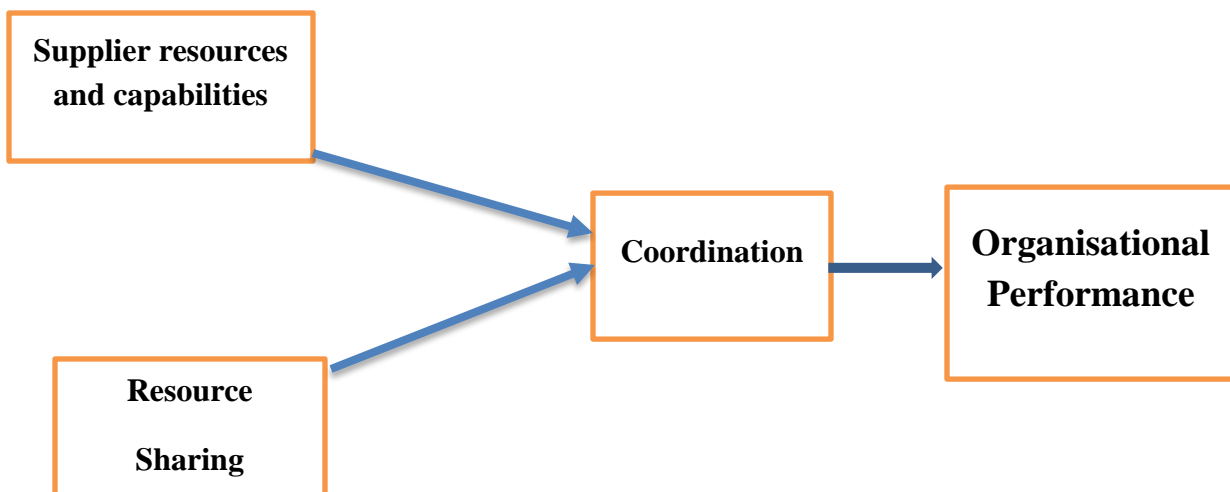
Adapted from: Williamson (1975, 1991)

Transaction specific investments make coordination easier as actors/player invest resources in the relationship and concentrate on ensuring the success of the relationship. These investments guarantee the participants in the supply chain quality product and rewards as this calls for mutual understanding, reward sharing and mutual benefits for all parties. The results from the transactions are proper coordination of the supply chain and ultimately organisational performance.

### 3.1.7.2 Factors from RBT that impact on coordination

The resource-based theory was found to be applicable to this study given that companies participating in the supply chain depend on each other for survival. Factors considered were supplier resources and capability to deliver and resource sharing.

**Figure 3.3: RBT on coordination and its impact on organisational performance**

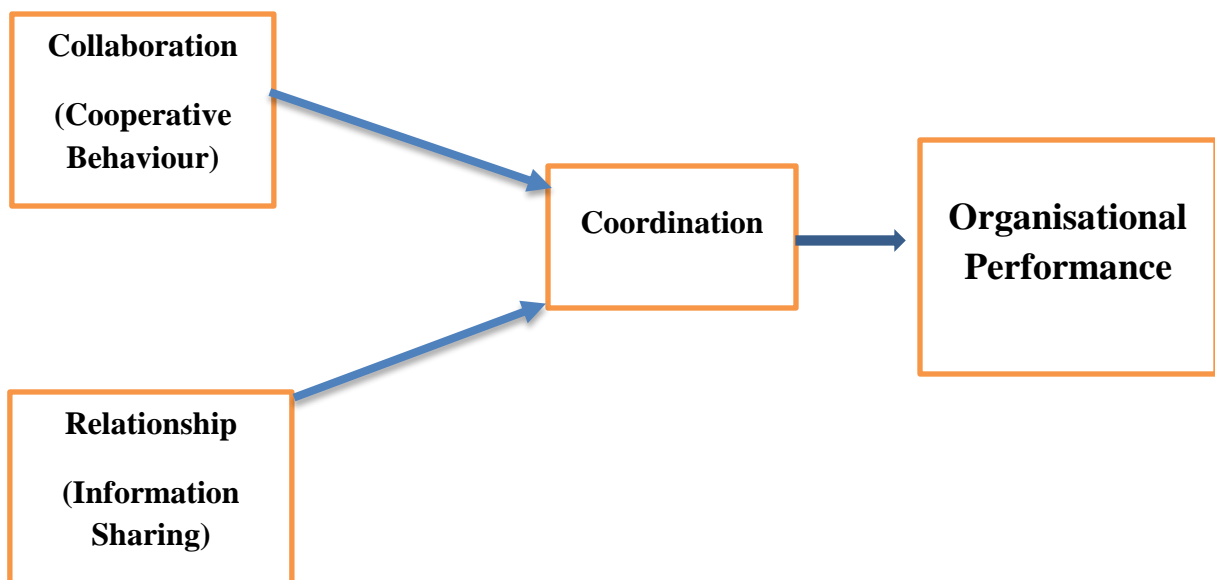


According to Barney and Clark (2007), the resource-based theory was first used in strategic management. They view the theory as founded on three key concepts: resources, competencies and strategic assets that give a company a competitive advantage. Resources, according to Amit and Schoemaker (1993) are the stocks of available factors that are owned or controlled by an organisation. A firm's resources include its assets, capabilities, knowledge, patents, and others that allow it to create value, design and implement strategies that enhance efficiency and effectiveness. Resources influence an organisation to seek competitiveness in their buyer - seller relationships. Masella and Rangone (2000) support the relationship proposal, by arguing that supplier resources and capabilities lock the buyer in a long term relationship. Humphrey *et al.* (2001) and Katobe and Murray (2004) corroborate this view through the argument that supplier resources and capabilities are regarded as competencies that assist organisations in developing long-term collaborative relationship with buyers.

### 3.1.7.3 Factors from Network Theory that impact on coordination

Network theory was found applicable to this study due to the fact that supply chain actors engage in cooperative behaviour when they collaborate with each other in new product development and lead time reduction. It was also noted that supply chain actors engage in relationships through information sharing.

**Figure 3.4: Network Theory on coordination and its impact on organisational performance**



Networks in business relationships are beneficial to companies through investments and actions of other players in the supply chain (Håkansson and Ford 2002). The Zimbabwean agro processing organisations are no exception as supply chain actors in the industry invest in the relationship and share information and knowledge with their partners. According to Wellenbrock (2013), companies in a network have a wider choice of suppliers to ensure continuity of supplies and companies in these relationships tend to be trustworthy, thereby contributing to value addition for the partners. Companies in a network have long term contractual agreements leading to the development of strong partnerships. Håkansson and Ford (2002) note that the position of an

organisation in a network influences the firm's performance leading to competitive advantage. Zimbabwean agro processing organisations use networks to achieve competitive advantage through contracts with supply chain partners.

### **3.2 Chapter Summary**

The existing theories focus on organisational coordination, resource-sharing, institutional and goal alignment and cost reductions through transaction economics, but they miss the role played by individual organisations and actors. The theories fail to address the differences in organisational structures, the degree of centralisation, organisational values, culture, systems and goals. The resource-based theory focuses on the sharing of resources basing on the assumption that the companies are equally resourced, but fails to consider that these might not be equal in terms of technological development and resources in terms of human resource skills and financial resources considering that this study is being carried out in a developing country where the uptake of technology by business organisations is still in its infancy. The other weakness of the theories is that they could not be applied across the board given the different environment in which this study was undertaken. The next chapter discusses coordination literature in the supply chain. Although the theories have weaknesses, the transaction cost theory, resource-based theory and network theory were found to be applicable to this study as they address the activities of Zimbabwean agro processing organisations.

## CHAPTER 4: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

### 4.0 Introduction

This chapter reviews different scholarly views on the subject matter. It starts by describing the history and development of the supply chain concept and supply chain management (SCM), highlighting the need for coordination. The chapter also highlights factors that have led to the development of supply chains, challenges, coordination mechanisms and benefits of coordinating supply chains. Performance measurements for the supply chain are also discussed in this chapter. The last section of the chapter discusses the conceptual framework of the study, leading to the development of a model or framework of the supply chain which could be adopted by Zimbabwean agro processing companies.

### 4.1 Conceptualisation of Supply Chain Management

#### 4.1.1 The Supply Chain Concept

A supply chain (SC) is a network of organisations that distribute output and distribute it from the manufacturer to the end customer. Various definitions of an SC have been offered in the past several years as the concept has gained popularity. The American Production and Inventory Control Society describe the SC as:

*The processes from the initial raw materials to the ultimate consumption of the finished product linking across supplier-user companies; and the functions within and outside a company that enable the value chain to make products and provide services to the customer (Cox et. al.1995).*

A SC is a network of facilities and distribution options that perform the function of procurement of materials, transformation of these materials into semi-finished and finished products, and the distribution of these finished products to end customers (Tarokh and Soroor 2006). The SC Council (1997) uses the definition:

*"The SC - a term increasingly used by logistics professionals - encompasses every effort involved in producing and delivering a final product, from the supplier's supplier to the customer's customer."*

A SC is a complex network of organisations which are operating with downstream and upstream linkages, depending on the various activities and processes that add value to the product or service at the ultimate end user; the consumer (Christopher, 2011). According to Beamon (1998), products start from the suppliers and continuously flow to the end consumers while the information travels from consumers towards suppliers, whereas Christopher (2011) is of the view that the customer triggers the order and is the receiver. Handfield and Nichols (2002) suggest that a SC encompasses organisations and flows of goods and information between organisations from raw materials to end-users. The SC is a meta-organisation built up by independent organisations that have established inter-organisational relationships and integrated business processes across the borderlines of the individual firms. Management of such an arrangement refers to inter-

organisational relationship management with the objective of improving the overall profitability of the activities and/or organisations involved. Available literature concurs with the definitions given above.

Christopher (2011) has a different view of the SC by suggesting that SC begins with the customer order and end with customer satisfaction. It is the customer who triggers the chain backwards. Fierce competition in today's global markets and the heightened expectations of consumers has forced business enterprises to invest in and focus attention on, the relationships with their customers and suppliers. Due to competition between producers/manufacturers, production and delivery of goods and services became increasingly difficult for them to achieve without linking their firms closely with suppliers and distributors. On the other hand, Kruger and Ramphal (2009) define SC as a process, which originates with the supplier and continues through manufacturing and distribution until the final product reaches the final customer. The term "SC" encompasses every effort involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer (SC Council, 1997). A SC is a network of facilities and distribution options that perform the functions of procurement of materials, the transformation of these materials into intermediate and finished products, and the distribution of these products to customers (Chan *et.al.* 2011). According to Iskandar *et.al.* (2014) a SC is a network of organisations that work towards the distribution of their output from the source of raw materials to the end customer. The formation of a chain, the involvement of actors and the activities carried out by them vary according to the nature of goods or services that flow across the chain. According to Picot *et al.* (2001) SC can also be characterised as a borderless organisation, a value net as proposed by Bovet and Martha (2000), a virtual SC (Chandrashekar and Schary 1999), an interactive firm (Johansen and Riis 2005), a multi-organisation/single-site coordinated operations network (Rudberg and Olhager 2003), or an extended enterprise (Davis and Spekman 2004). In support of these views, Arshinder *et.al.* (2009) suggest that a SC consists of disparate but interdependent members who are dependent on each other to manage various resources (such as inventory, money and information). This view is also supported by Azambuja and O'Brien (2009) who view a SC as a unity of customers and suppliers working together for a common interest. The main objective of the SC is to maximise the overall value generated by what the final product is worth and effort the SC expend in fulfilling the customer request.

#### **4.1.2 Supply Chain Competitive Strategies**

Johnson and Scholes (2004) define strategy as follows:

*A strategy is the direction and scope of an organization over the long-term: which achieves advantage for the organization through its configuration of resources within a challenging environment, to meet the needs of markets and to fulfill stakeholder expectations.*

Chopra and Meindl, (2007: 22) define supply chain strategy as, "the set of customer needs that it seeks to satisfy through its products and services." The strategy involves decisions relating to the

selection of suppliers, the location of facilities and the choice of distribution channels. A typical supply chain strategy should be aimed at achieving a smooth flow at a minimum cost. Christopher, Peck and Towill (2006), suggest that organizations should now accept that “one size does not fit all” when it comes to designing a supply chain strategy in order to support a wide range of products sold in a diversity of markets

Supply chain alignment is achieved when there is congruence between the supply chain strategy, the infrastructure (the physical supply chain and its assets) and the operating model (the way the physical supply chain will be managed) (Gattorna and Walters 1996; Gattorna 1998; Godsell and Harrison 2006; Sun and Hsu 2009). This essentially determines the “tailored practices” (Lapide 2006; Godsell 2009) through which the supply chain strategy is brought to life. It also helps to make the distinction between the supply chain and supply chain management. The supply chain is the infrastructure and supply chain management the way the operating model is used to manage the supply chain, in terms of processes, governance and decision rights, organisational design and performance management. This is an important distinction to make as strategic alignment affects all elements of both the supply chain (McAdam and Brown, 2001) and its management. Tamas (2000) found that there was a mismatch between supply chain processes and corporate strategic goals (Van Hoek *et al.* 2009).

#### **4.1.3 Competitive advantage**

Porter (1985), McGinnis and Vallopra (1999) define competitive advantage as the extent to which an organization is able to create a defensible position over its competitors. Tracey *et al* (1999), view competitive advantages as comprising capabilities that allow an organization to differentiate itself from its competitors and as an outcome of critical management decisions. According to Chopra and Meindl (2006), a company’s competitive strategy defines the set of customer needs that it seeks to satisfy through its products and services.

The competitive advantage of an organization is achieved through the competitiveness of all the supply chain components like suppliers, manufacturers, distributors and retailers. A firm gains competitive advantage by performing strategically important activities more cheaply or better than its competitors. According to Gruen (1997) companies may compete if they develop and manage cooperation and collaboration partnerships, a sentiment supported by Lalonde (1997) when he suggests that inter-firm cooperation in supply chains has shifted downstream toward the customer or end-users. Mentzer (2004), argued that competitive advantage can be obtained not just through products sold, but through the way companies manage the flows in a supply chain.

Lalonde (1997), is of the opinion that information and communication are important and influence changes that affect the company’s competitiveness and suggest the use of the internet and other communication systems improve the competitiveness of the supply chains. Lalonde, further proposes that organizations must be quick, agile, and flexible to compete efficiently, a strategy which can only be achieved through coordination of the companies in supply chains. Hitt *et al* (1999) agree with Lalonde and Mentzer on information but adds intelligence and expertise as other critical organizational sources for competitive advantage. To assess the competitiveness of

the sector, a SWOT analysis was undertaken. A SWOT analysis evaluates the internal strengths and weaknesses, and the external opportunities and threats in an organization's environment. The internal analysis is critical in identifying the source of competitive advantage. It pinpoints the resources that need to be developed in order to remain competitive. The internal analysis identifies resources, capabilities, core competencies and competitive advantages, using a functional approach to review finance, management, infrastructure, procurement, production, distribution, marketing, reputational factors and innovation. The external analysis identifies market opportunities and threats by looking at the competitors' environment, the industry environment and the general environment. The competitors' environment is an analysis of the resources and functions of each rival firm.

#### 4.1.4 SWOT Analysis of the Zimbabwean agro processing sector

The Strengths/Weaknesses/Opportunities/ Threats (SWOT) analysis allows the researcher to examine the current competitive state of the Zimbabwean agro processing sector. It assesses the sectors' competitive strengths and weaknesses and identifies pending opportunities (for growth) and threats, which the sector must be able to respond to, in order to improve its current competitive position. An analysis of the competitive state of the sector enabled for a composite investigation of the impact of supply chain coordination on Zimbabwean organisations.

The analysis reveals that despite having abundant raw materials and a young and growing workforce, a long list of weaknesses and threats are hampering Zimbabwean agro processing organisations from fulfilling their potential. Most of the strengths of the sector are related to its potential to produce low-cost tradable commodities. The markets in which Zimbabwean organisations compete are global commodity markets in which renewable natural resources are traded pose several limitations on the organisations that depend on them.

**Table 4.1 SWOT Analysis of the Zimbabwe agro processing sector**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Conducive agricultural climate</li> <li>• Abundant labour</li> <li>• A creative and resilient workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of capital</li> <li>• Poor infrastructure to take advantage of abundant raw materials in communal areas</li> <li>• Unfriendly business climate (electricity, water challenges and corruption)</li> <li>• Lack of quality standards</li> <li>• Lack of skilled personnel</li> <li>• Lack of funding, investments, R&amp;D</li> <li>• Outdated equipment and machinery</li> <li>• High costs of electricity</li> <li>• Lack of foreign currency</li> </ul>

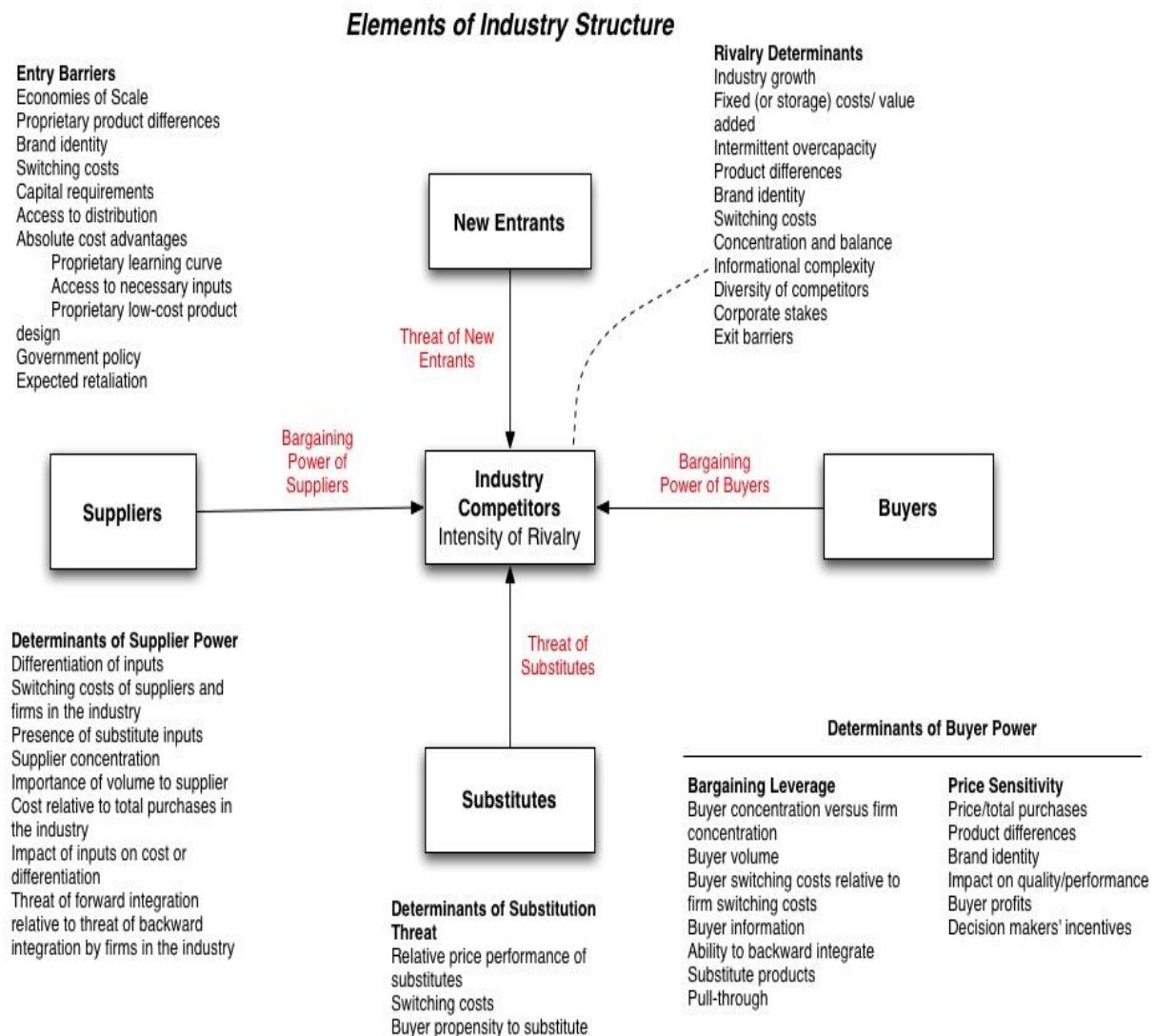
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• An abundant pool of willing labour</li> <li>• Rising middle-class</li> <li>• Increasing government support</li> <li>• Change in government</li> <li>• Increase in suppliers willing to be contracted for the supply of raw materials</li> <li>• Increase Public-Private Partnerships</li> <li>• Enactment of SI 64 to protect local industry and producers</li> <li>• Removal of import duties on specified raw materials and equipment (fertilizers, raw milk powder and agro equipment)</li> <li>• Potential for acquisition and mergers</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of coordination of supply chain activities</li> <li>• Competition from imports</li> <li>• Competition from small upcoming organisations</li> <li>• Fuel shortages</li> <li>• Continuous land grabbing</li> <li>• Uncertainty in the operating environment</li> <li>• Indigenisation Act</li> <li>• Lack of local currency</li> <li>• High dependency on imported components and raw materials</li> <li>• The concentration of market share and power in big companies</li> <li>• Lack of communication and knowledge sharing among sector stakeholders</li> <li>• Lack of collaboration within the supply chain</li> <li>• Limited government funding in the sector</li> </ul>

#### 4.1.5 Porter's Five Forces Model

Lambert (2000) emphasized the importance of cooperation and coordination for achieving competitive advantage whilst Pine (1993), emphasized on mass customization for gaining competitive advantage of supply chains. Thompson and Strickland (2003) note that one important component of competitive analysis involves analysis of the industry's competitive process to find out the main sources of competitive pressure are and assess the strength of each competitive force. Porter (1980) argues that organizations are concerned with the intensity of competition within their industry. Porter (1980) identified five forces that determine the intensity of competition in an industry which include; rivalry among existing competitors, the threat of new entrants, threat of substitute products and services, bargaining power of suppliers, and bargaining power of buyers. In any industry, the rules of the competition are embodied in these competitive forces as presented in Figure 4.1.



**Figure 4.1: Porter's Five Forces Model**



**Source: Porter (1985)**

#### 4.1.5.1 Rivalry among competing firms

According to Thompson and Strickland (2003), the strongest of the five competitive forces is usually the rivalry among existing competitors. This competitive jockeying among rivalry firms is a dynamic, ever-changing operating environment as new defensive and offensive moves are initiated (Thompson and Strickland, 2003). David (2011) notes that the intensity of rivalry among competing firms tends to increase as the number of competitors increases, as competitors become more equal in size and capability, as demand for the industry's products declines, and as price-cutting becomes common. He further points out that it also increases when consumers can switch brands easily, when barriers to leaving the market are high; when fixed costs are high; when a product is perishable; when consumer demand is growing slowly or declines such that rivals have excess capacity and/or inventory; when products being sold are commodities; when rival firms are diverse in strategies, origins and culture. In the Zimbabwean agro processing sector, there is rivalry among the main players who are jostling for position and the same dollar from consumers. The so called big processors are also competing with new processing companies who are penetrating the market for consumer goods using price as a strategy. Porter (1980) suggests that the intensity of the rivalry depends on the following factors:

- **Number and size of competitors:** with the rivalry intensifying as the number of competitors increases and as competitors become more equal in size and capability.
- **Rate of industry growth:** the rivalry is usually when the rate of industrial growth is slow and demand for products and service is low.
- **Lack of differentiation and switch costs:** Rivalry is stronger when customer's costs to switch brands are low. The rivalry is also weak where products and services are viewed as commodities are viewed as commodities or near commodities –products or services whose characteristics are the same regardless of who sells it.
- **Height of exit barriers:** Rivalry tends to be more vigorous when it costs more to get out of business than to stay and compete.
- **Diversity of Rivalries:** Rivalry becomes more volatile and intense where the firms have different ideas on how to compete in terms of their visions, strategic intents, objectives, strategies and resources. The rivalry also increases in proportion to the size of payoff from a successful strategic move.
- **Level of satisfaction with market position:** Rivalry is strong when some of the competitors are not happy with market share and initiate moves to buttress their market position at the expense of rivalries.
- **High fixed cost:** High fixed costs create strong pressures for all firms to increase capacity. The rivalry will intensify as the competitors use price competition and other competitive weapons to boost capacity.
- **Acquisitions and mergers:** Rivalry increases when firms outside the industry acquire weak firms in the industry and launch aggressive well-funded competitive moves.

#### 4.1.5.2 The potential entry of new competitors

New entrants to an industry bring in new capacity, the desire to gain market share that put pressure on prices, costs and the rate of investment necessary to compete (Porter, 2008). Wheelen and Hunger (2012) define a barrier to entry as an obstruction that makes it difficult for a company to enter an industry. Wheelen and Hunger (2012) go on to identify the following as potential barriers to entry: economies of scale, product differentiation, capital requirements, government policy and access to distribution channels. There has been an influx of new agro processing organisations sprouting in Zimbabwe, the majority of whom are not Standard Association of Zimbabwe (SAZ) certified thereby producing cheap substandard products. The government of Zimbabwe has promulgated the Indigenisation Act that calls for local ownership of businesses where locals own a fifty-one percent stake (51%) and this has turned out to be a huge barrier to entry as external investors are interested in full control of their investments.

#### 4.1.5.3 The threat of substitutes

Wheelen and Hunger (2011) define a substitute product as a product that appears to be different but can satisfy the same need as another product. Porter (1985) posits that substitutes limit the potential returns of an industry by placing a ceiling on the prices firms in the industry can profitably charge. As outlined in chapter one, the influx of cheap imported products on the Zimbabwean

market has affected local companies in the agro processing sector. These imported products are a big threat to the locally produced products that end up being shunned by the consumers because they are highly priced whereas the imported ones are cheaper on the local market. The threat of new entrants depends on the presence of entry barriers and the reaction of existing organisations. These barriers include:

- Economies of scale;
- Product differentiation;
- Capital requirement;
- Switching costs;
- Access to distribution channels;
- Cost disadvantage independent of size;
- Brand preferences and customer loyalty;
- The inability to match the technology and specialized know-how of firms already in the industry;
- Regulatory policies.

#### **4.1.5.4 Bargaining power of buyers**

According to Wheelen and Hunger (2012), buyers affect an industry through their ability to force down prices, bargain for higher quality or more services, and play competitors against each other. Now buyers have a lot of power through a wide choice of product and online purchasing, giving them the opportunity to participate in the global market. Hax (2003) also points out that large aggregated buyers such as retailers, large wholesalers and government institutions are progressively replacing the role of individual customers.

#### **4.1.5.5 Bargaining power of suppliers**

David (2011) argues that the bargaining power of suppliers affects the intensity of competition in an industry, especially when there are a large number of suppliers, when there are only a few good substitute raw materials or when the cost of switching raw materials is especially costly. Zimbabwean agro processing organisations new entrants being small, buy only a small portion of most suppliers' goods such that they are unimportant to the supplier, thereby giving the supplier more bargaining power (Wheelen and Hunger, 2012).

### **4.2 Supply Chain Management**

The last few decades have witnessed a global shift in trade which ushered a new way of doing business. Economic developments have led to the emergence and growth of SCM as a business strategy. Several factors have led to this new development. One of the factors is globalisation, which has led to a boundary-less supply chain, making global sourcing and partnering feasible. Xue *et al.* (2005) consider SCM as the coordination of decision-making of organisations or participants of material flow, information flow, human flow and cash flow in the supply chain. Speckman *et al.* (1998) define SCM as a way through which products or services are moved between upstream and downstream, a view which is supported by Arshinder *et al.* (2008) who

stated that a SC is a synthesis of different activities such as logistics, inventory management, material, information and financial flows. Arshinder *et al.* (2007) are of the view that collaborative decision-making in SCM helps to reduce information asymmetry, inventory cost and improves customer service efficiency of the replenishment process. Integration of SC activities results in better coordination. Arshinder *et al.* (2009) have identified globalisation, competition and outsourcing as the major factors that have forced companies to work coherently with each other. SCM can be defined as the process of planning, implementing and monitoring operations of a supply chain. SCM is an all-encompassing process as it undertakes the management of availability of raw materials, their processing into finished goods and the distributions of these goods to customers.

Definitions of SCM originate from the operations management literature referring to issues such as new product development (NPD), customization and distribution of goods, including the balancing of demand needs and capacity requirements in the transformation of raw materials into final products delivered to customers (Lee 1993). Iskander *et al.* (2014) corroborates this view by defining SCM as the coordination and control of activities in a SC with the main objective of maximising value for the customer. Thus SCM involves material flow, information flow, financial flow and commercial flow to maximise total SC profitability (Lui 2013). Table 4.1 summarises the definitions of SCM.

**Table 4.2 Definitions of Supply Chain Management**

AUTHOR	DEFINITION
Simchi-Levi <i>et al.</i> (2008)	A set of approaches utilised to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed in the right quantities, to the right locations, and at the right time, in order to minimise system-wide costs while satisfying service level requirements.
Mentzer <i>et al.</i> (2008)	Using analytical tools and frameworks to improve business processes that cross-organisational boundaries. The systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the SC, for the purposes of improving the long-term performance of the individual companies and the SC as a whole.
Lee & Billington (1995)	Networks of facilities that produce raw materials, transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system. It spans procurement, manufacturing and distribution.
Lambert <i>et al.</i> (1998)	The integration of key business processes from end-user through original suppliers that provide products, services, and information that add value for customers and other stakeholders.

Lau <i>et al.</i> (2004)	Coordination of independent enterprises in order to improve the performance of the whole SC by considering their individual needs.
Tan <i>et al.</i> (1999)	SCM encompasses materials/supply management from the supply of basic raw materials to the final product (and possible recycling and re-use). SCM focuses on how firms utilise their suppliers' processes, technology and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimisation and efficiency.
Berry <i>et al.</i> (1994)	SCM aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to a particular original equipment manufacturer so as to release management resources for developing a meaningful, long-term relationship.
Jones and Riley (1985)	An integrative approach to dealing with the planning and control of the materials flow from suppliers to end-users.
Saunders (2012)	External Chain is the total chain of exchange from the original source of raw material, through the various firms involved in extracting and processing raw materials, manufacturing, assembling, distributing and retailing to ultimate end customers.
Ellram (1991)	A network of firms interacting to deliver product or service to the end customer, linking flows from raw material supply to final delivery.
Christopher (2011)	A network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer.
Kopczak (1997)	The set of entities, including suppliers, logistics services providers, manufacturers, distributors and resellers, through which materials, products and information flow.

There have been paradigm shifts in modern business management in that individual business no longer compete as solely autonomous entities, but rather as supply chains. SCM has now become an integral part of any company's competitive strategy and the Zimbabwean agro-processing is no different. SCM is now seen as a major competitive weapon (Christopher 1992; Fisher 1997). Business management has entered the era of inter-network competition. In this emerging competitive environment, the ultimate success of the single business will depend on management's ability to integrate the company's intricate network of business relationships (Lambert and Cooper 2000). Intense global competition, short product life cycles, rapid changes in technology, demanding customers and the need to increase shareholder value has recently resulted in a significant focus on SCM (Losbichler *et al.* 2008). SCM allows for more efficient use of resources, which enables companies to achieve their customer service goals; improves relationships among SC network members; facilitates more precise planning and control of materials and information

flows from suppliers to end-users; contributes to reducing inventories in the supply network and compressed lead times (Romano *et al.* 2004). The operations strategy for the agro-processing industry falls in the make to stock category as most products are manufactured to stock. Large production batches keep processing costs down and having these products in inventory means that customer demand can be met quickly (Cohen and Roussel 2005).

### **4.3 Agro-processing**

“Agro-processing industry is a subset of manufacturing that processes raw materials and intermediate products derived from the agricultural sector. It means transforming products that originate from agriculture, forestry and fisheries” (FAO 2007). Agro-processing activities comprise two major categories; primary and secondary operations. Primary processing operations are activities such as crop drying, shelling/threshing, cleaning, grading, and packaging. Secondary processing operations entail increasing nutritional or market value of the product and these include activities such as grain milling, grinding groundnuts into peanut butter, oil pressing oil, fruit juice pressing, cheeses production and meat processing. Wilkinson and Rocha (2009) define agro-processing as follows:

*“The agro-processing industry covers a broad area of postharvest activities, comprising artisanal, minimally processed and packaged agricultural raw materials, the industrial and technology-intensive processing of intermediate goods and the fabrication of final products derived from agriculture”*

The main defining attribute of the agro-processing sector as suggested by Henson and Cranfield (2009) is the perishable nature of the raw materials employed in its processes. FAO (1997) classified the agro-processing sector in terms of upstream and downstream industries. Upstream sector involves the following activities: grain storage, fruit packaging, grain flour milling, leather tanning, cotton ginning, oil pressing, sawmilling and fish canning. Downstream activities involve further manufacturing of intermediate products made from agricultural products, such as bread, biscuit and noodle making, textile spinning and weaving, paper production, clothing and footwear manufacturing, and rubber manufacturing. For the purposes of this study, only upstream activities in the Zimbabwean agro processing industry will be considered.

#### **4.3.1 Agro-processing Supply Chains**

Agro-processing chains and networks play an important role in providing access to markets for producers from developing countries, as well as for local, regional and export markets. Changes in the sector impact the ability of agro-industrial enterprises to compete and be more responsive to consumer needs. Supply chains are formal and informal institutional arrangements that link producers, processors, marketers and distributors. They allow buyers and sellers, separated by space and time, to progressively add and accumulate value as products pass from one role-player in the chain to the next (Louw and Emongor 2004). The supply chains in the agribusiness sector have transformed from the traditional distribution channels of the 1960s to the recently emerged new type of retailers such as supermarkets (McBain 2007). Previously, farmers’ produce was sold

on wholesale, and markets with minimal processing and packaging especially in the case of perishables like fruits and vegetables due to lack of processing and preservation facilities (Louw *et al.* 2007). Having discussed the SC concept SCM and agro-processing SC, the next section discusses coordination and coordination mechanisms in the SC.

#### **4.4 What is Coordination?**

Balkik *et al.* (2010) define coordination as the relationship and interactions among different actors operating within the business environment. As a result, companies share resources and work together to achieve their objectives. Hai *et al.* (2012) suggest that coordination provides cooperation among chain participants by facilitating improvements in communication, integration and teamwork. This view is also corroborated by Chen *et al.* (2009) who suggest that coordination of efforts and resources is essential in the integration of all functional areas such as marketing, logistics, financial, human resources to achieve organisational goals. The area of coordination has grown in importance over the years due to various factors. Christopher (2011) suggests that competition is no longer among companies but supply chains, thereby forcing members to work together to improve their performance. Chopra and Meindl (2003) also corroborate this view by arguing that the coordination of SC is effective in streamlining operations and processes between SC members. Chopra and Meindl (2003) further suggest that coordination is vital for the achievement of consensus at all levels where SC members respond to market requirements in proper ways. From the definitions discussed, there seems to be no standard definition because of the nature of businesses and perceptions of actors in different industries. For the purpose of this study, the definition used is:

*Coordination is the management of upstream and downstream activities and processes that enable SC participants to achieve common goals and objectives of customer satisfaction through cost reduction activities.*

Coordination, as noted by Bohlje *et al.* (1999), improves information flow along the SC and enhances the ability of companies to identify and adjust to consumer changing demands, preferences and tastes. It results in the ability of companies to gain control over production and processing of products to ensure consistency in quality standards. Having defined coordination from different angles, Table 4.4 summarises the definitions from different scholars.

**Table 4.3: Definitions of coordination in Literature**

<b>SCHOLAR</b>	<b>DEFINITION OF COORDINATION</b>
Chang and Shen (2009)	An approach to managing a business by cooperating the interdependence in organisations
Arshinder <i>et al.</i> (2008)	Organising the activities of two or more groups so that they work together efficiently and know what the others are doing.
Cao <i>et al.</i> (2008)	Coordination encompasses every effort of information exchange and integration during the courses of developing, producing and delivering a product or service to end.
Ning <i>et al.</i> (2008)	The structuring of SC drivers for achievement of effectiveness, recognising the task of each other while pursuing their goals independently.
Wong (2004)	Different parts of an organisation in SC working together to achieve mutual benefits.
Marlone and Crowston (1994)	An act of managing dependencies between entities and the joint effort of entities working together towards mutually defined goals.
Alter and Hage (1993)	Coordination is regarded as a mode of control which is underpinned by organisational design principles.
Van de Ven <i>et al.</i> (1976)	The integration or linking together different parts of the organisation to accomplish a collective set of tasks.
Blau and Scott (1962)	Individuals' efforts towards achieving common and explicitly recognised goals.



#### 4.5 Supply Chain Coordination

Lee (2000) defines supply chain coordination (SCC) as the process of redeploying resources to synchronise product flow through supply chain partners in order to fulfil customers' requirements. Coordination can be used as a way of reducing transaction costs by shortening the SC. Arshinder *et al.* (2006) argue that SC members are dependent on each other for resources and information, so actors in the supply chain need to be coordinated by efficiently managing dependencies between each other. Kim *et al.* (2005) support this view by arguing that SCC can be achieved with the joint decision-making of all processes of the SC which include procurement, production, distribution, warehousing and economic allocation of the requirement of resources among SC members. SCC for agro-processors will be successful if all participants valued the trust, shared resources and business relationship established together with the business. Chopra and Meindl (2003) view SCC as an effective approach to streamline operations or processes between SC members. Ballou *et al.* (2000) suggest that coordination is the central lever of SCM while Lee (2000) view it as a vehicle for redesigning decision rights, controlling workflow, and resources between SC members to improve performance. SCC encompasses the integration of information exchange during development, production and deliverance of a product or service to the end market (Cao *et al.* 2008). The argument by Cao *et al.* (2008) is also supported by Malone and Crowston (1994) who suggest that coordination can be viewed as a combination of a number of objects to achieve SC objectives. Therefore coordination of the SC involves aligning and harmonising a number of activities such as decision-making, information sharing, financial exchange, and knowledge exchange for the sole purpose of achieving chain goals and objectives. It also involves adjusting and adapting to the organisational culture of chain members. This view is supported by Gittel (2011) who suggests a relational process that involves a shared understanding of work and a mutually reinforcing process of interaction between communication and connection to achieve task integration. Sharing of the information between the SC members is important for effective coordination in the SC. Stank *et al.* (1999) observed that effective communication system, information exchange, partnering and performance monitoring are the characteristics of the inter-firm coordination process. Proper coordination of supply chains would lead to competitive advantage thereby improving SC and organisational performance.

According to Stank, *et al.* (1999) inter-firm coordination processes are characterised by effective communication, information exchange, partnering and performance monitoring, while Lee *et al.* (1997) are of the view that channel coordination, operational efficiency and information sharing could be used by SC actors to improve the overall SC performance. March and Simon (1958) argue that communication is important in enhancing an organisation's capacity to maintain complex, highly interdependent activities in coordinated supply chains. The issue of communication is further corroborated by Melin (2002) who emphasises the importance of communication as a source of establishing common understanding in coordination. Simatupang *et al.* (2002) note that coordination combines a number of objects (actions, objectives, decisions, and information, and knowledge, funds) to facilitate the achievement of the chain goal. Simatupang *et al.* (2002) further introduce the element of mutuality in the coordination of supply chains, to create underlying values of responsibility among partners with an emphasis on the sustaining relationship for the attainment

of effective organisational goals. In support of this theory, Macneil (1980) argues that some degree of mutuality is important to strengthen the closeness of the relationship that results in better-coordinated activities among trading partners. The mutuality norm suggests the contribution of each partner to significant values and is entitled to an equitable distribution of exchange outcomes. The element of collectivism could only be meaningful if the partners share mutual accountability in attaining a better performance. Similarly, Arshinder *et.al.* (2008) support the mutuality of coordination by arguing that literature of systems thinking advocates that the mutuality among chain members provides the opportunity to focus on operational improvement that has a dramatic impact on the overall chain performance. Effectiveness of coordination could be assessed on the basis of quality, innovation and customer satisfaction.

#### **4.5.1 Coordination across Different Functions**

The member of the SC has performing distinctive activities like logistics, stock management, ordering and product design order to manage the flow of information and goods within the SC. According to Huiskonen and Pirttila (2002) the uncertainty and complexity of decision-making regarding logistics operations, coupled with diversified customers and their different requirements, different resources required, increasing rate of unanticipated change and level of goal difficulty among logistics provider and the customer has led to the need for coordination. Due to the above factors, SC members have realised the importance of coordination in inventory management.

#### **4.5.2 Coordination at Interfaces of the Supply Chain**

SC processes include procurement, production and distribution and these could accomplish if the procurement process including supplier management, ordering, acquisition, replenishment and inspection (Arshinder *et.al.*2008). In support of SCC issue, the researcher notes that the integration of different processes helps in improving SC performance. On the other hand, decentralised or individual decision-making in supply chains will weaken the competitiveness of the SC system, therefore supply chains need proper coordination to achieve competitive advantage. To minimise this problem, Yang and Wee (2002) suggest that SC processes could be coordinated through the implementation of joint production delivery policies, and joint lot- scheduling models (Kim *et al.* 2006).

In a study undertaken by Hilletofth and Eriksson (2011) on the coordination of NPD with SCM, the emphasis of the findings was the need to produce innovative and value-adding products. The prompt delivery of these products in the market is important and calls for coordination of activities among SC partners. Companies in mature business environments may face difficulties due to a greater emphasis on other value creation processes or on the value delivery processes. Therefore, NPD activities need to be coordinated with firms' SC activities on a strategic level (Van Hoek and Chapman 2007). Consumer-desired products need to be produced by firms in order to be competitive in the market. These products also need to be delivered to the marketplace efficiently and effectively in a convenient way (Kotler *et al.* 2009). SCC is also required when starting a new product at the earliest stage. The value advantage, price, technical progress, and innovativeness are common product features that bear upon the success of the product (Cheng and Shiu 2008, Droge *et al.* 2008, Kotler *et al.* 2009).

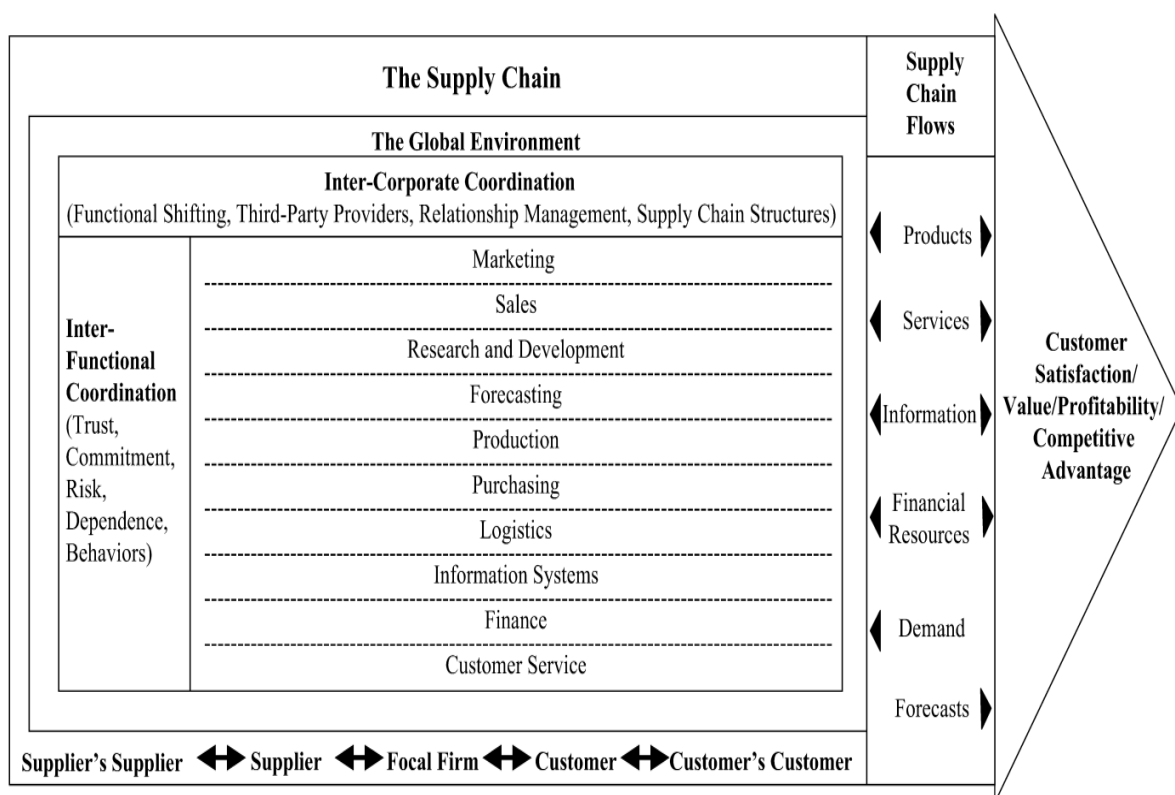
### 4.5.3 Coordination in Agro Supply Chains

Hastuti (2007) suggests that the SC of agricultural products has become a hot issue because of customer awareness of the availability and safety of the products that they use and consume. This notion is corroborated by Ahumada and Villalobos (2009) who argue that the consumers of agricultural products demand more information not only on product availability but also product farming, marketing, distribution, transportation, and processing activities. Due to customer sophistication, product knowledge and demands, coordination among SC members could utilise and reduce agriculture waste while increasing farmers' revenue and reducing production cost through utilisation of buyers' resources (technical expertise transfer, specialised inputs, or credits to farmers). Simatupang and Sridharan (2000) suggest that the overall performance of the agricultural SC could be improved if actors in the SC could be able to orchestrate their own actions, such that each member could benefit from the compromises made during the coordination process. Taylor and Fearn (2006) are of the view that coordination in the agricultural and agro-processing sectors is critical since agro-chains depend on value creation throughout the supply network. Value creation in supply chains can be achieved by SC partners by adopting the value chain analysis in their activities.

### 4.5.4 The Value Chain Analysis

The value chain analysis could be used by organisations to facilitate coordination. Figure 4.2 outlines the stages in the value chain that facilitate inter-functional and inter-firm coordination.

**Figure 4.2: The Value Chain**



Adapted From: Porter (1982).

**Inbound Logistics** - involve relationships with suppliers and include all the activities required to receive, store, and disseminate inputs.

**Operations** - are all the activities required to transform inputs into outputs (products and services).

**Outbound Logistics** - include all the activities required to collect, store, and distribute the output.

**Marketing and Sales** - activities inform buyers about products, induce buyers to purchase them, and facilitate their purchase.

**Service** - includes all the activities required to keep the product or service working effectively for the buyer after it is sold and delivered. This may not be too relevant in this particular value chain. The initial quality and durability issues of clothing and textile manufacturer take care of the serviceability of products.

**Secondary and/or support activities are:**

**Procurement** – is the acquisition of inputs, or resources, for the firm.

**Human Resource Management** - consists of all activities involved in recruiting, hiring, training, developing, compensating and (if necessary) dismissing or laying off personnel.

**Technological Development** - pertains to the equipment, hardware, software, procedures and technical knowledge brought to bear in the firm's transformation of inputs into outputs.

**Infrastructure** - serves the company's needs and ties its various parts together, it consists of functions or departments such as accounting, legal, finance, planning, public affairs, government relations, quality assurance and general management.

Major reason for the formation of value chains is to reduce costs, such as transaction costs, in order to promote competitiveness.

#### **4.6 Nature of Supply Chain Coordination**

Arshinder *et al.* (2007) are of the view that sharing of information between SC members helps to substitute information with inventory and lead time, reduces the SC costs, reduces the demand variability, enhances responsiveness and improves the service level. Development of relationships should be built on more matured understanding where trust, transparency and faith act as main pillars. In order to function as networks, firms have to move from adversarial relationships to collaborative ones. Network partners do not only share transactional data but also derive value from sharing operational and performance outcome information for SCC. The visibility of information across the SC provides the platform for improved resource allocation decisions, process integration, risk management, and responsiveness to changing demand. The majority of companies in developing countries operate using a transactional business strategy. Although this is the case, Zimbabwean agro-processing organisations operate in a dual market where there is the transactional and contract business strategy.

#### **4.6.1 Upstream Coordination**

Slack *et.al.* (2010) define upstream SC as the operations in the chain that are connected with the supply side of operations. The supply side of the SC is responsible for the provision of goods, information, materials or services to the final customer's operations and includes the suppliers and the supplier's suppliers. The flow of upstream customer requirements entails; payment, orders, market research information, long-term plan and requirements, and information regarding potential new products and services. All the participants in a SC share the common objective of satisfying the end consumer. A SC network with more tiers and layers becomes complex and difficult to manage the synchronisation of supply and demand successfully. Subroto and Sivakumar (2010) argue that since the upstream participants in the chain are far away from the end-users, they face different challenges due to knowledge-sharing, collection of customer preferences, usage patterns, information delays and distortions since "the information has to travel a long way which further escalates upstream that leads to a mismatch between supply and demand, highly connected to the "bullwhip effect" (Akkermans *et.al.* 2002). Siedman and Sundarajan (1997) support the importance of collaboration upstream in the SC due to the reductions in inventory- and ordering- cost, and reduction of lead time of supply, as well as an improved production planning with their suppliers.

**Table 4.4: An Analysis of Published Studies on Supply Chain Coordination.**

<b>RESEARCHER</b>	<b>COUNTRY</b>	<b>THEORIES USED</b>	<b>PURPOSE OF THE STUDY</b>	<b>RESEARCH DESIGN USED</b>	<b>FINDINGS</b>	<b>KNOWLEDGE GAPS IDENTIFIED</b>
Shukla <i>et. al.</i> (2013)	India		SCC Competency and Firm Performance: An Empirical Study in manufacturing industries.	Survey-based questionnaire	Contracts, standardisation of rules, joint cost minimisation, risk and reward sharing, use of electronic data interchange (EDI) have an influence on the coordination. Learning, growth, better product quality, reduced customer complaints, profits margin and customer service level are performance indicators of manufacturing organisations.	The study was done in a manufacturing set up in India. Results cannot be generalised due to geographical and industry gaps. Another challenge for the lack of generalisability of results is the level of technological developments and the differences in the operating environment.
Simatupang T.M <i>et.al.</i> (2004)	New Zealand	Coordination Theory	To develop and justify research propositions for exploring SCC.	Case study through site visits and semi-structured Interviews	Lack of a shared vision and execution in the company under study. Little attention paid to determining leading divisions that contributed the most to competitive advantage. The company engaged in piecemeal coordination rather than integrated coordination in defining and fulfilling customer needs.	The study was carried out in a different setting to this study, which is a developed country, results cannot be generalised due to geographical and industry gaps. The operating and technological environments also make it difficult to generalise the findings of this study.
Arshinder <i>et.al.</i> (2007)	India	Coordination Theory	Analysis of various issues related to coordination and the flexibility required for adopting different	Situation-Actor-Process (SAP-Learning Action Performance (LAP)) and learning - Action -	The authors proposed a “Situation-Actor-Process- Learning-Action-Performance (SAP-LAP)” for exploring the status of coordination in organisations. The framework considers the	The model cannot be generalised due to differences in operating environments, culture, technological development, political and legal

			coordination mechanisms.	Performance Model	role of actors in the implementation of supply chain coordination using the coordination theory where the actors depend on each other for business survival	factors which are not the same as countries used in the study. The proposed model has many linkages in the form of templates which makes it difficult to generalise and apply to developing countries, especially in Africa given the level of technological advancement and equipment to implement it.
Singh R.K.(2011)	India		Coordination in the SC of SMEs. Development of a framework for improving the coordination in the supply chain.	Interpretive structural modelling (ISM)	Organisational factors, mutual understanding, the flow of information, relationship and decision-making are linkage variable. Top management commitment has a strong driving power. Lack of information flow and mutual understanding among the members of SC.	The results of the study cannot be generalised since it does not consider cultural differences, technological differences, government policies and nature of SC of SMEs in developing nations.
Tan K.C and Cross J (2012)	The USA, Europe and New Zealand	Resource-based theory	Investigate the contribution of inter-organisational coordination to a company's SCM.	Multinational survey	Resource-based capability and inter-organisational coordination play a key role in a firm's SCM focus.	The results suggest that organisations involved are equally resourced which is not always the case. Developing countries lack resources for effective coordination. Those with resources tend to be more powerful and have dictatorial tendencies since small players depend on them for business.

						It also fails to consider environmental and geographical limitations.
Usuga <i>et.al</i> (2012)	Colombia		Investigates Coordination of Agrifoods SC in Colombia.	Case study	Farmers have the support of a marketing committee and a regional promoter for the management of marketing channels, but each farmer is responsible for the logistics to distribute their products. There is no coordination among the chain actors.	The study failed to discuss the type of information shared and benefit-sharing strategies among the different partners within the SC.
Johnsen <i>et.al</i> (2006)	Britain	Network theory	Assessing the importance of managing the relationship between the outsourcing organisation and the service provider.	Exploratory case study	Trust and commitment are required antecedents to achieve long-term, mutually beneficial outsourcing relationships.	
Hani <i>et.al</i> (2006)	China	Transaction Cost Theory	Investigate the relationship between TCE, vertical coordination, quality management & firm performance.	A survey in two districts	The positive relationship between asset specificity, uncertainty and degree of vertical coordination.	The findings of the study failed to address the issue of the relationship between processors and retailers. Lack of coordination of activities among the groups.
Leat and Revoredo – Gihac (2008)	The U.K.	Transaction Cost Theory	Explore the degree of cohesion & coordination of agrifood chain in the U.K. barley to beer SC.	Case study	Identified five factors that affect the beer agrifoods chain as, communication, compatibility of aims, contractual relationships backed by professional regard and personal bond, high levels of trust and willingness to resolve problems and	These findings could not be generalised given the different operating environments and political environment in developing countries.



					lastly commercial benefits.	
Sahin F and Robinson P.E (2005)	USA		Investigation of the impact of information sharing and physical flow coordination in make to order supply chains.	Case study of international manufacturer and vendor using mathematical modelling	Tighter SC integration through information sharing and physical flow coordination provides opportunities for improved economic performance. Information sharing increases with higher equipment set up costs.	The study lacks investigation on the characteristics of upstream SC processes in make to order environments.
Veselka (2005)	Czech Republic		Identification of the potential benefits from vertical coordination within the selected commodity chain.	Survey with a mathematic model of consumer price simulation	Czech brewery industry was in the observed period (1994–2002) vertically coordinated.	Results cannot be generalised to developing countries due to differences in economic, social, political and technological advancements.
Schulzeb, Spiller A. and Theuvsen L. (2006)	Germany	Transaction Cost Theory	Integration and coordination of the pork industry.	Survey of large-scale pork producers in Germany	The coexistence of different ways of organising meat supply chains can be expected even in the long run.	Results cannot be generalised to other industries since they have different characteristics.
Goel V. (2014)	India		To identify chain Coordination Mechanisms and Concerns in the Sugar Industry in Punjab.	Survey of the sugar industry in Punjab	Findings indicated that under a regulatory framework mutual interdependencies of the chain partners have facilitated chain coordination of sugar mills with the upstream/downstream chain partners in the Punjab state of India. This ensures timely cane supplies to mills.	Results cannot be generalised due to differences in the regulatory system and industry characteristics. It fails to take into account political and economic factors that could mitigate the industry outside the study country.

Claro D.P. and Claro P.B. (2004)	Brazil, Netherlands	Transaction Cost Theory	To analyse the coordinating B2B cross-border supply chains in the organic coffee industry.	Case study	Findings indicate that the production and processing of high-quality coffee are dependent on the willingness of buyers overseas to focus on long-term relationships. Coordination of cross-border relationship is not only a complex task but also needs time. The willingness of participants in the organic coffee industry to establish a high level of commitment leads to success.	The study fails to take into account technological and lack of access to information in developing and emerging economies. The study assumes that all players in the coffee industry are exporters. It focuses on the commitment to engage in long-term relationships and fails to address the issue of trade barriers, embargos and lack of government support in international trade.
Bouachouch M and Mohamed M. (2014)	Morocco		To identify the antecedents of inter-functional coordination in the SC.	Exploratory qualitative case study of Moroccan University hospital	The study found out that culture, formalisation, commitment, trust, information sharing and informal relationships remain the determinants factors that influence the inter-functional coordination in the Hospital SC.	The study was done in a hospital which operates in the medical services industry, so results could not be generalised to apply to other industries. They can only apply if tested in other service industries.
Claro D.P. and Claro P.B. (2006)	Netherlands	Transaction Cost Economics	Discussion of the value of trust and the effects of transaction specific investments for the relative degree of collaborative joint efforts, and also to assess the moderating effect of the information	A survey in the Dutch flower industry.	The results of the study show the importance of trust in coordinating the joint efforts and the joint effort response in terms of safeguarding and better integrating the transaction specific investments.	The findings could not be generalised since these were mainly for the industry under study. The results show the importance of coordination of joint efforts and integration of investments due to the nature of the product, but this could not be the case with other products

			network on such joint efforts.			or other industries since the production processes are different.
Kaipia R. (2007)	Research paper		To study the selection criteria used by companies to select a SC planning mechanism to improve the balance between material flow and information flow.	Inductive case study	Specific SC characteristics need to be balanced by selecting a coordination mechanism that uses information optimally to support the material flow. The flexible material flow needs frequent updates of the plan based on accurate information.	The framework developed fails to address situations with different levels and sources of uncertainty.

**Table 4.5: Coverage of Supply Chain Coordination in the Agro-Processing Sector**

<b>AUTHOR(S)</b>	<b>MAIN FOCUS</b>	<b>COVERAGE OF COORDINATION IN THE AGRO-PROCESSING SECTOR</b>
Veselka (2005)	Vertical coordination in the beer commodity chain in the Czech Republic.	Potential benefits of vertical coordination in the beer commodity chain.
Hani <i>et.al</i> (2006)	Coordination of the pork industry in China.	The relationship between TCE, quality management and organisational performance in the Chinese pork industry.
Claro D.P. and Claro P.B. (2004)	Coordinating B2B cross-border supply chains in the organic coffee industry in Brazil and the Netherlands.	Comparison of two organisations of the SC where B2B relationships are based not only on contracts but more importantly on the informal safeguards of mutual trust, long-term orientation and joint actions.
Leat and Revoredo – Gihac (2008)	Exploring the degree of cohesion & coordination of agrifood chain in the U.K. barley to beer SC.	Identification of factors that reduce transaction cost and mechanisms of SCC.
Alemu A.E. <i>et. al.</i> (2011)	Coordination in Agrifoods supply chains in Northern Ethiopia.	Analysis of key determinants in choosing vertical coordination for agrifoods products in Ethiopia.
Lemma H.R., Singh R., and Kaur N. (2015)	Determinants of SCC of milk and dairy industries in Ethiopia.	Analysis of determinants of SCC and its impact on sustainable business profitability. Discussion of coordination mechanisms used in Ethiopian milk and dairy industries.
Schulze B., Spiller A., and Theuvsen L., (2006)	Vertical Coordination in German pork production.	Identification of the most efficient form of vertical organization for the German pork sector.
Goel V. (2014)	Coordination in the Sugar industry in Punjab India.	Coordination Mechanisms and Concerns in the Sugar Industry in Punjab.
Usuga <i>et.al</i> (2012)	Coordination of Agro foods SC in Columbia.	Investigation of the decision structure and nature of demand and analyses the characteristics of the agri-food SC in the Central Region of Colombia.

## 4.7 Coordination Mechanisms

To achieve coordination within an organisation, companies need to adopt mechanisms that support interaction and information exchange among the actors in the SC. Written contracts are used to achieve coordination through regulating the relationship between upstream and downstream firms (Hammoudi *et al.* 2009). Tighter coordination could change bargaining power within the SC which may result in tensions in the relation between actors (Ibid). According to Fugate (2010), there is no consensus between academic researchers and practitioners about coordination mechanisms. According to Haghghat (2008), coordination mechanisms are tools to address particular coordination problems, which could be used by every member of a SC to achieve benefits. Xu and Beamon (2006) define coordination mechanisms as, “a set of methods used to manage interdependencies between organisations.” Spekman *et al.* (1998) and Cao *et al.* (2008) are of the belief that a coordination system is essential in bringing interdependent activities of organisations together through coordination of tangible and intangible assets and also aligning resources with the coordinated assets, and sharing benefits and risks equally.

Hage *et al.* (1971) argue that coordination could be accomplished through two ways, that is, programming and feedback. Cao *et al.* (2008) corroborate this view by suggesting that, from a strategic and tactical perspective of information sharing, there are two main ways to accomplish coordination, which is through centralised decision-making and decentralised decision-making through the utilisation of coordination mechanisms. Coordination using plans, schedules, policies, and procedures are examples of coordination through programming, whereas coordination by feedback involves the use of mutual adjustment among individuals and groups through vertical and horizontal communication. Although a coordination system is essential for the coordination of activities, these authors do not discuss the implementation of the coordination system. Gundlach *et al.* (2006) advocate the use of norms such as flexibility, solidarity, mutuality, harmonisation of conflict, restraint in the use of power, concern for reputation and information sharing as coordination mechanisms. The coordination mechanism consists of mutual adjustments and direct supervisions. This view is corroborated by Mintzberg and Sholom (2001) who argue that standardisation of work processes, outcomes, skills, knowledge and norms assist in achieving coordination success. According to Barkitt and Pinsonneault (2005), norms play a key role in coordinating supply chains through team-based approaches.

The purpose of a coordination mechanism is to bring chain partners' contribution that accomplishes their joint tasks and satisfies mutual interests, leading to the creation of a coordinated structure that enables chain partners to build the relationships across SC

boundaries (Gulati *et al.* 2012; Soosay *et al.* 2012). Christopher (1998), suggests that SCC could be used to create competitive advantages and build value through control of knowledge, complementary resources, capabilities and governance structures (Dyer and Singh 1998). Organisations use SCC as a tool to achieve their economies of scale, efficiency, superior technology, greater customer value and control over environmental factors. Tsay (1999), Cachon and Fisher (2000) concur with the view by noting that, coordination mechanisms such as invoking SC contracts, information sharing, information technology, collaborative decision-making, meetings with SC members, and technical support could be used to manage dependencies (Disney and Towill 2003).

Coordination variables identified, from literature review are plans and schedules, standardisation of rules, flexibility, contracts, information sharing, joint decision-making, risk and reward sharing, resource-sharing, quantity discount, flexible return policies, incentive mechanisms, credit scheme, effective communication, joint cost minimisation, collective learning, knowledge-sharing, use of EDI, order coordination, performance monitoring, scheduling of frequent meetings with stakeholder.

#### **4.7.1 Attributes of Coordination Mechanisms**

Krejci and Beamon (2013) suggest five attributes of coordination mechanisms that could be adopted to coordinate supply chains. The resource-sharing structure has its footing on the RBV and involves sharing resources among chain members to operational level information sharing, which could lead to a strategic alliance among coordinated companies. According to Wang and Wei (2007), the RBV emphasise the effectiveness of collaboration for generating value from relational resources. This could involve agro-processing companies coordinating with their suppliers and farmers to gain competitive advantage and improve SC performance. The other attribute is the decision style where possible values can range from centralised, in which one member has control and makes decisions for the coordinated group, to decentralised, in which each member makes decisions autonomously. In the Zimbabwean situation, it has become difficult to have a centralised structure because of lack of trust, the effect of the local indigenization laws coupled with uncertainty in the operating environment.

The level of control attribute involves a possible situation in which members adhere to strict rules and monitor each other frequently to enable proper coordination as compared to a situation in which there is very little monitoring. Where there is little monitoring, the SC might end up being fragmented because of the lack of control measures in place, leading to a compromise of quality.

The risk/reward sharing values can range from a situation in which the risk-benefit ratio is fair, to a situation in which the risk-benefit ratio is unfair, with one member taking on less risk/responsibility but receives more benefits (Krejci and Beamon 2013).

#### **4.7.2 Categories of Coordination Mechanisms**

This section discusses coordination mechanisms that are at the disposal of companies for managing and coordination of their supply chains. In every economy, the smooth functioning of entities is the result of well-coordinated entities. Coordination can be viewed from different perspectives, for example: based on organisation structure (Mintzberg 1979), coordination theory (Malone and Crowston 1994), workgroup coordination theory (Chaudhary *et al.* 1996) and distributed artificial intelligence theory (Chaib-Draa *et al.* 2004). The study of coordination theory in different disciplines like organisation theory, action coordination, sociology and psychology, resource-sharing and distributed artificial intelligence may give different connotations attached with coordination. According to Simatupang *et al.* (2002) coordination is a prerequisite to achieving the mutual goal of the SC as a whole, as well as those of the participating units, given the nature of interdependencies between these units.

Kim *et al.* (2005) on the other hand, suggest that achievement of SCC could be done through joint decision-making of all processes of the SC which include: procurement, production, distribution and warehousing and allocation of resources among SC members. The coordination perspective may motivate the SC members to work coherently by identifying interdependencies between each other thereby mutually defining goals and sharing risks and rewards. Coordination mechanisms according to Goel and Bhaskaran (2007c) are product specific and vary and suggest that these could be formal, informal or a combination of both. SC contracts are useful tools to make the several SC actors of decentralised setting behave coherently and in a coordinated manner.

##### **4.7.2.1 Trust as a Coordination Mechanism**

Trust is based on an organisation's belief that it is a business partner will act in a positive manner for the benefits of both companies. Cullen *et al.* (2000) are of the view that companies focused on a long-term relationship have a level of trust that will be increased in a favourable manner. Cachon and Lariviere (2005) concur with this argument by suggesting that, for the smooth flow of information and enhancement of SCC, trust and information sharing are important facets required by the SC as a whole (Arshinder and Deshmukh 2007; Singh 2011). This argument is corroborated

by Chopra and Meindl (2004) who note that trust is considered the most important component in SCC and alliance relationship.

The effectiveness of SCC depends on three dimensions of performance which are operational, social and financial. Chen and Paulraj (2004) suggest that operational performance is important for the assessment of product and service quality (Aramyan *et al.* 2007, Joshi *et al.* 2013). Social performance is based on trust and satisfaction with SC partners (Acquaah 2007) whereas financial performance increases profit, sales and market share (Akhtar *et al.* 2012a). Value chains in the Zimbabwean agro-processing sector are mainly based on operational performance which alone is not effective in the coordination of activities among channel partners. Trust among Zimbabwean agro-processing companies is affected by the uncertainty of the operating environment thereby affecting the coordination of organisational activities.

In studies carried out by Monczka *et al.* (1998) and Murali *et al.* (2011), it was found out that trust is the binding force on all SC parties to reap mutual benefits. Cullen *et al.* (2000) support these findings by suggesting that, the level of trust among SC parties increases when partners are focused on building long-term relationships bringing rewards to the relationship. Given these arguments, without trust, it might be difficult to coordinate the SC among Zimbabwean agro-processing organisations.

#### **4.7.2.2 Coordination through Contracts**

A contract is an agreement between two parties. Cachon (2004) notes that a supply chain contract is the set of clauses that offer suitable information and incentive mechanisms to guarantee all the firms in the SC to achieve coordination and optimise the channel performance. Contracts are formal rules for transactions between the supply chain actors and later utilise incentives (risks and rewards) to make the SC member's decisions coherent among each other. Boland and Jeffrey (2002) suggest that contracts emerged as a result of companies' exposure to risks and in a way assist producers and processors expand their operations. Contracts reduce revenue risks for the parties involved by guaranteeing price while adding stability to market transactions through commitment (Boland and Jeffrey 2002). Arshinder *et al.* (2007) argue that contracts offer guidance in negotiating the terms of the relationship between supplier and buyer and are designed in such a way that they minimise conflicts that may crop up in future. In contracts, either production or marketing contracts, companies are committed to purchasing the product or commodity from the producer at an established price. Boland and Jeffrey (2002), identified production and marketing contracts as the two types of contracts that could be utilised by agro-processors.



### **a) Production Contracts**

According to Boland *et.al.* (2002), these contracts have three main provisions which include the supply of production inputs by the contractor, quality and quantity of the product and lastly the type of compensation for services rendered. In production contracts, processors who are usually the buyers have control and are responsible for the management of crop loss and management risks. In production and management contracts, the processors participate in crop management and provide inputs. Although processors provide inputs and retain title to the product, they also agree to buy the whole crop and provide economic incentives for quality and quantity. This type of contract is popular in agro-based economies, especially developing countries where the majority of communal farmers do not have adequate resources to produce on their farms. Agro-processors and multinational companies enter into production contracts with the farmers where they are supplied with agricultural inputs in return for their produce.

### **b) Marketing Contracts**

Under this type of contract, a company sets a price and market for a product to be sold at a future date. In this type of contract, producers have a guaranteed buyer and price for their product but are responsible for all inputs and retain ownership of the crop until after the sale is concluded. Price in marketing contracts is determined by supply and demand conditions.

In a study carried out in the sugar industry in Punjab, India by Goel (2014) it was found out that the sugar industry had two sub-sectors, that is; the organised and non-organised sector. The product is regulated across the entire value chain from farmers to processors. It was found out that formal contracts between farmers and agro-processors enabled constant delivery of cane sugar to the mills. Under the terms of the contract, millers and agro-processors conducted farm surveys to assess farmers' areas. They used a coupon system that enabled the smooth movement of cane to millers as farmers did not waste time queuing to deliver their product since the coupons had all the information required to facilitate delivery. The millers and agro-processors advanced loans, credit, and essential inputs to farmers to facilitate production. When delivering cane to the millers, farmers were provided with refreshments and on spot payments were done for cane delivered as a way of motivating and maintaining the relationship and at the same time building trust. The study also showed that the mutual interdependence of chain partners facilitated chain coordination of sugar millers with upstream and downstream chain partners. Thus coordination ensured timely cane supplies to mills, easy disposal of cane and timely payment to farmers. The SC contracts may be

price-based contracts (buyback contracts) or quantity based contracts (quantity flexibility contracts). Among Zimbabwean agro-processing companies, production contracts are the most popular coordination mechanisms used by agro-processors to manage their relationships with farmers.

#### **4.7.2.3 Price Coordination Mechanisms**

Quantity discount pricing schemes are among the most frequently studied mechanisms in the price coordination area (Bergen, Dutta, and Walker 1992 and Williamson 1979). Spengler's (1950) "double marginalisation," is an example, where quantity discounts are offered to encourage the retailer to increase the replenishment quantity and eliminate system sub-optimisation. In a buyback contract, the buyer is allowed to return any leftover units to the supplier at the end of the period at some set buyback price. According to Pasternack (1985), a buyback contract that allows a retailer to return any portion of the initial order at a pre-specified price can coordinate pricing and quantity decisions for short shelf life and seasonal demand products (Sahin and Robinson 2002). The rationale for returns policies is linked to product insurance. Conversely, Krishnan *et al* (2004) suggest that a buyback contract coupled with promotional cost-sharing agreements between manufacturer and retailer result in SCC. This type of coordination is common in the retail sector in Zimbabwe where suppliers and the retailers have agreements for sharing promotional costs. The most popular type of this contract is the yearly OK Grand Challenge promotion where suppliers give the retailer promotional products, material and sponsor prices during the promotion period. Yao *et al* (2005) and Yue and Ranganathan (2007) note that another consideration in buyback contract is information sharing and asymmetrical information between the SC members.

Another price coordination mechanism suggested by Weng (1995) is a two-part tariff. In a two-part tariff, a supplier offers the buyer a constant unit wholesale price and a fixed fee, where the buyer chooses order quantity based on internal cost structure, the wholesale price, and the fixed fee offered in the contract.

#### **4.7.2.4 Non-Price Coordination Mechanisms**

Bergen and John (1997) propose that non-price coordination mechanisms include quantity flexibility contracts, allocation rules, promotional allowances, cooperative advertising, and exclusive dealings/territories, a view which Anderson and Weitz (1992) concur with, by noting that quantity flexibility contracts and allocation rules are the most frequently discussed forms of non-price coordination. In a quantity flexibility contract, the buyer is allowed to modify the order

within limits agreed to the supplier as demand visibility increases. The buyer modifies the order as he gains a better idea of actual market demand over time.

Lariviere (1999) and Fugate *et al.* (2010) also corroborate this view when by proposing that quantity flexibility contracts allow the buyer to obtain a different quantity than the previous estimate. These contracts, according to Bassok and Anupindi (1997) can be established through forms such as minimum purchase quantity contracts or special contracts with established terms, where the buyer purchases a minimum quantity and the supplier delivers up to a certain quantity should the demand exceed the forecast (Tsay 1999). Tsay (1999) went on further to describe quantity flexibility as a major form of SC agreement. This type of contract leads all the members motivated to the system-wide optimal outcome. The efficiency can be improved when the buyer is ready to pay more to the supplier for increased flexibility.

#### **4.7.2.5 Revenue Sharing Contract**

In a revenue-sharing contract, the supplier charges the buyer a low wholesale price and shares a fraction of the revenues generated by the buyer (Cachon and Lariviere 2005). Rubin and Benton (2003) note that SC members design contracts based on discounts: lot size based and volume-based. A lot size based contract occurs if the pricing schedule offers discounts based on the quantity ordered in a single lot. Weng (2004) corroborates this view by explaining that a volume discount based contract is based on the total quantity purchased over a given period regardless of the number of lots purchased over that period. In this instance, Chauhan and Proth (2005) proposed a profit-sharing model underprice dependent demand proportional to their risks based on expected customer demand.

#### **4.7.2.6 Flow Coordination Mechanisms**

Flow coordination mechanisms are designed to manage product and information flows in supply chains. Angulo *et al.* (2004) suggest that Vendor Managed Inventory (VMI), Quick Response (QR), Collaborative Planning, Forecasting and Replenishment (CPFR), Efficient Consumer Response (ECR), and postponement are among some of the initiatives used for product and information flows. According to Sahin and Robinson (2002) VMI allows suppliers to monitor the retailer's inventory levels and make periodic replenishment decisions involving order quantities, delivery mode, and the timing of replenishments while on the other hand, QR focuses on building collaborative partnerships between manufacturers and retailers by shortening the manufacturer's replenishment lead time. In such a situation the manufacturer gains from the collaboration by

improving forecast accuracy and revising production schedules based on early demand (Sahin and Robinson 2002). To simplify processes among members of the chain, Esper and Williams (2003) argue that CPFR automates and improves sales forecasting and replenishment between the partners, enabling participants to share improvements in inventory costs, revenue, and customer service. ECR decreases time and costs in the core, value-adding processes through efficient store assortment, efficient replenishment, efficient promotion, and efficient product introduction (Lohtia *et.al.* 2004). On the other hand, Pagh and Cooper (1998) argue that postponement as a coordination mechanism reduces risk and uncertainty of operations by delaying operational commitment until final customer commitments have been obtained. These mechanisms if adopted by Zimbabwe agro-processing sector could help in the coordination of activities between SC partners. Hoppe (2001) argue that these SC tools build competitive advantages, increase revenues, reduce costs and fulfil orders on-time leading to improved SC performance.

#### **4.7.2.7 Safeguarding and Enforcement Mechanisms.**

Whang and Wei (2007) argue that mechanisms based on TCE focus on the efficiency of controlling opportunistic behaviours and minimising transaction costs. According to Williamson (1975), the Transaction Cost Perspective focuses on the trade-off between transaction costs and alternative governance structures, a view corroborated by Roberts and Greenwood (1997) who suggest that firms can minimise their transactions costs by selecting appropriate governance mechanisms. According to Ouchi (1980), company choice of markets or hierarchies depend on transaction characteristics but the problem likely to be faced is that of opportunism. Conversely, Williamson and Ouchi (1981) suggests that under conditions of information asymmetry, agents in a relationship are likely to take unfair advantage of a bargaining situation. Chiles and McMakin (1996) suggest that opportunistic behaviour can be minimised by developing safeguards or investing in assets, a view corroborated by Bensao (1999) who suggests that the safeguards or assets should be specific to the relationship and bind partners together. Bradach and Eccles (1989) suggest that safeguards are mechanisms to protect against the risk of opportunism and uncertainty in the business relationship and these can be formal such as contracts or could be informal such as trust between the parties or hybrid such as a combination of contract and trust. Zimbabwean agro-processing companies use contracts as the most common safeguards mechanisms to guard against opportunistic tendencies. Ganesan (1994) proposes that a safeguard is a long-term orientation, where companies involved have a desire towards future interaction, because of the gains and benefits of such a relationship. Governance mechanisms in TCE are used to control opportunistic

behaviours of transacting partners for safeguarding specific investment in transactions (Williamson 1985, Rindfleisch and Heide 1997).

Williamson (1996) defines frequency as the number of times partners transact with each other. If the frequency of transactions with each other is higher, the coordination mechanism becomes sophisticated in the sense that it involves elaborate contracts, trust and long-term orientation.

Asset specificity of a transaction is when one partner of a transaction has invested resources specific to that exchange that has little or no value in alternative use (Hobbs 1996, Williamson, 1996). Higher site, physical and human specificity require a more sophisticated coordination mechanism (e.g. elaborate contracts, trust and long-term orientation). Product flow expresses quantities and fluctuations in quantities and prices (Stern *et al.* 1996). Larger quantities and lower price predictability in the transactions imply the need for a more sophisticated coordination mechanism (e.g. Elaborate contracts, trust and long-term orientation). Information flow describes the quality of the information in terms of accuracy, adequacy, completeness, credibility and timeliness (Mohr and Speckman 1994). The lower the quality of the information, the more sophisticated the need for a coordination mechanism.

#### **4.7.2.8 Mintzberg Coordination Mechanisms**

Conceptualization of coordination is informed by organization theory by analysing Mintzberg (1998), coordination mechanisms and their applicability to the coordination of supply chain activities of Zimbabwean agro processing organisations. Mintzberg (1998) identifies a set of six coordination mechanisms which are; 1) mutual adjustment where coordination of work is made possible by a process of informal communication between people conducting interdependent work. Zimbabwean agro processing companies use both formal and informal communication for their supply chain activities. 2) Direct supervision in which coordination is achieved by having one person is responsible for the work and is given instructions on how to do the work with their actions being monitored. Zimbabwe agro processing organisations use this coordination mechanism to monitor the quality of raw materials produced by suppliers who would have been given the work. 3) Standardisation of work processes is coordinated by specifying the work content in rules or routines to be followed by suppliers. 4) Standardization of output is obtained by the communication and clarification of expected results. The individual actions required to obtain a goal are not prescribed. Results are standardized when the results of the work such as dimensions of the product and quality specifications. 5) Standardization of skills and knowledge which is achieved through

standardised training and education. People are trained to know what to expect of each other. 6) Standardisation of norms is so that there is an influence on human action. This kind of standardisation is form of indirect coordination through socialization so as to establish common values and beliefs in order for people work toward common expectations. Mintzberg builds on March and Simon (1958) who identify three activities that are necessary to perform coordination: coordination through standardisation, coordination through planning, and coordination through feedback.

Mintzberg (1998) theory is criticised by Larsson (1990) who notes that coordination is performed before work is undertaken, through planning, designing and that division of labour is related to material flows and dependencies. On the other hand, the classification of coordinating mechanisms in organisations is criticised lacks empirical validation.

#### **4.7.3 Elements of Coordination**

The contracts assist SC members in achieving coordination by adjusting the order quantity and sharing some risk and profits for the compensation of the adjustment. The following elements of coordination theory are applicable to SC contracts.

##### **A). Interdependency**

Mccann and Ferry (1979) define interdependency the effect of actions taken by one member of the system on the actions or outcomes of another member of the system. SC members are interdependent on each other for the transfer of money, quantity and information. The supplier (an upstream member of SC) relies upon the buyer (downstream member) because of economies of scale, reputations of downstream members and member's knowledge about the local market. Interdependency is inherent in supply chains: members may be interdependent due to mutual information needs, transfer of funds and flow of physical units from one member to other.

##### **B) Coherency**

Simatupang *et al.* (2002) argue that coherency is the degree of consistency of reasoning across organisational borders through diffusing common understanding. The SC members are expected to make decisions in coherence with the whole SC. The quantity floating in the SC must be the optimal order quantity for the whole SC.

##### **C) Mutuality**

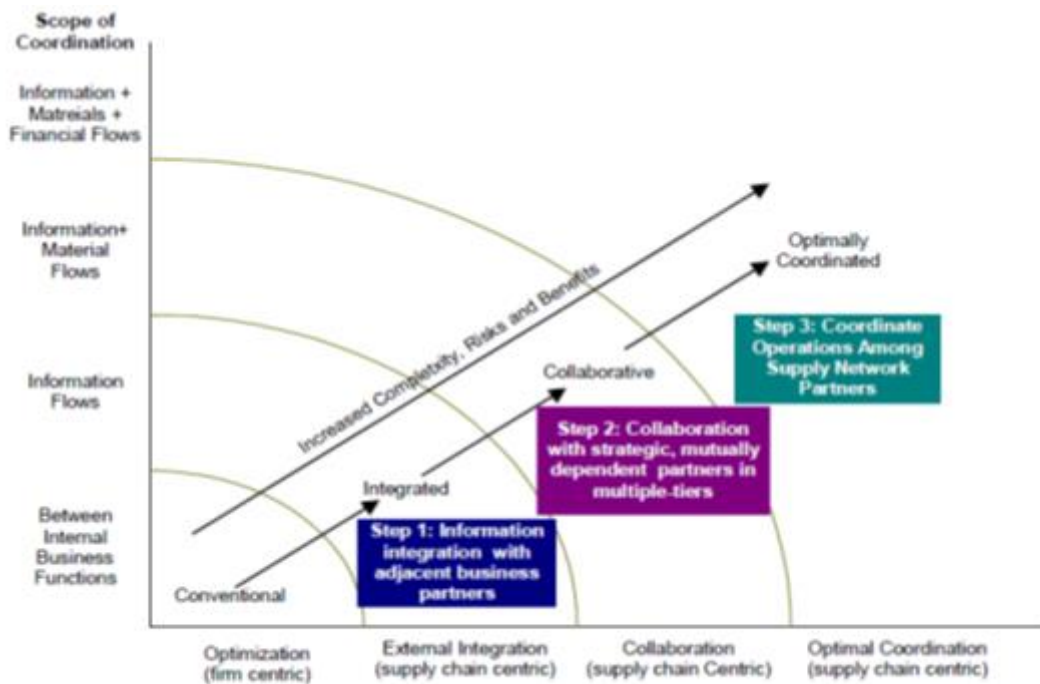
According to Campbell (1997), mutuality of coordination is the underlying values of responsibility among partners with a strong emphasis on sustaining the relationship in order to build effective goal attainment. The mutuality norm suggests that each partner contributes a significant value and

is entitled to an equitable and fair distribution of outcomes. In a SC, these outcomes could be revenues generated, net profits and mutual sharing of risk (overstock/understock). The contract parameters are decided mutually so that the expected profits of all members are more than the case of 'no coordination'. The contract parameters include cost and price-related information and quantity to be shipped in the SC.

#### **4.7.3.1 Dimensions of Coordination**

This section adopted a model proposed by Cookson and Deattre (2001) to discuss the dimensions of coordination that facilitate coordinated operations of information, materials and financial. Integrated SC involves both internal and external integration. Internal SC integration involves the coordination of functional activities within the organisation such as purchasing, warehousing, transportation, distribution, and customer service. Figure 4.2 shows that the basic dimension of coordination is the sharing of private information between two or more functions. Simatupang *et al.* (2002) define information sharing as the act of disseminating common understanding among participating members to provide visibility into SC processes used to coordinate the flow of products. The shared information may include customer needs, customer demand, product-related data, costs related data, process-related data, and performance metrics. External information integration is used to coordinate the exchange of information among companies. Another dimension of coordination is a collaboration with SC partners to jointly coordinate information and material flows. At the highest level of the model is optimal coordination where operations are coordinated among SC network partners. Decision synchronisation as another dimension of coordination assesses the extent to which participating actors are in joint decision-making such as resolving conflicting objectives, mitigating uncertainty, redesigning workflow, and allocating resources (Lee 2000, Simatupang *et al.* 2002). The participating actors do not only share information but also work together to solve problems encountered. SCC facilitates responsibility interdependence, as suggested by Bailetti *et al.* (1998) in order to capture the level of formal and informal direct contact among participating actors whose responsibilities are to create, modify, and use a set of shared work objects.

**Figure 4.3: Dimensions of Coordination**



Source: Author; Cookson and Delattre, 2001.

**Adapted from:** Cookson and Delattre (2001)

Simatupang *et al.* (2002), suggest that complementarity of processes and coherency of understanding of chain members collectively assist firms in managing interdependencies between logistics activities to create value. Interdependence is the degree to which one process depends on the other to achieve the overall value creation processes. This view supports Marlone and Crowston’s (1994) definition of coordination. Coherency refers to the degree of consistency of reasoning across organisational borders through diffusing common understanding and requires the chain members to share information and knowledge that can be used to understand process interdependencies and to manage uncertainties along the SC. According to Lissack and Roos (2001), organisations must find ways of understanding their identity in order to build a coherent viewpoint and actions. Coherency can be seen as the alignment of context, viewpoint, purpose and actions to attain the shared goal through information sharing and collective learning.

#### **4.7.3.2 Information Integration**

Bauknight (2000) observes that decreasing marginal returns have forced companies to focus outside the firm’s boundaries to identify higher-value opportunities from collaborating with SC partners, a view supported by Christopher (2011) who noted that companies no longer compete



among themselves but among supply chains. Although internal integration could be a source of competitive advantage in some cases, that advantage could be eroded over time due to the potential from coordination of SC activities outside the focal enterprise (Bauknight 2000). Because of this threat, many companies have focused on external integration with partners, with emphasis on coordinating information sharing. It is necessary for companies to create strong information linkages with their chain partners in order for firms to be successful in markets that are driven by the trends. Information sharing is the primary coordination dimension among companies engaging in external integration, for them to improve performance. Information integration creates visibility and coordinated flow of information in the SC, leading to higher profits for the organisations involved.

#### **4.7.3.3 Collaboration in supply chains**

Mentzer *et al.* (2002) define collaboration:

*“Collaboration means that the companies involved are working together to meet one common objective. Collaboration is characterised by the sharing of information, knowledge, risk and profits.”*

The model proposes that business partners often engage in collaboration to achieve SC integration through workflow coordination and synchronisation. Through collaboration companies are able to mutually determine how to synchronise product flows, reducing inefficiencies, and sharing the mutual value created. Collaboration facilitates joint planning, forecasting and running replenishment operations. Chin *et al.* (2004) found out that lack of skills to physically collaborate, knowledge of what to collaborate and use of the information and data received from their partners and the resistance of information sharing among chain actors are barriers for successful collaboration. In support of Chin *et al.* (2004), Singh *et al.* (2006) also identified implementation and introduction of the collaborative concept as another challenge that calls for a companywide commitment since people lack the skill and will of gathering, sharing and processing the information to create the synergetic goal of the collaboration. According to Detoni and Zamolo (2005) the reason for lack of collaboration between upstream participants was a result of the physical distance between suppliers and their customers and the volume that these partners operate with, a view supported by Simchi- Levi *et al.* (2003) who suggest that the reluctance of sharing confidential data and information coupled with neglecting employee involvement during the process hinder collaboration in supply chains. Simchi- Levi *et al.* (2003) suggest that these problems emanate from contrasting goals between the parties in the chain, leading to sub- optimal

processes and solutions thereby hindering the required synchronised transmission of data, which is caused by lack of clear incentive systems and benefits of collaboration, culminating in opportunistic behaviour. Williamson (1987) argues that the upstream participants commonly understand that price, supply, and delivery conditions could improve the bottleneck resources if there is no collaboration leading to increased competition among the suppliers of these goods.

#### **4.7.3.4 Organisational Linkages**

This dimension of coordination focuses on either operational or organisational linkages, which are the interfaces between firms where chain members need to coordinate their joint decisions. Operational linkages focus on the integration of interdependent processes and information flows that provide ways for partners to carry out logistics planning and day-to-day transactions. Operational linkages allow chain members to contribute and be involved in the operational decision-making, whereas organisational linkages are composed of interconnected actors who perceive and argue about their own interests in carrying out collective action. Appreciating organisational linkages allows them to understand partnership activities and bargaining realities. These two dimensions of coordination have led to the identification of the following coordination modes discussed in the preceding paragraphs.

#### **4.7.3.5 Logistics Synchronisation**

Logistics synchronisation means recognition and concerting of improvement initiatives that significantly contribute to value creation in the acquisition, consumption and disposition of products and services in markets. This refers to the market mediation function of a SC that aims to match the variety of products reaching the marketplace with customer needs and wants (Fisher 1997). Lambert *et al.* (1998) corroborate this view by arguing that customer demand and inventory management, facility and transportation between partners help to improve their response to customer requirements, reducing inventory costs, improved product availability, minimum obsolescence and minimum variance of any unexpected events such as forecasting errors and delays that disrupt chain performance. This dimension of coordination assists members to resolve role conflict, enabling each participant to perform specific tasks and assume certain responsibility to ensure the attainment of chain profitability.

According to Govindarajan and Gupta (2001), SC members can achieve competitive advantage through interrelated areas to ensure logistics synchronisation, which is customer definition, customer value identification and value creation process design. These require companies to

redefine the customer base, reinvent the concept of customer value, and redesign the end-to-end value chain architecture, in order to create competitive advantage from the customer's viewpoint. According to Simchi-Levi *et al.* (1999) this could be achieved through joint decision-making such as assortment planning, joint forecasting, joint inventory management and replenishment a view supported by Lee *et al.* (1997) who suggest that a retailer has better-projected customer demand compared with the manufacturer since he is close to the customer, therefore, if members share that information they would be able to make joint decisions and achieve competitive advantage for all chain members. Lee (2000) is of the view that coordination of information sharing will facilitate decision-making through the provision of relevant, accurate and timely information to the decision makers. Simatupang and Sridharan (2002) suggest that asymmetric information is inherent in supply chains since chain members have different private information, which is often not shared with others. Sharing demand information with the upstream members will create visibility of demand data and inventory at the point of sales thereby allowing upstream members to update forecasts and ensure continuous replenishment of the products.

#### **4.7.3.6 Role of Information Technology in Logistic Synchronisation**

Information technology (I.T) can be used to facilitate information sharing with customers and partners, and achieve optimisation of SC performance. I.T enables participating members to gain visibility about customer demand, resource planning and allocation, contract statuses such as price, automatic ordering, order status tracking, invoicing, auction, incentive scoreboard and electronic payment. This level of information sharing acts as the glue that integrates all chain members (Simchi-Levi *et al.* 1999).

The coordination of collection, processing and dissemination of information among the chain members must be accompanied by the readiness of the chain members to use shared information for the execution of logistics tasks that contribute to operational and financial performance. (Simchi-Levi *et al.* 1999). Lee and Whang (2001) suggest that information sharing provides mutual gains from the replacement of physical costs with information costs and less from reductions of exchange costs of information. The physical costs include the expenses associated with the conversion, transportation and storage of goods from material sources to end customers. The movement of physical goods incurs costs such as inventory costs, obsolescence, damage, pilferage, loss and spoilage; therefore information sharing could be used to substitute physical processes for creating more benefits. To be successful chain members should have logistics synchronisation that

is composed of formal processes to improve customer value and profitability in response to the shared information.

I.T facilitates linkages between the point of production and the point of delivery or purchase. It allows organisations in planning, tracking and estimating the lead times based on the real-time data. I.T enables companies to exchange products, information and funds and utilise collaborative methods to optimise SC operations through integration of web-based platforms such as the internet, EDI, enterprise resource planning and e-business. Arshinder *et al.* (2007) is of the view that information sharing between SC members helps to substitute information with inventory and lead time, reduces the SC costs, reduces the demand variability, enhances responsiveness and improves the service levels, competitive advantage and ultimately improves organisational performance

#### **4.7.3.7 Incentive Alignment**

Incentives are used for rewarding or penalization decision-makers for the decision-making process. Clemons and Row (1993) note that conflict of interest is likely to occur when the existing incentives lead to actions that maximise personal gain but often reduce the total profitability of the chain. Simatupang and Sridharan (2002) suggest that conflict of interests can be resolved by offering incentive schemes linked to a global performance that reflects both value creation for the customers and profitability. Simchi-Levi *et al.* (1999) argue that traditional incentive schemes are based on local costs and short-term concessions that attempt to fill the gap in inventory between chain members, while the perverse incentives, such as local inventory cost, transportation cost and lot size based quantity discounts, often do not support the value creation process of improving customer services, since they are tied to the action of reducing the internal costs of one stage of the SC. According to Lee (2000), this incentive alignment induces the partner to behave in a manner that is consistent with customer focus and total profit. Companies in this relationship complement business process by resolving incentive misalignment in mutually satisfying ways based on a relational contract in order to manage risks associated with demand uncertainty. A relational contract specifies parameters such as price, quantity, time and quality that guide how a buyer places orders and a seller fulfils orders (Lee 2000).

Incentive alignment motivates chain members to satisfy customer needs and increase their total profit. In a study carried out by Dapiran (1992), it was found out that Benetton uses quantity flexibility contracts that allow its retailers to change the order quantity of the coloured kit garments after observing early demand. On the other hand, Magretta (1998) observed that Dell encourages its parts suppliers to deliver small batches to increase inventory speed. Lambert *et al.* (1998) also

observed that Quantum Chemical Company uses gain-sharing contracts with its third-party logistics providers and offers an incentive scheme tied to surpassing expectations in order accuracy, on-time delivery, inventory accuracy, eliminating customer complaints and reporting timeliness. This scheme is used to motivate logistics providers to guarantee service and cost savings.

#### **4.7.3.8 Collective Learning**

Collective learning is an outcome of coordination and performance leading to feedback among SC participants. SC participants learn from their mistakes or those committed by others, opportunities lost due to negligence, or from inadequate information sharing. According to Simatupang *et al.* (2002), collective learning leads to new innovations in processes, methods of operations and NPD. He further argues that learning is a feedback mechanism that helps to detect deficiencies in information sharing and physical distribution flows, and affects the role that trust, power and contracts play in the coordination of the SC. On the other hand, Sawhney and Prandelli (2000) suggest that coordination of collective learning focuses on dealing with the coherency problem of initiation and diffusion of knowledge across organisational borders. The objective of coordination of collective learning is to extend each partner's capability that is useful for accomplishing ongoing improvement and includes ensuring the buy-in of key collaborators in the implementation phase. Smith (2000) suggests that the initiator of a breakthrough solution should be able to overcome the layers of resistance to change that could emanate from the following:

- 1). Disagreement about the nature of the problem
- 2). Disagreement about the direction of the solution
- 3). Disagreement on results of the solution in terms of desired effects on the organisation
- 4). Disagreement on the side-effects of the solution
- 5). The disagreement that the solution is viable in the environment
- 6). Universalized fear

This structural approach in achieving buy-in leads to creation, adoption and diffusion of useful knowledge for building commitment to change. Ways that companies could use to transfer knowledge to support the change process include personal communication, codified communication, joint training and apprenticeship.

## 4.8 Coordination Approaches

There two types of strategies that companies can use to coordinate their supply chains and these are vertical and horizontal integration.

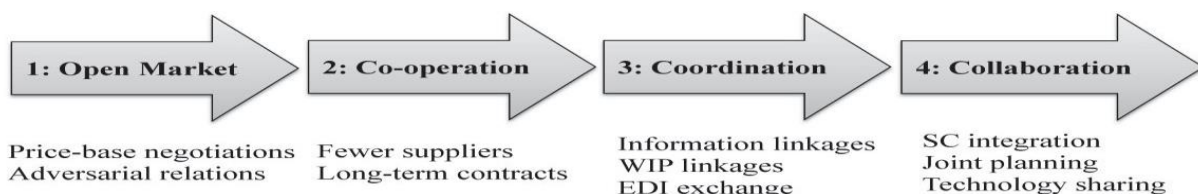
### 4.8.1. Vertical Coordination

The most popular definition of vertical coordination was provided by Mighell and Jones (1963) who define it as follows:

*“.....includes all the ways of harmonising the vertical stages of production and marketing. The market-price system, vertical integration, contracting and cooperation single or in combination are some of the alternative means of coordination”.*

Hobbs and Young (2001) concur with this definition when they explain vertical coordination as encompassing a continuum of possibilities, from open market spot transactions to full vertical integration which includes strategic alliances, joint ventures and contracting among others. According to Childerhouse and Towill (2003) vertical integration shows characteristics of SCC. Vertical coordination occurs when companies coordinate their upstream and downstream activities. It also refers to all possible economic arrangements involved in transferring resources between economic stages. Incentives for vertical coordination include the reduction of transaction costs associated with the process of exchange itself. It also leads to innovativeness and to differentiation through backward integration facilitating a company to obtain specialised inputs leading to competitive advantage (Veselská 2005). Hobbs *et.al.* (1996) suggest that vertical coordination results in the alignment and control of factors such as price, quantity, quality and terms of exchange. Speckman *et al.* (1998) propose the following transitional SC practices including coordination as outlined in Figure 4.4.

**Figure 4.4: Key Transitional Practices in supply chains**



**Adapted from:** Speckman *et al.* (1998)

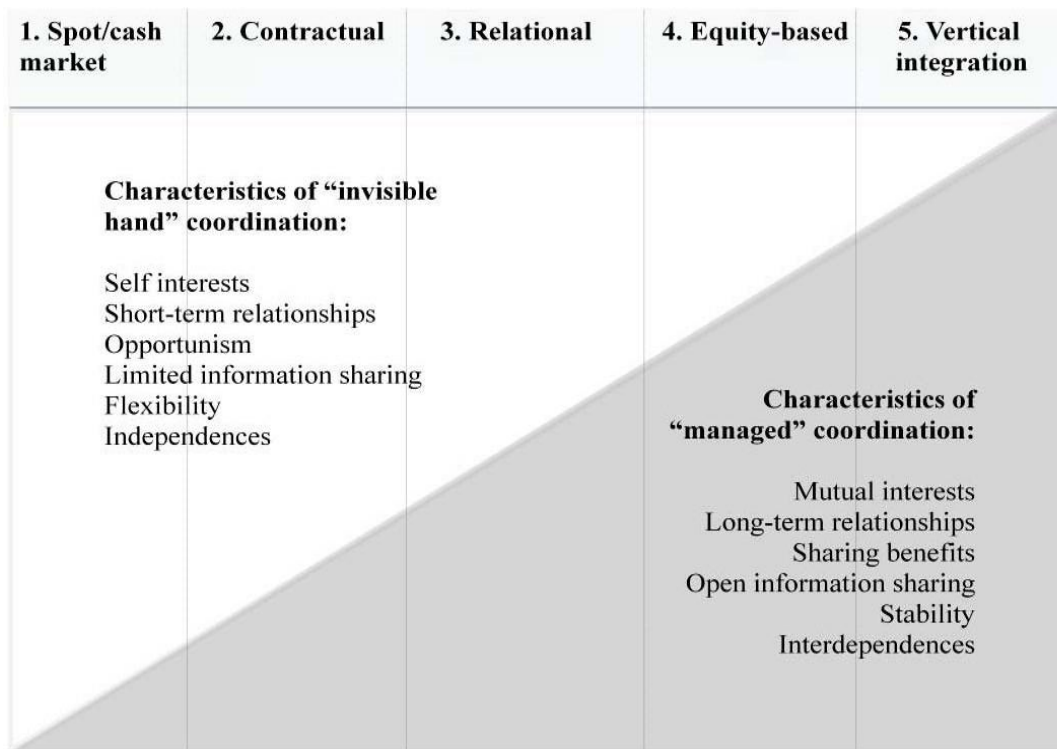
The open market is based on price-based negotiations and adversarial relationship.

Before the engagement of private companies, most transactions among Zimbabwean agro-processing organisations were adversarial in nature. Tobacco was traded mainly through the auction floors while other crops prices were negotiated between producers and the marketing body which had buying monopoly. Agro-processors would then buy from these state-owned companies at the gazetted price. The spot market is followed by a co-operative relationship which involves having fewer suppliers and long-term contracts as evidenced in the tobacco, cotton and grain SC in Zimbabwe. These contracts also known as production and marketing contracts facilitate the transfer of information and measurement of quality attributes other than price. Cooperation involves dealing with fewer suppliers and long-term contracts. The coordination stage is characterised by information sharing, work in progress linkages, processes and electronic data linkages. Lastly, Speckman *et al.* (1998) suggest collaboration as the final SC practice to be adopted by SC members. According to Speckman *et al.* (1998) collaboration focuses on integration, joint planning and technology sharing where companies in the relationship collaborate on certain aspects in order to be competitive. This stage involves designing and governing of SC activities which focus on partner selection, specific activities and approaches at the strategic, tactical and operational levels. Matopoulos *et al.* (2007) argue that in the collaboration stage involves sharing of risks and benefits and this depends on trust, power and dependency management. Without trust, it would be difficult to share rewards with other chain members.

#### **4.8.2 Vertical Coordination Continuum**

In support of Speckman *et al.* (1998), Peterson, Wysocki and Harsh (2001) propose a vertical coordination continuum to facilitate understanding the uniqueness and interconnectedness of individual strategies and the continuum strategies as presented in Figure 4.5

**Figure 4.5: Vertical Coordination Continuum**



**Adapted from:** Peterson *et al.* (2001)

Brown (2002) proposes three types of vertical, mainly by quasi-vertical integration which is based on long-term contractual commitments where members invest resources into relationships like joint ventures, franchisees and licensees. The second type is tapered-vertical integration occurs where a company is involved through backward integration with suppliers to obtain its input. The third type is full integration takes place where a company owns all of the various stages of production, processing and distribution. In the spot market type of relationship, coordination is low since transactions are determined by the price while the products traded are homogeneous (Hobbs *et al.* 1996). This argument is supported by Untischutz (2000) who suggests that due to the nature of sport market transactions, commitments in marketing are made after the completion of the production process. Hobbs (1996) is of the view that these contracts contain specifications that are used to determine the pricing, delivery and selling of the product. These contacts also give buyers control of the production process through quality inspections at every stage of the production process. The third type of relationship is coordination where members in the relationship share information, processes and electronic data linkages. In the last type of relationship, SC members or partners share risks, rewards and benefits as a result of mutual objectives. Participants maintain their independence while at the same time they increase coordination to improve the flow



of information and production to meet customer demands.

In the Zimbabwean scenario, vertical coordination was in state-controlled parastatal companies such as the Cotton Company of Zimbabwe (Cottco), Dairiboard, CSC, GMB, Tobacco Industry Marketing Board (TIMB) and AMA just to mention a few. These companies used vertical coordination systems with upstream suppliers. According to the International Fund for Agricultural development (IFAD 2003), vertical coordination was the only source of input and credit provision for peasant farmers and these were motivated by political motives. Warning and Key (2002) argue that state-controlled out-grower schemes were poorly managed and inefficient as the majority of the beneficiaries never paid their debts. Swinnen (2006b) support this argument when he observed that these systems had inefficiencies and deficiencies in terms of processing, agro-business, marketing systems and allocation of production factors.

The liberalisation and privatisation of parastatal companies led to emergence and growth of new forms of vertical coordination which are no longer controlled by the state but by private companies (International Fund for Agricultural Development (IFAD) 2003, World Bank 2005). With this new way of business, farmers are contracted by private companies that provide inputs and services in return for guaranteed quality supplies. Farmers sign contracts with the contractor to guarantee consistency and quality supplies and to overcome constraints faced by the farmers. The emergence and growth of vertical coordination has been witnessed in many sectors in many developing countries where traditional export products such as coffee, tea, cocoa, rubber and oil palm which were mainly grown on large commercial farms are now grown by small-scale farmers due to the contractual agreements with private companies. According to Baumann (2000) because of contract farming arrangements and out-grower schemes that come with the provision of inputs, new technologies, credit and extension services to farmers, smallholder farmers in developing countries have been able to produce and compete with the large-scale farmers. Baumann (2000) went on to give examples of success stories of smallholder producers in different countries, for example, Ghana and Nigeria where they are contracted in cocoa production, rubber in Malaysia, Nigeria and Sri Lanka; coffee in Ivory Coast, Kenya and Madagascar; palm oil in West Africa and tea in Kenya where they produce half of the total production and Malawi. According to (IFAD 2003), in Mozambique and Zambia contract farming through vertical coordination is the only source of finance for agricultural households where it is estimated that 400,000 rural households,

representing 12% of the rural population in Mozambique, are included in contract farming. However, even though private companies are participating in vertical coordination in developing countries, the government is still involved in agricultural supply chains, e.g. Through shares in privatised food processing companies, state-owned banks and government credit schemes, provision of extension services, where in Zimbabwe most Agricultural Extension (Agritex) officers are from the Ministry of Agriculture (MoA). According to IFAD (2003), Zambia is one of the only countries in sub-Saharan Africa with an almost complete absence of the government in production, marketing, regulation or direct financial contributions to the agricultural sector, although the government continues to play a major role in the distribution of fertilisers.

#### **4.8.3 Horizontal Coordination**

According to Balcik *et al.* (2010) horizontal coordination occurs when two firms are merged at the same level of production. Ergun, Gui *et al.* (2011) define coordination as “the management of parallel actions in ways that increase effectiveness” whereas Simatupang and Sridharan (2002), argue that horizontal coordination includes coordination with competitors or non-competitors providing similar services or internal departments with similar functions.

#### **4.8.4: Chain Coordinators**

Chain coordinators are key players involved in decision-making, leading and controlling of all coordination activities. Belaya *et al.* (2009) are of the view that powerful companies are regarded as chain coordinators as they are more powerful and well-resourced to coordinate the chain. Chain coordinators could be individuals or group members who influence the situation and define organisational culture for the business. According to Galbraith (2001), chain coordinators manage and build infrastructure, information systems, training and communication of chain member, while Akhtar *et al.* (2010), propose that chain coordinators provide leadership to the network of organisations. The role of an actor can be played by an individual or a company. Mehta *et al.* (2004) identified managers as chain coordinators whereas in a study carried out based on three case studies by Belaya *et al.* (2009), it was found out that the role of chain coordinator in commercial chains, retailers and distributors usually play the role. A chain coordinator is regarded as the leader of the chain who targets and controls markets and niches, and also acts as the person who communicates with chain partners and ensures effective information flows. In a study carried out by Cao *et al.* (2008), in the apparel industry, it was found out that brand owners coordinate the SC. The findings revealed that powerful garment manufacturers and trade agents play the role of chain coordinators in

vertically integrated chains, efficiency chain and third-party hub chain.

In support of Akhtar *et.al.* (2010), Cao *et.al.* (2008) propose that the coordinator should have the power to manage the SC and integrate the whole chain for profitability. They also propose comprehensive information sharing and product flow coordination within the SC. In a study carried out by Akhtar *et.al.* (2012) in the humanitarian relief chains, it was noted that the umbrella organisation played the role of coordination in horizontal coordination. The role of the coordinator, in this case, was to lead and direct others involved in humanitarian activities. The coordinator was also found to be responsible for making major decisions in collaboration with other NGOs and donors. The collaboration was meant to facilitate decision-making. Where the humanitarian chains operated under vertical coordination, country directors acted as chain coordinators and they played a pivotal role in national and international strategic options (Akhtar *et.al.* 2012). These countries director decisions are final and could not be disputed. Although they are decision-makers, they collaborated with key donors and top managers to come up with the final decisions. The findings of the study also found revealed that logistics, project and procurement managers in humanitarian supply chains are involved at the operational level. In the Colombian agro foods chain, Usaga *et.al.* (2012) found that the marketing committee acts as the facilitator in the relationship between farmers and buyers. The committee acts as the coordinator and executor of strategies and plans. The agents in the coordinated agro foods chain include farmers, transporters and retailers.

Although actors possess leadership skills and assume influential positions, the challenge is that they might have different perceptions and they have to be flexible in order to understand and adopt other chain member's perspectives (Arshinder *et.al.* 2007). The scholars' adopted a model used by Sushil (2000) Situation-Actor-Process (SAP) - Learning-Actor Process (LAP) to study coordination in an automobile manufacturing sector. The model suggests that when coordinating the SC, companies have to consider factors like values, behaviour and cooperation. To properly coordinate the chain, actors have to understand customer requirements, share information with suppliers and make on-time deliveries.

## **4.9 Antecedents of the Agro-Processing Sector**

This section discusses antecedents of Supply Chain Coordination as discussed by different scholars. The section also discusses the applicability of these to the agro-processing organisations.

### **4.9.1 Trust in Supply Chain Coordination**

Trust is defined as “is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer *et al.* 1995). Claro (2004) corroborates this view by suggesting that trust reflects the fairness of negotiations, sustainment of fair, commitments and the extent to which members believe that the other party will fulfil its requirements through future actions that the supplier would undertake. Claro (2004) also notes that trust is the belief, attitude or expectation that the actions or outcomes of another organisation will be accepted or will serve the other parties’ interest.

De Ruyter *et al.* (2001) identified two components of improving the relationship as trust and commitment, a view corroborated by Spekman *et al.* (1998) who suggest that trust and commitment are antecedents of co-operative behaviour which have an impact on SC practice and SC performance. Spekman *et al.* (1998) define trust as the willingness to rely on a trading partner in whom one has confidence (Moorman *et al.* 1993). Anderson and Narus (1990) are in support of this definition and define trust as the belief that the partners act in ways that bring positive outcomes for their companies and do not take unexpected actions that may bring a negative outcome. According to Kumar *et al.* (1995) trust has two dimensions: “honesty” and “benevolence.” Trust is the extent to which the buyer believes that the supplier has the necessary expertise to perform the activity effectively and reliably (Ganeshan 1994) in order for the relationship to be sustained the suppliers need to deliver the correct stock, in the correct quantity, at a price that is reasonable to both parties, so as to increase the trust and commitment levels of the supplier relationship (Crotts *et al.* 2001), leading to a collaborative relationship. Trust allows organisations and their suppliers to maximise the efficiency of their capabilities and resources leading to lower costs (Achim and Ritter 2003).

Doney and Cannon (1997) suggest that indicators of trust are personal contacts, commitment, reputation and tolerance, thus if organisations adopt these indicators, it would be easy to coordinate their supply chains.

Trust has three main factors which are: Ability (is that group of skills, competencies, and characteristics that enable a party to have influence within some specific domain), Benevolence (is the extent to which a trustee is believed to want to do good to the trustor,) and Integrity (the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable) Mayer *et al.* (1995). Trust among SC members can facilitate cohesion and collaboration between people. Mayer *et al.* (1995) suggest that trust is an important social resource that facilitates cooperation and enables better coordination of interactions. Claro *et al.* (2004) are of the view that in every transaction there is an element of trust although the trust varies across the transacting partners. Trust allows organisations to have a reasonable level of dependence on the SC partner's word. Dwyer *et al.* (1987) highlights that trust is important in building long-term relationships, promotion of effective communication and information sharing. Ganesan (1994) notes that trust is an important aspect of relationships as it binds parties and has a future orientation, a view supported by Smith and Barclay (1997) who note that trust influences the attitude of suppliers towards buyers. Through trust, organisations develop common beliefs which can assist in creating goal congruence thereby reducing the risk of free-riding opportunistic behaviour (Bradach and Eccles 1989). In a study by Fawcett *et al.* (2004), it was found out that there was a lack significant trust in many SC relationships. Sahay (2003) corroborates this view by arguing that, lack of trust has been cited as the main reason why dyadic relationships turn out to be less effective than planned. Svensson (2001) argues that trust reflects the confidence of parties in a relationship that the other party will not exploit its vulnerabilities.

#### **4.9.1.1 Types of Trust**

According to Paul and Mcdaniel (2004), the first type of trust is calculative trust, which is an ongoing, market-oriented, economic calculation for assessing the benefits and costs that can be derived from creating and sustaining a relationship. This type of trust reflects an assessment of a partner's likely cooperation, based on the partner's qualities and social constraints. Kim and Prabhakar (2004) also buttress this argument by noting that calculative trust develops in the building phase of a business relationship.

Once this trust has developed, the next type of trust becomes competence trust where chain members show their competencies by performing the tasks they promised to perform. Heffernon (2004) is of the opinion that this trust develops during the early interaction phase and grows as the relations take shape. Paul and Mcdaniel (2004) argue that competence trust covers technical, operational, human and financial abilities and develops when the skills needed to perform a task

reside across partners. In the Zimbabwean agro-processing sector, this type of trust exists where farmers are contracted by companies to produce for them due to their competencies.

#### **4.9.1.2 Trust in Integrity.**

Trust in integrity is the belief that a trustee makes good faith agreements, tells the truth and fulfils promises. Consistency and loyalty are two components of integrity. Integrity is based on experience from interpersonal relationships between the trustee and the trustor and more specifically on their perceptions of each other's past behaviour (Komiak and Benbasat 2004). Integrity is important in a SC because of the presence of numerous players with sometimes conflicting goals and the existence of written and oral promises to be fulfilled.

#### **4.9.1.3 Trust in Predictability.**

Predictability reflects the trustor's belief that a trustee's actions (good or bad) are consistent enough that it can be forecasted in a given situation. It is based on the premise that organisations are consistent, stable, and predictable in relation to past patterns of behaviour (Komiak and Benbasat, 2004). Relationship development explained by this type of trust depends on the ability to predict outcomes with a high probability of success, which is key to the effective and uninterrupted operation of a SC.

#### **4.9.2 Role of trust in organisational performance**

According to Hardin (1998) trust relationships comprise three parts: (1) the personal characteristics of those who invest in trust (2) the personal characteristics of those in whom trust is invested (3) the specific transactional context in which a given trust relationship exists. Ripperger (1998) compliments Hardin's argument by suggesting that two conditions must be met for there to be trust: which include the coexistence of an expectation of trust, and second, a trust-based action. Coleman (1990) introduces the notion of behavioural risk intrinsic to trust relationships which arise from the time asymmetries between an investment of trust and the opportunity to detect the results of this investment. From Coleman's (1990) assertion trust could be used as a social mechanism needed for the various economic transactions to occur, therefore, people need to be motivated to trust one another for investment purposes since the interacting agents are likely to trust their resources to each other as long as they trust that each agent will satisfy one's interests more effectively than one can oneself. In this case, trust becomes a social mechanism of risk reduction, allowing interacting agents to cooperate in meeting their interests and achieving their collective goals. Luhmann (1980) supports this notion by arguing that trust relationships can increase the efficiency of interactions, operating as a mechanism for reducing uncertainty.

### **4.9.3 Commitment**

Min (2001) suggests that an organisation should have commitment among the personnel from different functional areas. According to Meyer (1991) “Commitment is a psychological state that characterises the employee’s relationship with the organisation, and has implications for the decision to continue membership in the organisation.” Mentzer *et al.* (2001) share the same sentiments with Min (2001) by suggesting that both parties in a business relationship should show commitment in their dealings with each other. Commitment manifests itself in three relatively distinct manners: normative commitment (involves a feeling of moral obligation to continue working for a particular), affective commitment (refers to employees’ emotional attachment, identification with, and involvement in the organisation) and continuance commitment (refers to employees’ assessment of whether the costs of leaving the organisation are greater than the costs of staying) (Allen and Meyer 1991).

Commitment is the degree to which individuals at all levels of the organisation are engaged in the pursuit of the mission and work in a collaborative manner to fulfil organisational objectives (Zakari *et al.* 2013). In the same vein, Kohli (1996) argue that people who are committed to their organisations have the desire to achieve organisation’s goals and thus are motivated to seek inter-functional interactions to find ways of attaining those goals” (cited in Min 2001). Thus, commitment is a key antecedent of SSC (Min 2001, Mentzer *et al.* 2001).

### **4.9.4 Role of I.T in Supply Chain Coordination.**

Information technology and information systems have an effect on coordination mechanisms and these make use of I.T to manage information and product flows (Haghighat 2008). Companies use the web or internet as tools for coordination with other members of SC. I.T enables companies to respond to customer needs more effectively. The role of I.T is to support collaboration and coordination of supply chains through information sharing and reduces transactional friction between SC partners through effective information flow.

Sambamurthy *et.al.*(2003) note that I.T enables companies to manage SC relationships, a view which is corroborated by Lee (2002) who also notes that companies use IT to coordinate processes along the SC. According to Rail *et al.* (2006), SCM is a digitally enabled inter-firm process capability which will not be achievable without I.T. Lee *et al.* (2000), is of the view that for SCM to be effective there is a need to synchronise supply with production and delivery. This could be achieved when companies leverage the internet to create an inter- organisational digital platform which enables real-time information processing, thus improving the coordination of resources

across the SC (Lee 2004). Giannakis and Croom (2004) suggest that the internet gives companies the platform to communicate and share information across the SC. According to Williamson (1985), efficient coordination could be achieved through TCE as a company's task is to coordinate transactions efficiently. Zhu and Kraemer (2005) support Williamson's argument by suggesting that I.T lowers coordination costs through digitalization, thus enabling integration capabilities and improving transaction efficiencies. These transaction efficiencies are achieved through information sharing and communication thereby leading to improvements in SC performance.

#### **4.9.4.1 Communication**

Trust facilitates inter-organisational communication at all levels. Communication is considered a fundamental condition for SCM and the management of logistics capabilities across the SC. (Fugate, Sahin, and Mentzer 2006, Lee, Padmanabhan, and Whang 1997). Anderson and Narus (1990) define communication as:

*“The formal as well as informal sharing of meaningful and timely information between firms.”*

Open and honest communication can lead partners to enlarge the potential for greater joint action between them (Das and Teng 1998). The Relational View (RV) proposes that communication enables the identification of complementary resources and capabilities while facilitating the transfer, recombination, or creation of specialised knowledge (Grant 1996) leading to the creation of competitive advantage. Communication can only be successful if the companies involved trust each other. On the other hand, Williamson's (1985) TCT stipulates that firms determine which activities should be performed by the firm and which activities should be performed outside the firm by examining the situation's efficiency when production and transaction costs are considered. Communication allows companies to determine which activities to be performed by outside parties thereby increasing the need for integration with SC members that have the potential to lower the company's costs.

#### **4.9.4.1 Level of Information Sharing**

Monczka *et al.* (1998) suggest that level of information sharing refers to the extent to which critical and proprietary information is communicated to one's SC partner, for example, suppliers of agro products and agro-processing companies. Choi and Hartley (1996) identified two aspects of information sharing which are fundamental for the practices of the SC, the quantity of information and quality of the information being shared. Information sharing with members of the SC could be used as a source of competitive advantage. Jones (1998) suggests that the key to seamless SC is



the availability of undistorted and up-to-date marketing data at every node within the SC. Lalonde (1998) concurs with this view when he suggests that information sharing leads to solid SC relationship since SC partners who exchange information are able to work as a single entity. Through information sharing, members of the SC could understand the needs of the end customer better and respond to market changes quicker than competitors. Childhouse *et al.* (2003) are of the view that the visibility of information flow throughout the chain is important for the key to an integrated and effective SC.

Information exchanged among organisations should be accurate, timely, adequate and credible for decision-making (Monczka *et al.*1998). Information sharing between suppliers and processors could include the quantities, inventory levels, demand etc.

While information sharing is vital, the major of its impact on SCM depends on what information is shared, when, how it is shared, and with whom (Holmberg 2000). Feldmann *et al.* (2003) suggest that divergent interests and opportunities of SC participants affect the quality of information while Jones (1998) suggests that organisations can deliberately distort information that can potentially reach not only their competitors but also their own suppliers and customers. Berry *et al.* (1994) are of the view that organisations tend to be reluctant to give away more than minimal information since information disclosure is perceived as a loss of power. In view of these predispositions, ensuring the quality of the information exchanged is critical in managing and coordination of the SC (Feldmann *et al.* 2003). Members of the SC should consider information as a strategic asset which ensures that information flows with minimum delay and distortion.

#### **4.9.5 Buyer-Supplier Relationship Management in the Supply Chain**

Gunasekaran (2001) suggests that supplier management facilitates long-term relationships and encourage reciprocal planning and problems solving efforts. Yoshino *et al.* (1995) support this view when they propose that partnerships are entered into to support shared benefits among the parties and ensure participation in strategic areas such as technology, products, and markets.

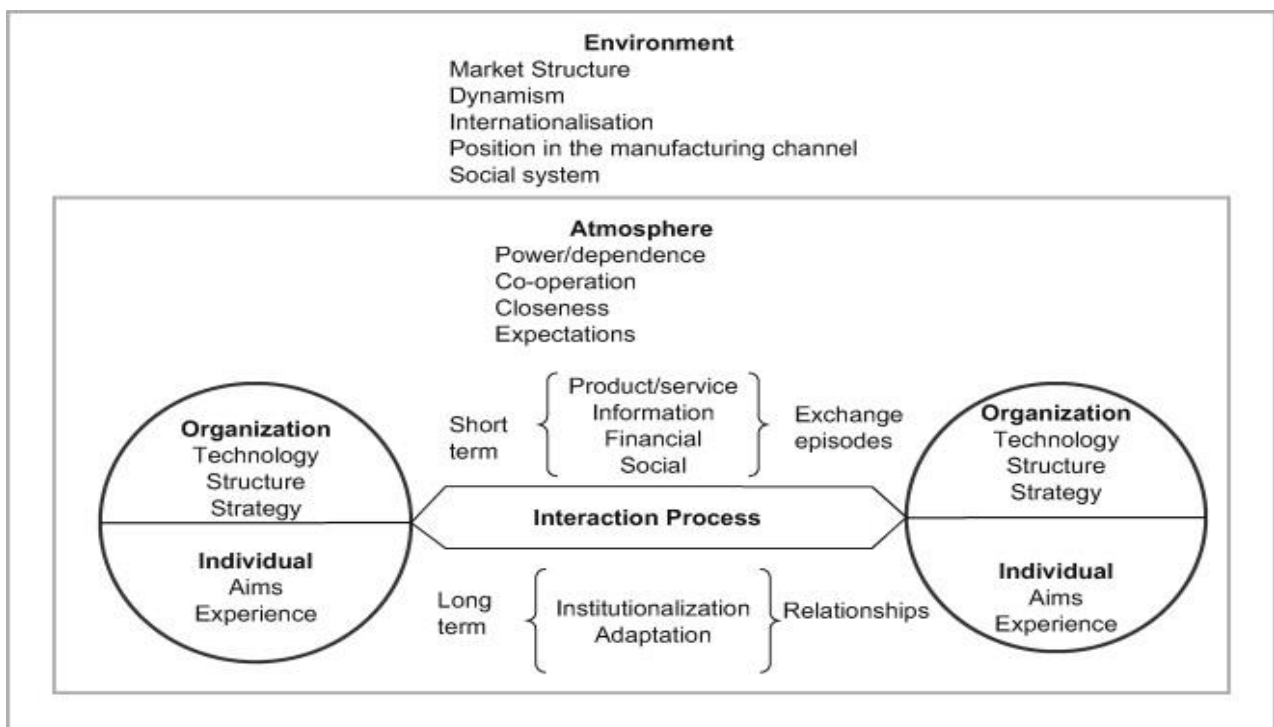
Monczka (1998) proposes the formation of strategic supplier partnerships with a few major suppliers who are willing to contribute responsibility for the success of the product. This proposition is supported by Balsmeier *et al.* (1996) who suggest that strategically aligned organisations can work closely together and eliminate wasteful time and effort. In support of this argument, Noble (1997) concurs that strategic supplier partnerships are designed to control the strategic, tactical and operational capabilities of participating organisations to assist them to achieve major ongoing mutual benefits. Noble (1997) goes further and argue that an effective

supplier partnership can be a critical component of a leading-edge SC that could lead to the competitive advantage of agro-processing organisations in Zimbabwe. Håkansson and Ford (2002) note that relationships enable companies to cope with their increasing technological dependence on others and the need to develop and tailor offerings to more specific requirements. Business relationships are based on trust and mutual benefits. (Cousins et al., 2008), suggest that benefits of supply chain relationships include market share, improved time to market, reduced supply chain lead times and increased profit for supply chain participants.

#### 4.9.5.1 Buyer-Supplier Relationship Management

Management of buyer seller relationships is key in supply chain coordination. Håkansson (1992) proposes an interaction model to manage relationships among supply chain organisations, i.e between the supplier and the customer organisation.

**Figure 4.6: Interaction Model of Relationship Management**



**Adapted from: Håkansson (1992; Turnbull 1996)**

The model is divided into four sections, the operating environment, and atmosphere of the relationship, the exchange episodes and the interacting process.

Under the environment, the model shows that the environment is important to the members of the supply chain as it has an impact on how coordination is done. Environmental factors according to the model include market structure (oligopolistic, monopolistic, pure competition etc), market

dynamism which affects the level of responsiveness calling for effective coordination of supply chain activities. Other factors are; the degree of internationalisation, position of the organisation in the manufacturing channel and social systems in which the organisation operates.

The second level of the model looks at the atmosphere of the relationship in terms of power and dependence of supply chain actors on each other. The more powerful tend to dictate terms on the weaker members who depend on them for organisational survival. The atmosphere of the relationship also focuses on the degree of closeness and co-operation among supply chain partners. The model also considers the exchanges that take place among supply chain partners which Håkansson (1992) divides into two categories; the short term exchange episodes (product, information and financial exchange) and long term exchange episodes in the form of organisational institutionalization and adaptation to changes.

The last stage of the model focuses on the interaction process where there are parties to the interactions in the form of organisations interacting with each other. The interaction among supply chain organisations is affected by organisational structure, technology, strategy and culture. The other interacting parties are the individuals from the buyer organisation interacting with those from the supplier organisation are influenced by their aims and experience in dealing with each other.

#### **4.9.5.2 Critique of the Model**

The model focuses on interactions that take among organisations and actors in the relationship but fails to consider other individual factors such as opportunistic tendencies of the interacting parties that can affect the relationship. The main focus of the model is on the impact of the environment and the atmosphere of the interactions which may not mirror the situation in a different environment. The interaction model fails to address the density of the relationship and the number of ties in the relationship. It focuses only on interactions between two organisations and may not be applicable to networks of organisations.

Although the model highlights the degree of closeness among the interacting parties in the supply chain, it does not consider the degree of centrality and betweenness (the extent to which an actor /node lies between and helps to connect other nodes) of the actors (Borgatti, Everret and Freeman 2013). It also fails to show which actor is active or has many direct connections in the network.

#### **4.9.6 Importance of Resource Coordination**

The RBV suggests that creating and preserving competitive capability is a function of the firm's core resources and capabilities, which represent the primary source of a firm's success. The RBV complements traditional industrial organisational theory that SCM focus is a function of industry structure and positioning by recognising the competitive value of resources/capabilities, and how they combine with and influence initiatives and strategies pursued by a firm. Resources enable firms to conceive and implement strategies, thereby improving their effectiveness. Organisational resources are fundamental drivers of an SCM focus whose value comes from an increase in the economic rent that accrues to those firm-specific resources.

Cheng *et al.* (2010) suggest that inter-organisational coordination in a SC refers to the extent to which firms coordinate their value-adding activities across the SC to improve efficiency and eliminate waste. Coordinated activities can be tactical such as purchasing, operations scheduling, logistics or strategic such as long-term corporate objectives, marketing and customer information (Hilletofth and Eriksson 2011). Lau (2011) suggests that effective coordination enhances visibility and reduces uncertainty. Hilletofth and Eriksson (2011) and Cheng *et al.* (2010) corroborates this view when they agree that effective coordination allows firms to collaborate across their supply chains, allowing them to coordinate their activities such as sales, production, and logistics. They also suggest that the extent to which coordination is conducted allows firms to work collaboratively to remove SC inefficiencies, and thus has a significant direct impact on the relationship among SC members. The ability to coordinate across the SC can also provide other opportunities. Whipple and Russell (2007) also propose that SC members' economic action is embedded in their ongoing network of coordination. Through formal and informal coordination channels, inter-organisational mechanisms facilitate information sharing, linking buyer with suppliers and potential business partners. Information sharing about labour and material costs, and market conditions with suppliers enhance are crucial for investment decisions.

##### **4.9.6.1 Resource-based Antecedents**

Dyer and Singh (1998) suggest that the RV proposes unique inter-firm linkages as a source of competitive advantage over firms that are unable or unwilling to form similar linkages. Four sources of inter-firm competitive advantage as proposed within RV are:

### **Relation-Specific Assets**

According to Amit and Schoemaker (1993), specialization of assets enables organisations to develop a competitive advantage against competitors. This view is in line with Williamson (1985) who notes that companies achieve competitive advantage through relation or transaction specific investments. Williamson (1985) further identifies three types of asset specificity as; site, physical and human asset specificity in relationships.

In site-specificity, companies in a relationship consider the site or location of their partners, so as to gain an advantage over competitors. In terms of location, the production plants and stages should be located close to supply chain partners in order to reduce inventory and transport costs so as to lower costs of coordinating the supply chain (Dyer 1996a). In the Zimbabwean agro processing organisations, location /site decisions play a major role as most manufacturing companies are located close to the source of raw materials, thereby reducing coordination, inventory and transport costs.

Companies in a relationship engage in transaction-specific capital investments (physical asset specificity) to tailor-make processes for supply chain partners (Williamson 1985). Capital transaction investments give companies a competitive edge as it gives them the ability to differentiate their product offering and enables them to improve product quality.

In human asset specificity, supply chain participants' knowledge is accumulated through long term relationships, as through interactions actors learn from each other. Human asset specificity increases as partners develop experience and accumulate specialized information and experience which enables the actors to efficiently and effectively communicate within the supply chain, leading to improvements in information quality and time to market (Dyer 1996a).

### **Knowledge-Sharing Routines**

Coordination and communication are knowledge-sharing routines. Coordination, cooperation, and communication meet the criteria of “inter-firm routines and processes” and can, therefore, lead to a competitive advantage. Cooperation contributes to effective relationship governance in that it promotes self-enforcement of agreements and complementary resource/capabilities and effective governance. Lawrence and Lorsch (1967a) suggest that coordination and cooperation are important for the achievement of integration. Coordination requires the alignment of actions between participating parties, while cooperation entails the alignment of interests between participating parties (Lawrence and Lorsch 1967b). For proper coordination to take place, organisations must share information regarding tactics and operations and these calls for the establishment of

knowledge-sharing routines to facilitate information exchange and acts as a potential source of competitive advantage. It can also facilitate the identification of potential complementary resources and capabilities and can help SC members better integrate their logistics capabilities (Fawcett, Magnan, and Mccarter 2008). Mentzer, Stank and Esper (2008) agree with Fawcett *et al.* (2008), by noting that complementary resources across SC members are a source of differentiation and competitive advantage.

The alignment of interest allows for the transfer, recombination, or creation of logistics management-related knowledge in a SC. Gligor and Holcomb (2012) are of the view that SC partners are not likely to exchange knowledge if their interests are not aligned. Dyer and Singh (1998) also suggest that cooperation enables effective governance, which is a source of competitive advantage. They argue that by cooperating, partners can reduce the need for formal governance mechanisms (e.g., legal contracts) and can employ informal self-enforcement governance mechanisms. The use of informal self-enforcement governance mechanisms can, therefore, facilitate the integration of activities within the chain as members will not exclusively rely on formal contracts to determine the terms of the specific exchange.

#### **4.9.6.2 Product innovation capability.**

Cheng *et al.* (2010) suggest that companies that actively involve key suppliers in product innovation must effectively manage their supply chains through sharing information, technology, and risk so as to have sound relationships with potential partners. Lau (2011), Hilletofth and Eriksson (2011) suggest that purchasing and supplier involvement in product innovation create a source of competitive advantage. Effectively incorporating suppliers' parts into product innovation capability requires careful evaluation of how they will interface with each other to reduce costs savings and improvement quality. To achieve these objectives, Sa'nchez-Rodr'quez and Mart'nez-Lorente (2011) suggest that companies need to have an understanding of how partners plan to align their individual goals to meet shared objectives. Andersen and Christensen (2005) show that research and development intensity for product innovation capability and the percentage of revenue generated from product innovation are directly related to the levels of sourcing activities. They also suggest that early supplier involvement in product innovation leads to significant improvements in product development across the SC.

#### **4.9.6.3 Inventory Control Capability.**

Marion and Sipahi (2010) examine SCM from an inventory control perspective, focusing on linkages between supply chain members and the chain's collective efficiency. Mollenkopf *et al.* (2010) report that manufacturers use inventory control techniques to achieve sustainable competitive advantage and propose an integrated inventory management model that is useful for managing inventory control in an environment where SC members form strategic alliances for the purpose of profit-sharing. Nordberg *et al.* (2003) discuss the importance of product delivery and how inventory control manufacturing principles can be applied to SCM practices. Olivares and Cachon (2010) suggest that a company's inventory control capability influences its SCM practices and capable inventory control manufacturers are expected to deliver raw materials and component parts in small lot sizes, frequently, and directly to the point of use, thus eliminating the need for non-value-adding inspection of incoming materials.

Companies adopt strategic alliances with key suppliers to share confidential information and technology and certify their suppliers' processes and/or products instead of relying on the inspection of incoming materials.

#### **4.9.6.4 Firm's Quality Control Capability**

Cai *et al.* (2009) suggest that there is a relationship between quality control, certification, and SCM and quality as a strategic variable should be managed across the entire supply chain. Whipple and Roh (2010) highlight the importance of a companywide commitment to the application of quality assurance principles across the SC. Mukherji and Francis (2008) also discuss the relationships between quality control and dimensions of SCM which shows that quality control capability is a key factor in the coordination of the supply network. Hsu *et al.* (2009) after reviewing and testing the relationship between quality control and SCM concluded that failure to consider the impact of quality control programs helps to explain the inadequacies of existing SCM models.

#### **4.9.7: Supply Chain Coordination and Organisational Performance**

The performance of a SC results from the contributions of all chain members. Akhtar (2012) defines SC performance as the degree of engagement in behaviour that adds value to the overall SC performance. Harari (1995) suggests that SC performance is a function of three factors which are:

- **The role of perceptions**-this focuses on the accurate ideas of the manager's true role.

- **Ability** – this refers to the ability of the coordinator or company to handle multiple tasks such as chain coordinator’s ability and internal capabilities of the company as well as partner abilities.
- **Motivation** –this is the driving force that motivates a person or company to get the required outcomes.

#### **4.10.7.1 Measuring Supply Chain Performance**

SC performance measurement is difficult since it involves different companies. Khare *et.al* (2012) are of the view that a company is required to measure its SC performance and make improvements across its SC so as to meet customer requirements. They went on to suggest that for companies to compete in the current competitive environment there is a need for continuous improvements in supply chains since these are indicators for performance measurement. According to Chan *et al.* (2003), “As an indispensable tool, performance measurement provides the necessary assistance for performance improvement in pursuit of SC excellence”. Similarly, Morgan (2004) suggest that “performance measurement is related to strategic intent, and the broad set of metrics used by managers to monitor and guide an organisation within acceptable and desirable parameters”. On the other hand, Murphy *et al.* (1996) recommended four aspects of performance measurement which include, the efficiency of the chain in terms of return on investments, equity, assets and gross revenues per employee. The other aspects of measurement are the growth of sales and employees, profit on sales and lastly sales and cash flows which are used to measure liquidity size of the partnership. Kanji (1998) also recommends three variables for financial performance measurement. The recommended measurements are, change in sales, Return on investment which is also highlighted by Murphy *et al.* (1996) and return on sales.

SC performance measurement can facilitate inter-understanding and integration among the SC members. Beamon (1999) proposed a framework for the selection of a performance measurement system and identified resources, output and flexibility as key performance measurements that could be used by companies. He explained that these measures have the goals of attaining a high level of efficiency, high level of customer service and the ability to respond to a changing environment. Resource measures cost so performance measures in this category are total costs of resources used, total costs of distribution including transportation and handling, the total cost of manufacturing including labour or maintenance. On the other hand, output measures are concerned with customer responsiveness.

The performance measures used are total revenue, the proportion of orders filled immediately, on-time deliveries, backorder or stock-outs, amount of time between order and delivery, the total



amount of time required to produce an item or batch and number of customer complaints. Flexibility deals with flexibilities like the ability to change the output level of products, ability to change planned delivery dates, ability to change the variety of products produced and the ability to introduce and produce new products. Beamon (1999) also suggested that, “SC models that utilise this framework can more completely characterise the SC system and the resulting reconfiguration effects, thus enabling the development of models that are more complete, accurate, and therefore, more effective”. Gunasekaran (2004) classified measures into strategic, tactical and operational levels of measurement whose aim is to enhance their visibility for the managerial decision-making. The first is the strategic level where the focus is on top-level management decisions, investigation of broad-based policies, corporate financial plans, competitiveness and adherence to organisational goals.

The second level, the tactical level focuses on resource allocation, measuring the performance of goals set in strategic level and feedback on the mid-level management decisions.

The last level is the operational level where the emphasis is data analysis, evaluation of decision of low-level managers and workers and ensuring that goals set in tactical level are met. All these levels ensure that the goals set in previous levels are met and are defined to assign measures to the places where they can be best dealt with. Gunasekaran (2004) framework maps the performance measures specific to the organisational goal.

#### **4.9.7.2 Supply Chain Operations Reference-model (SCOR)**

According to Khare *et.al.* (2012), SCOR is a cross-industry standard for SCM which uses a combination of business process re-engineering, benchmarking and best practices analysis. The model is aimed at providing a framework for performance measures and best practices for standard processes. Bolstorf (2003) suggested the use of SCOR model), which evaluates performance through measures such as delivery performance (time, order fulfilment, lead time and supply response time) and total SCM cost (within the firm) and also cash-to-cash cycle time. In a survey carried out by Chen and Paulraj (2004) they argue that SC performance should go beyond financial performance and operational performance measures to include mutual trust changes in inventory, turnover at the various stages of the chain and adaptability of the SC as a whole to meet customer needs. SCOR spans interactions pertaining to customers, markets and transactions pertaining to products. SCOR is based on management processes like plan, source, make, deliver and return. The model defines the SC as an integrated process of these management processes. It is aligned

with operational strategy, material, work and information flows and enables communication among SC partners.

The top-level defines the scope and content of the model and sets the basis for performance targets. Configuration level configures the SC so that the operational strategy can be implemented. The third level i.e. the process element level consists of process element definitions, information inputs and outputs, performance metrics, best practices and system capabilities to support best practices. The implementation level is concerned with defining practices to achieve competitive advantage. SCOR provides a list of performance measures for each activity and process in a supply chain aligns these measures with the strategic objectives and provides the best practices for each measurement.

#### **4.9.7.3 Balanced Score Card Approach**

Kaplan and Norton (1996) used the balanced scorecard approach and Brewer and Speh (2000) emphasised its use in measuring performance. The scorecard approach analyses the weaknesses of the old approaches and prescribes the strategy to exercise a “balance”. The approach views an organisation from four perspectives, that is learning and growth perspective; business process perspective; customer perspective and the financial perspective. Concepts like TQM; customer-defined quality; continuous improvement; empowerment and feedback and evaluation to view the success of entire SC are embedded in the balanced scorecard approach (Khare *et. al.* 2012).

The learning and growth perspective calls for employee training and attitude development for self-improvement. It also calls for communication among employees and technological tools that enhance performance. Brewer and Speh (2001) in support of this perspective, proposed that product and process innovation, partnership management, information flows and their measures (Product finalisation point, product category commitment ratio, number of the shared data set, performance of competing technologies) are important facets of performance measurement which should not be taken for granted. On the other hand, the business process perspective focus is on the internal business processes where performance is measured on the conformance of products and services to customer requirements. This perspective includes assessment of both mission oriented processes and support processes. According to Brewer and Speh (2001), the goals of this perspective are waste reduction, time reduction, flexible response and unit cost reduction which in turn is measured by SC cost of ownership, SC cycle efficiency, the number of choices/average response time and percentage of SC target cost achieved.

While the business process perspective focuses on cost reduction, the customer perspective concentrates on customer focus and customer satisfaction through analysis of the customer and

processes to ascertain adequate performance. The main goals include how the customer views products and services, timeliness, flexibility and customer values. This perspective is measured using the number of customer contact points, relative customer order response time, customer perspectives about flexible response and customer value ration. Lastly, the financial perspective focuses on the financial databases and stresses the need for automation. From Brewer and Speh (2001) view, goals related to this perspective are profit margin, cash flow, revenue growth and return on assets which are measured through profit margin by SC partner, cash-to-cash cycle, customer growth, profitability and return on SC assets.

#### **4.9.7.4 Chan Framework of Performance Measurement**

Chan *et al.* (2003) propose a framework to measure SC performance based on fuzzy set theory. The model uses fuzzy set theory to measure the integrated performance of the SC. It first identifies appropriate performance measures and assigns each measure weight by finding the normalised importance weight. The results are converted into a performance index. To identify appropriate performance measures, for each process and sub-processes of the SC, corresponding measures are grouped into processes and measures hierarchy. A performance measurement team is suggested consisting of people from various areas of the SC e.g. Shop floor operators, process supervisors and plant managers who serve as evaluators and assign weights to different performance measures. According to Chan *et al.* (2003), this framework gives a cross-organisational performance measurement method from a system perspective.

### **4.10 Impact of Supply Chain Coordination**

There are multiple benefits accruing from effective SCC. Some of the benefits according to Fisher *et al.* (1994) are: elimination of excess inventory, reduction of lead times, increased sales, improved customer service, efficient product developments efforts, and low manufacturing costs, increased flexibility to cope with high demand uncertainty, increased customer retention, and revenue enhancements. Lee *et al.* (1997) support this argument by suggesting that, the following performance indicators, for coordinating SC, which are profits margin, low inventory level, minimisation of costs, Increase in market share, better product quality, return on investment, order fill rate, capacity utilisation, level of product availability, good relationship, improved flexibility, product variety, unit cost reduction, on-time delivery, goodwill, learning and growth, reduced customer complaints and reduced waste.

#### **4.11.1 Supply Chain Coordination and Competitive Advantage**

Mentzer *et al.* (2001) are of the view that close coordination with suppliers and customers is needed in today's business in order to fulfil customers demand faster, timely and accurately.

Gunasekaran and Yusuf (2002), argue that alliances or partnerships with trading partners are essential in improving flexibility and responsiveness of organisations, while Power *et al.* (2001), Narasimhan and Das (2000) support this view when they argue that strategic supplier partnerships and supplier involvement at the initial stages of the product design process enhance responsiveness of organisations to design changes by customers. In a study carried out by Narasimhan and Das (2000) in manufacturing companies, it was found that the determinant of the manufacturing organisations' responsiveness was a result of the selection, development, and integration of suppliers.

#### **4.11.2 Quality Management in Supply Chain Coordination**

The need for quality in the SC was exacerbated by the competitive environment many organisations are operating in and to be competitive, companies saw the need to apply quality management systems. The objective of quality management efforts in any company should be focused on achieving customer satisfaction (Han *et.al* 2006). Quality management has evolved from quality control to quality assurance. According to Luning *et al.* (2006), quality control is a combination of technological and managerial quality functions. Madu *et al.* (1995) in a study on quality management practices in manufacturing companies in Taiwan found that there is a causal relationship between the quality dimensions such as customer satisfaction, employee satisfaction, and employee service quality and organisational performances. The quality management philosophy has led to a paradigm shift from traditional company-centred setting to a complete SC quality-based system (Kuei and Madu 2001). In addition to the above scholarly views, Saraph *et al.* (1989) suggested the following: the role of the quality department, training, product/service design, supplier quality management, process management, quality data and reporting, and employee relations as critical factors for assessing quality management in the SC. Han *et.al* (2006) found out that the Chinese pork industry has adopted four of the critical factors highlighted by Sarph *et.al.*(1989) namely, management leadership, supplier quality management, product/service design and process management.

#### **4.11 Challenges in Coordinating the Supply Chain**

Lack of coordination can be easily articulated through a variety of surrogate measures. The SC members have conflicting goals or objectives and disagreements over the domain of SC decisions and actions. It must be noted that a typical SC also deals with human systems, which may pose challenges and difficulties in coordinating SC members. The individual interest, local perspective and opportunistic behaviour of SC members may result in a mismatch of supply and demand (Fisher *et al.* 1994).

The traditional performance measures based on individual performance may be irrelevant to the maximisation of SC profit in a coordinated manner. Another challenge is that of traditional policies, particularly rules and procedures, which may not be relevant to the new conditions of, inter-organisational relationship.

##### **4.12.1 Challenges of Coordination in the Agro-processing Sector**

Akweshie (2007) identified challenges facing the agro-processing sector such as poor product quality due to outdated technology. Zimbabwe the agro-processing organisations are affected by limited market access due to barriers to trade (trade and non-trade barriers); restricted marketing opportunities due to problems with pricing since the country uses the American dollar, prices are too high and this affects profit margins. Since the 2013 general elections, the country has been facing liquidity crisis which has affected human capital development; impacting heavily on the coordination of activities of the sector. Power shortages have also affected the industry as the perishable raw material quality is affected. Another challenge being faced by the sector is that of high transaction costs resulting from weaknesses in the provision of relevant information and poor/ of coordination in infrastructure development for SC members. Zimbabwean agro-processing companies are faced with a lack of institutional coordination between agricultural research, training and extension institutes, resulting in poor research prioritisation, outdated training materials and extension messages (Mpande and Madziwa 2011).

#### **4.12 Critique of literature**

The review of literature on supply chain coordination noted that the literature was based on different industries and sectors, mainly the manufacturing sector. The literature on agro processing was done in developing countries (German, China, India and UK), may not accurately mirror the coordination of upstream supply chains due to geographical, economic and technological settings.

Coordination mechanisms discussed in empirical studies, such as buy-back contracts and quantity flexibility may not be applicable to the Zimbabwean agro processing sector due to the fact that the major supplying organisations do not have the capacity to buy back the raw materials as they lack capacity and are dependent on the agro-processors. Scholarly articles based on literature review lacks empirical evidence as this lack the practical aspect of research. Some models reviewed such as the LAP-SAP may not mirror the situation among Zimbabwean agro processing organisations due to differences in the operating environment, culture, technological development, political and legal factors. Empirical evidence from small to medium enterprises may fail to be generalised to the Zimbabwean agro sector due to differences in organisational culture and government policies. Nature of coordination of SME supply chain may not mirror the Zimbabwean context due to different setup.

#### **4.13 Section Conclusion**

The literature review noted the nature, antecedents, and consequences of SCC. The literature review noted that most studies on the subject were conducted in Europe, America and Asia. The literature search failed to identify any published Zimbabwean academic studies on SCC. The studies that were conducted outside Zimbabwe may fail to accurately explain SCC practices of Zimbabwean agro-processing organisations since they are based on findings from organisations that operate under economic, political, socio-cultural and technological conditions which are different from those prevailing in the country. The need to bridge these geographical and theoretical knowledge gaps identified in SCC literature influenced the decision to conduct this study, focusing on Zimbabwean agro-processing organisations. The next section discusses the conceptual framework for this study.

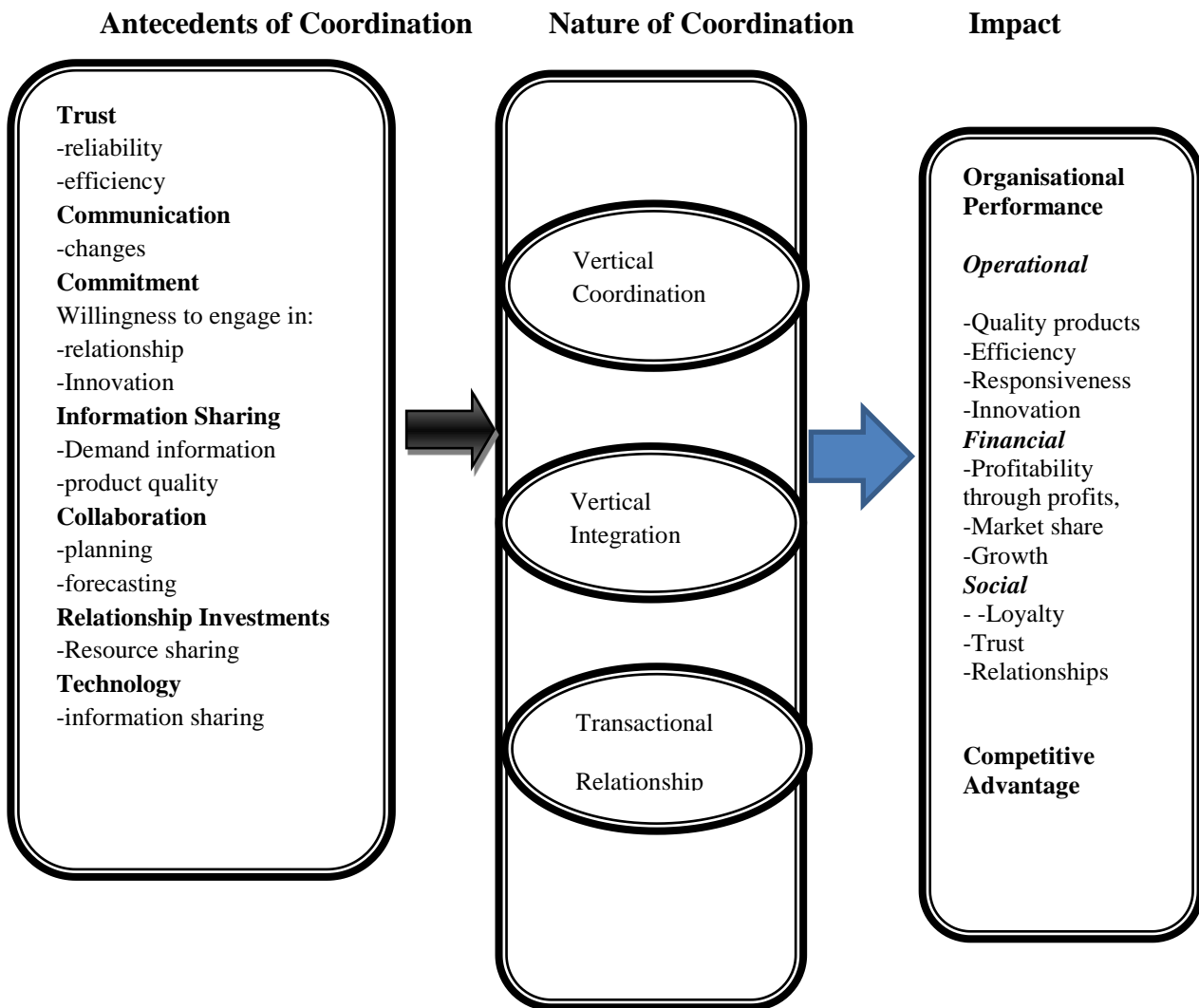
#### **4.14 Conceptual Framework of the Study**

The previous section discussed related literature and highlighted key issues in supply chain coordination. This section discusses the conceptual framework adopted for this study. The conceptual framework was derived from literature which was guided by the research objectives of the study.

The conceptual framework of the study outlines the factors that affect coordination in the Zimbabwean agro processing organisations. These factors are trust, communication, commitment,

information sharing, transaction specific investments, technology, collaboration and supplier capabilities as outlined in the literature discussion on antecedents of coordination. The conceptual framework led to the development of the following hypotheses which were guided by the theoretical framework of the study. The hypotheses were tested in chapter six when the results of the study were discussed.

**Figure 4.7: Conceptual Framework of the study**



#### **4.15 Hypothesis of the Study**

H1: Trust among supply chain players has a positive influence on Supply Chain Coordination

H2: Communication among supply chain players has a positive influence on Supply Chain Coordination

H3: Transaction Specific Investments in the supply chain has a positive influence on Supply Chain Coordination

H4: Supply Chain Coordination among supply chain players has a positive influence on Organisational Performance

H5: Trust among supply chain players has a positive influence on Organisational Performance

H6: Communication among supply chain players has a positive influence on Organisational Performance

H7: Transaction Specific Investments in the supply chain has a positive influence on Organisational Performance

H8: Supplier resources and capabilities of supply chain players have a positive influence on Supply Chain Coordination

H9: Technology levels of supply chain players have a positive influence on Supply Chain Coordination

H10: Supply chain coordination has a positive influence on Organisational Performance

H11: Supplier resources and capabilities of supply chain players have a positive influence on Organisational Performance

H12: Technology levels of supply chain players have a positive influence on Organisational Performance

H13: Information sharing among supply chain players has a positive influence on Supply Chain Coordination

H14: Collaboration among supply chain players has a positive influence on Supply Chain Coordination



H15: Supply chain coordination has a positive influence on Organisational Performance

H16: Information sharing among supply chain players has a positive influence on Organisational Performance

H17: Collaboration among supply chain players has a positive influence on Organisational Performance

#### **4.16 Chapter Summary**

This chapter discussed the related literature. In the next chapter, the methodology utilised in the study will be discussed in detail.

## CHAPTER 5: METHODOLOGY

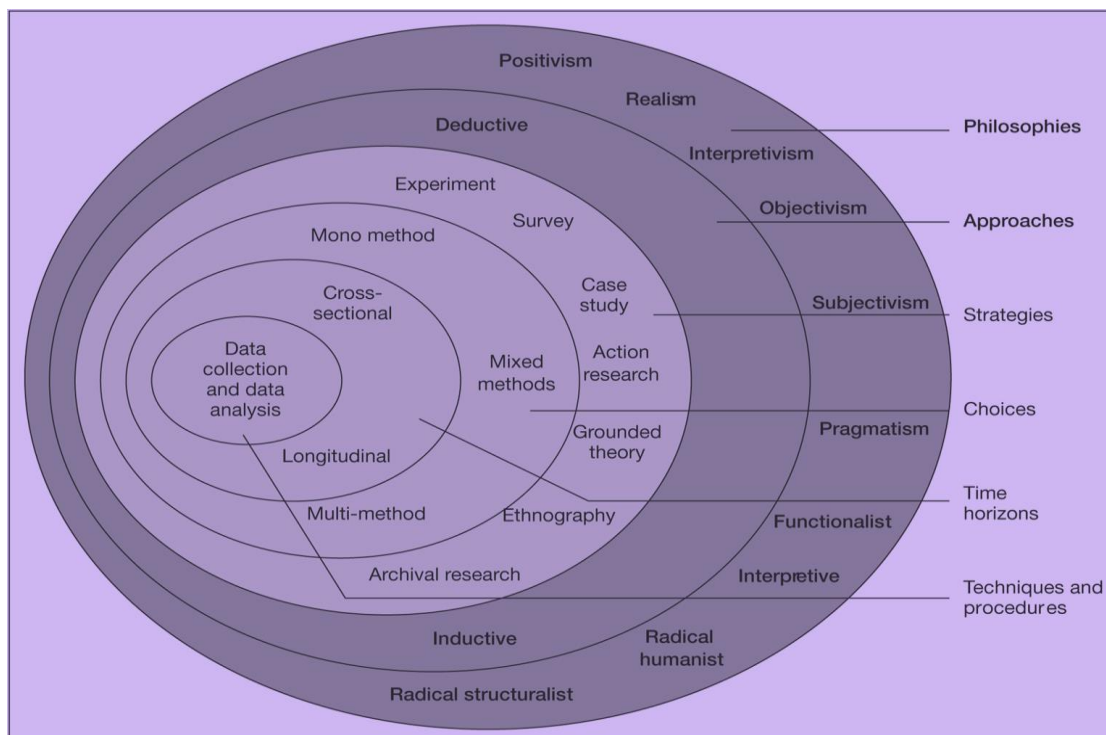
### 5.0 Introduction

The previous chapter discussed the theoretical and conceptual framework adopted for this study. This chapter discusses the methodology for this study. It covers the research design, research philosophy, research approach, the primary research method(s), the sampling procedures, the time horizons, the data collection techniques and the data analysis procedures as well as the ethical considerations.

### 5.1 Research Process

According to Cooper and Schindler (2003), a number of different approaches exist, but unfortunately, no simple classification defines all the variations that have to be considered. Saunders *et al.* (2009) state that for researchers to come up with the most suitable research approaches and strategies for the study, the research process “onion” was undertaken.

**Figure 5.1: The research Onion**

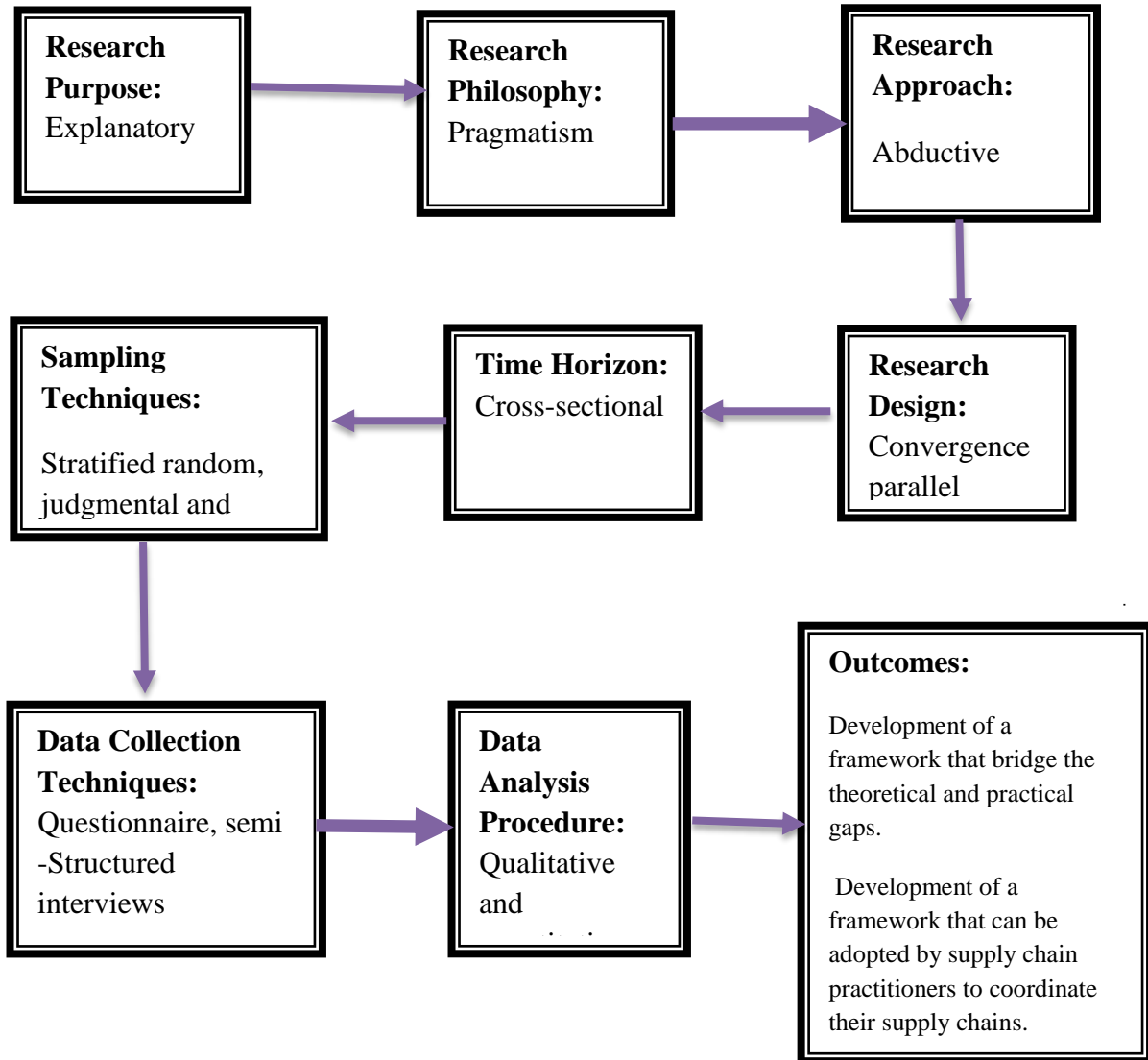


**Source:** Saunders, Lewis and Thornhill (2015).

Saunders *et al.* (2015) proposed the research onion, a description of the series of stages which were adopted in this study. It also shows issues underlying the choice of data collection techniques and

analysis procedures of this study. It was used as a guide in the methodology used for this study. The layers of the research onion are described and applied to this study in the next paragraphs. The researcher presented the research onion in diagram form as outlined in Figure 5.2.

**Figure 5.2: The Research Process adopted for the Study**



### 5.1.1 Research Purpose

Robson (2002) identified the exploratory, descriptive and explanatory purposes as the three possible forms of study. Robson (2002) and Laws and McLeod (2004) agree with this perspective when they argue that there are three major purposes of research which are to explore, explain and describe the subjects under study. This study adopted the explanatory approach, which according to Gray (2009) is valuable when there is sufficient information about a phenomenon as is the case with SCC, where the explanatory study was used to explain and to address the cause-effect research questions of the study. Cooper and Schindler (2008), posit that explanatory studies seek to

understand the reasons for phenomena or relationships between two or more variables by using theory to account for forces causing a phenomenon. According to Yin (1994), explanatory studies are preferred in cases where there is richness of the rival propositions in theories related to the topic of the study as is the case with supply chain coordination in general.

The study also adopted the phenomenological (Interpretivist) philosophical paradigm where it was aimed at describing the phenomena under investigation, refrain from any pre-given framework, but remain true to the facts (Groenewald 2004). Phenomenology is aimed at describing as accurately as possible the phenomena under investigation, refrain from any pre-given framework, but remain true to the facts (Groenewald 2004). In this light, this study describes the nature of the agro processing supply chain, buyer-seller relationship and coordination mechanisms used in the industry. It also analysed the impact of SCC on agro-processing organisations and its contribution to organisational performance. Since there has been very little local empirical research and literature among agro-processing organisations in Zimbabwe, the exploratory purpose was used in a peripheral manner. According to Gray (2009) exploratory research tackles new problems on which little or no previous research has been done. Cooper and Schindler (2004) concur with Gray's (2009) view by suggesting that exploratory studies are done when the area of investigation is so new and vague consequently requiring the researcher's investigation to bring new findings. This reasoning led to the use of the exploratory approach in a complementary manner since supply chain coordination is a new phenomenon among Zimbabwean agro processing organisations, where its nature and significance is opaque and remains under-researched. The researcher aims to gain familiarity management and coordination of the agro processing supply chain in Zimbabwe.

### **5.1.2 Research Philosophy**

The study adopts a mixed-methods approach (using both interpretive and positivist research paradigms), which has been established as a third methodological movement complementing existing conventions of quantitative and subjective developments (Teddlie and Tashakkori 2009). According to Charumbira (2013) mixed method approaches are a hybrid approach which include the examination of both quantitative and qualitative data in a single study in which the data are gathered simultaneously or consecutively, prioritised and involve the integration of the data at one or more stages in the process of research (Creswell *et al.* 2003). Johnson and Onwuegbuzie (2004) stated that mixed method of research is an attempt to legitimise the use of multiple approaches to answering research questions, rather than restricting or constraining researchers' choices. Using

one paradigm would prove inadequate for this particular study, thus the adoption of the two methodologies. Clarke (2008) states that research methods can be described, considered and classified at different levels, the most basic of which is the philosophical level. The assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a complete understanding of a research problem than using either quantitative or qualitative approach alone. Qualitative research can be credited for its ability to provide data that is rich and contextual in detail (Patton 2007). Quantitative research is not without its advantages, it also helps in making observations more explicit, making it easier to aggregate and summarise data (Babbie 2010). Masadeh (2012) identifies two major paradigms adopted in research as positivist and phenomenological approaches which encompass ontological and epistemological assumptions, whereas Johnson and Onwuegbuzie (2004) noted a recent movement towards mixed methods approaches which combine the positivist and phenomenological paradigms. The movement towards a mixed methods approach has led to the emergence of the pragmatic approach, using the strengths of the two approaches (Tashakkori and Teddlie 2003). This view is supported by Johnson and Onwuegbuzie (2004), Pansiri (2005) who argue that pragmatism offers a solid ontological and epistemological basis for mixed methods research by combining the benefits of each approach in one study. This development has influenced the adoption of the pragmatic philosophy for this study in order to offset the effects of the weaknesses of positivist and phenomenological on the quality of the study and draw on their strengths. However, mixed methods are labour and capital intensive as they emphasise on multiple methods. There is also a need for varied expertise in both qualitative and quantitative data (Masadeh 2012). It is critical to determine the point where to mix qualitative and quantitative data. Morse and Niehaus (2009) refer to this as the point of interface, also known as the stage of integration, which is a point within the process of research where the quantitative and qualitative strands are mixed. The choice of mixed methods design is based on research questions and the purpose of the research. The choice of the pragmatic philosophy was also informed by Tashakkori and Teddlie (2003) who argue that it is the best paradigm for justifying the use of mixed methods as it considers the importance of research questions than the methodology used.

The study used a methodological triangulation of semi-structured interviews, questionnaires, and document analysis to collect data from agro-processing companies in Zimbabwe. Although this study followed a mixed-methods research approach, it was predominantly grounded on the positivist paradigm. The positivist approach was used when questionnaires were used to complement qualitative data gathering methods. The phenomenological approach was used in a

secondary manner and was informed by the views of Saunders *et al.* (2009) and Charumbira (2013), who argue that the phenomenological research approach is useable where the subject is new and when previous studies in the area are limited. It was noted earlier, in the background section, that there is limited published literature on coordination on Zimbabwean agro-processing organisations. The decision to employ mixed methods research was therefore influenced by the need to minimise the effects of the shortcomings of positivism on the quality of the study.

### **5.1.3 Research Approach**

Saunders, Lewis, and Thornhill (2015) assert deduction and induction as the two major approaches used to research conclusions. Although there is debate among researchers on the mutuality of quantitative and qualitative approaches, the impression conveyed by research purists is that there are divisions between deduction and induction, but the consensus among researchers seems to point towards the complementary value of these two approaches. Saunders, Lewis and Thornhill (2015) also argue that it is possible and advantageous to combine induction and deduction within the same research. Dubois and Gadde (2002) argue that a systematic combination of both inductive and deductive approaches would result in an abductive approach. Given this background, this study, therefore, adopted an abductive research approach to theory. The abductive approach combines both deductive and inductive reasoning, yet the focus is on the deductive approach (Johansson 2003, Suddaby 2006). Easterby-Smith *et al.* (2012) posit that the abductive approach enables the researcher to have an informed decision about the research design to be used while at the same time assisting the researcher to choose research strategies and methodological choices that will work for the study. The abductive approach provides knowledge of different traditions that enables the researcher to adapt to the research design to cater for constraints (Easterby-Smith *et al.* 2012).

The research used deductive reasoning to determine the extent to which existing theories on supply chain coordination can be inferred on Zimbabwean agro processing organisations. According to Gray (2009), the deductive approach moves towards hypothesis testing, after which the principle is confirmed, refuted or modified. Saunders, Lewis and Thornhill (2015) corroborate this view when they argue that the deductive approach implies that the researcher develops a theory and hypothesis and after that tests the hypothesis in reality. Saunders, Lewis, and Thornhill (2015) argue that a topic for which there is a wealth of literature from which you can define a theoretical framework and hypothesis lends itself more readily to the deduction. This explains why this approach was extensively used in this study and according to Saunders, Lewis, and Thornhill (2015) it was used for hypothesis testing through the following propositions:

- a) Explain causal relationships between concepts and variables, in this case, it was used to explain the relationship between upstream supply chain coordination and organisational performance and strategy formulation.
- b) Operationalisation of concepts in a way that enables facts to be measured quantitatively.
- c) The generalisation of findings to other manufacturing organisations in Zimbabwe.

The adoption of the deductive approach as the dominant approach for this study is informed by Saunders, Lewis and Thornhill (2015) who note that researchers into topics where there is a wealth of existing literature (like supply chain coordination) work deductively by defining the theoretical framework and hypothesis testing.

On the other hand, Gray (2009) argues that the inductive approach starts with the collection of data, after which the data are analysed to see if any patterns emerge that suggest relationships between variables. The results are then used to construct generalisations, relationships, and even theories. This is echoed by Denscombe (2010) who argues that rather than basing an investigation upon whether certain theories work or not, a researcher following an inductive approach starts with a blank mind and embarks on a voyage of discovery. It is an approach dedicated to generating theories, as opposed to theory testing. In this study, the data from the qualitative strand in the convergent parallel design was used to complement the quantitative methods and were used to develop a conceptual framework in a bid to bridge the knowledge gaps identified in supply chain coordination literature. The inductive approach was also used to compliment the deductive approach. Saunders, Lewis and Thornhill (2015) are of the view that the inductive approach is used to generate data and analyse theoretical themes that are being suggested by the data.

The deductive approach, therefore, was adopted due to the fact that there is a wealth of information in one context and less in the context in which the research is carried out (Saunders, Lewis and Thornhill 2015). In this study, it was found that there is a wealth of information on supply chain coordination in other contexts, but little information on supply chain coordination in the Zimbabwean context. For this reason, the deductive approach was adopted since it enables the researcher to modify the existing theory to suit the context under study.

### **5.1.3 Research Design**

A research design is ‘a master plan that specifically identifies the techniques and procedures used to collect and analyse data relevant to the research problem’ (Zikmund *et al* 1996). According to Burns and Grove (2001) research design can be defined as structures within which the study is implemented. Research design can be defined as the plan of action that links the philosophical

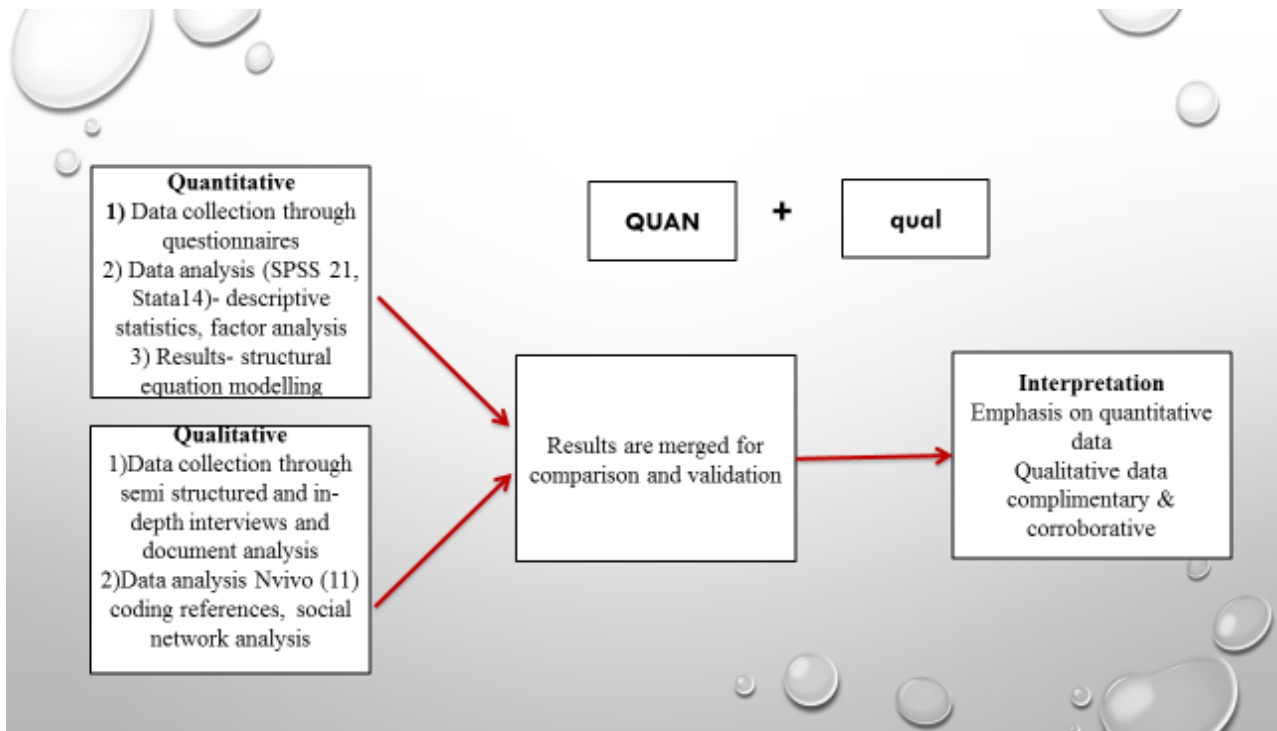
assumptions to specific methods (Creswell 2003). The research design involves procedures for collecting, analysing, interpreting and reporting data in research studies (Creswell and Plano Clark 2011, Schoel 1995). The study adopted a convergent parallel mixed-methods design for data collection, analysis and interpretation. The convergent design occurs when the researcher collects and analyses both quantitative and qualitative data during the same phase of the research process and then merges the two sets of results into an overall interpretation (Creswell, Plano Clark *et al.* 2003). According to Morse (1991) the purpose of the convergent design is to obtain different but complementary data on the same topic.

The methodology used for this research included both quantitative and qualitative analysis of data. Social network and stakeholder analysis methods were also used to understand actors' roles, actions and interactions within the networks to establish relationships between individuals and organisations (Wessrman and Fraust 1999, Caniato *et al* 2012). This method was useful in understanding the role and influence of the various actors involved among the Zimbabwean agro processing organisations supply chain. Data was collected from firms by means of questionnaires, semi-structured interviews and document analysis. According to Yin (2003), this methodological triangulation helps to increase construct validity. It can be noted from the previous discussion that the proposed study is based mainly on “how” and “what” questions. This is the basis for the decision to employ the comparative multiple case study approach in this study in order to provide a comprehensive analysis of the research problem (Creswell 2003). The quantitative and qualitative data are collected in parallel, analysed separately, and then merged and interpreted.

The data for this study was collected concurrently during the data collection period as a cost reduction strategy. The convergent parallel design was found suitable due to time constraints, interviews were carried out the same time when questionnaires were administered since the researcher was in full-time employment and had limited time to get into the field. Figure5.3 shows how the data for the study was collected in line with Creswell and Plano Clark (2011).



**Figure 5.3: The Convergent parallel design**



Adapted from: Creswell and Plano Clark (2011).

## 5.2 Time Horizon

Since this research was carried over a short period of time, a cross-sectional study was used. According to Gray (2009), a cross-sectional study is adopted when using a ‘snapshot’ approach where the data are collected at one point in time. Cross-sectional studies often use a survey methodology.

## 5.3 Population and Sampling

The population of this study were all agro-processing companies and small to medium enterprises' (SMEs), farmers and agro-input suppliers operating in Zimbabwe. The population of this study included all farmers and firms in Zimbabwe that are in the business of growing and processing of agricultural products. It was, however, impractical to comprehensively cover all these subjects due to restrictions on time, funds and access; as such the research was based on a representative sample of the population that was studied. This allowed minimum data to be collected for analysis. Conclusions about how the entire population responded were drawn from the representative sample.

### 5.3.1 Sample Size Determination

According to Bryman and Bell (2007), the larger the sample size, the greater the precision sample. The population of the study includes all agro-processing companies operating in Zimbabwe and all small to medium (SMEs) registered and unregistered agro-processing enterprises. Due to the economic crunch being experienced in the country and the infamous court ruling of July 2015, many companies were forced to close their operations and this also affected the population of the study. The introduction of Statutory Instrument number 64 of 2016 (IS 64), which banned importation of restricted products worsened the situation for most manufacturing companies that relied on imports for raw material.

A list [the sampling frame] of all agro -firms that have been in operation since the year 2000 which export their products was obtained from the Ministry of Industry and Commerce and cross-checked with the list from the MOA and the list from Zimtrade. The sample size for this study was:

Agro processing-150 (Zimtrade Directory 2014)

SMEs -75 (Ministry of SMEs)

Total =225

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

Used Yamane formula

$$n = \frac{225}{1 + 225 * (0.05)^2} = 144$$

Since the study was mainly explanatory, a sample size of 144 was found to be large enough and was considered achievable and representative enough to produce valid results.

### 5.3.2: Sampling Procedure

According to Onwuegbuzie and Collins (2007) sampling decisions are more complicated in mixed methods research because sampling schemes must be designed for both the qualitative and quantitative research components of these studies. These sentiments are echoed by Teddlie and Yu (2007) who also not that mixed methods sampling involves combining well-established qualitative and quantitative techniques in creative ways to answer research questions posed by mixed methods research designs. For these reasons, the researcher used sampling techniques that are in tandem with the use of mixed methods research.

The choice of sampling technique fore this study was informed by Onwuegbuzie and Collins (2007) argue that the choice of sampling class should be based on the type of generalisation of interest. It is against this background that the choice for sampling procedure for this study is

grounded. Since the objective of this study was to generalise the quantitative or qualitative findings to the population from which the sample was drawn (Ibid), the study adopted a stratified random sampling technique where respondents were grouped into strata according to the industry and products produced. The population target was divided into industry strata and randomly selected the companies to participate in the study. For the farmers, the researcher used purposive sampling to screen the participants for the study. Purposive sampling was informed by Onwuegbuzie and Collins (2007) who note that it when the goal is to obtain insights into a phenomenon, to maximise understanding of the underlying phenomenon as is the case in this study. In purposive sampling individuals, groups, and settings are considered for selection if they are information rich (Patton, 1990) and this is why it was used for selecting suppliers and agro processors participants for the study. The researcher also used expertise from the industry to gather particular relevant data hence judgemental sampling was also applied.

For interviews, purposive sampling was also used as informed by Guest, Bunce and Johnson (2006) who postulate that a minimum sample size of 12 participants is adequate to achieve data saturation in qualitative studies based on interviews. As a result, the sample of 26 interviewees was considered adequate to achieve data saturation, theoretical saturation, or informational redundancy, since it is much greater than the minimum threshold recommended by Guest, Bunce and Johnson (2006). In line with the suggestion of the authors, 13 interviews were held with agro-processors from the different strata and 13 were held with supplier respondents. The interview sample was in the range of the threshold recommended by Griffin and Hauser (1992) who suggest that a sample of between 20-30 respondents is needed to capture 90-95 % of responses. The stratified random and purposively selected participants for the survey are presented in Table 5.1 below.

**Table 5.1: Sample size for agro-processors and suppliers**

Industry	Agro-processors	Suppliers	Total
Agricultural Marketing	1		1
Agro-inputs	3		3
Agro Processor	11		11
Beverages	3		3
Cotton	7	1	8
Dairy	4		4
Food Manufacturing	5		5
Timber	3	3	6
Meat (Beef & Poultry)	7	9	16
Seed Production	3		3
Stockfeed Manufacturing	3		3
Tobacco	9	1	10
Sugar		6	6
Total	59	20	79

The sample size was higher due to the fact that the researcher had to accommodate the regulatory authority and AMA the marketing authority in the study.

## **5.4 Data Collection**

This study took place in all the ten provinces of the country where agro-processing is being practised. The companies were sampled according to the industry they belong to and by products produced. The researcher visited the companies twice. Data was also collected from companies that were exhibiting at the Zimbabwe International Trade Fair (ZITF 2016), where it was easy for the researcher to interview the managers. Research assistants were also used to collect data in Harare and Bulawayo.

### **5.4.1 Pilot Testing**

Pilot studies were undertaken in two phases. The first pilot study was aimed at test-running the data collection instruments, the semi-structured interviews, while the second one was meant to test-run the questionnaire survey. This is in line with the views of Saunders *et al.* (2008) who advised that, before using structured and semi-structured interview guides to collect data, they must be pilot

tested to ensure content and expert validity. The purpose of the pilot test is to refine the questions so that the respondents will have no difficulties in answering them (ibid). Bell (1993) also emphasised the importance of pilot testing when he argues that, however, pressed for time one might be, researchers should give the data collection instruments a trial run, because, without a trial run, there is no way of ensuring that the interviews will succeed. The semi-structured interview guides were administered on two practising marketing managers, SC managers and two production managers in Bulawayo. Preliminary analysis of pilot data was undertaken to test if the data collected addresses the research questions of the study and analysis procedures before the main data collection process.

#### **5.4.2 Data Collection Procedures**

The study adopted the methodological triangulation of quantitative and qualitative methods as questionnaires and semi-structured interviews. The data collection process was divided into three phases. The first phase involved companies in the southern region firms which were randomly chosen from the different industries. NGOs that work with SMEs were purposively interviewed during the research process.

In the second phase of the study, document analysis, questionnaire surveys and semi-structured interviews were used to collect data from SC managers and marketing managers in the northern region. The third stage involved the administration of questionnaires and semi-structured interviews with marketing and SC managers at the Zimbabwe International Trade Fair (ZITF). The researcher visited companies twice, first for introduction and questionnaire administration. The second visit was for collecting documents such as annual reports and production schedule which were analysed to determine the extent to which they support the use of SCC to achieve competitive advantage.

#### **5.4.3 Questionnaire Survey**

The questionnaire, according to Bryman (2004) is one of the most utilised instruments for collecting data in survey research. Questionnaires were the main data collection instrument used in this study due to their inexpensiveness and quickness in terms of administration, in the absence of the interviewer effect and their convenience for correspondence (Bryman 2004). The questionnaire also enables researchers to collect standardised information in respect of the same variables for everyone in the sample selected (Parfitt, 1997; cited in Zahari 2007). Denscombe (1998) contends that questionnaires are best suited for collecting data on facts and opinions. This

clarifies why they were used to extract demographic data and opinions on the SCC from employees of the different companies in the agro-processing sector. The decision to use questionnaire was also influenced by the fact that the study covered the entire country and it involved the collection of data from literate subjects. This is in line with methodological scholars as Neuman (2004) who argue that self-administered surveys can more easily reach a geographically disparate sample population. Another advantage of the method is that it is convenient for the respondents due to its ability to allow them to complete the questionnaire in their own time and in a location that best suits them (Neuman 2004).

#### **5.4.4 Semi-structured Interviews**

Semi-structured interviews were used to collect data on antecedent and consequences of SCC in on Zimbabwean agro-processing companies. Semi-structured interviews were used to provide detailed information needed to explore the nature of the supply chain adoption among agro processing companies and their suppliers. This is in line with Denscombe (1998) who argues that interviews are used in cases where there have been no previous researches, as is the case with this study. Freebody (2003) bolsters this perspective when he notes that interviewing is a useful way of collecting qualitative data because the technique is introspective and allows respondents to provide their details, perspectives, beliefs, practices, interactions and concerns. Robson (2003) influenced the selection of semi-structured interviews when he notes that, most people are more willing to talk in an interview, than when they were asked to write or complete a questionnaire.

Sekaran (2000) is of the perspective that oral interviews are appropriate for in-depth interviews and are flexible in the administration to particular individuals and circumstances, thereby enabling the researcher the opportunity to establish rapport with interviewees while at the same time motivating the researcher to discover complex interconnections in social relationships. Freebody (2003) likewise notes that interviews create the opportunity for respondents to ask for clarification when they do not comprehend a question just as the interviewer can ask for elaborations on responses given by interviewees. Social Network Analysis (SNA) was also used to collect and analyse data in order to identify patterns of relationships that exist among the players.

In spite of the fact that they give the researcher / interviewer the chance to probe further, interviews have their shortcomings as highlighted by Denscombe (1998) when he contends that, data from interviews depends on what individuals say, rather than what they do and consequently, they should be treated with caution. Patton (1990) bolsters this perspective when he notes that interview data

is open to misrepresentation due to cultural differences. Interviews are also time-consuming and can generate large volumes of information that may be both difficult to manage. Another shortcoming of in-depth interviews cited by Saunders *et al.* (2008) is that they are subject to a bias which impacts on data quality. Bias in in-depth interviews might arise from the interviewer, interviewee and situation.

## **5.5 Data Analysis and Presentation**

Merriam (2009) suggests that data analysis is the process of making sense out of one's data. It is conducted in order to answer the research questions in a study. In this study, the analysis of data generated by questionnaires was done using the Statistical Package for Social Sciences (SPSS) version 21.0 data analysis software, STATA 14 data analysis software complemented by XLSTATS software. Structural Equation Modelling (SEM) in STATA was used to analyse quantitative data so as to provide a model for hypothesis testing. The NVivo 11 qualitative software package was used to analyse non-statistical data collected through semi-structured interviews. UCINET, an SNA software package was also used to establish the different relationships that exist among the different players and identify key players in the industry. Quantitative data were presented in the form of tables and figures, while qualitative data were presented using SNA web and NVivo word cloud. The quantitative data were analysed using descriptive statistics, correlation analysis and Confirmatory factor analysis to test hypothesis while qualitative data was analysed using network density analysis and NVivo coding references to get an in-depth understanding of the problem under study.

## **5.6 Quality Standards**

### **5.6.1 Ethical Considerations**

It is an essential prerequisite that research involving human subjects always be guided by good clinical practice and human rights principles to ensure participation of participants. In order to ensure ethical research, by taking into cognisance considerations such as commitment to achieving valid results, access and acceptance, confidentiality and anonymity, honesty and openness in research relationships were addressed in the course of the study.

Schutt (2011) contends that commitment to achieving valid results is the necessary starting point for ethical research practice. This study conformed to this principle by employing methods that allowed the researcher to be a neutral observer in the service of learning more about SCC among Zimbabwean agro-processing organisations. This was meant to ensure that the research is unbiased

and scientifically sound. The research was designed and conducted in such a way that ensured compliance with the principle of honesty and openness. This is encouraged by Schutt (2011) who notes that the scientific concern with validity requires in turn that scientists be open in disclosing their methods and honest in presenting their findings. Basing on the principle of honesty and openness, direct and indirect contributions of other scholars, collaborators, colleagues, research assistants and other stakeholders who contributed towards the successful execution of this study were acknowledged.

In accordance with the rule of fair and openness, research assistants and different partners who contributed towards the success of this study were acknowledged. The researcher sought approval from relevant authorities in the organisations targeted for this study. Letters were written to all organisations identified to participate in the study, informing them of the impending study and seeking their consent to visit their premises for the study. The letters presented the authorities in these organisations with a brief background.

The researcher also obtained informed consent from all the participants. This in line with the views of Edwards and Skinner (2009) who argue that modern human research places a strong focus on obtaining voluntary and informed consent from potential participants. The potential participants were also informed about the researcher's commitment to maintaining anonymity and confidentiality. Once permission and informed consent were obtained, the participants were formally invited to take part in the study. This helped to reduce suspicion and promoted sincere responses.

### **5.6.2 Validity and Reliability**

According to Yin (1994), four tests should be used when judging the quality of case study research. These tests include construct validity, internal validity, external validity and reliability.

#### **A) Validity**

Krueger (1994) defines validity as the degree to which a measuring instrument or research procedure actually measures what it purports to measure. Consequently, Cresswell (2007) calls on qualitative researchers to use at least two of the eight strategies he suggested for validity in any given study. These strategies are: 'prolonged engagement and persistent observation in the field'; 'triangulation'; 'peer review or debriefing'; 'refining hypotheses as the inquiry advances'; 'clarifying researcher bias from the outset of the study'; 'the researcher solicits participants' views of the credibility of the findings and interpretations'; 'rich and thick description' and 'external



audits'. This study adopted most of these eight strategies. It has already been noted that the use of mixed methods research was aimed at generating complementary insights that together create a bigger picture and enhance the validity of the study. This is echoed by Edwards and Skinner (2009) who argue that the integration of qualitative and quantitative methods has the potential to strengthen the validity of the results.

The study instruments were pilot tested and this gave the researcher an opportunity to correct any ambiguous aspects on them until was satisfied that they were accurate measures of the desired construct. In a bid to capture in-depth information to meet the exploratory and descriptive purposes of the study, respondents were given the opportunity to respond in a language they could speak fluently. This probably had some bearing on the study's construct validity since some of the interview guides were translated into Shona and Ndebele and the responses were then translated back into English and thereby increasing the risk of a translation error.

**Table 5.2: Reliability Test**

Cronbach's Alpha	No of Items
.926	107

The alpha coefficient for the 107 items is .926, suggesting that the items in this study have a relatively high internal consistency. In general, a score of more than 0.7 indicates that all the items form a scale that has reasonable internal consistency reliability and is considered to be reliable.

### **5.6.3 Measurement of the Study Constructs**

To control the element of bias, the study considered issues to deal with the measurement predictor and the other variables. Davidson (2004), cited in Saleh (2012) suggests that measurement of the dependent and independent variables in a longitudinal study, when done at intervals provides better causal interpretation. In this study, a cross sectional study was used, therefore both the dependent and independent variables were measured at the same time. To measure the causality of the dependent and independent variables, the study made use of the 7-point Likert scales, ranging from 1 representing "Strongly Disagree" to 7 representing "Strongly Agree" for the construct measures.

## **5.7 Chapter Summary**

This chapter discussed and justified the methodologies that were utilised in this study. It examined the procedures and processes that were followed in choosing the participants, data collection and

analysis. The chapter also explored the issues of ethical concerns and ensuring the trustworthiness of the study. The next chapter discusses the results of the study.

## CHAPTER 6: RESULTS

### 6.0 Introduction

This study sought to assess the impact of upstream supply chain coordination on Zimbabwean agro processing organisations performance. The previous chapter discussed the research methodology and research design in detail. This chapter is divided into four sections. The first section discusses the response rate while the second section discusses demographic information of the respondent and company-specific factors of both the agro processing companies and suppliers (farmers). The third section presents results from both quantitative and qualitative data for the subjects under study while section four discusses SEM Estimation Model and hypothesis testing for both agro-processors and suppliers

### 6.1 Response Rate

**Table 6.1: Survey Response Rate**

Category	Total sample	Returned	Response %
Agro Companies Questionnaires Distributed	75	59	78.6
Suppliers Questionnaire Distributed	30	20	66.6
Interviews held Agro processors	20	13	65
Interviews -Suppliers	20	13	65
<b>Total</b>	<b>145</b>	<b>105</b>	<b>72</b>

Out of the 75 questionnaires distributed to companies in the agro industry, 59 were successfully completed and returned in time as the employees saw the significance of the research and cooperated well. The response rate was favourable at 78.6 %. Thirty questionnaires were sent to farmers across the country and 20 were returned, giving a response rate of 66.6%. These high percentages were due to the fact that the questionnaires were self-administered by the researcher. 20 interviews each were scheduled with agro-processors and suppliers, and 13 were successful for bot suppliers and agro-processors giving a response rate of 65% each. This is in line with Martella, Nelson and Morgan (2013) who suggest that a responsive rate of 50% is adequate for analysis reporting, 60% is considered to be good, while 75% would be reliable. Since the overall response rate was 75 % then the findings should be fairly reliable.

## 6.2 Presentation and Analysis of Socio-Demographic Data

This section presents the demographic data of respondents.

### 6.2.1 Demographic Information of Respondents

#### 6.2.1.1 Geographical Distribution of Respondents

The study was carried out in all of the country's ten provinces. The respondents for the survey were randomly and interviewees were purposively chosen without any criteria used since it was difficult to do so due to the nature of the industry and the scepticism surrounding the respondents. Although demographic information has no contribution to the analysis of this study, it provides a generalised view in terms of gender participation, qualifications and experience of Zimbabwean agro processing organisations.

**Table 6.2: Respondents' Province**

Agro processors			Suppliers			
Respondent's Province	N	Frequency	Percent %	N	Frequency	Percent %
Bulawayo	59	4	6.8	20		
Harare	59	32	54.2	20		
Manicaland	59	8	13.6	20	1	5
Mashonaland Central	59	4	6.8	20	4	20
Mashonaland East	59	2	3.4	20		
Mashonaland West	59	2	3.4	20	1	5
Masvingo	59	4	6.8	20	11	55
Matabeleland North	59	1	1.7	20	2	10
Matabeleland South	59	0	0	20	1	5
Midlands	59	2	3.4	20		
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>100</b>

More than half, 54.2% of the companies' respondents are from Harare province with 32 respondents', followed by Manicaland 13.6% with 8 respondents'. Bulawayo, Masvingo and Mashonaland Central had 4 respondents', resulting in a response of 6.8% each, while Midlands, Mashonaland East and West had the same number of respondents of 3.4% from 2 respondents' each. The least respondents were from Matabeleland with 1.7%, from 1 respondent, due to the fact that the majority of companies have relocated to Harare and there are very few agro-processors in the region. The majority of respondents were from Harare due to the fact that it is the capital city of Zimbabwe where most of the companies study have their headquarters. Another factor why

Harare has high responses is that most of the companies that participated in the study are located close to the sources of raw materials such as tobacco, cotton, maize and wheat. Manicaland has the same concentration of responses due to the nature of the product produced in the province which requires processors to be located close to suppliers as some of the products are perishable and have to be processed quickly.

From the supplier respondents, Masvingo province has the highest rate of respondents with 55%. This is due to the fact that the research assistant used in the province is from that area and is well known by most of the respondents, hence they trusted him and were willing to participate in the research. Masvingo province is followed by Mashonaland Central with 20%, Matabeleland North 10%, while Manicaland, Mashonaland West and Matabeleland South all had 5 % who participated in the study. The provinces with few responses were a result of bureaucracy and bottlenecks in those companies where the researcher was required to seek authority from the head offices of the companies in Harare. The findings show that 60% of the provinces participated in the research.

#### 6.2.1.2 The Distribution of Respondents by Gender

Respondents were requested to indicate their gender so as to see the distribution of gender in the industry. The responses are illustrated in Table 6.3.

**Table 6.3: Gender of Respondents**

Gender	Agro processors			Suppliers		
	N	Frequency	Percentage %	N	Frequency	Percentage %
Male	59	44	74.6	20	13	65
Female	59	15	25.4	20	7	35
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>100</b>

From Table 6.3 it can be noted that three-quarters of the respondents, 74.6% (44) are male which shows that the industry is male-dominated. Only 25.4% (15) of the respondents are females, showing gender imbalance in the industry. From the supplier respondents, 65% are male while 35% are female which suggests that the industry is male-dominated. The dominance of male respondents shows that more males are employed in the agro processing organisations than females due to the nature of the industry which is regarded as a male-dominated sector.

Farming in Zimbabwe is widely regarded as a female duty but the findings of this study show that it is mainly male dominated since it is for commercial purposes. This is also due to the land ownership laws enacted during the colonial era where women were regarded as second class

citizens who were not allowed to own land since everything belonged to the man. Gender roles and stereotyping also play an important part in the southern parts of the country where women do not respond to questions but the husbands and this accounts for the low participation of female respondents in this study.

### 6.2.1.3 Distribution of Respondents by Age

The distribution of respondents in each age segment is illustrated in Table 6.4.

It is worth noting that the respondents fall within the age groups as employees of the different companies.

**Table 6.4: Respondents Age**

Age group	Agro processors			Suppliers		
	N	Frequency	Percent %	N	Frequency	Percent %
20-29 years	59	5	8.5	20	1	5
30-39 years	59	20	33.9	20	6	30
40-49 years	59	21	35.6	20	10	50
50-65 years	59	13	22	20	3	15
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>100</b>

The 40-49 age range has the highest number of respondents (35.6 %) comprising of 21 respondents. This age group is the active generation mainly in positions of authority in different organisation. The 30-39 age range follows with 33.9% from 20 respondents, an age range which falls under the young working class. 22%, (13 respondents) fall into the 50-65 age range, and these are the people with experience in the industry. The least number of respondents is in the 20-29 age range with only 8.5% from 5 respondents. This age group is characterised by the young generation who still think that the agro-industry is for the old generation and are only in the sector because of lack of employment.

On the other hand, supplier respondents are varied in terms of age. The majority of respondents in this category fall under the 40-49 age range with 50% complimenting the findings from the agro processors, followed by the 30-39 age group with 30%, while 15 % of the respondents are in the 50-65 age range. The least group of respondents are in the 18-29 age range with 5%. Since most of the suppliers are farmers, 5% shows that the young generation is not keen to take farming as a business. From the interviews, the 5% respondent in this category become a farmer through

inheritance of his late father’s business, which shows that it was not by choice but for the family legacy.

#### 6.2.1.4 Individual Characteristics of Respondents

To assess the characteristics of the respondents, questions were asked about their educational qualifications, experiences and positions in the company. The results are presented in Table 6.5.

**Table 6.5: Individual Characteristics of Respondents**

Level of Education	Agro processors			Suppliers		
	N	Frequency	Percent %	N	Frequency	Percent %
No Formal Education	59	-	-	20	1	5
Primary Education	59	1	1.7	20	5	25
Secondary Education	59	-	-	20	4	20
Certificate	59	3	5.1	20	7	35
Diploma	59	18	30.5	20	2	10
First Degree	59	17	28.8	20	1	5
Postgraduate	59	20	33.9	20	1	5
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>100</b>
<b>Field of Experience</b>						
Marketing	59	30	50.8			
Accounting	59	6	10.2			
Purchasing and Supply Cha	59	5	8.5			
Human Resource Managemen	59	12	20.3			
Finance	59	1	1.7			
Economics	59	1	1.7			
Other	59	4	6.8			
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>			
<b>Years in current Position</b>						
1-2 Years	59	7	11.9			
3-5 Years	59	19	32.2			
6-10 Years	59	17	28.8			
11-15 Years	59	10	16,9			
16-20 Years	59	6	10.2			

<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>			
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### **6.2.1.5 Distribution of Individual Respondents by Level of Education**

The respondents were requested to indicate their educational qualifications. The results illustrated in Table 6.5, show that 58 respondents constituting 98.3 %, have tertiary education ranging from certificate to postgraduate qualifications. Only 1 respondent, which is 1.7% does not have tertiary nor secondary education. The findings are supported by the individual characteristics of suppliers show that 35% who constitute the majority of the respondents have diplomas in various fields which shows that they have business knowledge, followed by 25 % with secondary education, 20% with certificates in different disciplines and 10% with First Degrees. The last group of the respondent is the group with Postgraduate qualifications with 5% and no formal education respectively. Qualifications were used to assess the literacy levels and comprehension of the study.

Thus, the sample is above average in educational attainments. These high literacy levels, among the individual respondents, justified the use of 7-point Likert-type scale items in the questionnaire survey. This is in line with the views of Spectator (1992), who argues that the use of rating scales requires respondents to have a reasonably high level of literacy.

### **6.2.1.6 Field of Respondents' Experience**

Respondents were asked to indicate their main field of experience. From Table 6.5, the main field of experience for the majority of the respondents is marketing with 50.8% of respondents indicating different qualifications in Marketing from 30 respondents', followed by Human Resources Management with 20.3% from 12 respondents' and Accounting with 10.2% from 6 respondents. Those with qualifications in purchasing and supply constitute 8.5% from 5 respondents, followed by those with other qualifications besides the listed ones are 6.8% from 4 respondents. The least number of respondents' have qualifications in Finance and Economics which have responses of 1% each. The results from the respondents' in the study held key decision- making positions in Accounting, Human Resources and Marketing, signifies high profile participation from the respondents and has an impact on data quality.



### 6.3.3.3 Respondents' Years in Current Position

The researcher asked respondents to indicate their years in current position. From the responses, 32.2% of the respondents' indicated that they have been in their current position for between 3-5 years, while 28.8% have been in the same position for about 6-10 years. While 16.9 % have been in the same position for 11-15 years showing their level of experience, 11.9 % of the respondents have served their companies for about 1-2 years. The least number of respondents 10.2 % is for those who have been in the same position for about 16-20 years and these are the most experienced employees in the industry.

### 6.2.1.7 Respondents Experience

On the question that required respondents' experience, the respondents had varied responses as presented in Table 6.6.

**Table 6.6: Respondents Experience**

Professional Experience	Agro processors			Suppliers		
	N	Frequency	Percent %	N	Frequency	Percent %
1-2 Years	59	3	5.1	20	-	-
3-5 Years	59	17	28.8	20	3	15
6-10 Years	59	17	28.8	20	8	40
11-15 Years	59	13	22	20	5	25
16-20 Years	59	4	6.8	20	3	15
Above 20 Years	59	5	8.5	20	1	5
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>	<b>20</b>	<b>20</b>	<b>100</b>

From Table 6.6, it was noted that the highest number of respondents' (17) in terms of professional experience have been in their place of employment from 3-5 years and 6-10 years 28% each. This category is followed by those respondents' (13) who have between 11-15 years' experience constituting 22%, followed by the above 20 categories with (5) 8.5% respondents', the 16-20 years range with (4) 6.8% responses. The least category in terms of professional experience is the 1-2 years category with (3) respondents culminating into 5%.

Results also show that 40% of the supplier respondents have been in their positions for about 6-10 years, followed by 25% who indicated that they have been in the position for about 11-15 years. 15 % of the respondents have been with the company for about 3-5 years and 16-20 years respectively. The remaining 5% have been in their current position for more than 20 years. The results indicate that respondents have experience in Zimbabwean agro organisations.

### 6.3 Company Specific factors

To gain more insight on the participating companies the researcher dug deeper into the demographics of the companies participating in the survey.

#### 6.3.1 Type of Business Undertaken

The researcher sought to find out the type of business that the agro processing companies engage in. The type of business undertaken would assist in identifying the different players involved in the study and the nature of their business.

When asked about the industry they operate in, 37 of the respondents, that is: 62.7% are agro processing companies operating in different parts of the country, followed by 15.3% from 9 companies operating in the tobacco industry. The tobacco industry is followed by six respondents who constitute 10.2 percent of the study population and operate in the industries not listed in the questionnaire. The beverages industry had 6.8 % from 4 respondents, followed by the Food industry with 3.2% from 2 companies. The findings are presented in Table 6.7

**Table 6.7: Type of Business Undertaken**

Type of Business	N	Frequency	Percent
Agro Processor	59	37	62.7
Tobacco Industry	59	9	15.3
Food Manufacturing	59	2	3.4
Beverage Manufacturing	59	4	6.8
Middlemen	59	1	1.7
Other	59	6	10.2
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>
<b>Age of Business</b>			
Less than 5 Years	59	8	13.6
6-10 Years	59	9	15.3

11-15 Years	59	3	5.1
16-20 Years	59	6	10.2
21-25 Years	59	3	5.1
26-30 Years	59	1	1.7
31-35 Years	59	1	1.7
36-40 Years	59	3	5.1
41-50 Years	59	1	1.7
Above 50 Years	59	24	40.7
<b>Total</b>	<b>59</b>	<b>59</b>	<b>100</b>

The least number of respondents' was from middlemen with 1.7% from one company. The results indicate that all the respondents represented companies from the different sectors in the Zimbabwean agro processing industry. All the companies that participated in the survey are agro-based and rely on agro suppliers for their existence.

### 6.3.2 Age of Business

To find out the length of business operations, the researcher asked the respondent's to indicate how long they have been in business. The responses are presented in Table 6.7. The results show that 40.7 % of the respondents, which shows that 24 companies have been in business for more than 50 years, showing that they have stood the test of time. This category is followed by 15.3% showing that 9 companies have been in business for about 6-10 years, while 13.6% of the respondents, represented by 8 companies indicate that they have been operational for less than 5 years. The new players in the industry are well equipped and have developed relationships with their suppliers. Another group of respondents constituting 10.6% from 6 companies indicate that they have been operational for about 16-20 years, followed by those in the 11-15 year category, 21-25 and 36-40year category who all had 5.1% responses from 3 respondents each. The least number of responses came from the 26-30, 31-35 and 41-40 years category who had one responded each, which was 1.7%. The responses from the last group show that these companies have been in the business long enough to understand the workings of the industry.

### 6.3.3: Industry in Which Company Operate

The researcher sought to identify the industry in which the different companies operate in. This information would assist the researcher to have a better understanding of the research problem and the nature of the problem so as to achieve the set objectives.

**Table 6.8: Industry in which the company operates**

INDUSTRY	N	FREQUENCY	PERCENT
Agricultural marketing	59	1	1.7
Agro Inputs Manufacturing	59	3	5.1
Agro Processor	59	11	18.6
Beverage Manufacturing	59	3	5.1
Cotton Processing	59	7	11.9
Dairy	59	4	6.8
Food Processing	59	5	8.5
Forestry	59	3	5.1
Meat Processing	59	7	11.9
Seed Processing	59	3	5.1
Stock Feed Manufacturing	59	3	5.1
Tobacco Processing	59	9	15.3
<b>Total</b>		<b>59</b>	<b>100</b>

From Table 6.8, the findings show that the agro processing sector has the highest number of respondents 18.6%, with 11 companies participating in the study, followed by the tobacco processing industry with 15.3% from 9 respondents. This is due to the fact that agro processing and tobacco are the cash cows of the economy. The cotton and meat processing industries are third with 11.9% from 7 companies each, indicating that these industries are not performing as expected, as they have become a shadow of themselves. The food processing sector has 8.5% from 5 companies and the dairy industry with 6.8% from 4 companies this industry is a fast-growing industry with new players coming in. The following, stock feed manufacturing, seed processing, forestry, beverage and agro inputs manufacturing industries have a response rate of 5.1% from 3 respondents in each industry, showing sectors with potential for growth. AMA is the least with 1.7 % since it is the only regulatory authority that participated in the survey.

### 6.3.4: Supplier Specific Factors

The researcher sought to understand more about the companies that participated in the survey by asking questions that would give more information on the surveyed companies.

**Table 6.9: Supplier Specific factors**

<b>Business Category</b>	<b>N</b>	<b>Frequency</b>	<b>Percent</b>
A1 Farmer	20	1	5
A2 Farmer	20	8	40
Commercial Farmer	20	9	45
Communal Farmer	20	2	10
<b>Total</b>	<b>20</b>	<b>20</b>	<b>100</b>
<b>Type of Business</b>			
Leasing	20	1	5
Management Contract	20	1	5
99 Year Lease	20	4	20
Title Deeds	20	11	55
Illegal Settlement	20	2	10
Other	20	1	5

#### 6.3.4.1 Business Category

Table 6.9 shows company-specific factors in order for the researcher to find out how the business is managed. From the findings, 45% of the respondents have commercialized farms, doing farming for commercial purposes, followed by 40% who are A2 farmers but have also commercialized their businesses. Of the remainder, 10 % are communal farmers who survive on communal farming and sell the extra produce to any buyer while five % are A1 farmers. The results show that suppliers have the capability to produce the required quantities since they have the main resource, land at their disposal.

#### 6.3.4.2 Type of Business

The results in Table 6.9 show that 55% of the supplier respondents have title deeds to their land /business, followed by 20% who indicated that they have acquired the 99-year lease agreements from the government after they have been allocated land. 10 % of the respondents indicated that

they are illegal operators on the business premises after grabbing the land from commercial farmers while the remaining 5% each indicated that they are under a management contract, leasing and just operating.

#### 6.4: Products Produced By Surveyed Companies

The researcher sought to identify the products produced by the different companies that participated in the survey. This was done in order to find out the nature of each industry and the products produced in the different industries. The findings are presented in Table 6.10.

**Table 6.10: Products Produced**

Products Produced	N	Frequency	Percent
Beef	58	4	6.9
Tobacco	58	9	15.5
Poultry	58	3	5.2
Dairy	58	4	6.9
Sugar	58	2	3.4
Ethanol	58	1	1.7
Foodstuff	58	9	15.5
Timber	58	3	5.2
Cotton	58	7	12
Tea	58	2	3.4
Alcoholic Beverages	58	1	1.7
Non-Alcoholic Beverages	58	2	1.7
Seed	58	3	5.2
Stock feeds	58	3	5.2
Coffee	58	3	5.2
Inputs	58	2	3.4
<b>Total</b>		<b>58</b>	<b>100</b>

Table 6.10, tobacco has the highest number of respondents of 15.5% from nine companies, and foodstuffs with 15.5% from 9 companies. Cotton follows behind tobacco and foodstuffs with 12% from seven companies and two products, which are beef and dairy products are at 6.9% and are produced by 4 companies in each industry, while tea, coffee, poultry, timber, seed and stock feeds are all at 5.2%, is produced by 3 companies each. On the other hand, sugar, tea and inputs at the same level with 3.4% each from the 2 companies that participated from each industry. The least participants with the lowest number of responses are from producers of agricultural input and sugar with 3.4% each from 2 respondents in each industry.

The researcher also sought to find out the products supplied by the companies to agro processing companies. This would help the researcher to identify and analyse the relationships that exist between the suppliers and their customers. The results from the respondents' are presented in Table 6.11.

**Table 6.11: Supplier Products**

<b>Product</b>	<b>N</b>	<b>Frequency</b>	<b>Percent</b>
Beef	20	4	20
Pork	20	2	10
Poultry	20	2	10
Maize	20	3	15
Tobacco	20	1	5
Cotton	20	1	5
Sugar Cane	20	6	30
Fish	20	1	5
<b>Total</b>	<b>20</b>	<b>20</b>	<b>100</b>

Table 6.11 shows the products produced /raw materials produced by suppliers, and the findings reveal that 30% of the suppliers produce sugar cane which they supply to contracted companies. The results are due to the fact that the key informant used is also a sugar cane farmer, so the respondents' trusted him and were willing to participate in the study. 20 % of the respondents produce beef, followed by 15% who produce maize, 10% pork and poultry while tobacco, fish and cotton have 5% each. The results show that all the products used in the agro processing industry are supplied by farmers from the different provinces of the country.

#### **6.4.1 Section Summary**

This section discussed the demographic information of the agro processing companies and suppliers that participated in the survey. The information discussed included the age of respondents, educational qualifications and professional experience of the individual respondents who participated on behalf of their organisation. Demographic information on the age of business, industry the companies operate in and products produced by the companies was also discussed. The next section discusses demographic information and company-specific factors of suppliers

who supply the agro-processors with raw materials and other components needed for the success of the business.

## **6.5 Survey Data Analysis**

### **6.5.0. Agro Processors' and Suppliers' Data**

Questionnaires were used to collect data in the quantitative aspects of the study and only 59 agro processor questionnaires and 20 supplier questionnaires were satisfactorily completed and considered usable for analysis. This section presents data extracted from questionnaire responses and semi-structured interviews and is divided into five sections according to the main research objectives. The first section presents findings on the nature of supply chain coordination among Zimbabwean agro processing companies. The second section presents the antecedents of supply chain coordination and the third presentation on the role of technology on Zimbabwean companies followed by challenges faced by companies operating in this industry. The last section presents findings on the impact of supply chain coordination on the performance of Zimbabwean agro processing organisations. The study used descriptive statistical measures from the SPSS Data Analysis Software, Version 21, to analyse data from the 59 questionnaires from agro processing companies and 20 supplier questionnaires. Qualitative data was collected in order to get an in-depth understanding of the activities and relationships that exist among the supply chain actors. Qualitative data were analysed using NVivo 11, a qualitative data analysis software.

For easy analysis of quantitative data, the following statements were used to explain the findings.

- Mean scores of between 6.5 and 7 indicate that the survey participants strongly agreed with the statement under consideration;
- Mean scores of between 5.5 and 6.49 indicate that the survey participants agreed with the statement.
- Mean scores of between 4.5 and 5.49 indicate that the survey participants somewhat agreed with the under consideration.
- Mean scores of between 3.5 and 4.49 indicate that the survey participants were neutral or not sure about the statement being posed.
- Mean scores of between 2.5 and 3.49 indicate that the survey participants somewhat disagreed with the statement.
- Mean scores of between 1.5 and 2.49 indicate that the survey participants disagreed with the statement.



- Mean scores of between 1 and 1.49 indicate that the survey participants strongly disagreed with the statement under consideration.
- Standard deviation and variance show the mathematical dispersion of the data set relative to the mean. A low standard deviation and variance scores show that there was some convergence in the respondent's view on the statement under consideration. A higher standard deviation and variance scores show that the respondents' views on the statement under consideration vary significantly.

### 6.5.1 Nature of supply chain Coordination

To find out the nature of supply chain coordination among Zimbabwean agro processing organisations, the researcher used three measurements. This statement sought to find out the nature of supply chain coordination among Zimbabwean agro processing organisations. Nature was measured by the adoption of supply chain as a business strategy, coordination of activities within the supply chain and formalization of coordination within the supply chain. It is also measured by coordination mechanisms and types of coordination used in the industry. The researcher also sought to identify coordination mechanisms used by Zimbabwean agro processing organisations and highlighted mechanisms such contracts, price, trust, quantity discounts and bargaining power so that respondents indicate those that apply to their organisation. The study also sought to identify the types of coordination being adopted by Zimbabwean companies.

**Table 6.12 Nature of the Zimbabwean Agro Companies Supply Chain**

Question Item	Item statement	N	Min	Max	Mean	Std Dev	Variance	Skewness	Kurtosis
<b>Nature 1</b>	Adoption of supply chain as a business strategy	59	3	7	5.97	0.850	0.723	-784	4.09
<b>Nature 2</b>	We coordinate activities within the supply chain	59	3	7	5.81	0.973	0.947	-0.638	2.974
<b>Nature 3</b>	Coordination activities within the supply chain are formalized	59	2	7	5.58	1.163	1.352	-1.049	3.895

	<b>Coordination Types</b>								
<b>Coord 1</b>	Our supply chain is vertically coordinated	59	1	7	5.44	1.611	2.596	-1.065	3.540
<b>Coord 2</b>	Our supply chain is vertically integrated	59	1	7	5.08	1.725	2.975	-0.498	2.091
<b>Coord 3</b>	Our supply chain is horizontally coordinated	59	1	7	2.95	1.565	2.463	0.543	2.109
<b>Coord 4</b>	Our supply chain is horizontally integrated	59	1	7	2.90	1.470	2.162	0.735	2.495
	<b>Average</b>				<b>4.819</b>	<b>1.337</b>	<b>1.888</b>	<b>-112.28</b>	<b>3.027</b>
	<b>Coordination Mechanisms</b>								
<b>CM 1</b>	Our supply chain relationship is transactional	59	1	7	4.51	1.968	3.874	-1.049	3.895
<b>CM 2</b>	We use contracts to coordinate our supply chain	59	1	7	5.71	1.672	2.795	-1.051	4.537
<b>CM 3</b>	We use price as a coordination mechanism	59	1	7	5.41	1.219	1.487	-1.853	7.514
<b>CM 4</b>	We use quantity discounts as a coordination mechanism	59	1	7	4.54	1.430	2.046	-0.122	2.824
<b>CM 5</b>	We use trust as a coordination mechanism	59	1	7	5.15	1.282	1.649	-0.879	3.748
<b>CM 6</b>	We use bargaining power to coordinate the supply chain	59	1	7	5.17	1.262	1.591	-0.374	2.654
	<b>Average</b>				<b>5.082</b>	<b>1.472</b>	<b>2.240</b>	<b>-0.888</b>	<b>4.195</b>

The findings show that in relation to nature of the supply chain, respondents agreed that their companies have adopted supply chain as a business strategy (M=5.97), coordination of supply chain activities (M=5.87) and that their supply chain activities are formalized (M=5.58). When requested to indicate the coordination mechanisms used by their organisations, respondents also agreed with the statements that they use contracts (M=5.71) and somewhat agreed with the statement on the use of quantity discounts (M=4.54) as coordination mechanisms while others indicated that they have a transactional relationship (M=4.51) and buy their raw materials on the market. The other statements where respondents indicated that they somewhat agree include use of trust, price and bargaining power s coordination mechanisms. On the issue of types of coordination, respondents also somewhat agreed with the statements that their supply chain is vertically coordinated (M=5.44), while others indicated that they have a vertically integrated supply chain (M=5.08). Respondents somewhat disagreed with the statements that their supply chains are horizontally coordinated and integrated respectively. Results from suppliers were used to corroborate the results from the agro processing companies as presented in Table 6.13

#### **6.5.1.1 Supplier Quantitative Results**

From the supplier side, the results on the nature of coordination are presented in Table 6.13.

From the results presented in Table 6.13, all the variables used to describe nature fall in the normality range with kurtosis scores below the maximum level of normality range ( $\leq 3$ ). The findings are likely to produce reliable results which could be replicated in other industry sectors. The results also show that respondents somewhat agreed with the statement under consideration, with coordination of activities within the supply chain having the highest mean score (M=5.3). The findings indicate that these variables are significant in explaining the nature of coordination among the players in the agro processing supply chain.

The variables not discussed show that the respondents disagree with the statement that under consideration. *Our supply chain is horizontally coordinated (M=2.9)*, show that the variable is insignificant in describing the nature of coordination between the agro processing companies and their suppliers.

**Table 6.13 Nature of the Zimbabwean Agro Suppliers**

Question Item	Item statement	N	Min	Max	Mean	Std Dev	Variance	Skewness	Kurtosis
<b>Nature 1</b>	We coordinate activities within the supply chain	20	2	7	5.3	1.455	2.116	-0.750	2.666
<b>Nature 2</b>	Our company is the coordinator	20	1	7	4.9	2.150	4.621	-0.553	1.884
<b>Nature 3</b>	Coordination activities within the supply chain are formalized	20	1	7	5.05	1.932	3.734	-0.521	2.050
<b>Coord 1</b>	Our supply chain is vertically coordinated	20	1	7	4.85	1.981	3.924	-0.788	2.407
<b>Coord 2</b>	Our supply chain is horizontally coordinated	20	1	6	2.9	1.714	2.937	0.480	1.918
	<b>Average</b>				<b>4.6</b>	<b>1.85</b>	<b>3.466</b>	<b>-0.426</b>	<b>2.185</b>

From the qualitative strand of the study, data were collected using semi-structured interviews and analysed using the NVivo 11 software for qualitative data and the results are also corroborated by the findings from the quantitative strand of the study. Interviewees were asked to indicate the level of coordination of supply chain activities within their organisation and the responses show that supply chain activities are coordinated with coordinators playing a key role as presented in Table 6.14.

**Table 6.14: Coding Reference Percentage Coordination of Activities**

NVivo Node	Coding References	Coding Reference %
Coordinated	8	50
Coordinated by Company	4	25
Coordinated by Others	4	25

The results show that 50% (8 coding references) of the respondents indicated that their supply chain activities are coordinated with coordinators being employed by the farmers. 25 % of the respondents, (4 coding references) indicated that coordination is done by the company that buys the product and supplies farmers with inputs (The Fertilizer Company and agro processing

companies). The remainder 25% of the respondents (4 coding references) highlighted that supply chain activities are coordinated by others, usually farmer associations in the industry (e.g. SASCO and MFA)

These results are supported by findings from semi-structured and unstructured interviews where agro processor interviewees were asked if they engage their suppliers. The 13 interviewees were asked to answer questions on supplier engagement and how they engage them. The responses are presented in the form of a word cloud frequency query. The bigger the word the more frequency it has, meaning that respondents were repeating the same word over and over. The results from the responses are presented in Figure 6.1

**Figure 6.1: Word Frequency Query Results on supplier engagement**



From Figure 6.1, it can be noted that the interviewees highlighted that their companies engage their suppliers. Supplier engagement helps organisations to get raw materials on time.

**Table 6. 15: Coding Reference Percentage for Supplier Engagement**

NVivo Node	Coding References	Coding Reference %
Contract	4	22.2
Engagement	9	50
No Engagement	5	27.8

Table 6.15 reiterates what is presented in the word frequency query as presented in Figure 6.1. From the table, 22.2% (4coding references) indicate that they engage suppliers through contract. These companies signed contracts with their suppliers to ensure timely delivery of raw materials.50% (9 coding references) of the respondents are of the view that they engage suppliers regularly, while 27.8% (% coding references) do not engage suppliers at all. These companies

operate in a transactional way by playing the market where they can buy their raw materials from any supplier offering the lowest possible price. From the presentation, it can be noted that the Zimbabwean agro processing organisations have adopted supply chain as a business strategy. The next section presents the Test done to explain the significance of the variables in describing the nature of supply chain coordination among Zimbabwean agro processing organisations.

### 6.5.1.2 One-Sample T-Test on Nature of Supply Chain Coordination

A One-Sample T-test ( $\alpha = 0.05$ ) with a Test Value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to identify the extent to which respondents agree with the statements describing the nature of supply chain coordination of the Zimbabwean agro processing industry.

- From the findings, any mean scores that are greater than the Test Value (4.0) indicate that the factor under consideration was significant in describing the nature of supply chain coordination in the Zimbabwean agro processing organisations.
- Any mean scores that are less than the Test Value (4.0) indicate that the factor under consideration was an insignificant factor on the nature of supply chain coordination.
- Mean values equal to the Test Value (4.0) indicate that the factor under consideration is neither significant nor insignificant as a factor describing the nature of supply chain coordination in Zimbabwe.

**Table 6.16 One-Sample T-Test on Nature of Supply Chain Coordination**

	Statement	N	Mean	Std Deviation	Std. Error Mean
<b>Nature 1</b>	Adoption of supply chain as a business strategy	59	5.97	0.850	0.111
<b>Nature 2</b>	We coordinate activities within the supply chain	59	5.81	0.973	0.127
<b>Nature 3</b>	Coordination activities within the supply chain are formalized	59	5.58	1.163	0.151
<b>CM 1</b>	Our supply chain relationship is transactional	59	4.51	1.968	0.256
<b>CM 2</b>	We use contracts to coordinate our supply chain	59	5.71	1.672	0.218
<b>CM 3</b>	We use price as a coordination mechanism	59	5.41	1.219	0.159
<b>CM 4</b>	We use quantity discounts as a coordination mechanism	59	4.54	1.430	0.186

<b>CM 5</b>	We use trust as a coordination mechanism	59	5.15	1.282	0.167
<b>CM 6</b>	We use bargaining power to coordinate the supply chain	59	5.17	1.262	0.164
<b>Coordination Types</b>					
<b>Coord 1</b>	Our supply chain is vertically coordinated	59	5.44	1.611	0.210
<b>Coord 2</b>	Our supply chain is vertically integrated	59	5.08	1.725	0.225
<b>Coord 3</b>	Our supply chain is horizontally coordinated	59	2.95	1.565	0.191
<b>Coord 4</b>	Our supply chain is horizontally integrated	59	2.90	1.470	0.204

The mean scores for 11 of the variables that describe the nature and coordination mechanisms used by Zimbabwean agro processing organisations were all significantly above the Test Value (4.0). They range from:

*Adoption of supply chain as a business strategy with M=5.97, Coordination activities within the supply chain are formalised with M=5.85, We coordinate activities within the supply chain (M=5.81). Our supply chain is vertically coordinated (M=5.44) and our supply chain is vertically integrated (M=5.08).*

In terms of coordination mechanisms used, all the variables were above the Test Value hence the following findings:

*We use contracts as a coordination mechanism with M=5.71, We use prices as a coordination mechanism (M=5.41), We use bargaining power to coordinate our supply chain (M=5.17), We use trust as a coordination mechanism (M=5.15), We use quantity discounts to coordinate our supply chain (M=4.54) and our supply chain is transactional (M=4.51).*

The results show that these factors were significant in describing the nature of supply chain coordination and coordination mechanisms used.

The mean scores of the other two variables describing the nature of supply chain coordination were as follows;

*Our supply chain is horizontally coordinated (M=2.95) and our supply chain is horizontally coordinated (M=2.90).*

These variables were below the Test Value (4.0), and this shows that they were not significant in describing the nature of supply chain coordination in the Zimbabwean agro processing organisations. This shows that these two variables that describe the nature of supply chain coordination are not even used by Zimbabwean agro processing organisations.

### 6.5.1.3 Coordination mechanisms used by Suppliers

The research sought to identify the coordination mechanisms used in the industry when coordinating activities with suppliers. Supplier respondents had different responses pertaining to mechanisms used when coordinating their supply chain activities. The results are presented in Table 6.17.

**Table 6.17: Coordination Mechanisms used by Suppliers**

Question Item	Item statement	N	Min	Max	Mean	Std Dev	Var	Skewness	Kurtosis
CM 1	We sell our products to anyone	20	1	7	5.25	2.381	5.671	-1.072	2.440
CM 2	We have contracts with our customers	20	1	7	4.95	2.259	5.102	-0.751	2.050
CM 3	We are more concerned about the price our customers offer	20	1	7	6.3	1.380	1.905	-3.021	12.131
CM 4	We offer discounts for bulk purchases	20	3	7	6.1	1.210	1.463	-1.66	4.971
CM 5	We trust each other	20	1	7	5.5	1.878	3.526	-1.346	3.904
CM 6	We have more power than our customers	20	1	7	4.25	2.023	4.092	-0.232	1.751
	<b>Average</b>				<b>5.392</b>	<b>1.855</b>	<b>3.627</b>	<b>-1.347</b>	<b>4.541</b>



The findings show that suppliers agree with the statement that price (M=6.3) is the major concern when coordinating supply chain activities with their customers. Respondents also agree with the statements describing the coordination mechanisms like trust and quantity discounts such as:

*We offer discounts for bulk purchases (M=6.1); We trust each other (M=5.5).*

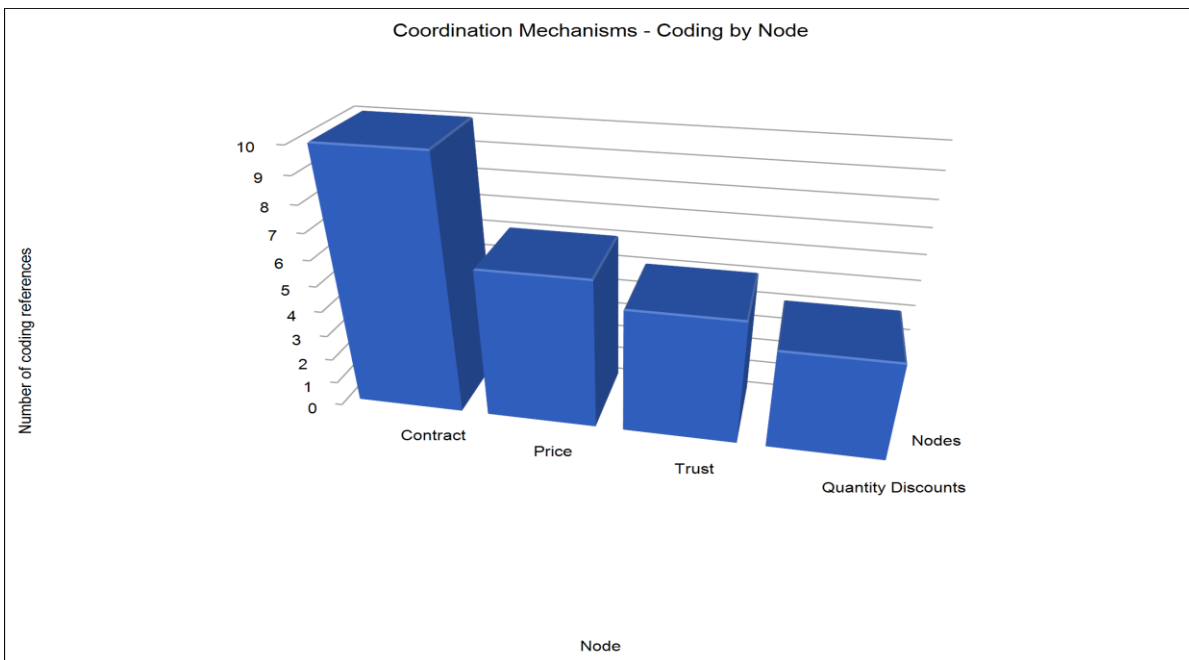
Respondents somewhat agreed on variables describing the transactional relationship, contracts as coordination mechanisms which were described by the following statements.

*We sell our products to anyone (M=5.25); We have contracts with customers (4.95)*

The findings show that the variables under consideration are significant in describing the coordination mechanisms used by suppliers of Zimbabwe agro processing organisations. However, respondents were not sure about using bargaining power as a coordination mechanism (M=4.25).

Results from semi-structured interviews also complement the results from the quantitative strand of the study on coordination mechanisms used by agro processing companies when coordinating their supply chains. The results are presented in Figure 6.2.

**Figure 6.2: Coordination Mechanisms**



The results presented in Figure 6.2 show that (10 coding references or 40% of respondent's) use contracts as coordination mechanisms as highlighted in the responses.

*We use price, contracts and quantity discounts as coordination mechanisms;*

*We sign a memorandum of understanding and agreements with the farmers;*

*Contract without growers (2000);*

*Contracts with farmers.*

The results also show that (6 coding references which are 24% of the respondents') use price as a coordination mechanism, while (5 coding references or 20% of the respondents') use trust to coordinate their supply chain as shown by the responses. The remainder (4 coding references constituting 16 % of the respondents') indicate that they use quantity discounts to coordinate their supply chain.

*We use price, as a coordination mechanism.*

*We use trust as a coordination mechanism*

*We use price, quality and quantity discounts as coordination mechanisms.*

The results show that Zimbabwean agro processing organisations use contracts as their main coordination mechanism to coordinate their supply chain, followed by price, trust and lastly quantity discounts.

#### **6.5.1.4 Descriptive Statistics of Suppliers**

Quantitative data from suppliers was analysed using descriptive statistics so as to gain a better understanding of the coordination of Zimbabwean agro processing organisations from the supplier side.

**Table 6.18: Descriptive Statistics for Suppliers**

<b>Variables</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Var</b>	<b>Skewness</b>	<b>Kurtosis</b>
Nature	20	1	7	4.6	1.85	3.466	-0.426	2.185
Coordination Mechanisms	20	1	7	5.392	1.855	3.627	-1.347	4.541
Trust	20	1	7	5.738	1.183	1.450	-0.635	2.758
Communication	20	1	7	4.687	1.779	3.281	-0.546	3.14
Commitment	20	1	7	5.52	1.500	2.383	-1.019	3.711
Information Sharing	20	1	7	5.68	1.237	1.563	-1.012	4.235
Collaboration	20	1	7	4.642	1.945	3.858	-0.683	2.671

Transaction Specific Investments	20	1	7	5.067	1.998	4.044	-1.024	3.082
Technology	20	1	7	5.107	1.781	3.255	-0.692	2.605
Challenges	20	1	7	4.535	2.012	4.094	-0.505	2.128
Organisational Performance	20	1	7	5.76	2.352	13.350	-1.015	6.344

Table 6.18 presents a summary of the descriptive statistics of the agro suppliers in Zimbabwe. The responses were from 20 suppliers who were willing to participate in the study. From the results presented, univariate non-normality is shown through organisational performance with a kurtosis score of 6.344, Information sharing (4.235), nature (3.841), commitment (3.711) and communication (3.14), whose kurtosis scores exceed the maximum level of normality range ( $\leq 3$ ). This may have an effect on the overall findings of the study. All the other variables, (collaboration, transaction specific investments, technology and challenges) fall within the normally acceptable kurtosis score. The results also show that respondents agreed with the statements that were used to describe antecedents of coordination in the sector. The factors /antecedents had the following mean scores:

*Trust (M=5.738); Information sharing (M=5.68); and Commitment (M=5.52).*

Respondents somewhat agreed with the statements that were used to describe all the remaining antecedents of coordination such as:

*Coordination mechanisms (M=5.392); Nature of coordination (M=4.6); Communication (M=4.687); Collaboration (M=4.642); Transaction specific investments (M=5.067).*

The results indicate that all the variables are significant in explaining the coordination of activities between the agro processing companies and their suppliers to enable a responsive and efficient supply chain.

In terms of technology adoption and usage, respondents somewhat agreed with the statement under consideration (M=5.107), and challenges (4.535). On the consequences of coordinating their supply chain, the respondents agreed that coordination has led to improvements in organisation performance (M=5.76). The results also indicate that the variables used by Zimbabwean agro processing organisations benefit both parties in the relationship.

## 6.6. Antecedents of Supply Chain Coordination

This section presents antecedents of supply chain coordination which are communication, information sharing, trust, commitment, collaboration, transaction specific investments and supplier capabilities. Table 6.19 presents the antecedents of coordination among Zimbabwean agro processing organisations.

**Table 6.19: Antecedents of Supply Chain Coordination**

Question Item	Item statement	N	Min	Max	Mean	Std Dev	Variance	Skewness	Kurtosis
<b>Trust 1</b>	The coordinator is reliable	59	3	7	5.24	1.023	1.046	-0.390	3.174
<b>Trust 2</b>	Supplier is trustworthy	59		7	5.49	0.954	0.909	-0.396	2.587
<b>Trust 3</b>	Our relationship with main supplier is satisfactory	59	3	7	5.59	0.873	0.763	-0.367	3.184
<b>Trust 4</b>	Our supplier performance is satisfactory	59	3	7	5.56	0.952	0.901	-0.232	2.657
<b>Trust 5</b>	Our supplier always keeps promises	59	3	7	5.53	1.056	1.116	-0.820	3.242
<b>Trust 6</b>	We have confidence in our suppliers	59	3	7	5.53	0.953	0.909	-0.615	3.686
<b>Trust 7</b>	We mutually understand each other	59	1	7	4.90	1.337	1.886	-0.702	3.257
	<b>Average</b>				<b>5.40</b>	<b>1.021</b>	<b>1.076</b>	<b>-0.503</b>	<b>3.11</b>
<b>Commit 1</b>	Supplier willingness to share information	59	2	7	5.51	1.040	1.082	-0.857	4.399
<b>Commit 2</b>	Suppliers willingness to be included in planning and goal-setting activities	59	1	7	4.76	1.478	2.814	-0.781	3.123
<b>Commit 3</b>	Supplier willingness to adopt new technology	59		7	4.92	1.500	2.251	-0.534	2.721
<b>Commit 4</b>	Suppliers willingness to be involved in	59	1	7	4.58	1.642	2.697	-0.313	2.184

	innovation and new product development processes								
<b>Commit 5</b>	Supplier willingness to deliver on time	59	1	7	5.66	1.290	1.665	-1.517	6.451
<b>Commit 6</b>	Our suppliers are responsive to our needs	59	1	7	5.78	0.811	0.658	0.027	2.211
<b>Commit 7</b>	We are both committed to product improvements for the benefit of the relationship	59	1	7	5.12	1.340	1.796	-1.085	4.695
<b>Commit 8</b>	We have a long term relationship with our suppliers	59	2	7	5.64	1.171	1.371	-0.839	3.465
	<b>Average</b>				<b>5.206</b>	<b>1.312</b>	<b>1.792</b>	<b>-0.737</b>	<b>3.656</b>
<b>Comm 1</b>	We contact our suppliers for coordination purposes	59	1	7	3.63	1.751	3.627	0.175	1.764
<b>Comm 2</b>	We visit our suppliers premises	59	2	7	5.17	1.428	2.040	-0.874	2.862
<b>Comm 3</b>	We have meetings with our suppliers	59	2	7	4.69	1.207	1.457	-0.287	2.337
<b>Comm 4</b>	We call our suppliers	59	1	7	3.17	1.811	3.281	0.219	1.780
<b>Comm 5</b>	We communicate face to face with our suppliers	59	1	7	3.90	1.550	2.403	0.171	2.120
<b>Comm 6</b>	We use written communication with our suppliers	59	1	7	3.58	2.230	4.972	0.355	1.709
<b>Comm 7</b>	We communicate with our suppliers through skype	59	1	7	6.05	1.861	3.463	-1.920	5.310
<b>Comm 8</b>	Changes on the buyers' side are communicated with the suppliers in advance	59	1	7	4.97	1.438	2.068	-0.888	3.505
<b>Comm 9</b>	Suppliers inform the buyer about	59	2	7	5.03	1.389	1.930	-0.489	2.663

	issues that affect the business								
	<b>Average</b>				<b>4.57</b>	<b>1.629</b>	<b>2.805</b>	<b>-0.393</b>	<b>2.672</b>
<b>Info 1</b>	We share information on price changes with suppliers	59	4	7	5.73	0.887	0.787	-0.042	2.143
<b>Info 2</b>	We share information on inventory data with suppliers	59	3	7	5.19	1.137	1.292	-0.015	2.040
<b>Info 3</b>	We share on demand data with suppliers	59	2	7	5.19	1.106	1.223	0.012	2.783
<b>Info 4</b>	We share information about trends in the market with our suppliers	59	1	7	5.20	1.166	1.337	-0.808	4.699
<b>Info 5</b>	We share operational data with suppliers	59	1	7	4.17	1.404	1.971	0.148	2.745
<b>Info 6</b>	We share product quality data with suppliers	59	2	7	5.81	1.008	1.016	-1.046	4.935
<b>Info 7</b>	Suppliers share business knowledge about core processes with the company	59	1	7	4.25	1.549	2.40	-0.319	2.455
	<b>Average</b>				<b>5.077</b>	<b>1.180</b>	<b>1.432</b>	<b>-0.296</b>	<b>3.114</b>
<b>Col 1</b>	We plan production schedules with our suppliers	59	1	7	4.22	1.801	3.244	-0.405	2.227
<b>Col 2</b>	We collaborate with our suppliers in new product development	59	1	7	4.25	1.825	3.331	-0.450	2.039
<b>Col 3</b>	We engage in collaborative forecasting and replenishment with suppliers	59	1	7	4.92	1.549	2.389	-0.988	3.730
<b>Col 4</b>	We collaborate with our suppliers in research and development of new products	59	1	7	4.15	1.720	2.960	-0.402	2.077

<b>Col 5</b>	We share rewards and risks with our suppliers	59	1	7	4.31	1.477	2.181	-0.060	2.938
<b>Col 6</b>	We engage in joint decision making with our suppliers when required	59	1	7	4.29	1.661	2.760	-0.557	2.463
	<b>Average</b>				<b>4.356</b>	<b>1.672</b>	<b>2.811</b>	<b>-0.477</b>	<b>2.579</b>
<b>TSI 1</b>	The company assists its suppliers to improve their product quality	59	2	7	5.66	1.321	1.745	-1.122	3.684
<b>TSI 2</b>	The company has continuous improvement programs that include its key suppliers	59	1	7	5.39	1.352	1.371	-0.839	3.465
<b>TSI 3</b>	We have engaged in joint investments with our suppliers	59	1	7	4.17	2.027	4.109	-0.170	1.623
	<b>Average</b>				<b>5.073</b>	<b>1.567</b>	<b>2.408</b>	<b>-0.710</b>	<b>2.924</b>
<b>SC1</b>	Supplier is efficient	59	4	7	5.56	0.898	0.802	-0.180	2.301
<b>SC2</b>	Supplier is effective	59	3	7	5.54	0.916	0.839	-0.466	2.884
<b>SC3</b>	Our suppliers deliver on time	59	3	7	5.51	0.838	0.703	0.062	3.291
<b>SC4</b>	Our supplier is consistent on quality	59	1	7	5.76	1.006	1.012	-1.768	9.730
<b>SC5</b>	Our suppliers fulfill orders with accuracy	59	4	7	5.68	0.840	0.705	-0.398	2.665
	<b>Average</b>				<b>5.61</b>	<b>0.899</b>	<b>0.812</b>	<b>-0.55</b>	<b>4.174</b>
<b>EF1</b>	Understanding customer requirements	59	1	7	3.42	1.404	1.973	-0.445	1.893
<b>EF2</b>	Analysing supply chain performance	59	1	7	2.98	1.444	2.086	-0.040	1.646
<b>EF3</b>	Forecasting demand and supply accurately	59	2	7	3.95	0.936	0.877	-0.408	2.152
<b>EF4</b>	Matching demand and supply effectively	59	3	7	4.29	0.744	0.553	-0.514	1.982

<b>EF5</b>	Managing market changes	59	1	7	4.03	0.999	1.305	-0.715	2.760
<b>EF6</b>	Making constant improvements in performance	59	1	7	3.73	1.142	0.999	-0.904	3.246
	<b>Average</b>				<b>3.733</b>	<b>1.112</b>	<b>1.299</b>	<b>-0.504</b>	<b>2.280</b>

Results from Table 6.19 show factors of supply chain coordination that have an impact on the coordination of Zimbabwean agro processing companies' supply chain. The findings show that the respondents agree with the statement on supplier capability (M=5.61) which highest mean agreement score and it shows that it has an effect on coordination of Zimbabwean agro processing organisations' supply chain. Supplier capability is measured by five (5) items which include supplier efficiency, effectiveness, on time, deliveries on time, quality consistency and accuracy in order fulfilment.

Respondents also agreed, but to a lesser extent that variables such as trust (M=5.4), which is measured by factors such as coordinator reliability, trustworthy supplier, satisfaction with the relationship and supplier performance. Other factors that assist in building trust among supply chain members as highlighted also include fulfilment of promises by the supplier, supplier confidence and mutual understanding among the players.

When asked about commitment (M=5.206) to the relationship, respondents somewhat agreed that it affects the coordination of the supply chain. The commitment was measured by 8 items where respondents agreed with some of the statements that described commitment. Supplier responsiveness had the highest mean agreement score (M=5.78), followed by willingness to deliver on time, long term relationship and willingness to share information respectively. The other items that were used to measure commitment were supplier willingness to be included in planning and goal- setting activities, willingness to adopt new technology, willingness to be involved in innovation and new product development processes and committed to product improvements for the benefit of the relationship

On the variable communication respondents also somewhat agreed with the mean agreement score (M=4.5). Communication was measured by 9 items which included contacting suppliers for coordination purposes, frequency of communication and methods of communication. Methods of communication highlighted by respondents include calling suppliers, visiting supplier premises, writing to suppliers and calling and using skype. The respondents also agreed that changes on the



supplier side are communicated in advance. Information sharing (M=5.077) and transaction specific investments (M=5.073) also have mean agreement scores where respondents somewhat agreed with the statements that were used to measure these variables. On the other hand, respondents were neutral or not sure about the effect of collaboration (M=4.356) and environmental factors (M=3.733) on the coordination of the Zimbabwean agro companies' supply chain.

### 6.6.1. One-Sample T-Test on Antecedents of Supply Chain Coordination

Table 6.20 presents the findings on the antecedents of supply chain coordination in the Zimbabwean agro processing industry. A One-Sample T-test ( $\alpha = 0.05$ ) with a Test Value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to identify the extent to which respondents agree with the statements describing factors affecting supply chain coordination of Zimbabwean agro processing organisations.

- From the findings, any mean scores that are greater than the Test Value (4.0) indicate that the factor under consideration was a significant antecedent supply chain coordination.
- Any mean scores that are less than the Test Value (4.0) indicate that the factor under consideration was an insignificant antecedent of supply chain coordination.
- Mean values equal to the Test Value (4.0) indicate that the factor under consideration is neither significant nor insignificant as an antecedent of supply chain coordination.
- The standard deviation shows the mathematical dispersion of the data set relative to the mean. The low standard deviation scores show some convergence in the respondent's view on the brand status statement under consideration. The high standard deviation and variance scores show that the respondents' views on the brand status statement under consideration vary significantly.

**Table 6.20: One-Sample T-Test on Antecedents of supply chain coordination**

Antecedent	Statement	N	Mean	Std Dev	Std. Error Mean
Trust 1	The coordinator is reliable	59	5.24	1.023	0.133
Trust 2	Supplier is trustworthy	59	5.49	0.954	
Trust 3	Our relationship with main supplier is satisfactory	59	5.59	0.873	0.124
Trust 4	Our supplier performance is satisfactory	59	5.56	0.952	0.114

Trust 5	Our supplier always keeps promises	59	5.53	1.056	0.124
Trust 6	We have confidence in our suppliers	59	5.53	0.953	0.138
Trust 7	We mutually understand each other	59	4.90	1.337	0.179
Commit 1	Supplier willingness to share information	59	5.51	1.040	0.135
Commit 2	Suppliers willingness to be included in planning and goal- setting activities	59	4.76	1.478	0.192
Commit 3	Supplier willingness to adopt new technology	59	4.92	1.500	0.195
Commit 4	Suppliers willingness to be involved in innovation and new product development processes	59	4.58	1.642	0.214
Commit 5	Supplier willingness to deliver on time	59	5.66	1.290	0.168
Commit 6	Our suppliers are responsive to our needs	59	5.78	0.811	0.106
Commit 7	We are both committed to product improvements for the benefit of the relationship	59	5.12	1.340	0.174
Commit 8	We have a long term relationship with our suppliers	59	5.64	1.171	0.152
Comm 1	We contact our suppliers for coordination purposes	59	3.63	1.751	0.228
Comm 2	We visit our suppliers premises	59	5.17	1.428	0.186

Comm 3	We have meetings with our suppliers	59	4.69	1.207	0.157
Comm 4	We call our suppliers	59	3.17	1.811	0.236
Comm 5	We communicate face to face with our suppliers	59	3.90	1.550	0.202
Comm 6	We use written communication with our suppliers	59	3.58	2.230	0.290
Comm 7	We communicate with our suppliers through skype	59	6.05	1.861	0.242
Comm 8	Changes on the buyer's side are communicated with the suppliers in advance	59	4.97	1.438	0.187
Comm 9	Suppliers inform the buyer about issues that affect the business	59	5.03	1.389	0.181
Info 1	We share information on price changes with suppliers	59	5.73	0.887	0.116
Info 2	We share information on inventory data with suppliers	59	5.19	1.137	0.148
Info 3	We share on demand data with suppliers	59	5.19	1.106	0.144
Info 4	We share information about trends in the market with our suppliers	59	5.20	1.166	0.151
Info 5	We share operational data with suppliers	59	4.17	1.404	0.183
Info 6	We share product quality data with suppliers	59	5.81	1.008	0.131
Info 7	Suppliers share business knowledge about core processes with the company	59	4.25	1.549	0.202
Col 1	We plan production schedules with our suppliers	59	4.22	1.801	0.234
Col 2	We collaborate with our suppliers in new product development	59	4.25	1.825	0.238

Col 3	We engage in collaborative forecasting and replenishment with suppliers	59	4.92	1.549	0.201
Col 4	We collaborate with our suppliers in the research and development of new products	59	4.15	1.720	0.224
Col 5	We share rewards and risks with our suppliers	59	4.31	1.477	0.192
Col 6	We engage in joint decision making with our suppliers when required	59	4.29	1.661	0.216
TSI 1	The company assists its suppliers to improve their product quality	59	5.66	1.321	0.172
TSI 2	The company has continuous improvement programs that include its key suppliers	59	5.39	1.352	0.176
TSI 3	We have engaged in joint investments with our suppliers	59	4.17	2.027	0.264
SC1	Supplier is efficient	59	5.56	0.898	0.117
SC2	Supplier is effective	59	5.54	0.916	0.119
SC3	Our suppliers deliver on time	59	5.51	0.838	0.109
SC4	Our supplier is consistent on quality	59	5.76	1.006	0.131
SC5	Our suppliers fulfill orders with accuracy	59	5.68	0.840	0.109
EF1	Understanding customer requirements	59	3.42	1.404	0.183
EF2	Analysing supply chain performance	59	2.98	1.444	0.188
EF3	Forecasting demand and supply accurately	59	3.95	0.936	0.122
EF4	Matching demand and supply effectively	59	4.29	0.744	0.097

EF5	Managing market changes	59	4.03	0.999	0.149
EF6	Making constant improvements in performance	59	3.73	1.142	0.130

From Table 6.20, six out of the eight variables used to describe the antecedents of supply chain coordination have ratings above the Test Value (4.0). The variable measurements for trust, commitment, information sharing, collaboration, supplier capabilities and transaction specific investments were all significantly above the Test Value (4.0). The results show that these factors were significant in describing the antecedents of supply chain coordination among Zimbabwean agro processing organisations.

The mean scores of the other antecedents of supply chain coordination not discussed above were as follows;

Communication:

*We contact our suppliers for coordination purposes (M=3.63)*

*We call our suppliers (M=3.17).*

*We communicate face to face with our suppliers(M=3.90)*

*We use written communication with our suppliers (M=3.58)*

Environmental Factors/Uncertainty:

*Understanding customer requirements (M=3.42)*

*Analysing supply chain performance (M=2.98)*

*Forecasting demand and supply accurately (M=3.95)*

*Making constand improvemts in performance (M=3.73)*

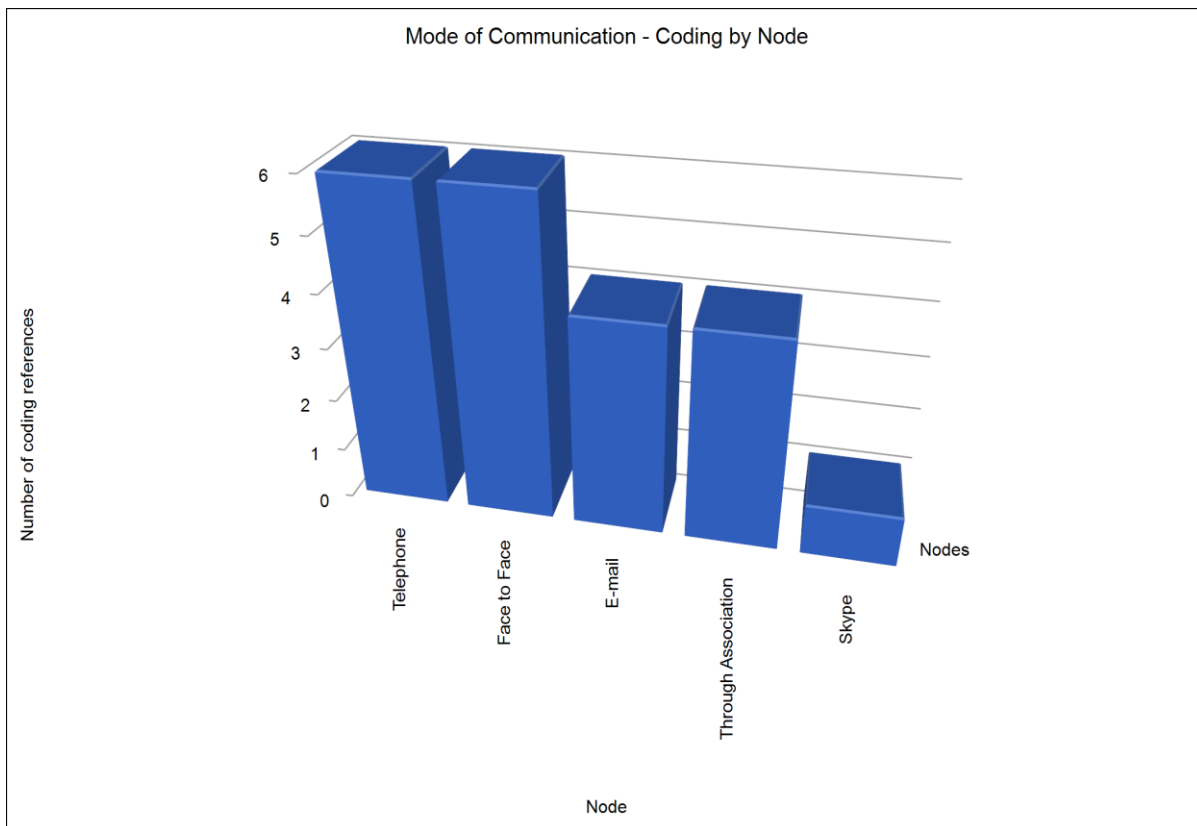
These variables were below the Test Value (4.0), and this shows that they were not significant as antecedents of supply chain coordination among Zimbabwean agro processing organisations. This shows that these two antecedents of supply chain coordination are not regularly used by Zimbabwean agro processing organisations.

#### **a) Communication**

On the variable communication respondents also somewhat agreed with the mean agreement score (M=4.5). Communication was measured by 9 items which included contacting suppliers for

coordination purposes, frequency of communication and methods of communication. Methods of communication highlighted by respondents include calling suppliers, visiting supplier premises, writing to suppliers and calling and using skype. The respondents also agreed that changes on the supplier side are communicated in advance. From the One-Sample T-Test results, the variables with a score above the Test Value (4.0) were: We visit our supplier premises (5.17); We have meetings with our suppliers (4.69) and We communicate through skype show the communication channels used but have no significant impact on supply chain coordination. All the other variables used to measure communication are below the Test Value. These results are corroborated by results from suppliers whose mean score for the factor Communication (M=4.687). These results are corroborated by results from suppliers where interviewees indicated some of the communication channels used by Zimbabwean agro processing organisations when communicating with their suppliers and customers. The results on communication were also corroborated by results from suppliers/farmers where interviewees were asked how they communicate with their suppliers. The responses were analysed using NVivo 11 and the results are presented in Figure 6.3.

**Figure 6.3: Mode of Communication**



The most popular modes of communication used by suppliers of Zimbabwean agro processing organisations are telephone and face to face communication (6 coding references each). Suppliers

also use email (4 coding references) to communicate with their customers, especially international customers. Suppliers with industry representation in the form of associations (4 coding references) communicate with their customers through their associations. The least channel of communication used by suppliers is skype (1 coding reference) which is used to communicate with international customers.

Some of the responses from interviewees were:

*We communicate through our association -Hippo valley Sugar Farmers Association of Zimbabwe (HSFZ)*

*Through phone calls and sometimes face to face communication*

*Through the association. Group chairpersons who are coordinators.*

*We communicate through telephone, email and skype with the agent*

On the frequency of communication between suppliers and customers in the Zimbabwean agro processing industry, the responses from interviewees are presented in Figure 6.4.

**Figure 6.4: Word Frequency Query Results on Frequency of Communication**



The word cloud depicting the frequency of communication shows that suppliers and customers of Zimbabwean agro processing organisations communicate with each other on a weekly basis, followed by the interviewees who indicated that they communicate regularly. The other group of interviewees indicated that they communicate daily.

The results show that suppliers and agro-processors in the Zimbabwean agro processing sector use different communication channels when communicating with their customer but these communication channels do not show the impact on coordination activities of the supply chain.

**b) Trust**

Respondents also agreed, but to a lesser extent that variables such as trust (M=5.4), which is measured by factors such as coordinator reliability, trustworthy supplier, satisfaction with the relationship and supplier performance. Other factors that assist in building trust among supply chain members as highlighted also include fulfilment of promises by supplier, supplier confidence and mutual understanding among the players. The variables used to measure trust were also measured using the One-Sample T-Test to assess the significance of trust in supply chain coordination. All the variables for this factor were above the Test Value (4.0) showing the significant effect of trust on supply chain coordination. Some of the results of the Test were: Supplier is trustworthy (M=5.49); Our supplier keeps promises (5.53) and Our coordinator is reliable (5.24). Results from the suppliers are in tandem with the results from agro processors where the mean score was also above the Test Value (4.0) with Trust (M=5.738. The results from the quantitative strand of the study were corroborated by agro processing companies’ interviewees whose responses to questions relating to trust were then analysed by creating nodes in NVivo 11 as presented in Table 6.21.

**Table 6.21: Coding Reference Percentage on Trust**

NVivo Node	Coding References	Coding Reference %
Trustworthy	12	85.7
Not Trustworthy	2	14.3

Of the interviewees that completed the semi-structured interviews, 85.7% of the responses (12 coding references) indicated that their suppliers are trustworthy. Those who indicated that their suppliers are not trustworthy constitute 14.3% (2 coding references). Some of the responses that came out of the in-depth interviews with the respondents were:

*Our supply chain partners are trustworthy*



*They are trustworthy and National railways of Zimbabwe (NRZ) being the key partner at times delays with products and raw materials*

*They are trustworthy to the extent of advance payments*

*They are trustworthy since they rely on the company for business*

*Not all are trustworthy*

To get an in-depth understanding of the level of trust in the sector, supplier interviewees were also asked if they trust their customers. The interviewees' responses were then analysed by creating nodes in NVivo 11 as presented in Table 6.22.

**Table 6.22: Coding Reference Percentage on Customer Trustworthy**

<b>NVivo Node</b>	<b>Coding References</b>	<b>Coding Reference %</b>
Trustworthy	12	75
Not Trustworthy	4	25

The results presented in Table 6.22 show that 75% (12 coding references) of the interviews indicated that their customers are trustworthy, while 25 % (4 coding references) indicated that their suppliers are not trustworthy. Some of the responses from the interviewees were:

*The customer is trustworthy although they manipulate farmers and charge milling charges while paying low prices. There is no transparency in the pricing and charging system. Everything is dictated by the company.*

*Very trustworthy because of the relationship*

*Some of our customers are trustworthy while some are not.*

The results from the supplier side show that agro processing companies in Zimbabwe are trustworthy although respondents were not happy with the practices of some companies they supply with raw materials. On the other hand, the results from agro processing companies show that the majority of the interviewees acknowledge that their suppliers are trustworthy and this has led to timely delivery of raw materials thereby ensuring continuous production. Generally the results show that supply chain players and Zimbabwean agro processing organisations trust each other.

On supplier reliability, in-depth interviews were used to assess the reliability of agro processing companies in honouring their promises to suppliers. The interviewees' responses to questions

relating to customer reliability were then analysed by creating nodes in NVivo 11. The results show that the majority of interviewees (10 coding references) indicated that agro processing companies are reliable in their dealings with suppliers, results are corroborated by the suppliers with (14 coding references representing) 70% of the respondents from the interviewees indicating that their suppliers are reliable. The remaining suppliers (farmer) respondents (2 coding references) indicated that their customers are not reliable in line with the remaining (6 coding references representing 20%) of the agro processor respondents who indicated that their suppliers are not reliable. Some of the responses that came out of the interviews with suppliers (farmers) were:

*Fertilizer Company is reliable whereas seed availability depends with the season. There is sometimes a shortage of seed since most farmers would be focusing on milling*

*Payment is done on agreed time that is 30 days after delivery.*

*Harvesters' and transporters are not reliable*

*Some suppliers are very reliable but chemical suppliers at times supply fake chemicals so its difficult to rely on them.*

*They are very reliable and focus on quality*

On the other hand, some of the responses from agro processing companies were:

*Our suppliers are very reliable since they depend on the company. Both local and South African suppliers;*

*Our suppliers are very reliable since they depend on the company although we do not use other farmers for specified purposes;*

*Our suppliers are very reliable especially premix suppliers but maize suppliers tend to change with time;*

*Our key suppliers are very reliable but others engage in side marketing;*

*Major suppliers are reliable but contract workers and transporters are not.*

The results show that although some interviewees indicated that customers are not reliable, the majority indicated that agro processing companies are reliable and fulfill their promises on time. This shows that Zimbabwean agro processing companies are reliable. The results also show that the majority of suppliers of Zimbabwean agro processing organisations are reliable and deliver raw materials and products on time.

**Table 6.23: Coding Reference Percentage on Product and Quality Specifications**

NVivo Node	Coding References	Coding Reference %
Specifications Met	13	86.7
Specifications Not Met	2	13.3

Table 6.23 shows that 86.7% (13 coding references) indicated that suppliers meet their product and quality specifications, while 13.3% (2 coding references) indicated that suppliers do not meet product and quality specifications. Through probing, some of the interview responses that came out were:

*Suppliers meet product and quality specifications due to assistance from extension services*

*Suppliers meet product and quality specifications. The quality department certifies incoming products. Non-compliant products are rejected.*

*Product and quality specifications are accurately met*

The responses indicate that suppliers of Zimbabwean agro processing companies meet product and quality specifications of their customers. This is due to the fact that the majority of suppliers have contracts with the agro processing companies and there is vertical integration within the industry.

### **c) Commitment**

When asked about commitment (M=5.206) to the relationship, respondents somewhat agreed that it affects coordination of the supply chain. Commitment was measured by 8 items where respondents agreed with some of the statements that described commitment. Supplier responsiveness had the highest mean agreement score (M=5.78), followed by willingness to deliver on time, long term relationship and willingness to share information respectively. The other items that were used to measure commitment were supplier willingness to be included in planning and goal- setting activities, willingness to adopt new technology, willingness to be involved in innovation and new product development processes and committed to product improvements for the benefit of the relationship. The results from the One-Sample T-Test show that all the variables used to measure commitment were above the Test Value (4.0), showing that the factor is significant in the coordination of the Zimbabwean agro processing companies' supply chain. Results from

suppliers corroborate these results where the mean average score for the factor commitment (5.52) is above the Test Value (4.0).

Results from data collected through the use of semi structured interview complements the quantitative results on commitment. The results show that the Zimbabwean agro processing companies are committed to the relationship they have with their suppliers. The results of the findings are presented in Figure 6.5.

**Figure 6.5: Relationship Commitment**

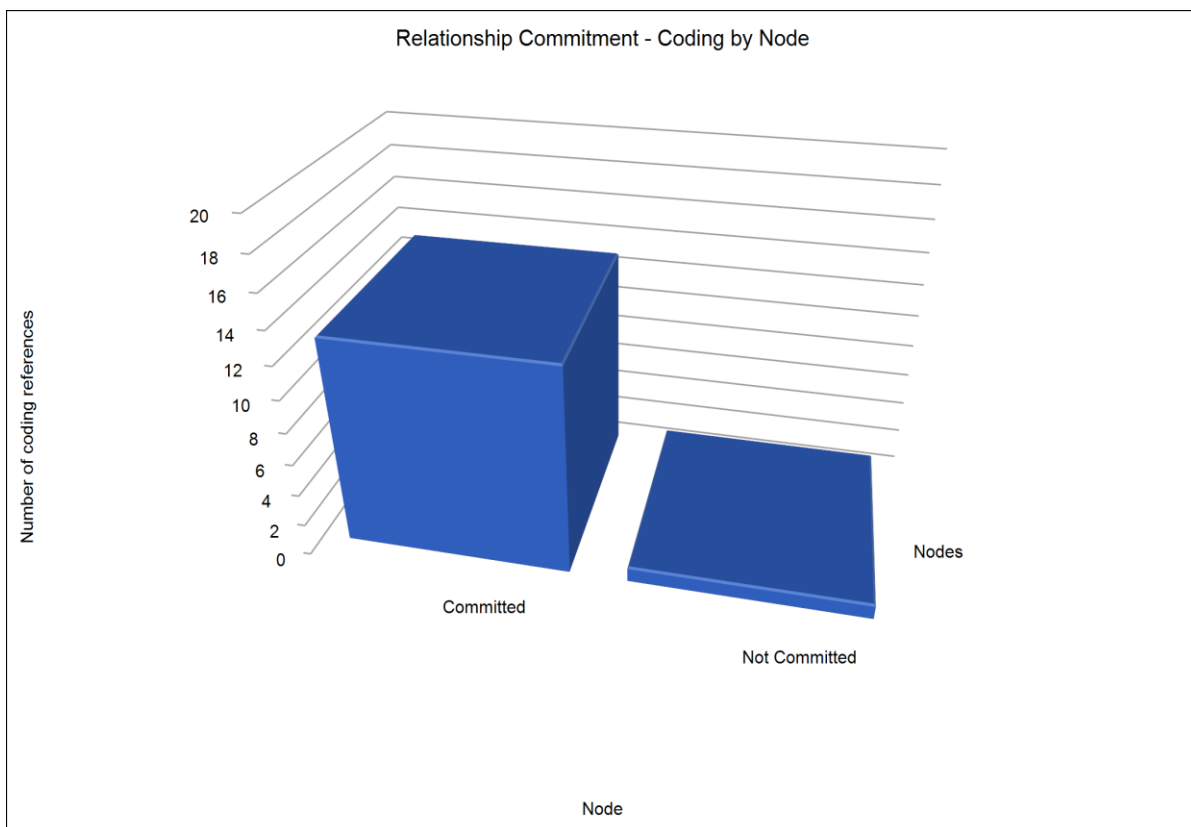


Figure 6.5 shows that 92.3% of the respondents (12 coding references representing) indicated that they are committed to the relationships with suppliers. Some of the responses received were:

*Company is very committed since it relies on farmers to maximise economies of scale (300 tonnes of sugar needed);*

*We are committed to the relationship since it is beneficial to both parties;*

*We are committed because we have invested in the farmers*

The last group of 7.7 % of respondents (1 coding reference representing) indicated that the company is not committed to the relationships with their suppliers. Such companies are the ones

that engage in transactional relationships where they do not value the importance of relationships in business. The response for non-commitment was:

*With the part time workers there is no commitment*

Results from supplier interviews also indicate that Zimbabwean agro processing organisations are committed to the relationship with their suppliers thereby corroborating the results from the agro processing companies. The supplier interviewees' responses on relationship commitment were then analysed by running a word frequency query in NVivo 11 and the results are presented in Figure 6.6

**Figure 6.6: Word Frequency Query Results on Relationship Commitment**



The results presented in the word frequency show that suppliers of Zimbabwean agro processing organisations are committed to the relationship they have with their suppliers who are the agro processing companies. Some of the responses that came out of the interviews were:

*The customer is committed since they buy all the sugar cane produced.*

*They are committed because the relationship benefits both of us*

*The research station is committed because it benefits from the company.*

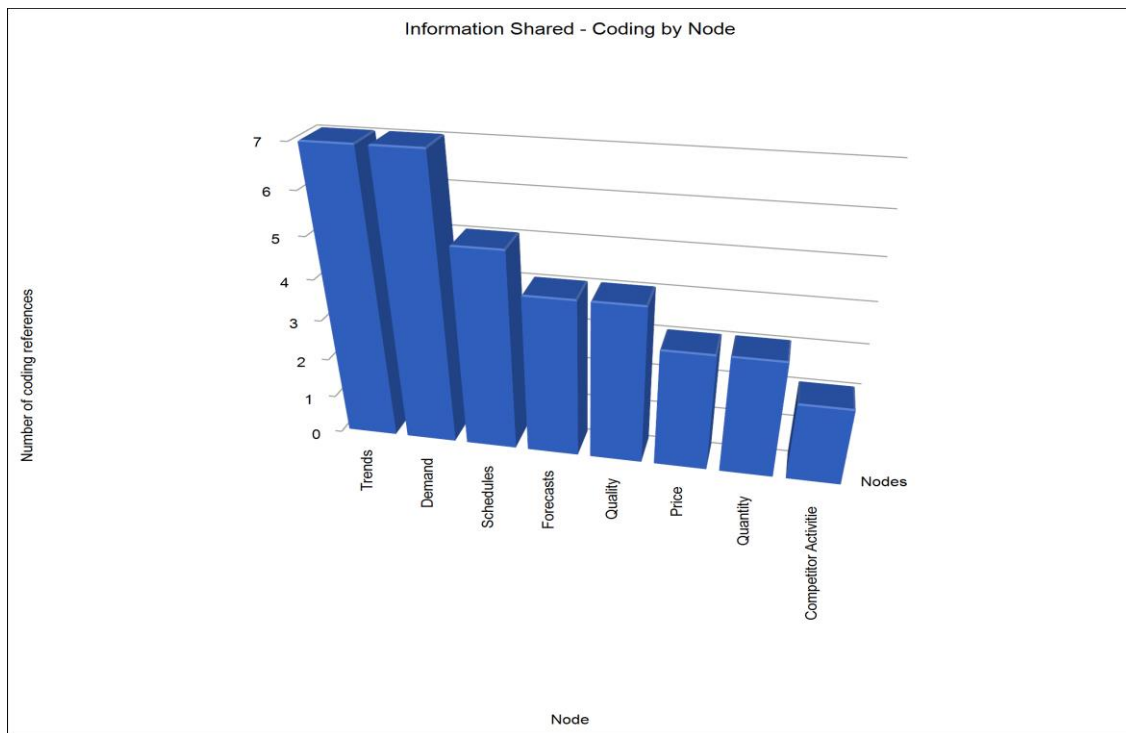
The results show that both suppliers and agro processing companies are committed to the relationship since they depend on each other for business.

#### **d) Information Sharing**

Information sharing (M=5.077) also has mean agreement scores where respondents somewhat agreed with the statements that were used to measure these variables. The results of the One-

Sample T-Test on information sharing show that all the variables used to measure this factor are above the Test Value (4.0) and some of the results were: We share product quality data with suppliers (5.81); We share information on price changes with suppliers ( 5.73) and We share information about trends in the market (5.20). From supplier respondents, results show that information sharing had an average mean score (M=5.68) which is above the T-Test Value (4.0) indicating that this factor is significant in coordinating the supply chain of Zimbabwean agro processing organisations. These results are complemented by results from in-depth interviews used to collect the qualitative data from agro processing companies. The interviewees’ responses to questions relating to information shared were then analysed by creating nodes in NVivo 11, as presented in Figure 6.7

**Figure 6.7: Information Shared**



From the responses, 20% of the Zimbabwean agro processing companies share information about trends in the market and demand data (7 coding references representing each) respectively. The results also show that the interviewees indicated that they share information on production and training schedules (5 coding references) representing 14.3%, while forecasts, that is demand and sales forecasts with their suppliers had (4 coding references). Agro processing companies in Zimbabwe share quality data (4 coding references) representing 11.4% each, with their suppliers

so that they get feedback and adjust where there is need for improvements in product quality. Other areas where information is shared include price and quantity required at any given time (3 coding references, 8.6% each). Competitor information has the least number of coding reference (2 coding references which are 5.7%).

Some of the interviewee responses to information shared include:

*We share information on quantities to be supplied, due dates and quality of the products*

*We share technical information, demand fluctuations, trends in the market, and farming information*

*We share information on price, demand fluctuations, trends in the market, competitor activities and forecasts*

*We share information on price, demand fluctuations, trends in the market, competitor activities and forecasts.*

*We share information about the health and problems affecting the animals which could affect the quality of meat and skins*

*Production quotas, quantities and demand information*

*We share information with our suppliers on the price since the premix is imported*

The results show that Zimbabwean agro processing organisations share information with their suppliers, which facilitates the smooth running of the business. The results show that information sharing among Zimbabwean agro processing organisations is a significant factor in coordinating their supply chains.

#### **e) Collaboration**

The researcher sought to assess the level of collaboration between suppliers and agro processing companies in Zimbabwe. On the other hand, respondents were neutral or not sure about the effect of collaboration ( $M=4.356$ ) on the coordination of the supply chain activities among Zimbabwean agro processing companies. Results from the One-Sample T-Test also show that the variables used to measure collaboration are slightly above and closer to the Test Value (4.0) indicating that respondents were not sure about the effect of collaboration on supply chain coordination. Suppliers results on collaboration have an average mean score ( $M=4.642$ ) above the T-Test Value(4.0) but has no significance on coordination of supply chain activities of Zimbabwean agro processing organisations. This shows that the variable collaboration has no significant impact on coordination

Zimbabwean agro processing organisations supply chains. The study also sought to find out areas in which these partners have collaborated in. results from the interview are presented in Figure 6.8

**Figure 6.8: Word Frequency Query Results on Collaboration**



Results from Figure 6.8 show that Zimbabwean agro processing companies collaborate with suppliers in various areas. From the word frequency query, collaboration has been in new product varieties, product development and forecasting. The interviewees’ responses to questions relating to collaboration were then analysed by creating nodes in NVivo 11 as presented in Table 6.24.

**Table 6.24: Coding Reference Percentage on Collaboration**

NVivo Node	Coding References	Coding Reference %
Collaboration	10	76.9
No Collaboration	3	23.1

Table 6.24 presents coding reference percentages on collaboration on supply chain activities of Zimbabwean agro processing organisations. From the results, 76.9% (10 coding references) of the respondents have collaborated and are still collaborating with their suppliers.

The remaining 23.1 % indicated that there is no collaboration with their suppliers. In-depth interviews on areas of collaboration produced some of these responses:

*We have collaborated with the Forestry school to come up with new product varieties*

*We have collaborated in new product development, for PET bottles to ensure quality*

*We collaborate with suppliers in research and new product development of seed varieties*



*We work with the school of Forestry*

*We have never collaborated with suppliers and customers due to the nature of the product.*

The results show that most of the respondents collaborate with their suppliers in different areas for the benefit of the business.

The study also sought to assess the level of integration for collaborative purposes and the results from in-depth interviews show that Zimbabwean agro processing companies' processes are integrated with their suppliers. In-depth interviewee responses indicate areas where processes integration takes place. Some of the responses from in-depth interview include:

*Our processes are coordinated with those of CYMMIT the NGO we partner in new product development;*

*Our processes are not really integrated although the supplier is required to send order schedule details;*

*Our processes are integrated since we are also vertically integrated;*

*Our processes are integrated since we own the farms that produce raw materials;*

*We are working towards that;*

*Our processes are coordinated with those of CYMMIT the NGO, FAO, SNV and GIZ we partner in new product development, to promote conservation agriculture and small scale mechanism.*

The results show that the majority of the companies that participated in the survey have their supply chain processes integrated with those of their suppliers, customers and like-minded partners.

#### **f) Transaction Specific Investments**

The study sought to assess the level of joint investments in the sector and the results from the quantitative strand of the study show that transaction specific investments (M=5.073) had mean agreement scores where respondents somewhat agreed with the statements that were used to measure these variables. Results from the One Sample T-Test show that all the variables used to measure this factor are above the Test Value (4.0), therefore transaction specific investments is a significant factor of supply chain chain coordination. The variable test results were: The company assists its suppliers to improve its quality (M=5.66), The company has continuous improvements programmes that include suppliers (M=5.39) and We have engaged in joint investments with suppliers (M=4.17). Results from supplier respondents are in line with these results with an average mean score on transaction specific investments (M=5.067) which is above the T-Test

Value (4.0). These results were corroborated by interviewees who responded by relating to the form of investments either from the supplier side or from the customer side. Respondents highlighted that they have been assisted by their customers and the type of assistance received. Results in Table 6.25 show that the agro processing companies in Zimbabwe have been assisting their suppliers in different ways. Some of the responses include assistance through inputs supply, fertilizers, agrochemicals and transport. The researcher used coding reference percentages to identify the percentage of respondents who have assisted their suppliers as presented in Table 6.25.

**Table 6.25: Coding Reference Percentage on Supplier Assistance**

NVivo Node	Coding References	Coding Reference %
Assistance	12	92.3
No Assistance	1	7.7

From Table 6.25, 92.3% (12 coding references) indicate that they have assisted their suppliers. Some of the assistance offered to include:

*We have assisted farmers with free extension services, inputs such as fertilisers, agrochemicals and diesel whose amount is deducted after selling their products to the company;*

*We have assisted suppliers by giving them information, rates, prices and volume of our requirements;*

*We give farmers pesticides, protective clothing and provide technical knowledge and transport; We assist our farmers through inputs supply-seed, fertilisers, chemicals, fuels, loan finance, market linkages, storage, transport and commodity trading*

Results show that Zimbabwean agro processing companies assist their suppliers in different ways in order to ensure timely deliveries of their requirements. These results are corroborated by results from suppliers who also indicated that they have been assisted by their customers. Supplier interviewees were also asked to explain how the customers have assisted them. The responses were analysed using NVivo 11.

On the type of assistance, responses from interviewees were:

*Free deliveries of inputs and training from the suppliers*

*We have received fertilizers, chemicals, and herbicides, then they deduct after harvesting*

*We have received inputs in the form of seed and fertilizers. We have also been trained.*

The results show that suppliers of Zimbabwean agro processing organisations receive assistance from their customers (agro processing companies) in the form of inputs, chemicals and training. The results show that investments in the relationship are done by the customers who are the agro processing companies since the bulk of their materials come from farmer suppliers.

Interviewees were asked a question on the source of their raw materials and inputs to facilitate production. This question sought to find the level of input accessibility by farmers from different stakeholders in the industry. Supplier interviews were asked a question on the availability of resource and their adequacy at their disposal to facilitate production on their premises, respondents had various responses are presented in Figure 6.9.

**Figure 6.9: Resource Availability and Adequacy**

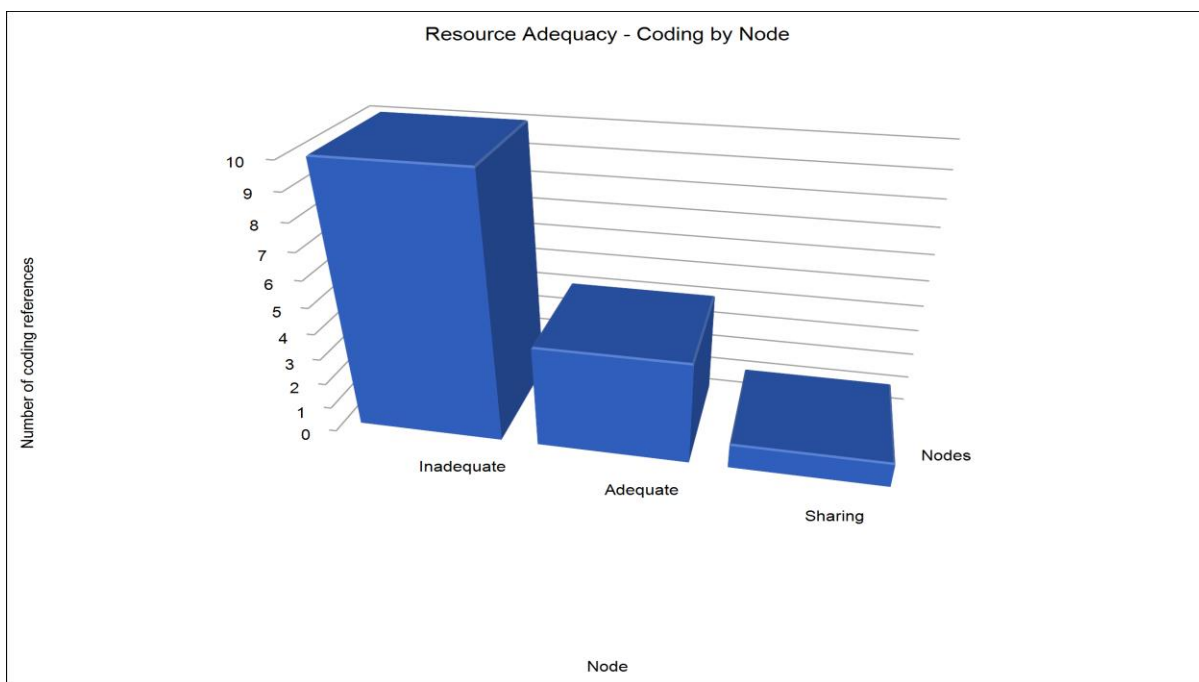


Figure 6.9 show responses to resource availability and adequacy. Responses from interviewees show that resources are inadequate (10 coding reference representing 66.7%) while (4 coding references representing 26.7%) indicated that they have adequate resources. The remaining (1 coding reference 6.6%) indicated that they share resources with others. This is supported by responses from interviewees whose responses were as follows:

*Individual farmers have adequate resources but we share resources for pumping water for irrigation purposes. We have a roaster for irrigation.*

*Resources are inadequate since the company is under judicial management.*

*Not enough due to unavailability of capital*

*Inadequate resources are a challenge for production.*

The results show that Zimbabwean agro processing suppliers have inadequate resources which affect production and delivery of the product to the customer. Some of the reasons given for inadequacy of resources include judicial management, lack of working capital and new players in the sector.

### **g) Resource Sharing**

Since respondents indicated that they share resources with their customers the researcher sought to assess the level of resource sharing among supply chain partners. Sharing resources would help the partner who is not equally resourced, so as to be able to deliver the required quantities to other supply chain partners. The responses to this aspect are presented in Table 6.26.

**Table 6.26 Coding Reference Percentage on Resource Sharing**

<b>NVivo Node</b>	<b>Coding References</b>	<b>Coding Reference %</b>
Resource Sharing	10	76.9
No Resource Sharing	3	23.1

The coding references in Table 6.26 show that 76.9% (10 coding references) of the interviewees share resources with their suppliers. On further probing about the resources being shared, the responses were:

*We share resources with suppliers in the form of canals, infrastructure, diesel, water, marketing of the product through the sharing of facilities; the product remains the farmers' until it is sold,*

*We share offices since we are a cooperative association of farmers;*

*We rent out our premises to CYMMIT;*

*We share resources with the Forestry school when doing research since they have resources;*

*We share resources such as cold rooms, storerooms and slaughterhouse.*

On further probing on the benefits of sharing resources, the respondents noted that resource sharing reduces costs and provides flexibility and enables on-time delivery of raw materials and products.

However, 23.1% (3 coding references) of the interviewees indicate that they do not share resources with their suppliers or customers. The responses were as follows:

*We do not share resources but information;*

*We do not share resources;*

*We have no resources to share.*

Generally, the results show that the majority of the companies that were interviewed share resources with either their suppliers, partners or competitors. The results show that players in the Zimbabwean agro processing companies' supply chain work together for the benefits of the sector through the creation of synergetic relationships leading to resource sharing, thereby reducing costs. These results show that supply chain partners of Zimbabwean agro processing organisations have engaged in relationship investments for mutual benefit.

On the other hand, the researcher sought to identify the market for suppliers' products by asking interviewees a question which sought to find out where they sold their products. The researcher sought to find out if these suppliers have a ready market for their products as the coding reference percentage was run in NVivo 11 and the results are presented in Table 6.27.

**Table 6.27: Coding Reference Percentage Market**

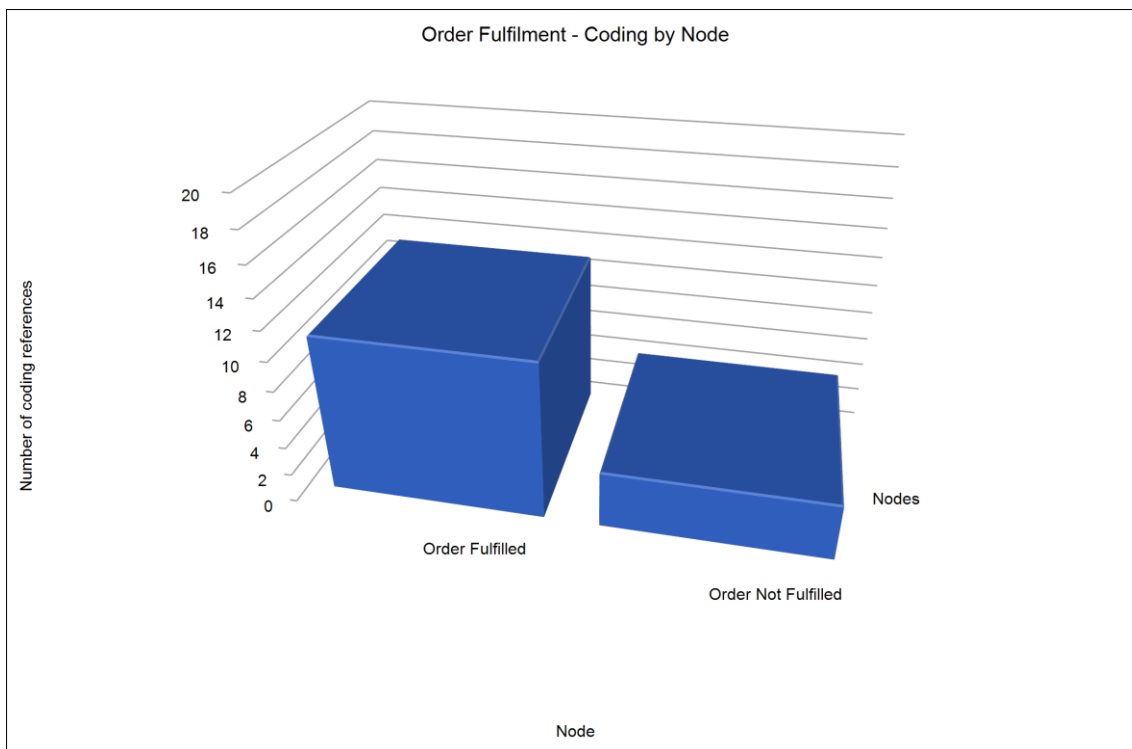
NVivo Node	Coding References	Coding Reference %
Business Customers	4	21
Contracting Companies	6	31.6
International Markets	3	15.9
Private Buyers	2	10.5
Processing Companies	4	21

The results in Table 6.27 show that 31.6% of the interviewees (6 coding references) sell their produce to contracting companies. These companies constitute the bulk of the buyers for supplier produce as they would have invested in the relationship. Interviewees who indicated that they sell their products to business customers and agro processing companies constitute 21% each (4 coding references each). Suppliers who sell their products to international markets constitute 15.9% (3 coding references) while 10.5 % (2 coding references) sell their produce to private buyers. The results show that there is a ready market for the suppliers produce were contracting companies that would have invested in supplier try to recoup their costs.

## h) Supplier Capabilities

The findings on supplier-specific factors show that the respondents agree with the statement on supplier capability (M=5.61) which highest mean agreement score and it shows that it has an effect on coordination of supply chain activities among Zimbabwean agro processing organisations. Supplier capability is measured by five (5) items which include supplier efficiency, effectiveness, on time, deliveries on time, quality consistency and accuracy in order fulfilment. Results from the One-Sample T-Test show that all the variables used to measure supplier capabilities have values above the Test Value (4.0) with the following results: Supplier efficiency (M=5.56); Supplier effectiveness (M=5.54); On time, deliveries (M=5.51); quality consistency (M=5.76) and accuracy in order fulfilment (M=5.68). These results are corroborated by results from the qualitative strand of the study where suppliers of agro processing organisations were asked if they fulfill orders of their customers or not. The responses are presented in Figure 6.10

**Figure 6.10: Order Fulfillment**



Interviewees were asked questions relating to fulfilment of orders by their suppliers and the results show that 76.9% (10 coding references) indicated that suppliers fulfill their orders accurately, whereas 23.1% (3 coding references) indicated that their suppliers do not fulfill their orders. On further probing, responses that came out included:

*Suppliers fulfil their promises efficiently because of the harvesting quotas*

*Suppliers fulfil their promises.*

*Suppliers fulfil their promises efficiently although others need to be pushed.*

*Sometimes suppliers deliver earlier than promised. At one time the supplier was delayed by packaging supplier where they import*

*Suppliers fulfil their promises partially*

The results show that suppliers of agro processing companies fulfil their orders accurately and deliver on time.

To evaluate the effectiveness of the agro processing organisations in meeting demand requirements and product specifications. The interviewees' responses on supplier effectiveness were then analysed by running a word frequency query in NVivo 11 and the results are presented in Figure 6.11.

**Figure 6.11: Word Frequency Query Results on Supplier Effectiveness**



From the word frequency query in Figure 6.11, the most frequently used word was effective. This shows that suppliers /farmers in this industry are effective in meeting customer requirements. In-depth interviews were used to probe further and the responses from the interviewees were:

*They are effective although at times the quality of the raw material is compromised due to logistic problems*

*They sometimes fail to meet requirements due to logistical problems*

Although there are some challenges faced by suppliers, the responses indicate that suppliers of Zimbabwean agro processing companies are effective in meeting customer requirements.

Respondents from the different agro processing companies were also asked if their suppliers met their product and quality specifications. This was done to find out if quality consistency is maintained in the sector from the source. The variables used to measure supplier capability through in-depth interviews proved that suppliers of Zimbabwean agro processing organisations fulfill their orders accurately and effectively. The results show that supplier capability is a significant factor for the Zimbabwean agro processing organisations and has a significant effect on the coordination of supply chain activities among the organisations.

### 6.6.2 Role of Information Technology in supply chain coordination

This study sought to assess the role of information technology in the coordination of supply chain activities of Zimbabwean agro processing organisations. It also sought to assess the extent to which Zimbabwean agro processing companies have embraced IT and its usage by them.

**Table 6.28: Role of Technology**

Question Item	Item statement	N	Min	Max	Mean	Std Dev	Var	Skewness	Kurtosis
Tech 1	Our technology is compatible with supplier technology	59	1	7	3.97	1.800	3.240	-0.164	1.823
Tech 2	We use technology to control stock movement	59	1	7	4.46	1.745	3.045	-0.311	2.236
Tech 3	We use technology for sharing information with suppliers	59	1	7	4.90	1.583	2.507	-0.883	3.034
Tech 4	Technology is used to pay suppliers	59	2	7	5.98	1.042	1.086	-1.165	4.964
Tech 5	Technology is used for research and new product development	59	1	7	4.63	1.721	2.962	-0.371	1.978
	<b>Average</b>				<b>4.788</b>	<b>1.578</b>	<b>2.568</b>	<b>-0.579</b>	<b>2.807</b>



Results from Figure 6.28, show that respondents somewhat agreed that technology has been adopted and is being used by Zimbabwean agro processing companies. Technology was measured by 5 item statements. From the results, it can be noted that respondents agree that technology is used for payment purposes, with a mean agreement score of 5.98. This is followed the respondents' mean agreement statement score of 4.9 where respondents somewhat agree that technology is used for information sharing, research and development (4.63) and control of stock movement (4.46) respectively. On the issue of technological compatibility among supply chain partners, respondents were not sure or neutral with a mean agreement score of 3.97 which is the lowest in this category.

### 6.6.2.1 One-Sample T-Test on Technological Adoption and Usage by Zimbabwean Companies

A One-Sample T-test ( $\alpha = 0.05$ ) with a Test Value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to identify the extent to which respondents agree with the statements describing the adoption and usage of technology for coordination of the Zimbabwean agro processing organisations' supply chain.

**Table 6.29: One-Sample T-Test on Technology**

	<b>Statement</b>	<b>N</b>	<b>Mean</b>	<b>Std Deviation</b>	<b>Std. Error Mean</b>
Tech 1	Our technology is compatible with supplier technology	59	3.97	1.800	0.234
Tech 2	We use technology to control stock movement	59	4.46	1.745	0.227
Tech 3	We use technology for sharing information with suppliers	59	4.90	1.583	0.206
Tech 4	Technology is used to pay suppliers	59	5.98	1.042	0.136
Tech 5	Technology is used for research and new product development	59	4.63	1.721	0.224

From the findings presented in Table 6.29, four out of the five items used to describe technological adoption and usage have ratings above the Test Value(4.0). The results were as follows:

*We use technology to control stock movement (M=4.46); We use technology for sharing information with our suppliers (M=4.90); Technology is used to pay suppliers (M=5.98); Technology is used for research and new product development (M=4.63)*

The results show that these factors were significant in describing the adoption and usage of technology in the coordination of the Zimbabwean agro processing companies' supply chain.

The mean score of the other item describing technological adoption and usage by Zimbabwean agro processing organisations was as follows;

*Our technology is compatible with supplier technology (M=3.97)*

The variable below the Test Value (4.0), shows that it was not significant as an item describing technological compatibility among Zimbabwean agro processing organisations.

Interviews were carried out with agro processing companies to assess the use of technology for information exchange and other areas of the business when dealing with suppliers.

Through in-depth interviews, interviewees indicated how they make use of technology in the sector. Some of the responses from the interviewees were:

*Technology is available on both side but we face a challenge of power outages and cash*

*We use technology for communication and payment of suppliers.*

The results are complementary to the results that came out of the survey carried out for this study which show that Zimbabwean agro processing organisations have adopted technological usage but their suppliers are still lagging behind, hindering technological advancement and usage in the sector. Although the sector is lagging behind in technology, it is an important resource for the industry as it facilitates information exchange and communication.

### **6.6.3 Challenges of Coordination**

The researcher sought to identify challenges faced by Zimbabwean agro processing companies when coordinating supply chain activities with their suppliers. The responses regarding challenges faced.

Table 6.30 present challenges faced by Zimbabwean agro processing organisations, which are measured by eight (8) items. Respondents somewhat agree that the major challenge they face is power shortage with a mean agreement score of (M=5.37, followed by poor government policies (M=5.27) and high transaction costs (M=4.75) respectively.

Respondents were not sure on the item statements indicating a lack of institutional support and poor infrastructural developments with mean aggregate scores of (M=4.32) and (M=4.31) respectively.

**Table 6.30: Challenges Faced during Coordination**

<b>Question Item</b>	<b>Item statement</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Var</b>	<b>Skewness</b>	<b>Kurtosis</b>
<b>Cha 1</b>	We face a challenge of poor products / raw materials	59	1	7	3.00	1.712	2.931	0.478	2.086
<b>Cha 2</b>	We have outdated equipment	59	1	7	3.14	1.833	3.361	0.628	2.376
<b>Cha 3</b>	We have limited access to market due to trade barriers	59	1	7	2.83	1.577	2.488	0.707	2.690
<b>Cha 4</b>	We are faced with a challenge of power shortages	59	1	7	5.37	1.799	3.238	-0.964	2.757
<b>Cha 5</b>	We are affected by high transaction costs	59	1	7	4.75	1.708	2.917	-0.265	2.542
<b>Cha 6</b>	We are affected by poor infrastructural developments	59	1	7	4.31	1.793	3.216	-0.285	2.053
<b>Cha 7</b>	Lack of institutional support	59	1	7	4.32	1.383	1.912	-0.237	2.466
<b>Cha 8</b>	Poor government policies	59	1	7	5.27	1.400	1.960	-0.568	2.835
	<b>Average</b>				<b>4.123</b>	<b>1.651</b>	<b>2.753</b>	<b>-0.063</b>	<b>2.476</b>

Respondents somewhat disagreed with the statements with the statements that they face challenges of poor products/ raw materials (M= 3), outdated equipment (M=3.14) and limited access to markets due to trade barriers with a mean aggregate score (M=2.83).

### 6.6.3.1 One-Sample T-Test on Challenges faced by Zimbabwean Agro processing organisations

A One-Sample T-test ( $\alpha = 0.05$ ) with a Test Value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to identify the extent to which respondents agree with the statements describing challenges faced by Zimbabwean agro processing organisations when coordinating their supply chains.

**Table 6.31: One Sample T-Test on Challenges**

	Statement	N	Mean	Std Dev	Std. Error Mean
<b>Cha 1</b>	We face a challenge of poor products / raw materials	59	3.00	1.712	0.223
<b>Cha 2</b>	We have outdated equipment	59	3.14	1.833	0.239
<b>Cha 3</b>	We have limited access to the market due to trade barriers	59	2.83	1.577	0.205
<b>Cha 4</b>	We are faced with a challenge of power shortages	59	5.37	1.799	0.234
<b>Cha 5</b>	We are affected by high transaction costs	59	4.75	1.708	0.222
<b>Cha 6</b>	We are affected by poor infrastructural developments	59	4.31	1.793	0.233
<b>Cha 7</b>	Lack of institutional support	59	4.32	1.383	0.180
<b>Cha 8</b>	We are affected by poor government policies	59	5.27	1.400	0.182

Table 6.31 shows that five (5) out of the eight (8) challenges highlighted are within and above the Test Value (4.). The challenges being faced by Zimbabwean agro processing organisations include the following:

*We are faced with a challenge of power shortage (M=5.37); We are affected by Poor government policies (M=5.27); We are affected by high transaction costs (M=4.75); Lack of institutional support (M=4.32) and Poor infrastructural developments (M=4.31)*

The results show that these factors were significant in describing the challenges faced in coordinating the Zimbabwean agro processing supply chain.

The variables below the Test Value (4.0) were as follows:

*We have a challenge of poor products/raw materials (M=3.0);*

*We have outdated equipment (M=3.14);*

*We have limited access to the market due to trade barriers (M=2.83*

### 6.6.3.2: Coordination Challenges faced by agro processing companies

This interview question sought to identify challenges faced by Zimbabwean agro processing companies when coordinating their supply chain activities. The interviewees’ responses to questions on challenges faced when coordinating supply chain activities were then analysed by creating nodes in NVivo 11 as presented in Figure 6.12.

**Figure 6.12: Coordination Challenges faced by Companies**

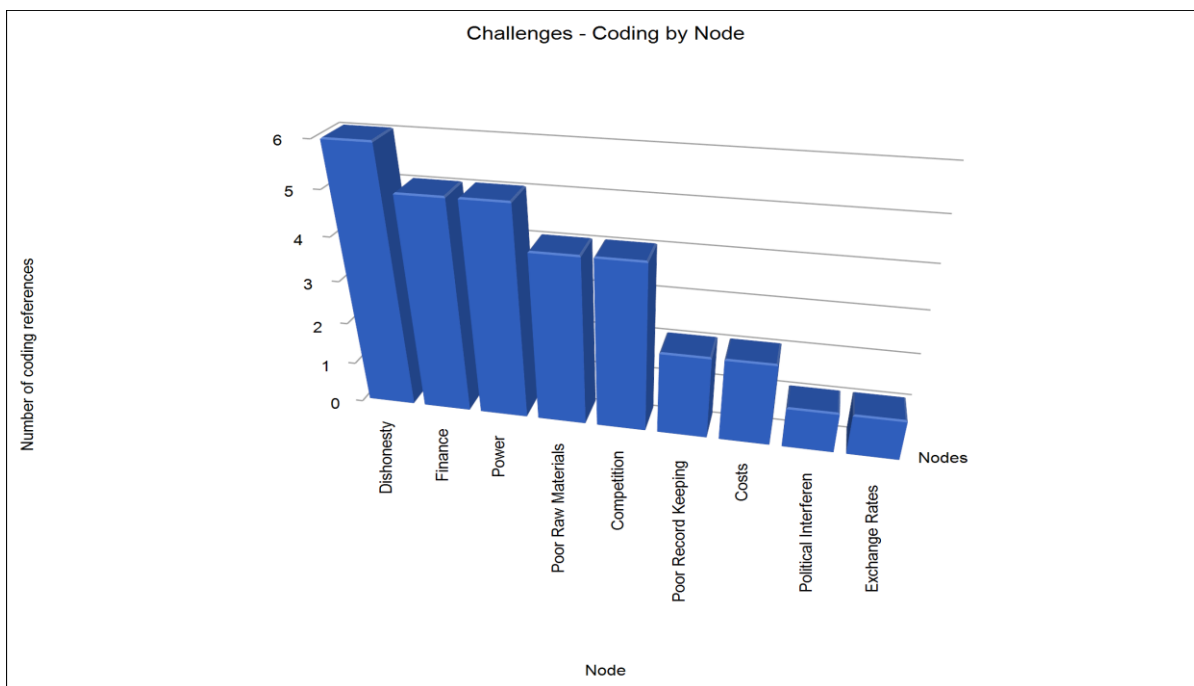


Figure 6.12 shows that the main challenge being faced by agro processing companies is dishonesty from suppliers (6 coding references, 20%), followed by financial challenges and power outages (5 coding references, 16.7% each). Other challenges highlighted include; competition and poor raw materials (4 coding references, 13.3% each), costs and poor record keeping (2 coding references each). Exchange rates and political interference complete the list of challenges (1 coding reference, 3.3% each).

Some of the responses from interviewees when probed were:

*Power challenges, financial challenges and competition from independent producers.*

*Accusations from farmers, politics mixed with business, lack of proper records on the part of the farmers*

*Production of substandard raw materials by some farmers, diversion of inputs and delivery delays*

*We have a challenge of substandard raw materials, lack of credit terms, power shortages and cash-flow problems*

*We have a challenge of supplier power and rigidity, especially with core suppliers. Suppliers prioritize side marketing instead of delivering to us*

*Side marketing, farmers defaulting on supply, low throughput due to low production of the crop, lack of training manuals, input shortages, lack of funding and expertise*

The results indicate that Zimbabwean agro processing organisations face a myriad of challenges when coordinating their supply chains, chief among them being dishonesty from suppliers, financial challenges and power outages.

Other challenges that came out of in-depth interviews with agro companies interviewees show that the sector has had no significant impact on their operational activities. The results show that these challenges were not significant in the coordination of the Zimbabwean agro processing organisations' supply chain.

Just like with agro processing companies, suppliers also face a myriad of challenges that affect their businesses. Responses from interviewees on challenges faced are presented in Figure 6.13

**Figure 6.13: Coordination Challenges faced by Supplier Businesses**

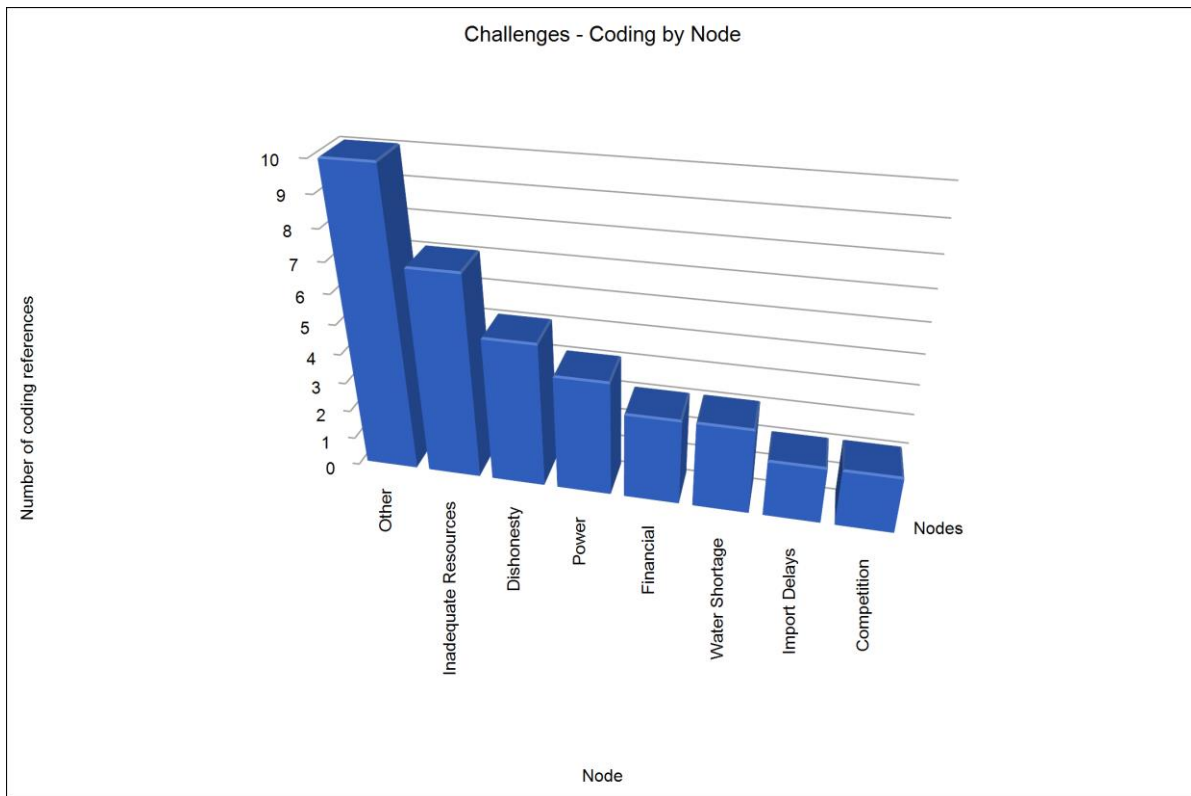


Figure 6.13 shows that the majority of interviewees indicated that they face other (10 coding references) challenges apart from the ones they listed. Major challenges highlighted by interviewees that are faced by suppliers include; inadequate resources (7 coding references); dishonesty (5 coding references) and power outages (4 coding references). Financial challenges and water shortage (3 coding references each) are some of the challenges that suppliers of Zimbabwean agro processing organisations face. The challenges with the least coding references include competition and import delays (2 coding references each).

In-depth interviews buttress the results from on challenges faced by the suppliers. Some of the responses were:

*Power outages resulting in shortage of water for irrigation purposes. Lack of understanding from other farmers who are not willing to follow the irrigation roaster.*

*Competition, baboon damages on the tree bark affecting the quality of timber, invasive weeds which suppress the trees*

*Late payment by buyers. For example GMB due to unavailability of funds*

*We have outdated irrigation systems. Tillage equipment is inadequate.*

*Poor phone network, Regular breakdowns, unreliable transporters, marketing, outdated equipment, cash flow, breakdown of harvesting equipment, competition, clearance for imports and high duty for imports.*

*We have faced a challenge of fake chemicals and delays in supply of raw materials since most of them are imported*

The results show that agro processing suppliers face financial challenges and late payments that have a negative effect on their business. Power shortages affect the irrigation roasters for farmers and cause friction and misunderstanding among farmers. Other challenges include completion, dishonesty and import delays, thereby affecting supplier activities

#### **6.6.4 Impact of Supply Chain Coordination**

The study sought to identify the consequences of supply chain coordination on Zimbabwean agro processing organisations, whether positive or negative. Table 6.34 presents descriptive statistics from the respondents' views.

**Table 6.32: Impact of SCC on Organisational Performance**

<b>Question Item</b>	<b>Item statement</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std Dev</b>	<b>Var</b>	<b>Skewness</b>	<b>Kurtosis</b>
OP 1	Coordination has increased our profits margin	59	2	7	5.32	0.918	0.843	-0.948	5.489
OP 2	Coordination with suppliers has reduced our inventory levels	59	2	7	4.93	1.230	1.513	-0.560	3.006
OP 3	Coordination has minimized our transaction costs	59	2	7	5.05	1.007	1.015	-0.816	4.631
OP 4	Our market share has increased because of coordination	59	2	7	5.39	1.130	1.276	-0.953	4.063
OP 5	We have improved our product quality	59	2	7	5.73	1.112	1.236	-1.425	5.721
OP 6	Our return on investment has increased	59	2	7	5.29	1.175	1.381	-0.639	3.581



OP 7	Coordination enables on time delivery	59	2	7	5.85	1.031	1.063	-1.216	5.338
OP 8	Coordination has led to a reduction in customer complaints	59	2	7	5.05	1.305	1.704	-0.376	2.676
OP 9	We have improved flexibility because of coordinating with suppliers	59	1	7	5.31	1.380	1.905	-1.036	3.735
OP 10	Waste has been reduced	59	2	7	4.95	1.332	1.773	-0.216	2.473
OP 11	Our customers are satisfied	59	3	7	5.53	1.135	1.288	-0.277	2.407
OP 12	Coordination has improved our profitability	59	2	7	5.53	1.088	1.186	-0.834	3.908
OP 13	Coordination has increased customer loyalty	59	3	7	5.14	1.252	1.566	-0.258	1.897
OP 14	Coordination has led to competitive advantage	59	3	7	5.92	1.039	1.079	-0.948	3.489
	<b>Average</b>				<b>5.356</b>	<b>1.152</b>	<b>1.345</b>	<b>-20.516</b>	<b>3.745</b>

From Table 6.32 respondents highlighted that coordination has led to competitive advantage with mean scores of 5.92, followed by on-time delivery (5.85), improved product quality (5.73), customer satisfaction and improved productivity with 5.53 each. The responses in these mean score range indicate that the survey participants agreed with the statement being asked. The participants somewhat agreed with all the other statements under consideration since the mean scores for these statements fall between 4.5 and 5.49.

#### 6.6.4.1 One-Sample T-Test on Impact on Organisational Performance of Zimbabwean Agro processing organisations

A One-Sample T-test ( $\alpha = 0.05$ ) with a Test Value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to identify the extent to which respondents agree with the statements describing the impact of supply chain coordination on Zimbabwean agro processing companies, focusing on organisational performance.

**Table 6.33: One-Sample T-Test on Organisational Performance**

	Statement	N	Mean	Std Deviation	Std. Error Mean
OP 1	Coordination has increased our profits margin	59	5.32	0.918	0.120
OP 2	Coordination with suppliers has reduced our inventory levels	59	4.93	1.230	0.160
OP 3	Coordination has minimized our transaction costs	59	5.05	1.007	0.131
OP 4	Our market share has increased because of coordination	59	5.39	1.130	0.147
OP 5	We have improved our product quality	59	5.73	1.112	0.145
OP 6	Our return on investment has increased	59	5.29	1.175	0.153
OP 7	Coordination enables on time delivery	59	5.85	1.031	0.134
OP 8	Coordination has led to a reduction in customer complaints	59	5.05	1.305	0.170
OP 9	We have improved flexibility because of coordinating with suppliers	59	5.31	1.380	0.180
OP 10	Waste has been reduced	59	4.95	1.332	0.173
OP 11	Our customers are satisfied	59	5.53	1.135	0.148
OP 12	Coordination has improved our profitability	59	5.53	1.088	0.142
OP 13	Coordination has increased customer loyalty	59	5.14	1.252	0.163
OP 14	Coordination has led to competitive advantage	59	5.92	1.039	0.135

From Table 6.33, it can be noted that all the statements used to measure organisational performance were above the Test Value (4.0). Some of the variables used to measure organisational performance were:

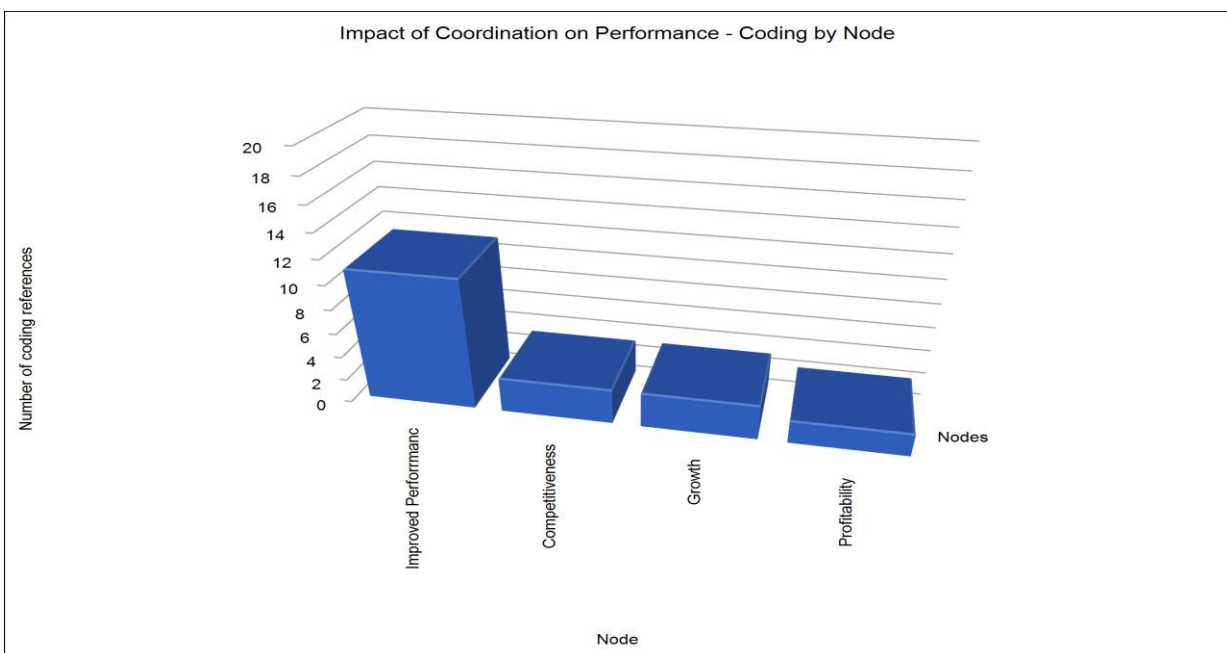
*Coordination has led to competitive advantage (M=5.92); Coordination has led to on-time deliveries (M=5.85); We have improved product quality (M=5.73); Coordination has improved our profitability (M=5.53); Our Customers are satisfied (M=5.53); Our market share has increased because of coordination (M=5.39); Coordination has increased our profit margins (M=5.32)*

The results show that coordination has a positive impact on the performance of Zimbabwean agro processing organisations.

#### 6.6.4.2 Impact of Coordination on Performance of Agro processing Companies

To assess the impact of supply chain coordination on the performance of Zimbabwean agro processing organisations, interviewees were asked a question on this aspect. The interviewees’ responses on the impact of coordinating supply chain activities on organisational performance were then analysed by creating nodes in NVivo 11, as presented in Figure 6.14.

**Figure 6.14: Impact of Coordination on Company Performance**



Results from Figure 6.14 show that coordination of supply chain activities has improved performance of Zimbabwean agro processing companies (10 coding references representing 66.7%). Competitiveness and growth (2 coding references each representing 13.3 % each) are some of the impacts on Zimbabwean agro processing companies performance when their supply chains are coordinated. The least impact on organisational performance highlighted by the interviewees was profitability with (1 coding reference which is 6.7%). The results are supported by responses from in-depth interviews such as:

*Improved performance and ability to meet demand and delivery requirements*

*Profitability, expansion, increases in production and factory capacity. Growth in market share*

*Improved competitiveness, profitability and market share*

*Continuous production since there are no raw material shortages*

The results indicate that coordinating the Zimbabwean agro processing supply chain has impacted positively on organisational performance through improved performance, profitability, competitiveness and growth (market share).

#### **6.6.4.3 Overall Impact of Coordination on Agro processing Organisations**

To complement the results from the quantitative study of the study, qualitative data on the impact of coordinating the agro processing supply chain, data were collected using semi-structured and in-depth interviews. The responses from interviewees on the overall impact of coordination were analysed using coding references in NVivo 11 as presented in Table 6.34.

**Table 6.34: Coding Reference Percentage on Impact of Coordination**

<b>NVivo Node</b>	<b>Coding References</b>	<b>Coding Reference %</b>
Customer Satisfaction	3	10.7
New Product Development	2	7.1
Product Availability	5	18
Profitability	4	14.3
Quality Improvements	2	7.1
Timeous Delivery	10	35.7
Training	2	7.1

The results in Table 6.34 show that the main impact of coordinating the agro processing supply chain is timeous delivery with 35.7% (10 coding references), followed by product availability with 18% (5 coding references). Other benefits of coordinating the supply chain include; profitability

with 14.3 % (4 coding references) and customer satisfaction with 10.7% (3 coding references). New product development, quality improvements and training constitute 7.1% each (2 coding references each) are some of the benefits of coordinating the Zimbabwean agro processing supply chain. The responses from in-depth interviews support the results presented in Table 6.42. Some of the responses include:

*Benefits include improved cane deliveries, demand fulfilment, production concept where we sell what we have produced, quality improvements, and deliveries done on daily basis.*

*Sustainability, product availability, scheduled deliveries, customer satisfaction, long term relationship. Reliable customer guarantees confidence.*

*Timeous input supply, adequate inputs, trust is built, the extension of credit facilities and knowledge sharing*

*Profitability, ability to trade on the international market*

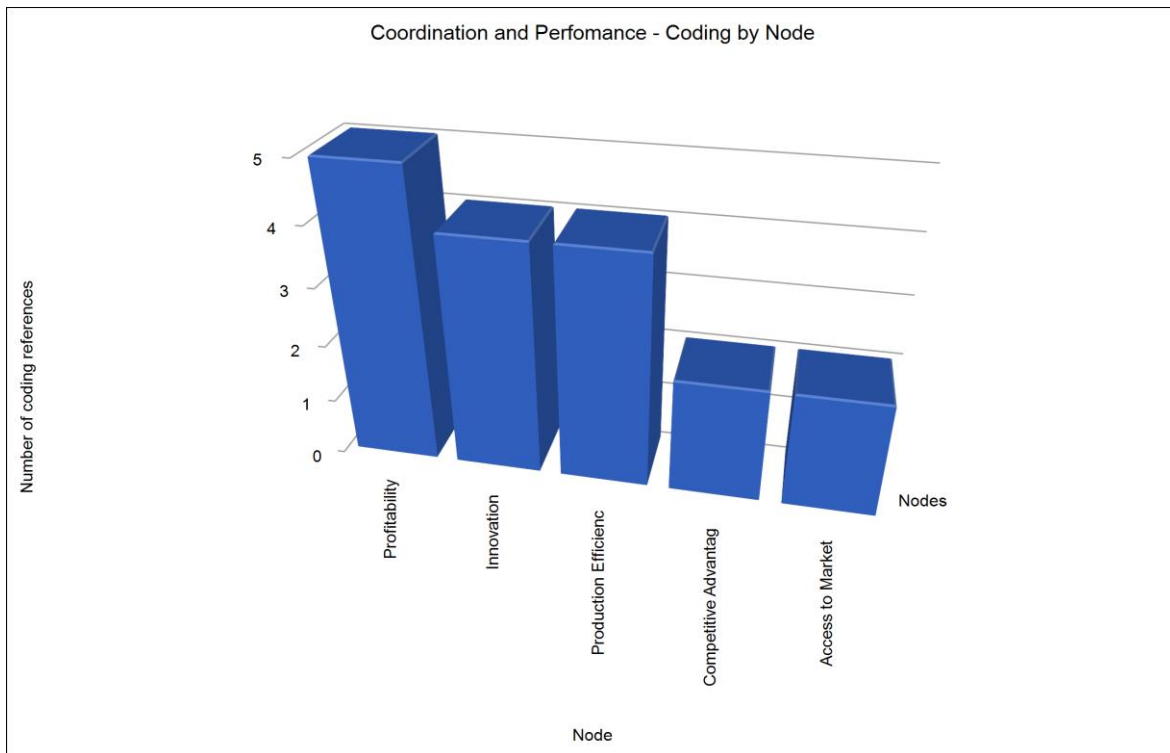
*On-time delivery of raw materials, meeting customer requirements*

The results show that coordination of the Zimbabwean agro processing supply chain brings in positive impacts such as timeous delivery of raw materials to facilitate smooth production leading to customer satisfaction and profitability.

#### **6.6.4.3 Impact of Coordination on Supplier Performance**

To assess the impact of supply chain coordination on the performance of suppliers, interviewees were asked to explain the relationship between these two variables. The interviewees' responses on the impact of coordinating supply chain activities on supplier performance were then analysed by creating nodes in NVivo 11.

**Figure 6.15: Coordination and Supplier Performance**



Results from Figure 6.15 show that the majority of interviewees indicated that coordination has led to supplier profitability (5 coding references), followed by those who indicated that coordination has led to innovation and production efficiency (4 coding references each). The interviewees also indicated that coordination has enabled them to achieve competitive advantage (2 coding references) while at the same time giving them access to markets (2 coding references).

Responses to the question were:

*Relationship with the forestry commission gives us access to certified seed.*

*We managed to achieve a 95% utilization of the allocated land*

*Performance of suppliers has improved due to the input scheme. Tonnage has also increased.*

*We have benefitted through exposure to innovative new products, profitability and competitive advantage*

*Market share and competitive advantage*

The results show that the coordination of the Zimbabwean agro processing organisations has a positive impact on the performance of suppliers in this industry.

#### 6.6.4.4 Overall Impact of Coordination to Suppliers

To assess the overall impact of coordinating the Zimbabwean agro processing organisations to suppliers of the sector, interviewees were asked to identify the benefits that their companies have accrued from supply chain activities. The responses from interviewees were analysed in NVivo 11 and the results are presented in Table 6.35.

**Table 6.35: Supplier Coding Reference Percentage on Benefits of Coordination**

NVivo Node	Coding References	Coding Reference %
Cost Reduction	2	12.5
Inputs & Credit Terms	3	18.75
Investments	4	25
Meeting Customer Needs	4	25
Profitability	2	12.5
Ready Product Market	1	6.25

The results in Table 6.35 show that 25 % (4 coding references each) of the interviewees indicated that the benefits of coordinating their supply chain were investments done by the customer (25%) and meeting customer needs (25%) respectively. Interviewees who indicated that they have benefited from their coordination efforts through access to inputs and credit terms constitute 18.75 % (3 coding references), while 12.5% (2 coding references each) indicated that they have benefited from coordinating their supply chain activities through cost reductions and meeting customer needs respectively. The remaining 6.25 % (1 coding reference) indicated that they benefited through the provision of a ready market for their products. Some of the responses from interviewees to the question were:

*Cost reduction*

*A ready market for the product*

*Credit terms and through outsourcing we pay for the volumes*

*We have benefited from credit facilities, reliable ready market for our produce, linkages and cost savings*

*Investments in new technology and agricultural equipment*

The results show that suppliers (farmers) in the Zimbabwean agro processing organisations have benefited from customer investments in their business in the form of technology and agricultural equipment. Customers also supply inputs and offer suppliers credit terms to enable them to

produce continuously. The other benefits highlighted included cost reductions, ready market for produce and linkages. The next section presents results on each industry in the sector.

## 6.7 Industry by Industry Analysis

This section presents data on each sector in the Zimbabwean agro processing sector. Industry analysis was done according to strata based on products produced. The sectors presented in this section include the agro-processors, dairy, tobacco, food and meat processors.

### 6.7.1 Agro processors

From the data collected from the ten provinces of the country, eleven agro-processors participated in the study and the results were analysed in SPSS and the descriptive statistics are presented in table 6.36.

**Table 6.36: Descriptive Statistics for Agro processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	11	1	7	5.130	1.279	1.969	-0.173	1.967
Coordination Mechanisms	11	1	7	4.758	1.869	3.6	-0.695	2.77
Trust	11	1	7	5.766	0.939	0.992	0.293	2.375
Communication	11	1	7	4.464	1.370	2.196	-0.150	1.966
Commitment	11	1	7	5.441	1.205	1.843	-0.700	3.244
Information Sharing	11	1	7	5.416	1.068	1.249	-0.512	2.440
Collaboration	11	1	7	4.455	1.984	3.994	-0.405	2.062
Transaction Specific Investments	11	1	7	5.818	1.012	1.955	-0.053	2.410
Supplier capabilities	11	1	7	5.576	1.006	1.058	-0.716	3.358
Environmental Factors	11	1	7	4.348	0.719	0.646	-0.722	2.437
Technology	11	1	7	5.309	1.540	2.469	-1.023	3.23
Organisational Performance	11	1	7	5.539	1.073	1.212	-0.826	3.812

Eleven agro processing organisations participated in the survey and the results are presented in Table 6.36 show that respondents agree with the following statements,



The industry engages in transaction investments with a mean average score of ( $M=5.818$ ) showing that investments among players in the sector are important in the coordination of supply chain activities. Other statements that were regarded as important for coordination of supply chain activities in the sector include;

*Trust* ( $M=7.66$ ), *Supplier capabilities* ( $M=5.576$ ), *Organisational performance* ( $M=5.539$ )

Respondents somewhat agreed on the following;

*Nature of coordination* ( $M=5.1$ ), *Technology* ( $M=5.309$ ), *Commitment* ( $M=5.441$ ), *Information Sharing* ( $M=5.416$ ), *Coordination mechanisms* ( $M=4.758$ ).

Generally, the results show that respondents in the sector agreed that the sector engages in coordination of its supply chain activities with the factors indicated being important in the facilitation of coordination.

### 6.7.2 Cotton processing Sector

Seven companies from this sector participated in the survey and the results are presented in Table 6.37.

**Table 6.37: Descriptive Statistics for Cotton processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	7	1	7	4.408	0.860	1.0	-0.346	2.546
Coordination Mechanisms	7	1	7	5.40	0.904	0.81	-0.186	2.625
Trust	7	1	7	5.265	0.622	0.333	-0.048	1.837
Communication	7	1	7	5.254	1.331	2.021	-0.886	3.080
Commitment	7	1	7	4.777	0.881	0.915	-1.197	2.636
Information Sharing	7	1	7	4.755	1.233	1.673	0.813	2.391
Collaboration	7	1	7	4.452	1.030	1.150	0.445	2.806
Transaction Specific Investments	7	1	7	4.857	1.082	1.524	0.574	2.131
Supplier capabilities	7	1	7	5.314	0.432	0.191	1.093	3.697
Environmental Factors	7	1	7	2.976	1.077	1.341	0.547	2.888
Technology	7	1	7	4.314	1.612	1.75	0.422	2.543
Organisational Performance	7	1	7	5.01	0.673	0.615	0.101	2.878

In the cotton sector, the results show that the sector engages in the coordination of its supply chain activities. The results show that respondents somewhat agreed with the statements used to describe nature and antecedents of supply chain coordination in the sector. On coordination mechanisms used in the sector, respondents indicated that they somewhat agreed that coordination mechanisms used are effective which are mainly contracts and price with the following mean score;

*Coordination mechanism (M=5.40)*

Respondents also somewhat agreed on factors that influence effective coordination of the cotton industry as represented by the mean score of the factors. The mean scores for antecedents of supply chain coordination in the cotton sector were;

*Trust (M=5.265), Communication (5.254), Supplier capabilities (5.314), Commitment 4.777), Transaction specific investments (4.857), Information sharing 4.755).*

However, respondents were not sure on the impact of the following factors on the coordination of the cotton supply chain whose mean scores were lower than the agreeing range;

*Collaboration (M=4.452), Technology (4.314).*

Results also show that organisations agreed that supply chain coordination of activities in the sector has a positive impact on the sector through improvements in organisation performance (M=5.01).

Respondents disagreed that environmental factors have an impact on the coordination of the cotton supply chain with a mean score value of (M=2.976).

### **6.7.3 The Dairy Processors**

The dairy sector is composed of four major companies competing against each other. The sector has one government (parastatal) organisations and three independent companies. Table 6.38 presents descriptive statistics for the sector.

**Table 6.38: Descriptive Statistics for Dairy processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	4	1	7	5.357	1.387	1.938	-0.959	1.848
Coordination Mechanisms	4	1	7	5.292	1.239	2.234	0	2.03
Trust	4	1	7	5.714	1.418	2.042	-0.367	1.834
Communication	4	1	7	3.583	1.656	3.617	-0.235	1.805
Commitment	4	1	7	5.722	1.167	1.56	-0.121	1.753
Information Sharing	4	1	7	5.5	1.087	1.262	-0.031	1.779
Collaboration	4	1	7	4.714	2.023	4.417	-0.294	1.979
Transaction Specific Investments	4	1	7	5.25	1.273	3.25	0.824	1.94
Supplier capabilities	4	1	7	6.05	0.761	0.617	0.428	1.718
Environmental Factors	4	1	7	4.125	1.042	1.306	-0.383	1.783
Technology	4	1	7	5.4	1.449	2.233	-0.384	1.844
Organisational Performance	4	1	7	6.143	1.032	2.208	-0.483	1.948

Results from organisations in the dairy sectors show that organisation that participated somewhat agreed with the statement on nature of coordination in the sector, mainly vertical coordination in the form of contracts and vertical integration. On coordination mechanisms used, the results show that the sector uses contracts as the main mechanism of coordinating its supply chain activities as shown by the mean scores.

*Nature (M=5.357), Coordination Mechanisms (M=5.292)*

Results also show that respondents agreed that the antecedents of coordination discussed in the previous sections have a positive impact on coordination of supply chain activities among organisations in the dairy sector. The results show the mean average scores as follows;

*Trust (M=5.714), Commitment (M=5.772), Information sharing (M=5.5), and supplier capabilities (M=6.05).*

Results also show that organisations agreed that coordination of their supply chain activities has a positive impact on their performance as indicated by the mean scores of organisational performance (M=6.143).

On the other hand, organisations in the sector were not sure about the impact of communication on the coordination of their supply chain activities with a mean score of ( $M=3.583$ ).

#### 6.7.4 Tobacco Processors

Tobacco is the backbone of the agricultural sector in the country and is the biggest net exporter bringing in the much needed foreign currency. Nine organisations from the sector participated in the survey and the results show that the sector highly depends on farmers for its existence. The results show that the respondents were not sure on the nature of coordination ( $M=4.413$ ) in the sector as it is the only sector that operates under a dual system which is both contract and transactional through the auction system at the Tobacco sales floor. On coordination mechanisms used, organisations somewhat agreed that they use contracts as a coordination mechanism ( $M=4.98$ ).

**Table 6.39: Descriptive Statistics for Tobacco processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	9	1	7	4.413	1.466	2.3278	-0.278	3.636
Coordination Mechanisms	9	1	7	4.98	1.53	2.453	-0.388	2.969
Trust	9	1	7	5.27	0.784	0.646	-0.458	1.688
Communication	9	1	7	5.049	1.716	3.127	-1.075	3.218
Commitment	9	1	7	5.097	1.361	2.339	-0.345	2.442
Information Sharing	9	1	7	4.857	1.222	1.527	-0.731	2.322
Collaboration	9	1	7	4.13	1.495	2.355	-0.705	3.086
Transaction Specific Investments	9	1	7	4.704	1.626	2.731	-0.405	2.314
Supplier capabilities	9	1	7	5.389	0.955	0.938	-0.095	2.344
Environmental Factors	9	1	7	3.148	1.384	1.972	-0.249	2.026
Technology	9	1	7	4.022	1.883	3.756	-0.189	1.473
Organisational Performance	9	1	7	5.008	1.179	1.52	-0.526	2.643

Results also show that organisations somewhat agreed that factors such as; trust ( $M=5.27$ ), communication ( $M=5.049$ ), commitment ( $M=5.049$ ), information sharing ( $M=4.857$ ), transaction specific investments ( $M=4.704$ ) and supplier capabilities ( $M=5.389$ ) have a positive impact on coordination of supply chain activities in the sector.

Results also show that organisations that participated were not sure if *collaboration* ( $M=4.13$ ) has a positive impact on the coordination of supply chain activities in the sector.

On the other hand, organisations somewhat disagreed that environment factors ( $M=3.148$ ) have an impact on the coordination of their supply chain activities as tobacco is auctioned and exported to other countries.

Generally, all organisations agreed that coordination of supply chain activities has led to improvements in organisational performance ( $M=5.008$ ).

### 6.7.5 Food Processors

In the food processing sector, five companies participated and the results show that the organisations somewhat agreed that they coordinate their supply chain activities and that the sector is both vertically coordinated and integrated with the mean score for nature ( $M=5$ ).

**Table 6.40: Descriptive Statistics for Food processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	5	1	7	5	0.68	0.55	-0.555	2.43
Coordination Mechanisms	5	1	7	5.133	0.988	1.117	0.14	1.65
Trust	5	1	7	4.886	0.943	1.26	-0.468	1.935
Communication	5	1	7	3.778	0.840	1.038	-0.741	2.172
Commitment	5	1	7	1.935	0.711	0.625	0.152	2.738
Information Sharing	5	1	7	4.371	1.131	1.9	-0.342	2.344
Collaboration	5	1	7	3.8	1.333	2.26	-0.453	1.780
Transaction Specific Investments	5	1	7	4.133	1.779	3.167	-0.585	2.146
Supplier capabilities	5	1	7	2.146	0.680	0.733	-0.245	1.666
Environmental Factors	5	1	7	3.6	0.695	0.7	0.279	2.081
Organisational Performance	5	1	7	5.2	0.881	1.18	-0.030	1.916

Results show that food processing companies somewhat agreed that they have *coordination mechanisms* ( $M=5.133$ ) in place for effective coordination of their supply chain activities. Organisations also somewhat agreed that *trust* ( $M=4.886$ ) and *technology* ( $M=4.64$ ) have an impact on the coordination of upstream activities in the food processing sector.

Respondents were not sure about the impact of *communication* ( $M=3.778$ ), *information sharing* ( $M=4.371$ ), *collaboration* ( $M=3.8$ ) and *environmental factors* ( $M=3.6$ ) on the coordination of their upstream supply chain activities.

Organisational respondents also disagreed that *supplier capabilities* ( $M=2.146$ ) and *commitment* ( $M=1.935$ ) have an impact on the coordination of supply chain activities with their suppliers.

Although the responses on antecedents on supply chain coordination were not positive, organisations that participated in the survey somewhat agreed that coordination leads to improved *organisational performance* ( $M=5.2$ ).

### 6.7.6 Meat processing companies

Seven companies participated and the results show that the organisations somewhat agreed that they coordinate their supply chain activities and that the sector is both vertically coordinated and integrated and also transactional with the mean score for nature ( $M=5$ ).

**Table 6.41: Descriptive Statistics for Meat processors**

Question Item	N	Min	Max	Mean	Std Deviation	Variance	Skewness	Kurtosis
Nature	7	1	7	5.0	1.228	1.755	-0.394	2.374
Coordination Mechanisms	7	1	7	5.024	1.215	1.627	-0.617	2.403
Trust	7	1	7	5.673	0.858	0.817	0.071	1.897
Communication	7	1	7	4.206	1.405	2.280	-0.340	2.787
Commitment	7	1	7	5.625	0.922	0.952	0.156	1.762
Information Sharing	7	1	7	5.45	1.107	1.32	-0.094	2.002
Collaboration	7	1	7	4.837	1.296	1.721	-0.624	2.397
Transaction Specific Investments	7	1	7	5.047	1.502	2.5242	-0.05	2.464
Supplier capabilities	7	1	7	5.886	0.967	1.079	-0.322	2.199
Environmental Factors	7	1	7	3.762	0.962	1	-0.296	1.792
Technology	7	1	7	5.343	1.056	1.428	-0.316	2.039
Organisational Performance	7	1	7	5.510	0.929	0.921	-0.288	2.261

The results also show that meat processing organisation somewhat agreed that they have coordination mechanisms ( $M=5.024$ ) in place to facilitate effective coordination of their supply chain activities.

The organisations also somewhat agreed that *technology* ( $M=5.343$ ), *collaboration* ( $M=4.837$ ), *information sharing* ( $M=5.45$ ) and *transaction specific investments* ( $M=5.047$ ) have an impact on coordination of supply chain activities as it facilitates communication and payments. Results also show that organisations agreed that factors; *trust* ( $M=5.625$ ), and *supplier capabilities* ( $M=5.886$ ) have a positive impact on coordination of their supply chain activities.

However, respondents were not sure about the impact of environmental factors ( $M=3.762$ ) and communication on the coordination of their supply chain activities.

Results show that respondents generally agreed that coordination of their upstream supply chain activities has a positive impact as it improves organisational performance ( $M=5.510$ ).

## **6.8 Section Summary**

This section presented industry findings by-products produced. Descriptive statistics were used to analyse the presented data for each industry. The industries analysed were the agro-industry, food, dairy, meat, tobacco and cotton processing industries. Qualitative data were collected using semi-structured and in-depth interviews. The results show that the Zimbabwean agro sector has adopted supply chain as a business strategy, engage their suppliers, assist and visit suppliers. Coordination mechanisms used in the industry were also discussed together with antecedents of coordination among Zimbabwean agro processing organisations. The last section discussed technological usage, challenges, benefits and impact of coordination of supply chain activities on the performance of Zimbabwean agro processing organisations. The next section presents results on the relationships that exist between suppliers and Zimbabwean agro processing companies

## **6.9 Relationships among Agro processing companies in Zimbabwe**

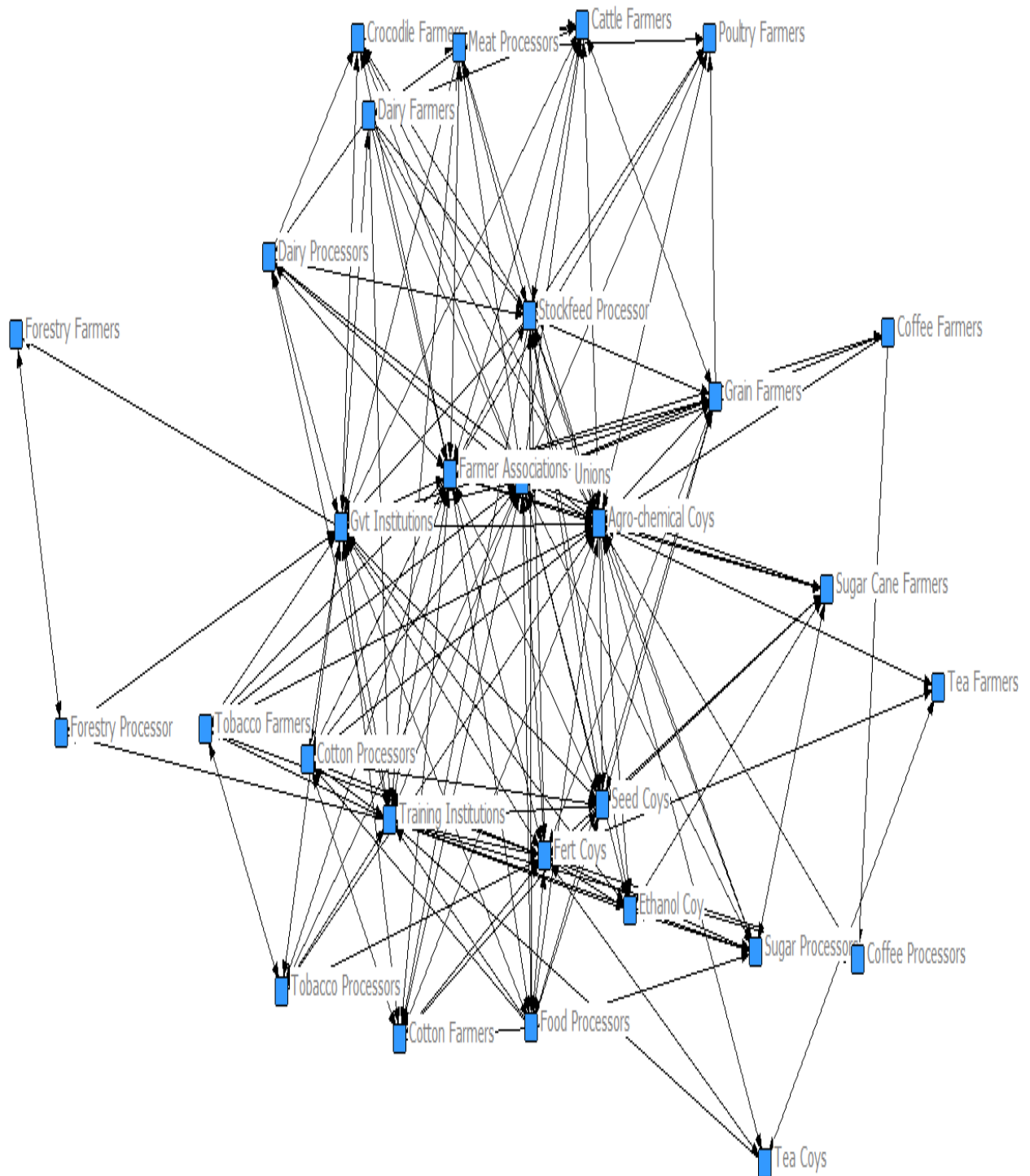
The study also utilised UCINET software to analyse the relationships that exist between agro processing companies and their suppliers. Social network analysis (SNA) was used in the study to define the role of the various actors in a relationship so as to understand the nature of the interaction between actors. SNA helps in identifying bottlenecks in resource and information sharing that affect business activities.

Data analysed in this section was collected from actors /player in the Zimbabwean agro processing supply chain using semi-structured interviews. During the interviews, key informants were asked about the types of relationships that exist with their suppliers and customers. Both agro processing companies and suppliers were asked standard questions regarding their interaction, power, material and financial exchanges in the relationships that exist among them. According to Caniato et al

(2014), SNA is used to understand the roles of actors, their actions and interactions within the network so as to investigate the relationships between the individuals, groups and systems hence its usage in this study. The researcher used this methodology to understand the nature, role and influence of supply chain actors in the Zimbabwean agro processing organisations. Findings from the interviews are presented in Figure 6.16.



**Figure 6.16: Relationships among supply chain actors in Zimbabwean agro-industry**



Arrows in Figure 6.16 indicate the direction of flow of resources or relationship as reported by respondents. The researcher used UCINET qualitative software program to graphically present the social relationships that exist among supply chain actors. To identify the interaction patterns among supply chain actors, the study employed three social network measures that have been proposed by Borgatti, Verret and Freeman (2013) such as:

A) Degree centrality which was used to measure the level of connectedness in the network. It also measures the number of ties that exist among the actors. The actors are connected to each other by the supplier representatives, industry associations, NGOs and institutions such as the MoA.

B) Closeness used to measure the degree to which actors are close to each other in a network/relationship. It also considers the distance of the relationship between actors.

C) Betweenness which was used to measure the connection between nodes and considers the centeredness in respect to any other nodes (Ansell, Lundin and Öberg (2017)). It considers an actor's position in a relationship who assumes the role of a gatekeeper.

### **6.9.1 Network Density.**

Density in a relationship is used to measure the connectivity of the actors through the number of ties in the relationship. Density is used to count the number of relationships that exist and potential relationships that can exist (Borgatti, Everett, and Johnson 2013).

Borgatti, Everett, and Johnson (2013) argue that where there is a high proportion of connectivity, the network is highly dense and is more cohesive. Such a cohesive network is likely to mobilise collective action for the benefit of the existing relationship and all actors involved.

From Figure 6.16, it can be noted that the network density is characterised by farmer associations and agro-inputs suppliers (seed, fertilizer & agrochemical companies) that act as gatekeepers. These companies have relationships with almost all farmers and agro processor save for crocodile, tea and coffee farmers as well as agro-processors in these industries since the companies source inputs for onward transmission to farmer unions in the different industries. They also have relationships with farmer unions and associations as they represent and negotiate terms for their members. Government departments and institutions in the agricultural sector are not left out of the relationship since they come in to regulate and collaborate in terms of research and new product development initiatives with these players.

Farmer associations, mainly ZFU represents all farmers in Zimbabwe and is the secretariat of the farmers. In-depth interviews with the association representative revealed that it offers services such as training, market linkages, weekly market guides, production manuals, commodity prices for each and every market. The association also uses technology to run a platform for its members. The Esoko platform operates as an online auction for farmers by providing bids and offers for commodities through the provision of commodity codes in partnership with AMA. The online system is linked to buyers thereby strengthening the relationship between buyers and sellers. Through the platform buyers and suppliers have access to transport information, weather reports and facilitates linkages between trading companies and suppliers.

**Table 6.42: Relationship density**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	Density	No.of Ties	Std Deviation	Avg Degree	Alpha
<b>Agro SNA</b>	0.304	247	0.460	8.517	0.927

Table 6. 42 shows the relationship density among Zimbabwean agro processing companies. The network has 247 ties with a density of 0.304 which shows that there is no cohesion in the industry. Since the networks lack cohesion, it becomes difficult to mobilise collective action among the actors.

Although there is no cohesion in the sector, the results show that the actions of the participants are based on interest, where their level of involvement in the network is based on responsibilities and benefits derived from the activities of the actors involved (Ackerman 2011). This explains the involvement of farmer associations and representatives in the sector as they have the ability to influence decision making in Zimbabwean agro processing organisations (Alemu 2017). In this case, the ZFU is responsible for representing farmer interests by providing micro-finance services to small suppliers and engaging in farmer training through farmer forums so as to reduce costs. The association is also responsible for training suppliers on the value chain, monitoring of supplier projects that are initiated by the association and has also embarked on livestock vaccination programmes for suppliers in the meat processing sector.

### **6.9.2 Nature of Relationship**

The researcher sought to identify the nature of the relationship that exists between agro processing companies and their suppliers. The results are presented in Figure 6.17.

**Figure 6.17: Word Frequency Query Results on Nature of Relationship**



Figure 6.17 shows that the predominant word in the word cloud query is a relationship, meaning that Zimbabwean agro processing organisations have relationships with their suppliers, followed by transactional showing that other companies do not have relationships with their suppliers. Contractual relationship is third showing that the relationship is based on contractual agreements. Other companies engage in vertical integration as presented in the word cloud query.

The results show that 61.1 % (11 coding references) indicate that they have a relationship with their suppliers, which includes contractual agreements and vertical integration. 38.9% of the respondents (7 coding references) indicate that they have a transactional relationship with their suppliers, meaning that they buy from anyone selling the raw material and products they want.

### **6.9.3 Relationship Power**

To determine the power –dependence dynamics in the business relationship, the researcher asked the respondents a question on who has more bargaining power. The responses to this question are presented in Table 6.43.

**Table 6.43: Coding Reference Percentage on Relationship power**

<b>NVivo Node</b>	<b>Coding References</b>	<b>Coding Reference %</b>
Partnership	7	46.7
Company	7	46.7
Suppliers	1	6.6

Results from Table 6.43 show that 46.7 % (7 coding references) of the interviewees indicated that they have a partnership, meaning that they have equal bargaining power and depend on each other for the survival of the business. Some of the responses from in-depth interviews were as follows:

*We both have power depending on the nature of the product and volumes.*

*We have control measures in place since we are a quasi monopoly.*

*We depend on each other.*

*We have a partnership.*

Another 46.7 % (7 coding references) indicate that their company has more bargaining power in the relationship than the suppliers. Responses from this group include some of the following:

*The company has leverage on the suppliers.*

*Our company has international connections*

*The company as the supplier relies on our farm for farming and cattle ranching.*

*We have more power as farmers rely on us to buy their produce*

The remainder 6.6% (1 coding reference) which constitute the minority of the respondents indicate that suppliers have more bargaining power in the relationship. The response was:

*Farmers have more bargaining power because of political decisions that affect company activities such as payment for by-products and services rendered.*

From the response, it is noted that the relationship is affected by political interferences and patronage which affect organisational activities giving suppliers bargaining power.

#### **6.9.4 Supplier Visits**

The researcher sought to find out if agro processing companies visit their supplier premises and the reasons for their visits. The results are presented in Figure 6.18.

**Figure 6.18: Word Frequency Query Results on Supplier Visits**



Results from Figure 6.18 show that agro processing companies visit supplier premises for different reasons, such as to check product, assess hectrage among other reasons. Some of the responses include:

*We visit supplier farms to check on the quality of the product for forecasting and also to check on input usage*

*We visit supplier premises to learn about production methods and facilities*

*We visit suppliers to assess production hecтарage in order to forecast accurately*

*They visit our premises to check on the quality of their cattle*

*To check on the quality of tea and assessment of hecтарage*

On the other hand, some of the reasons for supplier visits that came out of in-depth interviews with the suppliers were:

*The Company visits our farms to assess the plant and its quality and estimate tonnage of produce*

*Customer visits farms and offers employees who provide service to farmers such as issuing of fertilizers and application of chemicals*

*They visit to assess if there is any help they can offer to improve my yield*

*They do farm visits when there are problems, for relationship maintenance and to check on production*

*Coordinator visits, research, soil sampling is done for free, seminars and training*

Generally, the results show that Zimbabwean agro processing companies visit their supplier premises for a number of reasons, chief among them, to check on the quality of the product, hecтарage cultivates and relationship maintenance. Supplier visits assist in ensuring the right quantities and quality of products producing through supplier engagement and product assessment from the source.

### **6.9.5 Section Summary**

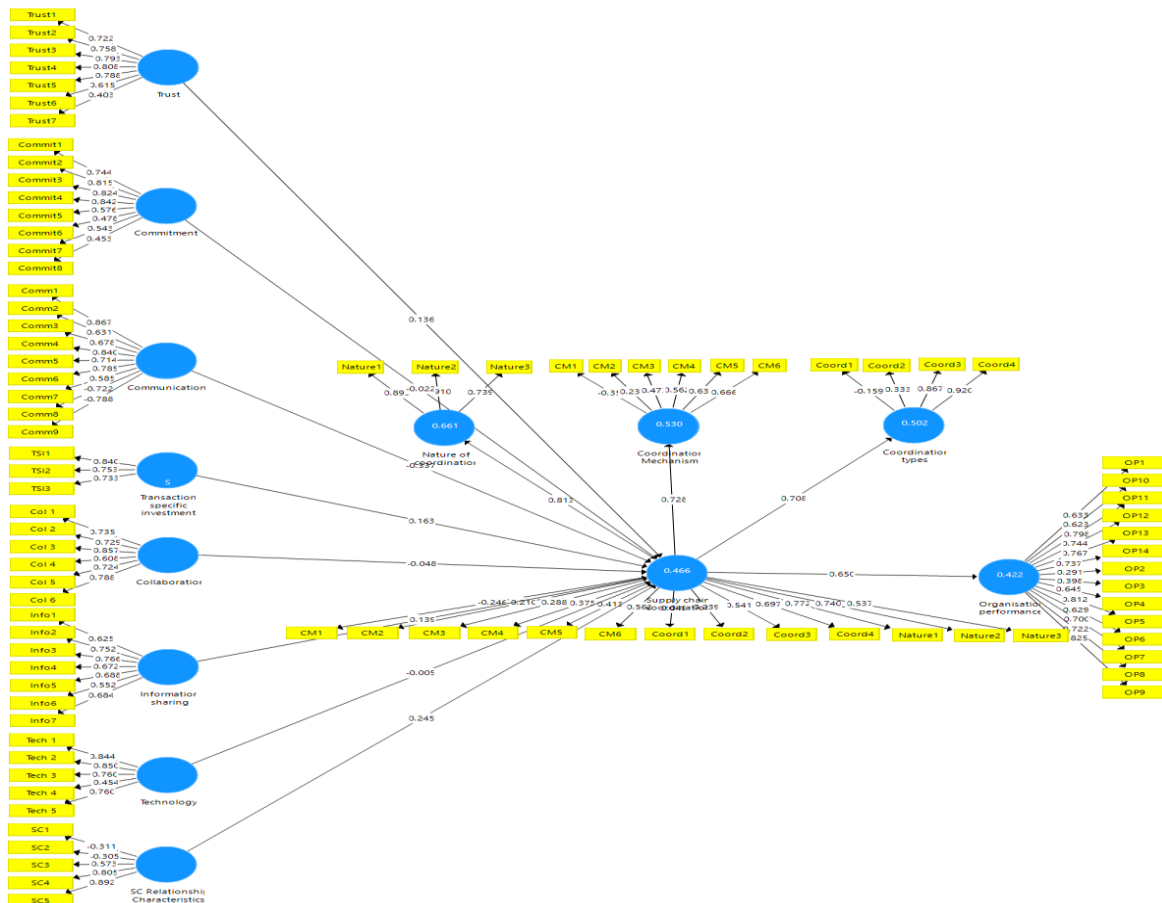
This section presented the empirical data collected from Zimbabwean agro processing companies by means of descriptive statistics and qualitative methods. The next section used a structural modelling approach was chosen to evaluate both errors in construct measurement and error in hypothesized relations.

## 6.10 Structural Equation Modelling and Hypothesis Testing

### 6.10.0 Section Introduction

The previous section presented descriptive statistics from the survey data and results from the exploratory strand of the study presented in the form of word frequency query and percentages. It also provided the foundation for hypothesis testing through factor analysis. In line with the convergent parallel methodological design used for the study, the quantitative strand had more weighting than the qualitative strand. Due to the dominance of the quantitative research approach, it was found necessary to test the hypothesis of the study. It is against this background that Partial Least Squares (PLS) and Structural Equation Modelling (SEM) were adopted for hypothesis testing to explain the correlational and causal relationships between the test variables.

**Figure 6.19 Proposed Model**



**Key:** Trust, Commit (Commitment), Comm (Communication), TSI (Transaction Specific Investments), Col (Collaboration), Info (Information Sharing), Tech (Technology), SC (Supplier

Capabilities), CM (Coordination Mechanisms), Coord (Coordination) and OP (Organisational Performance).

### **6.10.1 MODEL FORMULATION**

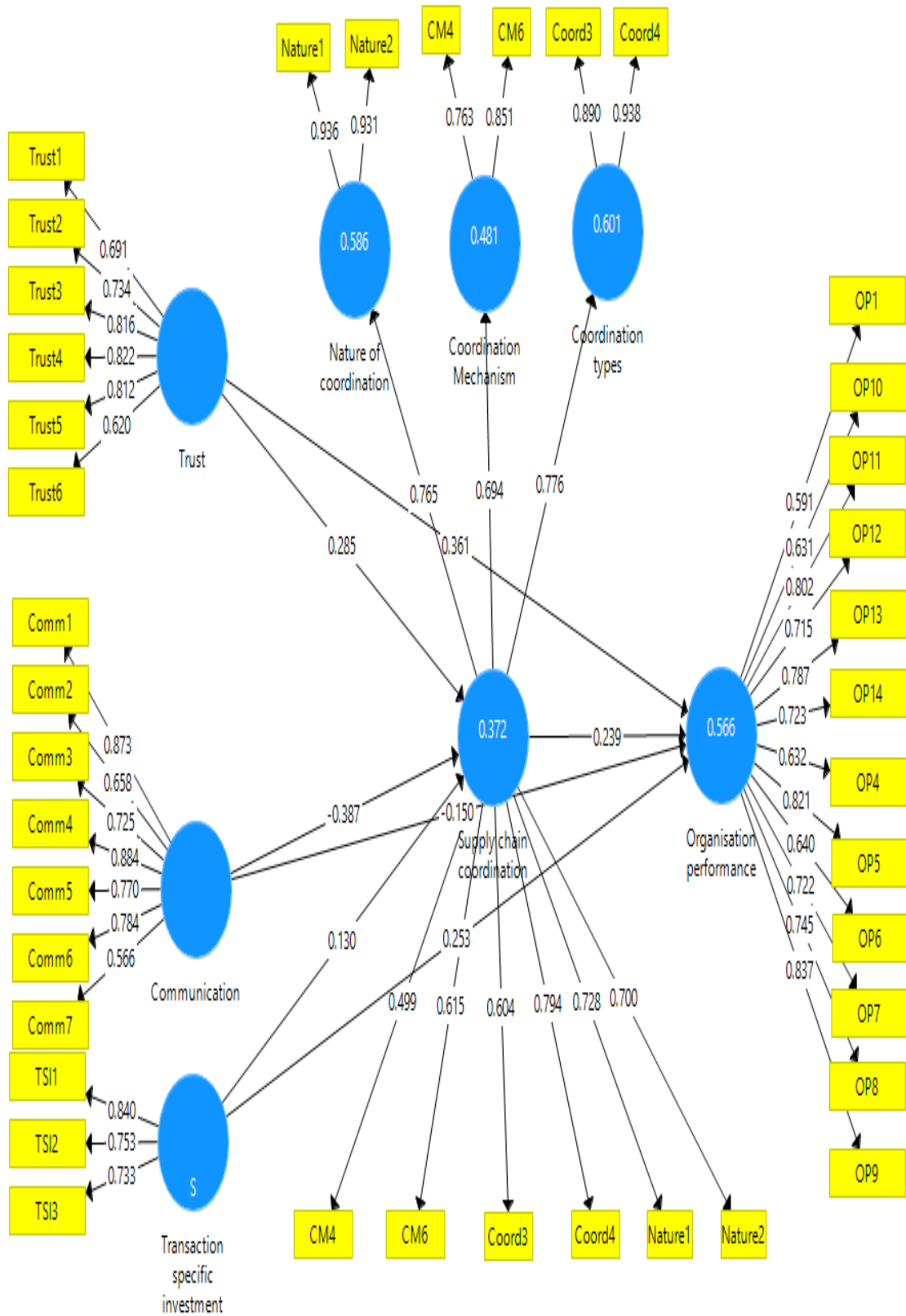
#### **Model 1(Transaction Cost Theory)**

### **6.10.2 Indicator Reliability**

Since reliability is a condition for validity, indicator reliability was first checked to ensure the associated indicators have much in common with what was captured by the latent construct. After examining the outer loadings for all latent variables presented in Figure 6.23, 7 indicators (Coord1, Coord2, CM1, CM2, CM3, OP2, OP3) were removed because their outer loadings were lower than the 0.4 threshold level (Hair et al., 2013). Meanwhile, 8 indicators (CM4, CM5, CM6, Coord3, Nature3, Trust6, Comm2, Comm7, OP1, OP4, OP6, OP10), were found to have loadings between 0.4 to 0.7. A loading relevance test was therefore performed for these indicators to see if they should be retained in the model. In a loading relevance test, problematic indicators should be deleted only if their removal from the PLS model leads to an increase of AVE and composite reliability of their constructs over the 0.5 thresholds. CM5 and Nature3 were removed to improve the Average Variance Extracted (AVE) and composite reliability for the latent variable Supply chain coordination to above 0.5; the other indicators were not removed from the PLS model to maintain content validity because their respective Average Variance Extracted (AVE) and composite reliability was already above 0.50. The remaining indicators were retained because their outer loadings are all 0.7 or higher. The resulting path model estimation is presented in Figure 6.20 and the outer loadings of the various constructs are shown in Table 6.44.



**Figure 6.20: PLS Path Model Estimation 1**



**Table 6.44: Outer Loadings Model 1**

<b>Constructs (Latent Variables)</b>	<b>Outer loadings</b>
<b>Supply Chain Coordination</b>	
<b>Nature of Coordination</b>	
Nature1	0.728
Nature2	0.700
<b>Coordination Mechanism</b>	
CM4	0.499
CM5	0.615
<b>Coordination Types</b>	
Coord3	0.604
Coord4	0.794
<b>Trust</b>	
Trust1	0.691
Trust2	0.734
Trust3	0.816
Trust4	0.822
Trust5	0.812
Trust6	0.620
<b>Communication</b>	
Comm1	0.873
Comm2	0.658
Comm3	0.725
Comm4	0.884
Comm5	0.770
Comm6	0.784
Comm7	0.566
<b>Transaction Specific Investments</b>	
TSI1	0.840
TSI2	0.753
TSI3	0.733
<b>Organisation Performance</b>	
OP1	0.591
OP4	0.632
OP5	0.821
OP6	0.640
OP7	0.722
OP8	0.745
OP9	0.837
OP10	0.631
OP11	0.802
OP12	0.715
OP13	0.787
OP14	0.723

### **6.10.3 Internal Consistency Reliability**

In PLS-SEM, composite reliability rather than Cronbach's alpha is used to evaluate the measurement model's internal consistency reliability. The internal consistency reliability is traditionally checked using Cronbach's alpha. However, it is not suitable for PLS-SEM because it is sensitive to the number of items in the scale, and this measure is also found to generate severe underestimation when applied to PLS path models (Werts, Linn, & Joreskog, 1974).

Prior research suggests that a threshold level of 0.60 or higher is required to demonstrate satisfactory composite reliability in exploratory research (Bagozzi and Yi, 1988) but not exceeding the 0.95 level (Hair et al., 2013). The composite reliability for the constructs Supply Chain Coordination, Trust, Communication, Transaction Specific Investments and Operations Performance were 0.822, 0.886, 0.903, 0.820 and 0.929 respectively, indicating fairly high levels of internal consistency reliability (Nunnally & Bernstein, 1994).

### **6.10.4 Convergent Validity and Discriminant Validity**

Convergent validity refers to the model's ability to explain the indicator's variance. The Average Variance Extracted (AVE) can provide evidence for convergent validity (Fornell and Larcker, 1981). Bagozzi and Yi (1988) suggest an AVE threshold level of 0.5 as evidence of convergent validity. The AVE for the latent construct Supply Chain Coordination, Trust, Communication, Transaction Specific Investments and Operations Performance as shown in Table 6.43, all are above the required minimum level of 0.50 (Bagozzi and Yi, 1988) except for Supply Chain Coordination which has a value of 0.498 (very close to 0.500). Therefore, the measures of the five reflective constructs can be said to have fairly high levels of convergent validity.

The Fornell-Larcker criterion (1981) is a common and conservative approach to assess discriminant validity and it can be applied in PLS-SEM. To establish the discriminant validity, the square root of average variance extracted (AVE) of each latent variable should be larger than the latent variable correlations (LVC) (Fornell and Larcker, 1981). Table 6.39 below clearly shows that discriminant validity was achieved because the square root of AVE for Supply Chain Coordination, Trust, Communication, Transaction Specific Investments and Organisation Performance was much larger than the corresponding LVC.

**Table 6.45: Convergent Validity and Discriminant Validity Model 1**

	1	2	3	4	5
1. Communication	<i>0.759</i>				
2. Organisation Performance	-	<i>0.725</i>			
3. Supply Chain Coordination	0.446	-	<i>0.589</i>		
4. Transaction Specific Investments	0.516	-	<i>0.664</i>		
5. Trust	-	0.551	0.388	<i>0.777</i>	
	0.350	0.588	0.465	0.409	<i>0.753</i>
	-				
	0.254				

Note: The square root of AVE values is shown on the diagonal and printed in italics; non-diagonal elements are the latent variable correlations (LVC).

### 6.10.5 Evaluation of the Structural Model in PLS-SEM: Collinearity Assessment

In addition to checking the measurement model, the structural model has to be properly evaluated before drawing any conclusion. Collinearity is a potential issue in the structural model and that variance inflation factor (VIF) value of 5 or above typically indicates such problem (Hair et al., 2013). The collinearity assessment results are summarized in Table 6.46 below. It can be seen that all VIF values were lower than five, suggesting that there was no indication of collinearity between the predictor variables.

**Table 6.46: Collinearity Assessment Model 1**

Constructs	VIF	Collinearity Problem? (VIF>5?)	Constructs	VIF	Collinearity Problem? (VIF>5?)
<i>Communication</i>	1.159	NO	<i>Communication</i>	1.405	NO
<i>Trust</i>	1.221	NO	<i>Trust</i>	1.363	NO
<i>Transaction Specific Investments</i>	1.301	NO	<i>Transaction Specific Investments</i>	1.348	NO
			<i>Supply Chain Coordination</i>	1.591	NO

*Dependent variable: Supply Chain Coordination; Organisation performance*

*Dependent variable:*

### 6.10.6 Coefficient of Determination (R<sup>2</sup>)

A major part of structural model evaluation is the assessment of coefficient of determination (R<sup>2</sup>). In this model, Organisational Performance was the main construct of interest. From the PLS Path model estimation diagram (see Figure 6.19), the overall R<sup>2</sup> was found to be a moderate one. Threshold value of 0.25, 0.5 and 0.7 are often used to describe a weak, moderate, and strong

coefficient of determination (Hair et al., 2013). In this case, it suggests that the four constructs Supply Chain Coordination, Trust, Communication and Transaction Specific Investments jointly explain 56.6% of the variance of the endogenous construct Organisation Performance. The  $R^2$  value is 0.566.

### 6.10.7 Path Coefficient

Table 6.47 below show that five of the seven of the structural model relationships are significant, confirming some of the hypotheses about the construct relationships. The PLS structural model results led to the conclusion that Trust had the strongest effect on Organisational performance (0.361), followed by Transaction Specific Investments (0.253) and Supply Chain Coordination (0.239). Communication had the least effect on Organisational Performance (-0.150).

The PLS model estimation in Figure 6.19 above also revealed that the higher-order construct (HOC), Supply Chain Coordination, had strong relationships with its lower-order constructs (LOC), Nature of Coordination (0.765), Coordination Mechanism (0.694) and Coordination Types (0.776). This means that the LOC Nature of Coordination, Coordination Mechanism and Coordination Types were highly correlated for the HOC Supply Chain Coordination to explain more than 50% of each LOC's variance.

**Table 6:47: Significance Testing Results of the Structural Model Path Coefficients Model 1**

	<b>Path:</b>	<b>Path Coefficients</b>	<b>t-values</b>	<b>p-value</b>
H1	Trust →Supply Chain Coordination	0.285	2.091	0.037
H2	Communication →Supply Chain Coordination	-0.387	4.237	0.000
H3	Transaction Specific Investments →Supply Chain Coordination	0.130	0.994	0.323
H4	Supply Chain Coordination →Organisational Performance	0.239	2.005	0.045
H5	Trust →Organisational Performance	0.361	3.934	0.000
H6	Communication →Organisational Performance	-0.150	1.008	0.314
H7	Transaction Specific Investments →Organisational Performance	0.253	2.091	0.037

### 6.10.8: Predictive relevance ( $Q^2$ )

An assessment of Stone-Geisser's predictive relevance ( $Q^2$ ) is important because it checks if the data points of indicators in the reflective measurement model of the endogenous construct can be predicted accurately. This was achieved by making use of the blindfolding procedure in SmartPLS.

*Supply Chain Coordination* and *Organisational Performance* were the two endogenous constructs in the model so they were selected for running the Blindfolding Algorithm.

The following table summarizes the results. It was observed that the proposed model had good predictive relevance for the endogenous variables. Chin (1998) suggests that a model demonstrates good predictive relevance when its  $Q^2$  value is larger than zero as shown in Table 6.48 below.

**Table 6.48: Results of Coefficient of Determination ( $R^2$ ) and Predictive Relevance ( $Q^2$ ) Model 1**

Endogenous Latent Variable	$R^2$ Value	$Q^2$ Value
<i>Supply Chain Coordination</i>	0.372	0.141
<i>Organisational Performance</i>	0.566	0.259

### 6.10.9: The $f^2$ Effect Size

The final step in structural model evaluation was to assess the effect of a specific exogenous construct on the endogenous construct if it is deleted from the model. This was achieved by examining the  $f^2$  effect sizes. Following Cohen's (1988) guideline which states that  $f^2$  values of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large effect sizes, respectively, therefore, in general the exogenous variables had low to medium effect sizes on the endogenous variables as presented in Table 6.49 below.

**Table 6.49: Results of  $f^2$  Model 1**

	<i>Supply Chain Coordination</i>		<i>Organisation Performance</i>	
	Path Coefficient	$f^2$ Effect Size	Path Coefficient	$f^2$ Effect Size
Communication	-0.387	0.204	-0.150	0.037
Trust	0.285	0.105	0.361	0.221
Transaction Specific Investments	0.130	0.020	0.253	0.110
Supply chain Coordination	n/a	n/a	0.239	0.083

Note: Target constructs appear in the first row, whereas the predecessor constructs are in the first column

### 6.10.10 Summary of Hypothesis Testing

Five of the hypotheses were supported, and the results are summarized in Table 6.50 below. Trust and Communication are found to have a significant impact on Supply Chain Coordination (H1 and H2). However, there was no significant effect of Transaction Specific Investments on Supply Chain Coordination so the hypothesis (H3) was rejected. There was also a significant effect of Supply

Chain Coordination, Trust and Transaction Specific Investments on Organisational Performance so the hypotheses (H4, H5 and H7) were supported. However, there was no significant effect of Communication on Organisational Performance so the hypothesis (H6) is rejected.

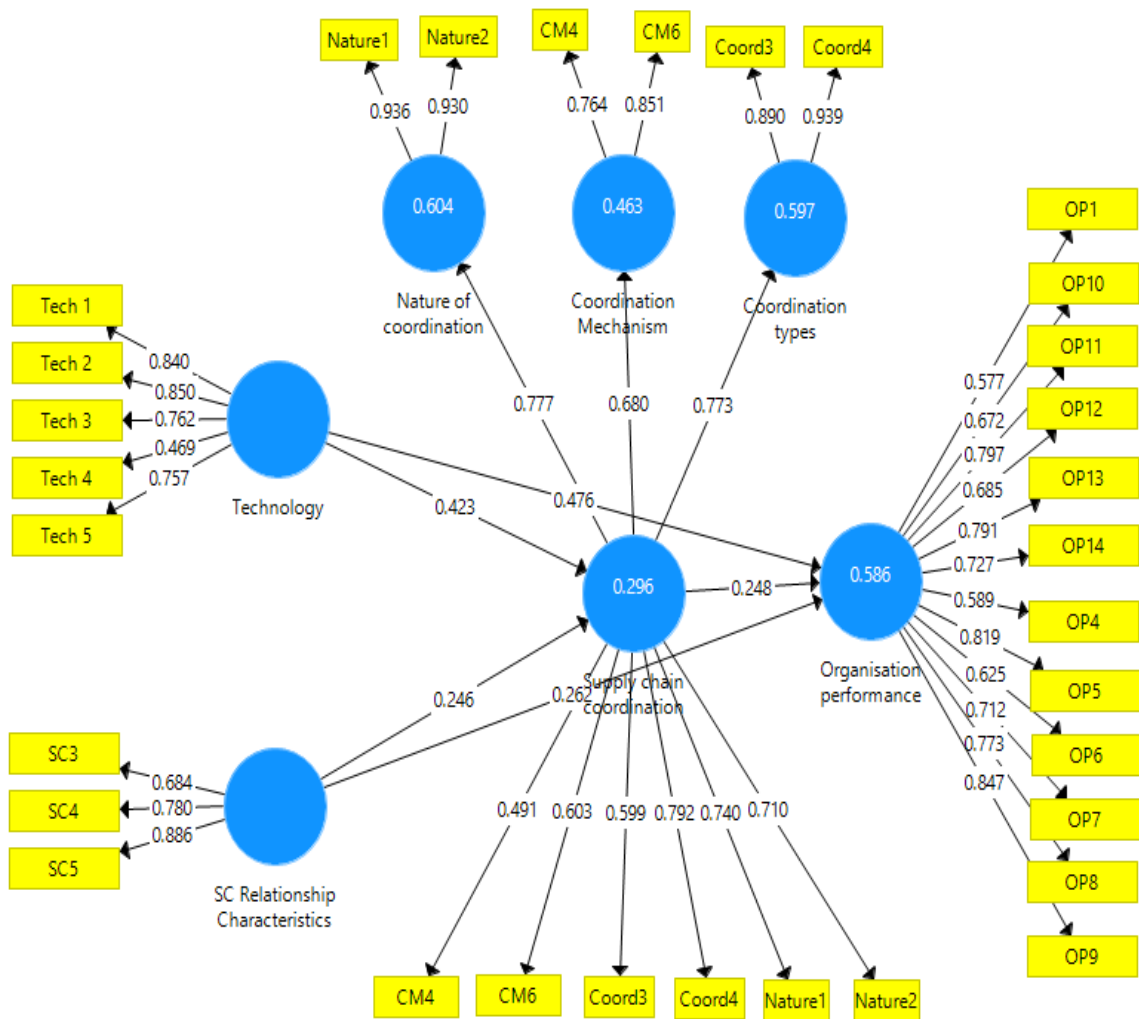
**Table 6.50: Summary of Hypotheses Testing Model 1**

	Hypotheses	Supported? (Yes/No)
H1	Trust →Supply Chain Coordination	Yes
H2	Communication →Supply Chain Coordination	Yes
H3	Transaction Specific Investments→Supply Chain Coordination	No
H4	Supply Chain Coordination →Organisation Performance	Yes
H5	Trust →Organisation Performance	Yes
H6	Communication →Organisation Performance	No
H7	Transaction Specific Investments →Organisation Performance	Yes

**6.11: Model 2 (Resource Based Theory)**

The indicator reliability discussion for Supply Chain Coordination, Nature of Coordination, Coordination Mechanism and Organisation Performance presented in Model 1 also applied to Model 2. After examining the outer loadings for Technology and Supplier Relationship Characteristics latent variables, the 4 indicators (Tech4, SC1, SC2 and SC3) were found to have loading between 0.4 to 0.7. A loading relevance test was therefore performed for these indicators to see if they were to be retained in the model. SC1 and SC2 were removed to improve the Average Variance Extracted (AVE) and composite reliability for the latent variable Supplier Relationship Characteristics to above 0.5; the other indicators were not removed from the PLS model to maintain content validity because their respective Average Variance Extracted (AVE) and composite reliability were already above 0.50. The remaining indicators were retained because their outer loadings were 0.7 or higher. The resulting path model estimation is presented in Figure 6.21 and the outer loadings of the various constructs are shown in Table 6.51.

**Figure 6.21: PLS Path Model Estimation 2**





**Table 6.51: Outer Loadings Model 2**

<b>Constructs (Latent Variables)</b>	<b>Outer loadings</b>
<b>Supply Chain Coordination</b>	
<b>Nature of Coordination</b>	
Nature1	0.936
Nature2	0.930
<b>Coordination Mechanism</b>	
CM4	0.764
CM5	0.851
<b>Coordination Types</b>	
Coord3	0.890
Coord4	0.939
<b>SC Relationship Characteristics</b>	
SC3	0.684
SC4	0.780
SC5	0.886
<b>Technology</b>	
Tech1	0.840
Tech2	0.850
Tech3	0.762
Tech4	0.469
Tech5	0.757
<b>Organisation Performance</b>	
OP1	0.577
OP4	0.589
OP5	0.819
OP6	0.625
OP7	0.712
OP8	0.773
OP9	0.847
OP10	0.672
OP11	0.797
OP12	0.685
OP13	0.791
OP14	0.727

### 6.11.1 Internal Consistency Reliability

The composite reliability for the constructs Supply Chain Coordination, SC Relationship Characteristics, Technology and Organisation Performance were 0.822, 0.829, 0.860, and 0.928 respectively, indicating fairly high levels of internal consistency reliability (Nunnally & Bernstein, 1994).

### 6.11.2 Convergent Validity and Discriminant Validity

The AVE for the latent construct Supply Chain Coordination, Supplier Relationship Characteristics, Technology and Organisation Performance are shown in Table 6.52, were all above the required minimum level of 0.50 (Bagozzi and Yi, 1988) except for Supply Chain Coordination which had a value of 0.498 (very close to 0.500). Therefore, the measures of the four reflective constructs can be said to have fairly high levels of convergent validity.

Table 6.52 below also clearly shows that discriminant validity was achieved because the square root of AVE for Supply Chain Coordination, SC Relationship Characteristics, Technology and Organisation Performance were much larger than the corresponding LVC.

**Table 6.52: Convergent Validity and Discriminant Validity Model 2**

	1	2	3	4
1. SC Relationship Characteristics	<i>0.788</i>			
2. Organisation Performance	0.572	<i>0.723</i>		
3. Supply Chain Coordination	0.479	0.576	<i>0.664</i>	
4. Technology	0.367	0.638	0.489	<i>0.749</i>

Note: The square root of AVE values is shown on the diagonal and printed in italics; non-diagonal elements are the latent variable correlations (LVC).

### 6.11.3 Evaluation of the Structural Model in PLS-SEM: Collinearity Assessment

The collinearity assessment results are summarized in Table 6.47 below. It shows that all VIF values were lower than five, suggesting that there was no indication of collinearity between the predictor variables.

**Table 6.53: Collinearity Assessment Model 2**

Constructs	VIF	Collinearity Problem? (VIF>5?)	Constructs	VIF	Collinearity Problem? (VIF>5?)
SC Relationship Characteristics	1.077	NO	SC Relationship Characteristics	1.163	NO
Technology	1.077	NO	Technology	1.332	NO
			Supply Chain Coordination	1.420	NO

*Dependent variable: Supply Chain Coordination;  
Organisation performance*

*Dependent variable:*

#### 6.11.4 Coefficient of Determination ( $R^2$ )

In this model, Organisational Performance was the main construct of interest. From the PLS Path model estimation diagram (see Figure 6.20), the overall  $R^2$  was found to be a moderate one. In this case, it suggests that the three constructs Supply Chain Coordination, SC Relationship Characteristics and Technology jointly explain 58.6% of the variance of the endogenous construct Organisation Performance. The  $R^2$  value is 0.586.

#### 6.11.5 Path Coefficient

From Table 6.54 below, it can be seen that four of the five of the structural model relationships are significant, confirming some of the hypotheses about the construct relationships. The PLS structural model results lead to the conclusion that Technology had the strongest effect on Organisation performance (0.476), followed by Supplier Relationship Characteristics (0.262). Supply Chain Coordination had the least effect on Organisation Performance (0.248).

**Table 6.54: Significance Testing Results of the Structural Model 2 Path Coefficients**

	Path:	Path Coefficients	t-values	p-value
H8	SC Relationship Characteristics →Supply Chain Coordination	0.246	1.904	0.057
H9	Technology →Supply Chain Coordination	0.423	3.727	0.000
H10	Supply Chain Coordination →Organisational Performance	0.248	2.526	0.012
H11	SC Relationship Characteristics →Organisational Performance	0.262	2.011	0.045
H12	Technology →Organisational Performance	0.476	3.714	0.000

### 6.11.6 Predictive relevance ( $Q^2$ )

*Supply Chain Coordination* and *Organisation Performance* were the two endogenous constructs in the model so they were selected for running the Blindfolding Algorithm. The following table summarizes the results. It was observed that the proposed model had a good predictive relevance for the endogenous variables. Chin (1998) suggests that a model demonstrates good predictive relevance when its  $Q^2$  value is larger than zero (see Table 6.55 below).

**Table 6.55: Results of Coefficient of Determination ( $R^2$ ) and Predictive Relevance ( $Q^2$ ) Model 2**

Endogenous Latent Variable	$R^2$ Value	$Q^2$ Value
<i>Supply Chain Coordination</i>	0.296	0.115
<i>Organisation Performance</i>	0.586	0.262

### 6.11.7 The $f^2$ Effect Size

In general, the exogenous variables had low to medium to large effect sizes on the endogenous variables (see Table 6.56 below).

**Table 6.56: Results of  $f^2$  Model 2**

		<i>Supply Chain Coordination</i>		<i>Organisation Performance</i>	
		Path Coefficient	$f^2$ Effect Size	Path Coefficient	$f^2$ Effect Size
Supplier Relationship Characteristics		0.246	0.080	0.262	0.143
Technology		0.423	0.236	0.476	0.411
Supply Chain Coordination	chain	n/a	n/a	0.248	0.105

Note: Target constructs appear in the first row, whereas the predecessor constructs are in the first column

### 6.11.8 Summary of Hypothesis Testing

Four of the hypotheses were supported, and the results are summarized in Table 6.57 below. Supplier Relationship Characteristics was found to have no significant impact on Supply Chain Coordination so the hypothesis (H8) was not supported. However, there was a significant impact of Technology on Supply Chain Coordination so the hypothesis (H9) was supported. There was also a significant effect of Supply Chain Coordination, Supplier Relationship Characteristics and Technology on Organisational Performance so the hypotheses (H10, H11 and H12) were supported.

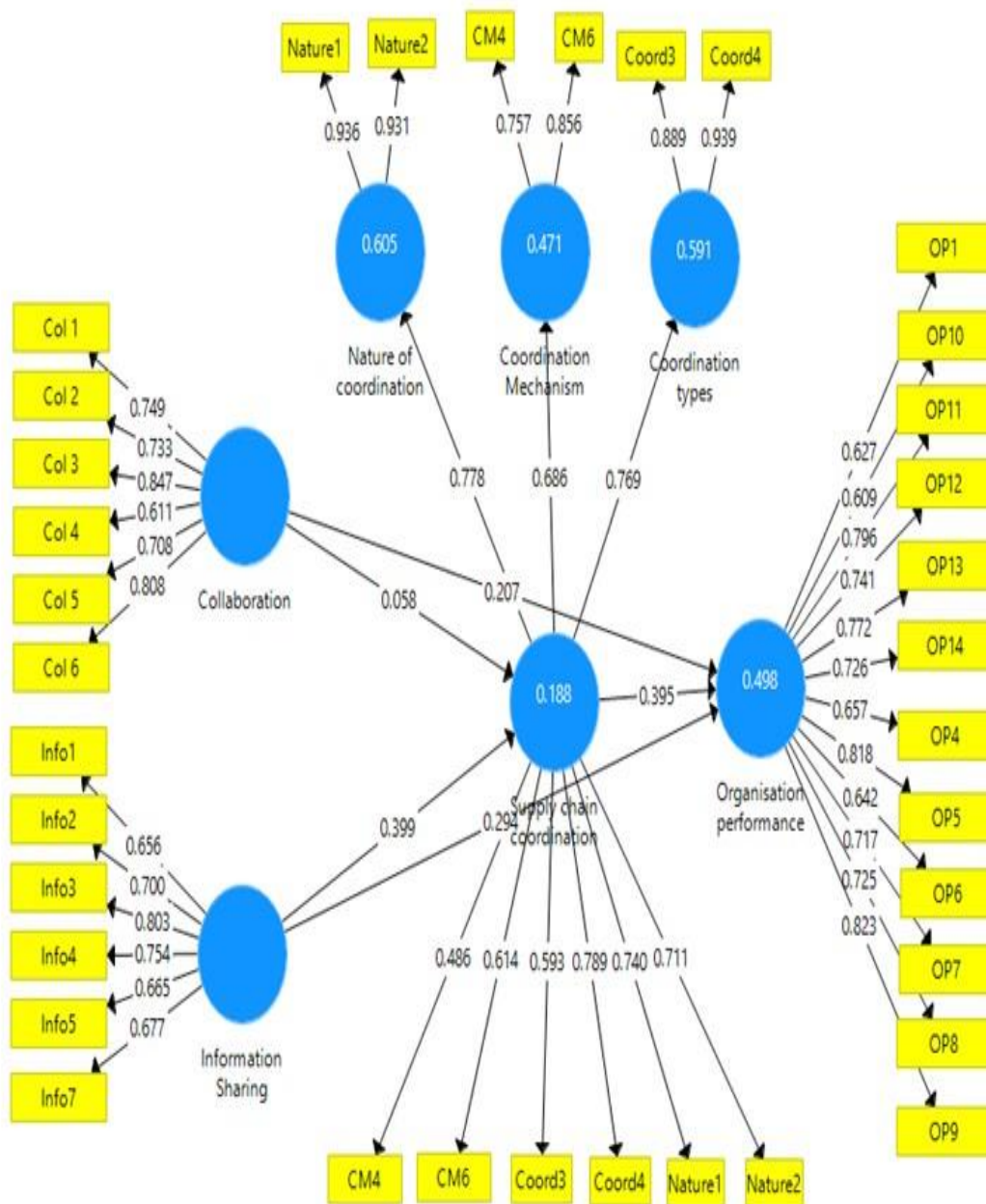
**Table 6.57: Summary of Hypotheses Testing Model 2**

	Hypotheses	Supported? (Yes/No)
H8	SC Relationship Characteristics →Supply Chain Coordination	No
H9	Technology →Supply Chain Coordination	Yes
H10	Supply Chain Coordination →Organisation Performance	Yes
H11	SC Relationship Characteristics →Organisation Performance	Yes
H12	Technology →Organisation Performance	Yes

### 6.12 Model 3 (Network Theory)

The indicator reliability discussion for *Supply Chain Coordination*, *Nature of Coordination*, *Coordination Mechanism* and *Organisation Performance* presented in Model 1 also applied to Model 3. After examining the outer loadings for *Collaboration* and *Information Sharing* latent variables, the 5 indicators (Col4, Info1, Info5, Info6, and Info7 ) were found to have loadings between 0.4 to 0.7. A loading relevance test was therefore performed for these indicators to see if they should be retained in the model. Info6 was removed to improve the Average Variance Extracted (AVE) and composite reliability for the latent variable *Information Sharing* to above 0.5; the other indicators were not removed from the PLS model to maintain content validity because their respective Average Variance Extracted (AVE) and composite reliability was already above 0.50. The remaining indicators were retained because their outer loadings were 0.7 or higher. The resulting path model estimation is presented in Figure 6.22 and the outer loadings of the various constructs are shown in Table 6.58.

**Figure 6.22: PLS Path Model Estimation 3**



**Table 6.58: Outer Loadings Model 3**

<b>Constructs (Latent Variables)</b>	<b>Outer loadings</b>
<b>Supply Chain Coordination</b>	
<b>Nature of Coordination</b>	
Nature1	0.936
Nature2	0.931
<b>Coordination Mechanism</b>	
CM4	0.757
CM5	0.856
<b>Coordination Types</b>	
Coord3	0.889
Coord4	0.939
<b>Information Sharing</b>	
Info1	0.656
Info2	0.700
Info3	0.803
Info4	0.754
Info5	0.665
Info7	0.677
<b>Collaboration</b>	
Col1	0.749
Col2	0.733
Col3	0.847
Col4	0.611
Col5	0.708
Col6	0.808
<b>Organisation Performance</b>	
OP1	0.627
OP4	0.657
OP5	0.818
OP6	0.642
OP7	0.717
OP8	0.725
OP9	0.823
OP10	0.609
OP11	0.796
OP12	0.741
OP13	0.772
OP14	0.726

### 6.12.1 Internal Consistency Reliability

The composite reliability<sup>1</sup> for the constructs *Supply Chain Coordination*, *Information Sharing*, *Collaboration* and *Organisation Performance* were 0.822, 0.859, 0.882, and 0.929 respectively, indicating fairly high levels of internal consistency reliability (Nunnally & Bernstein, 1994).

### 6.12.2 Convergent Validity and Discriminant Validity

The AVE for the latent construct *Supply Chain Coordination*, *Information Sharing*, *Collaboration* and *Organisation Performance* are shown in Table 6.59, were all above the required minimum level of 0.50 (Bagozzi and Yi, 1988) except for *Supply Chain Coordination* which had a value of 0.498 (very close to 0.500). Therefore, the measures of the four reflective constructs had fairly high levels of convergent validity.

Table 6.59 below also clearly shows that discriminant validity was achieved because the square root of AVE for *Supply Chain Coordination*, *Information Sharing*, *Collaboration* and *Organisation Performance* were much larger than the corresponding LVC.

**Table 6.59: Convergent Validity and Discriminant Validity Model 3**

	1	2	3	4
1. Information Sharing	<i>0.711</i>			
2. Organisation Performance	0.578	<i>0.725</i>		
3. Supply Chain Coordination	0.431	0.580	<i>0.664</i>	
4. Collaboration	0.550	0.478	0.277	<i>0.746</i>

Note: The square root of AVE values is shown on the diagonal and printed in italics; non-diagonal elements are the latent variable correlations (LVC).

### 6.12.3 Evaluation of the Structural Model in PLS-SEM: Collinearity Assessment

The collinearity assessment results are summarized in Table 6.60 below. It can be seen that all VIF values were lower than five, suggesting that there was no indication of collinearity between the predictor variables.

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We have only considered the composite reliability for the Higher-Order Construct (HOC) *Supply Chain Coordination* and not its Lower-Order Construct (LOC) *Nature of Coordination*, *Coordination Mechanisms* and *Coordination Types*. This also applies to convergent and discriminant validities.



**Table 6.60: Collinearity Assessment Model 3**

Constructs	VIF	Collinearity Problem? (VIF>5?)	Constructs	VIF	Collinearity Problem? (VIF>5?)
Information Sharing	1.433	NO	Information Sharing	1.629	NO
Collaboration	1.433	NO	Collaboration	1.437	NO
			Supply Chain Coordination	1.232	NO

*Dependent variable: Supply Chain Coordination;  
Organisation performance*

*Dependent variable:*

#### 6.12.4 Coefficient of Determination ( $R^2$ )

In this model, Organisational Performance was the main construct of interest. From the PLS Path model estimation diagram (see Figure 6.22), the overall  $R^2$  was found to be a moderate one. In this case, it suggests that the three constructs Supply Chain Coordination, Information Sharing and Technology c jointly explain 49.8% of the variance of the endogenous construct Organisation Performance. The  $R^2$  value is 0.498.

#### 6.12.5 Path Coefficient

From Table 6.61 below, it can be seen that three out of five of the structural model relationships are significant, confirming some of hypotheses about the construct relationships. The PLS structural model results enabled the researcher to conclude that Supply Chain Coordination had the strongest effect on Organisational performance (0.395), followed Information Sharing (0.294). Collaboration had the least effect on Organisation Performance (0.207).

**Table 6.61: Significance Testing Results of the Structural Model Path Coefficients Model 3**

	Path:	Path Coefficients	t-values	p-value
H13	Information Sharing →Supply Chain Coordination	0.399	3.234	0.001
H14	Collaboration →Supply Chain Coordination	0.058	0.424	0.672
H15	Supply Chain Coordination →Organisation Performance	0.395	3.953	0.000
H16	Information Sharing →Organisation Performance	0.294	2.687	0.007
H17	Collaboration →Organisation Performance	0.207	1.766	0.078

### 6.12.6 Predictive relevance ( $Q^2$ )

*Supply Chain Coordination* and *Organisation Performance* are the two endogenous constructs in the model so they were selected for running the Blindfolding Algorithm. The following table summarizes the results. It is observed that the proposed model has good predictive relevance for the endogenous variables. Chin (1998) suggests that a model demonstrates good predictive relevance when its  $Q^2$  value is larger than zero (see Table 6.62 below).

**Table 6.62: Results of Coefficient of Determination ( $R^2$ ) and Predictive Relevance ( $Q^2$ ) Model 3**

Endogenous Latent Variable	$R^2$ Value	$Q^2$ Value
<i>Supply Chain Coordination</i>	0.188	0.067
<i>Organisation Performance</i>	0.498	0.226

### 6.12.7 The $f^2$ Effect Size

In general, the exogenous variables had low to medium effect sizes on the endogenous variables (see Table 6.63 below).

**Table 6.63: Results of  $f^2$  Model 3**

	<i>Supply Chain Coordination</i>		<i>Organisation Performance</i>	
	Path Coefficient	$f^2$ Effect Size	Path Coefficient	$f^2$ Effect Size
Information Sharing	0.399	0.137	0.294	0.106
Collaboration	0.058	0.003	0.207	0.060
Supply chain Coordination	n/a	n/a	0.395	0.253

Note: Target constructs appear in the first row, whereas the predecessor constructs are in the first column

### 6.12.8 Summary of Hypothesis Testing

Three of the hypotheses were supported, and the results are summarized in Table 6.64 below. Information Sharing had a significant impact on Supply Chain Coordination (H13). However, there was no significant effect of Collaboration on Supply Chain Coordination so the hypothesis (H14) was rejected. There was also a significant effect of Supply Chain Coordination and Information Sharing on Organisational Performance so the hypotheses (H15 and H16) were supported. However, there was no significant effect of Collaboration on Organisational Performance so the hypothesis (H17) was rejected.

**Table 6.64: Summary of Hypotheses Testing Model 3**

	Hypotheses	Supported? (Yes/No)
H13	Information Sharing →Supply Chain Coordination	Yes
H14	Collaboration →Supply Chain Coordination	No
H15	Supply Chain Coordination →Organisational Performance	Yes
H16	Information Sharing →Organisational Performance	Yes
H17	Collaboration →Organisational Performance	No

### **6.13 Chapter Summary**

This chapter presented the empirical data collected from individual and corporate users of football brands by means of quantitative and qualitative methods. The structure of the chapter followed data collection process where data were collected concurrently, analysed separately and results were merged. SEM was used in the chapter to test the hypotheses proposed in chapter 4. The chapter provides a detailed discussion of the empirical data presented.

## **CHAPTER 7: DISCUSSION OF FINDINGS**

### **7.0 Introduction**

The chapter provides a detailed discussion of the empirical data that was presented in the preceding chapter. The findings are discussed in relation to the study's research questions which provided a guideline for the study. The study adopted a mixed-methods study by mixing qualitative and quantitative datasets in order to give a more complete picture of the problem.

The chapter is divided into five sections in line with the research questions. The first section discusses the findings on the nature of the supply chain among Zimbabwean agro processing companies. The second section discusses antecedents of supply chain coordination, while the third section discusses the impact of supply chain coordination in the Zimbabwean agro processing organisations and results of hypothesis testing. The fourth section discusses findings on buyer-seller relationships that exist in the sector. The last section focuses on determining the extent to which existing theories of coordination that can be applied to supply chain coordination among Zimbabwean agro processing organisations.

### **7.1 What is the nature of Supply Chain coordination among Zimbabwe agro processing organisations?**

#### **7.1.1 Adoption of Supply chain as a business strategy**

Questionnaires were used to collect data in the quantitative aspects of the study from 59 agro processing companies and 20 suppliers. To find out the extent to which the Zimbabwean agro processing organisations have adopted supply chain as a business strategy, a One-Sample T-test with a test value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to analyse data.

The findings that identified the adoption of supply chain as a business strategy are:

Adoption of supply chain as a business strategy (M=5.97), formalisation of supply chain activities (M=5.85) and coordination of supply chain activities (M=5.81). These findings are corroborated by findings from suppliers, where the mean scores for adoption of supply chain as a business strategy were: formalisation of supply chain activities (M=5.05), coordinated supply chain activities (M=5.3) and company is coordinator (M=4.9). Formalisation offers a mechanism for integrating or coordinating activities. This is in line with Reukert and Walker (1987) who note that

formalisation through rules and procedures have a positive relationship with supply chain effectiveness.

The results from the qualitative strand of the study show that Zimbabwean agro processing organisations engage their suppliers. The study recorded a total of 18 coding references from agro processing companies' interviews analysis in NVivo. The findings show that 50% (9 coding references) and 22.2 % (4 coding references) of the interviewees engage their suppliers, through either contract or other means (Table 6.33) while the remaining 27.8% (5 coding references) do not engage suppliers. These findings are also corroborated by interview results from suppliers (farmers) who indicated Zimbabwean agro processing organisations have adopted supply chain as a business strategy by coordinating supply chain activities. Findings from supplier interviews show that all the interviewees indicated that their supply chain activities are coordinated. Findings were from 16 coding references where 50% (8 coding references) indicated that supply chain activities are coordinated by coordinators, 25 % (4 coding references) by agro processing companies and 25% (4 coding references) by others, namely supplier associations. Findings from in-depth interviews with key informants from agro processing organisations (mainly public) show that Zimbabwean agro processing organisations engage in public-private partnerships to boost production. These collaborative relationships are used as a way of reducing operational costs as participants share resources and costs.

The findings from SEM show that the PLS model estimation in Figure 6.24 also reveals that the higher-order construct (HOC), *Supply Chain Coordination*, has strong relationships with its lower-order constructs (LOC), *Nature of Coordination* (0.765), *Coordination Mechanism* (0.694) and *Coordination Types* (0.776). This means that the LOC *Nature of Coordination*, *Coordination Mechanism* and *Coordination Types* are highly correlated for the HOC *Supply Chain Coordination* to explain more than 50% of each LOC's variance. These findings, therefore, show that Zimbabwean agro processing organisations have adopted supply chain as a business strategy.

### **7.1.2 Nature of Supply chain coordination**

To identify the nature of supply chain coordination among Zimbabwean agro processing organisations, a One-Sample T-test with a test value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to analyse the resultant data. Quantitative findings from agro processing companies show that Zimbabwean agro processing organisations are both vertically coordinated and integrated with mean scores above the Test Value (4.0) such as vertically coordinated supply chain (M=5.44) and vertically integrated supply chain (M=5.08). This shows that Zimbabwean

agro processing organisations vertically coordinate activities between suppliers and agro companies are coordinated. The companies also use vertical integration, where it was noted that a number of companies in the industry own farms to produce raw materials and reduce costs. Findings from suppliers also support coordination of activities through vertical coordination. This stems from the mean average score of supplier responses of a vertically coordinated supply chain. (M=4.85). Vertical coordination is practiced in almost every sector of the agro processing industry, for example in the tea, coffee, sugar, cotton, timber, dairy, tobacco and timber processing sectors. The findings are in line with Brown (2002) who notes that vertical coordination is based on long-term contractual commitments where members invest resources into relationships. In vertical integration a company is involved through backward integration with suppliers to obtain its input. This type of coordination is also practised by Zimbabwean agro processing companies in the tea, coffee, sugar, timber and ethanol processing sectors. These companies, apart from vertically coordinating their supply chain through contracts, produce their own raw materials so as to meet production schedules. The findings are also in line with IFAD (2003), where farmers are contracted by private companies that provide inputs and services in return for guaranteed quality supplies.

### **7.1.3 Coordination mechanisms used by Zimbabwean agro processing companies**

Findings also show the coordination mechanism used by Zimbabwean agro processing organisations. Coordination mechanisms that were identified included: contracts (M=5.71), prices (M=5.41), bargaining power (M=5.17), trust (M=5.15), quantity discounts (M=4.54) and transactional (M=4.51). Results from suppliers support the findings on coordination mechanisms. From the supplier quantitative strand, the findings indicate that coordination mechanisms used by Zimbabwean agro processing organisations are: price (M=6.3), quantity discounts (6.1), trust (M=5.5), contract (M=4.95) and bargaining power (M=4.25).

The results from interviews with agro processing companies show that the majority of these companies (10 coding references) use contracts as the main coordination mechanisms. Some of the responses given were:

*We have 2000 contract farmers*

*We have 240 growers of which 204 are contract farmers*

*We sign a memorandum of understanding and agreements with the farmers;*

*We subcontract 179 hectares to a private company (Eastern Highlands)*

*We have an out grower scheme where we provide inputs.*

Interviews with suppliers produced similar results on coordination mechanisms used in the sector where some of interviewees responses were:

*I am a contract farmer because of benefits and assistance from the customer.*

*Independent and contract*

Findings from document analysis show that in the tobacco sector in 2014, licensed merchants contracted 49 143 growers who delivered their crop to the contracting companies (TIMB2014), while the number of contracting companies increased from eight (8) to fifteen (15). For the 2018-2019 seasons, the number of licensed contracting companies has increased to 35 and 32 licensed merchants (TIMB 2019), showing an increase in vertically coordinated supply chains. Findings from interviews with farmer associations also show that contracts are used in this sector as their association representative highlighted that their role is to review contract terms on behalf of farmers and checking the viability of the contract. These findings are in line with the views of Ashinder et al. (2007) who note that contracts offer guidance in negotiating the terms of the relationship between supplier and buyer and are designed in such a way that they minimise conflicts that may crop up in future. In order to minimize conflicts, Zimbabwean agro processing organisations use contracts as the main coordination mechanism. Zimbabwean agro processing organisations mainly use production contracts as noted by Boland et.al. (2002), where contracts have provisions which include supply of production inputs by the contractor, quality and quantity of the product and the type of compensation for services rendered as is the case in the sector. In production contracts, processors who are usually the buyers have control and are responsible for management of crop loss and management risks. In production and management contracts, the processors participate in crop management and provide inputs. Arshinder and Deshmukh (2007) and Singh (2011) note that trust and information sharing as a coordination mechanism are important facets required in a supply chain. Zimbabwean agro processing organisations also use trust as a coordination mechanism. Chopra and Meindl (2004) also note that trust is the most important component in supply chain coordination, hence it is important in guiding Zimbabwean agro processing industry in the signing of contractual agreements between suppliers and agro companies.

## **7.2 What are the Antecedents of Supply Chain Coordination among Zimbabwean Agro-Processing Companies?**

Antecedents that were identified when a One-Sample T-test with a test value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was applied to the quantitative data where; trust, commitment, information sharing, collaboration, supplier capabilities and transaction specific investments.

### **7.2.1 Trust**

The variables used to measure trust (M=5.40) were all significantly above the Test Value (4.0) and were: satisfactory relationship (M=5.59), satisfactory supplier performance (M=5.56), keeping promises (M=5.53), supplier confidence (M=5.53), trustworthy supplier (M=5.49) coordinator reliability (M=5.24) and mutuality (M=4.90). Findings from supplier respondents' show that the players in this sector trust each other with trust (M=5.74). The findings are in line with Murali et al. (2011) who notes that trust is the binding force on supply chain parties to reap mutual benefits. This view is corroborated by Yeung, *et.al.* (2009) who notes that trust contributes to the long-term stability of a supply chain and upholds relationships among the supply chain members.

The results from the qualitative strand of the study also show that the players in the Zimbabwean agro processing organisations trust each other. The variable trustworthy recorded 12 coding references from agro processing companies. This element was supported by suppliers who 12 coding references for the same variable. Trust was also measured by reliability, where a total of 14 NVivo coding references were recorded for agro processing companies and 10 NVivo coding references from suppliers on the same measure.

The study used the SEM technique to assess the impact of trust on supply chain coordination. The findings presented in the PLS Path Model Estimation 1 (Figure 6.23) show that trust (*H1*) as an antecedent of supply chain coordination has a significant impact on the dependent variable SCC.

*Therefore the hypothesis (H1) Trust among supply chain partners has an impact on Supply Chain Coordination is accepted on the basis that the p-value of trust is 0.037 and is less than 5%.*

The findings are also in line with Crotts *et al.* (2001) who posits that trust enables sustainability of the relationship within the supply chain, where suppliers deliver the correct stock, in the correct quantity, at a price that is reasonable to both parties, so as to increase the trust and commitment levels of the supplier relationship, leading to a collaborative relationship. The findings are also in line with Achim and Ritter (2003) who note that trust allows organisations and their suppliers to maximise the efficiency of their capabilities and resources leading to lower costs as is the case in the Zimbabwean agro processing organisations. Mayer *et al.* (1995) corroborates this view when



he notes that trust facilitates cohesion and collaboration between organisations. Trust facilitates cooperation and is an enabler of coordination and interactions among supply chain partners. The findings show that trust plays an important role in the coordination of Zimbabwean agro processing organizations' supply chains.

### **7.2.2 Commitment**

Commitment (M=5.21) was measured by variables such as: supplier responsiveness (M=5.78), supplier willingness to deliver (M=5.66), willingness to share information (M=5.51), long term relationship (M=5.64), supplier commitment to product improvements (M=5.12), supplier willingness to innovate (M=4.92), supplier willingness to engage in planning (M=4.76), supplier responsiveness (M=5.78) and willingness to be involved in innovation (M=4.58). From the supplier respondents, commitment has an average mean score (M=5.52) showing that the sector is committed to working together for the mutual benefit of the parties involved.

These findings are in line with Xiao *et.al* (2010) who notes that commitment is also a key element in maintaining a relationship in a supply chain. Moshkdanian and Molahosseini (2013) also support the contribution of commitment by noting that commitment significantly influences supply chain information sharing

The results from interviews with agro processing companies and supplier representatives showed that the players in this sector are committed to the success of the relationship that exists in the industry. In terms of commitment, a total of 12 NVivo coding references were recorded from interviews with agro processing companies showing the level of commitment that exist in the sector. Findings from agro processor suppliers also highlighted the level of commitment with responses such as:

*The customer is committed since they buy all the sugar cane produced.*

*They are committed because the relationship benefits both of us*

These findings are also in line with Salam (2011) who posits that commitment in a supply chain is a promise or agreement which is vital for the success of a supply chain relationship. The findings show that both parties are committed to the relationship that exists between them. Commitment leads to adaption in meeting the required product specifications. Buxton and Tait (2012) note that committed suppliers will make relationship-specific investments and exert effort to satisfy the buyer. The findings also show that because of commitment, suppliers of Zimbabwean agro processing companies strive to satisfy the needs of the buyer by allocating required resources (time, effort and money) to improve their supply chain performance.

### 7.2.3 Communication

On communication (M=4.57) as an antecedent of supply chain coordination among Zimbabwean agro processing organisations, the variables subjected to a One-Sample T-Test produced the following findings: communication through skype (M=6.05), supplier visits (M=5.17), informing customers about business issues (M=5.03), communicating changes (M=4.97) and supplier meetings (M=4.69). These findings show that Zimbabwean agro processing organisations communicate with each other for coordination purposes. However, in the study, mean score values below the test value (4.0) were recorded for; face to face communication (M=3.90), contact suppliers for coordination purposes (M=3.63), written communication (M=3.58) and calling suppliers (M=3.17). The qualitative strand of the study of agro processing companies and supplier representatives showed that communication is important among supply chain partners.

The findings show that agro processing companies communicate with suppliers through various communication platforms. The platforms used include telephone (6 NVivo coding references), face to face communication (6 coding references), email and through association (4 coding references each). Communication through skype has the least number of respondents (1 coding reference), showing that Zimbabwean agro processing organisations have not embraced technology for communication purposes. The findings also show that Zimbabwean agro processing organisations have very few international suppliers as highlighted in the responses:

*We communicate through telephone, face to face, email and skype with foreign suppliers*

*We communicate through telephone, face to face, and at times written communication*

*We communicate through visits and calling the farmers board depending on the situation. We usually use the extension officers*

The findings also show the frequency of communication between Zimbabwean agro processing companies and their suppliers. The findings show that the companies communicate frequently with their suppliers on the coordination of the supply chain. The findings show that communication is weekly (6 NVivo coding references) by agro processing companies, when necessary and regularly (4 coding references each) and daily (3 coding references each). The findings from the supplier qualitative strand compliment the quantitative findings. Findings from supplier interviews show that communication is done daily (12 coding references), face to face (8 coding references), email (4 coding references), skype (2 coding references) and written communication (1 coding reference).

Findings from the PLS Path Estimation Model 1 (Figure 6.23) show that communication (H2) has a significant impact on supply chain coordination.

Given the findings, *therefore the hypothesis (H2) that Communication among supply chain players has an impact on Supply Chain Coordination is accepted since the p-value (0.000) is less than 5%.*

#### **7.2.4 Information Sharing**

Another antecedent with high mean scores after the One Sample T-Test was information sharing (M=5.07). The findings show that information sharing as an antecedent was measured by the following variables: sharing product quality data (M=5.81), sharing information on price (M=5.73), sharing information on trends in the market (M=5.20), sharing information on-demand data (M=5.19), sharing information on inventory data (M=5.19), share business knowledge (M=4.25) and operational data (M=4.17). These results are in line Min *et al.* (2007) who note that information sharing involves distributing useful information for systems, people or organizational units and is regarded as the heart of supply chain collaboration.

Findings from the qualitative strand also show that Zimbabwean agro processing organisations share information. Information sharing recorded a combined total of 14 NVivo coding references from agro-processors' interviews showing that companies share information about trends in the market and demand data. The agro-processors also share information on production and training schedule with a combined total of 10 NVivo coding references. Information shared on-demand and sales forecast and product quality data has 4 NVivo coding references each. The study also identified that price (3coding references), quantity (3coding references), and competitor information (2 coding references) are marginally significant to Zimbabwean agro processing organisations. Information sharing in the supply chain leads to competitive advantage, through understanding customer needs, responsiveness to market changes quicker than competitors, costs enhance customer service and value at the same time, while lowering inventories and ultimately the total.

Some of the responses from interviews were:

*We share information on quantities to be supplied, due dates and quality of the products*

*We share information on price, demand fluctuations, trends in the market, competitor activities and forecasts.*

*We share information on price, trends in the market, and forecasts*

*We share technical information, demand fluctuations, trends in the market, and farming information*

*Production quotas, quantities and demand information*

The findings show that information sharing is of great importance in managing and coordination of the agro processing organisations supply chains in Zimbabwe. To analyse the impact of information sharing on supply chain coordination, SEM was used to test the impact of this variable. The findings from the PSL Path Model Estimation 3 (Figure 6.25) show that information sharing (H13) has a significant impact on SCC with a p-value (0.001) less than 5%.

*Therefore the hypothesis (H13) that information sharing among supply chain players has an impact on supply chain coordination is accepted.*

These findings concur with the views of Simatupang and Sridharan (2002) who noted that information sharing and incentive alignment are different forms of supply chain coordination which are critical in the management and coordination of the SC (Feldmann *et al.* 2003). This is also echoed by Simatupang (2004), who notes that information sharing is the beginning of collaborative arrangements in supply chains.

### **7.2.5 Collaboration**

The variable measurements for collaboration (M=4.36) are marginally significant above the Test Value (4.0) with the following findings: collaborating forecasting and planning (M=4.92), reward and risk-sharing (M=4.31), joint decision making (M=4.29), collaboration in new product development (M=4.25), collaborative planning (M=4.22) and collaborating in research and development. The findings show that collaboration among Zimbabwean agro processing organisations is marginally done by a few companies. From the supplier respondents, findings show that they collaborate with their customers in different facets of the business. The variable measurements for collaboration produced findings where planning production schedules with our customers (M=5.05), rewards and risks (M=4.6) are considered important by Zimbabwean agro processing organisations in buyer-seller relationships. The other measurement variables, engagement in collaborative forecasting and replenishment M= (3.8), collaboration in research and development of new products (M=3.95) were slightly below the Test value (4.0), showing that the suppliers of Zimbabwean agro processing organisations do not consider collaboration in these areas important.

The findings are in line with Agan (2011) who notes that collaboration is a result of commitment and trust among the supply chain members. These findings are also in line with Cao and Zhang (2010) who posits that collaboration involves companies working together to plan and execute supply chain operations for the achievement of common goals and mutual benefits.

Findings from the qualitative strand of the study also show that suppliers and agro processing organisations collaborate with each other in different aspects of the business for the benefit of the relationship. Collaboration recorded a combined total of 10 NVivo coding references from agro-processors' interviews and only 3 NVivo coding references for non-collaboration with suppliers. According to interviewees, non-collaboration is due to the fact that there is no need to collaborate with suppliers because of the nature of the product.

Some of the responses from interviewees included:

*We have collaborated in chicken production*

*We have collaborated in new product development, for PET bottles to ensure quality*

*We collaborate with suppliers when there is a new variety of product*

*We have collaborated with the Forestry school to come up with new product varieties*

Findings from in-depth interviewee responses also show that collaboration is done through processes integration. Interviewees indicated areas where companies collaborate with suppliers and areas of integration in their business processes. Responses from interviewees on this aspect were:

*Our processes are coordinated with those of CYMMIT the NGO we partner in new product development.*

*Our processes are coordinated with those of CYMMIT the NGO, FAO, SNV and GIZ we partner in new product development, to promote conservation agriculture and small scale mechanism.*

*We engage in collaborative research with Nyanga experimental research station. Agritex officers from the research station work with the company*

Although supplier quantitative responses tended to suggest that they do not collaborate with customers in new product development and research, findings from the interviews show that suppliers and customers of Zimbabwean agro processing organisations collaborate in these areas. The findings on collaboration are also in line with Mentzer *et al.* (2002) who posits that collaboration is characterised by the sharing of information, knowledge, risk and profits. These findings are also in line with Nyaga *et al.* (2010) who note that collaboration can be done through collaborative information sharing, joint relationship efforts and dedicated investments. From the findings, it was also noted that collaboration leads to competitive advantage as participating companies share resources, information, technology and expertise. The competitive advantage stems from collaborative planning, forecasting and replenishment, thereby minimizing wastage and costs as suppliers supply the required quantities in the right quality. However, the findings from

the PLS Path Model Estimation 3 (Figure 6.25) contradict the findings from literature since the P-value of the relationship between collaboration and supply chain coordination is greater than 5%. It is against this background that the hypothesis is rejected

*H14: Collaboration among Zimbabwean agro processing companies has an impact on supply chain coordination*

The results from the model show that collaboration has no significant impact on supply chain coordination. These findings could be from the fact that Zimbabwean agro processing organisations do not engage in collaboration due to the fact that suppliers do not have adequate resources and the prevailing economic conditions in Zimbabwe hinder collaborative relationships.

### **7.2.6 Supplier Capabilities**

The variable measurements for supplier capabilities ( M=5.61) that were identified when a One-Sample T-test with a test value (4.0), indicating the midpoint of a 7-point Likert-type scale was: supplier consistency on quality (M=5.76), accurate order fulfilment (M=5.68), supplier efficiency (M=5.56), supplier effectiveness (M=5.54) and on-time deliveries (M=5.51).

These findings show that suppliers of Zimbabwean agro processing organisations supply the required quality and are consistent in their supplies. Apart from being quality consistency, suppliers meet quality specifications while fulfilling orders accurately.

Findings from the qualitative strand of the study show that, on supplier effectiveness, agro processing interviewees noted that suppliers are effective in meeting their requirements. Some of the responses that came out were:

*The suppliers effective in meeting our requirements*

*The forestry school is effective in meeting our requirements but others are not*

*Suppliers are very effective although there is a need for improvement.*

Findings from the SEM show that there is no relationship between Supplier Relationship Capabilities and supply chain coordination. The findings from Model 2 (Table 6.48) show that the p-value (0.057) of Supplier Capabilities (SC) is greater than 5%, therefore, the variable has no significant impact on supply chain coordination. It is against this background that;

*Hypothesis (H8), Supplier Capabilities of supply chain players have an impact on Supply Chain coordination is rejected.*

From the findings, it can be noted that suppliers in the agro processing organisations in Zimbabwe are effective and efficient in meeting customer requirements but this is no due to coordination of activities in the supply chain. The reason why supplier capabilities do not have an impact on coordination could be attributed to the prevailing economic conditions and lack of resources as highlighted by some of the interviewees.

### **7.2.7 Transaction Specific Investments**

Variable measurements on transaction specific investments were all significantly above the Test Value (4.0) and the findings were: supplier assistance (M=5.66), the inclusion of suppliers in innovative programmes (M=5.39) and engagement in joint investments (M=4.17). Findings from suppliers also show that the variable measurements were significantly above the Test value, with Supplier assistance (M=5.75), showing that agro processing companies invest in their suppliers through offering assistance in different facets of the supplier business. the findings also show that suppliers are assisted to improve product quality (M=4.9) and are also included in continuous improvement programs (M=4.55) by agro processing companies so as to improve the performance of the supply chain thereby improving supply chain efficiency and effectiveness.

Findings from the qualitative strand of the study also corroborate these findings from the survey. Findings also show that suppliers and agro processing organisations work together in different aspects of the business for the benefit of the relationship. From agro processing companies' interviewee responses, it was noted that the companies invest in their suppliers. Some of the responses from in-depth interviewees were:

*We have assisted suppliers by offering clearance fees for their consignments through advance payments.*

*We have assisted our suppliers through knowledge sharing and inputs supply*

*We have assisted farmers with free extension services, inputs such as fertilisers, agrochemicals and diesel whose amount is deducted after selling their products to the company*

*We give farmers pesticides, protective clothing and provide technical knowledge and transport*

These findings were also supported by findings from interviewees with suppliers. Some of the responses from the interviews with suppliers were:

*We get cotton inputs from the contracting company and for maize, we purchase from hardware shops*

*Free deliveries of inputs and training from the suppliers*

*We have received fertilizers, chemicals, and herbicides, then they deduct after harvesting*

*We have received inputs in the form of seed and fertilizers. We have also been trained*

*Customer transport directly the mill*

*We have been trained by our customer on product handling.*

The findings show that apart from offering suppliers through access to inputs, agro processing companies also assist suppliers through training, offering technical assistance, financial assistance and transport for the produce. Suppliers are also assisted by their agro customers through resources sharing as evidenced in some of the interview responses:

*Individual farmers have adequate resources but we share resources for pumping water for irrigation purposes. We have a roaster for irrigation.*

*Our supplier assists us through training of employees on precision agriculture. When we buy new tractors, five employees are sent to the supplier in Brazil for training on equipment use, management and repairs.*

The findings show that agro suppliers share resources with their customers to the extent of having an irrigation roaster. The findings also show that suppliers of agro processing organisations offer after-sales service through technical assistance to their customers. This shows that coordination of the entire supply chain runs from the source to the end customer. Generally, Zimbabwean agro processing companies engage in transaction-specific investments to ensure timely delivery of raw materials, quality consistency and required quantities.

These findings are in disagreement with the findings from the PLS Path Model Estimation where it was proved that Transaction Specific Investments have no impact on Supply Chain Coordination with a p-value (0.323) greater than 5%. Due to these findings, therefore, the hypothesis:

*H8: Transaction Specific Investments among Zimbabwean agro processing companies have an impact on supply Chain Coordination is rejected.*

The disagreement in findings could be from the fact that the prevailing economic conditions and cash and foreign currency shortages could be hindering transaction-related investments.



### 7.2.8 Technological Adoption and Usage

Findings on technological adoption and usage show that the four out of five variable used to measure technological usage by Zimbabwean agro processing organisations have ratings above the test value (4.0) as outlined: Technology is used to pay suppliers (M=5.98); sharing information (M=4.90); research and new product development (M=4.63) and technological usage for stock control (M=4.46). The findings from agro processing companies' respondents of the survey show that the measurement variables for technology were significant. Findings from suppliers respondents show that the measurements for technology adoption and usage were significant with: used by our customers for payments (M=5.5), technology used for sharing information with customers (M= 5.35), technology used for communication with customers (M=5.15), used for stock control movement (M=5.15) and customer has proper & sufficient technology for coordination purposes (M=5). Generally, the findings show that suppliers of Zimbabwean agro processing organisations have embraced technology and use it for the benefit of the supply chain. The findings also show that technology has been adopted by both suppliers and agro processing companies and is used for coordination of the supply chain in the sector. Although the suppliers have adopted technology, its usage in research and development (M=4.35) is marginally significant.

Findings from the qualitative strand of the study show that technological adoption in the sector is growing. Technological adoption recorded 12 NVivo coding references from agro-processors interviewees and some of the responses were:

*On the agro processor, technology is available but on the supplier side they have limited technology so it is difficult to use it frequently.*

*Technology is available as we use email and software system for supplier and internal updates.*

The findings show that agro processing companies in Zimbabwe are using technology to improve production efficiency, product quality and effectiveness.

*Technology is available as we use precision farming technology. GPS software on tractors*

*We use precision agriculture and have a GPS tracking system to track our livestock. We also have a software that enables us to identify our cattle when to milk them,*

*quantity and the type of illness they suffer from. We are the only company in the country in the dairy industry with such state of the art equipment and even produce our own raw material.*

Findings show that only two companies from the supplier side have embraced technology to the fullest and use it in their day to day supply chain activities. Findings from interviews with suppliers also show that very few suppliers have adopted technology for use in their businesses. Although suppliers have embraced technology, it is not used for production purposes besides communication with customer and payments.

The findings from the PLS structural model design show that technology has the strongest effect on supply chain coordination with a p-value (0.000) less than 5%. Since technology has a significant effect on supply chain coordination, the hypothesis:

*H9: Technology levels of supply chain players have a significant impact on Supply Chain Coordination is accepted.*

The findings are in line with Sambamurthy *et.al.* (2003) who note that I.T enables companies to manage SC relationships and Haghghat (2008) who posits that I.T is used to manage information and product flows among Zimbabwean agro processing organisations. Rail *et al.* (2006) also support the use of I.T in managing the supply chain, as a digitally enabled inter-firm process capability leads to the achievement of organisational goals and objectives.

### **7.3 What is the impact of Supply Chain Coordination on Zimbabwean Agro Processing Companies?**

To assess the impact of supply chain coordination on Zimbabwean agro processing organisations, a One-Sample T-test with a test value of 4.0, indicating the midpoint of a 7-point Likert-type scale, was used to analyse the resultant data. Quantitative findings from agro processing companies show that coordination of upstream activities of Zimbabwean agro processing organisations has a positive impact on organisations through competitive advantage (M=5.92). Coordination has led to on-time deliveries (M=5.85) of raw materials and supplies, while at the same time improving product quality (M=5.73). The other positive impacts were achieved through company profitability (M=5.53), customer satisfaction (M=5.53), market share (M=5.39), and an increase in profit margins (M=5.32).

Supplier respondents also indicated that coordination has had both positive and negative impacts on their companies. On the positive impact on organisational performance, findings show that suppliers, through coordination has led to a reduction in customer complaints (M=7.2), profitability (M=6.2), competitive advantage (M=6.1), customer loyalty (M=5.85). Coordination among agro processing organisations has enabled agro suppliers to achieve customer satisfaction (M=5.7), increased return on investment (M=5.6), improved flexibility (M=5.5), improved product quality (M=5.3) and lastly on-time delivery of raw materials and products to customers (M=5.25). The findings show that due to coordination, suppliers of Zimbabwean agro processing organisations have become efficient, effective and responsive to customer needs, thereby reducing customer complaints while satisfying the customer leading to profitability and ultimately competitive advantage.

The findings are in line with Madu *et al.* (1995) who posits that there is a causal relationship between customer satisfaction, employee satisfaction, and employee service quality and organisational performances. As a result of coordination, Zimbabwean agro processing organisations have managed to achieve customer satisfaction, product/service quality and organisational performance. In line with these findings, Fisher *et al.* (1994) note that coordination of supply chains eliminates excess inventory, reduces lead times, improved customer service and satisfaction, reduces manufacturing costs, increases flexibility, customer retention, and competitiveness. The findings also concur with Lee *et al.* (1997) who posits that supply chain coordination increases profit margins, lowers inventory, increases market share, improves product quality, return on investment, capacity utilisation product availability, relationship management, improved flexibility, cost reduction, on-time delivery and reduced customer complaints among others. This shows that Zimbabwean agro processing organisations have become efficient and responsive to customer needs while reducing costs due to coordination of the entire supply chain.

The qualitative strand of the study also support these findings with (10 NVivo coding references) from agro processing companies interviewees indicating that coordination of the Zimbabwean agro supply chains has improved organisational performance. Coordination has also had a positive impact on the sector through competitiveness (2 NVivo coding references) and growth (2 NVivo coding references). Profitability is the least impact with (1 NVivo coding reference). Some of the responses that came from in-depth interviews were:

*Improved performance and ability to meet demand and delivery requirements*

*Profitability, expansion, increases in production and factory capacity. Growth in market share*

*Improved competitiveness, profitability and market share*

*Continuous production since there are no raw material shortages*

Other impacts from coordination among Zimbabwean agro processing organisations include, timeous delivery with 35.7%, product availability 18%, customer satisfaction 10.7%, new product development, quality improvements and training 7.1%. Some of the responses from agro processor interviewees were:

*Improved performance as Company is operating at 70% production capacity. Milling starts April to November*

*Profitability, expansion, increases in production and factory capacity. Growth in market share*

*Improved competitiveness, profitability and market share*

*It has led to company expansion*

*Sustainability, product availability, scheduled deliveries, customer satisfaction, long term relationship. Reliable customer guarantees confidence.*

Findings from supplier interviewees also corroborate agro companies' findings as they show that coordination has had a positive impact on the performance of their organisation. From the supplier side, coordination has enabled company profitability with (5 NVivo coding references), innovation (4 NVivo coding references) and production efficiency (4 NVivo coding references). On the supplier side, coordination of the Zimbabwean agro processing supply chain has given them competitive advantage (2 NVivo coding references) and enabled them to have access to markets (2 NVivo coding references). From supplier interviewees, some of the responses were:

*We have benefitted through exposure to innovative new products, profitability and competitive advantage.*

*We managed to achieve a 95% utilization of the allocated land*

*Performance of suppliers has improved due to input scheme. Tonnage has also increased*

*Investments in new technology and agricultural equipment*

*We have benefited from credit facilities, reliable ready market for our produce, linkages and cost savings*

Generally, the findings show that coordination among Zimbabwean agro processing organisations has a positive impact through profitability (profits in monetary terms), growth (market share) and competitive advantage.

To achieve this objective, hypothesis testing was used and the PLS model and 12 hypotheses were tested with the results showing that the variables that have a significant impact on supply chain coordination significant impact on organisational performance. The results show that there is a significant effect of Supply Chain Coordination, Trust and Transaction Specific Investments on Organisation Performance, therefore the following hypotheses were accepted.

*H4: Supply Chain Coordination among Zimbabwean agro processing organisations has a significant effect on Organisational Performance-*

*P-value (0.045), therefore the hypothesis is accepted*

*H5: Trust among supply chain players has a significant effect on Organisational Performance-*

*P-value (0.000) therefore the hypothesis is accepted*

*H6: Communication among supply chain players has a significant impact on Organisational performance-the hypothesis is rejected since the P-value (0.314) is greater than 5% and there is no significant effect of this variable on Organisational performance.*

*H7: Transaction Specific Investments among supply chain players have a significant effect on Organisational Performance- P-value (0.037), therefore the hypothesis is accepted.*

The findings also show that the following hypotheses were accepted on the basis that they had a significant effect on supply chain coordination and organisational performance.

*H11: Supplier Relationship Characteristics among Zimbabwean agro processing organisations have a significant effect on Organisational Performance*

*H12: Technology levels among supply chain players have a significant effect on Organisational Performance*

*H16: Information Sharing among supply chain players has a significant effect on Organisational Performance*

The findings on information sharing are in line with the findings of Zhou and Benton (2007) who note that information sharing enhances an organization's non –financial performance.

*H15: Supply Chain Coordination has a significant effect on Organisation Performance*

The findings in this study on supply chain coordination are in agreement with Arshinder et al. (2011) and Simatupang et al. (2002), where supply chain coordination was found to have an impact on the financial performance of an organisation.

The study also found out that collaboration H (14) had no significant impact on supply chain coordination and had (H17) no significant impact on organisational performance and these findings are in line with Gimenez et al., (2012), who also found that collaboration was not related to organizational performance.

On the other hand, the findings also highlighted the negative effects of coordination of the Zimbabwean agro processing companies' supply chains. Findings from in-depth interviews show that the negative effects faced in the coordination of the agro processing organisations are; dishonesty from suppliers (6 coding references, 20%), costs, poor record-keeping (2 coding references each) and mistrust. Exchange rates and political interference complete the list of challenges (1 coding reference, 3.3% each). Some of the responses from interviewees on the negative effects include;

*Accusations from farmers, politics mixed with business, lack of proper records on the part of the farmers*

*Diversion of inputs and delivery delays*

*Supplier power and rigidity especially with core suppliers. Suppliers prioritize side marketing instead of delivering to us*

*Side marketing, farmers defaulting on supply*

*Lack of funding and expertise*

Other challenges not related to coordination that are uniform to all organisations include; financial challenges (5 coding references) and power outages (5 coding references), competition (4 coding references) and poor raw materials (4 coding references).

Although the sector faces these challenges, the findings generally indicated that coordination of the supply chain is beneficial to all actors in the sector as the benefits outweigh the negative effects.

#### **7.4 Buyer-Supplier Relationships that exist among Zimbabwean Agro processing organisations**

Nooteboom *et al.* (2000) note that companies engage in relationships with other firms to obtain access to complementary resources as is the case with Zimbabwean agro processing organisations. The findings show that 61.1 % (11 coding references) indicated that they have a relationship with their suppliers, which includes contractual agreements and vertical integration. Because of the relationships that exist within supply chain, partners share valuable resources, such technical capability, organisational capability, knowledge, innovative capability and international presence

as highlighted in the discussion on benefits of coordinating the Zimbabwean agro processing supply chain. 38.9% of the respondents (7 coding references) indicate that they have a transactional relationship with their suppliers, meaning that they buy from anyone selling the raw material and products they want. On power –dependence dynamics in the business relationship, 46.7 % (7 coding references) of the interviewees indicated that they have a partnership, meaning that they have equal bargaining power and depend on each other for the survival of the business. 46.7 % (7 coding references) indicate that their company has more bargaining power in the relationship than the suppliers. 6.6% (1 coding reference) which constitute the minority of the respondents indicate that suppliers have more bargaining power in the relationship.

The findings are in line with Dyer and Singh (1998) who posits that relationships through the RV are a source of competitive advantage over firms that are unable or unwilling to form similar linkages.

On the workings of the relationships, interviewees from agro processing companies indicated that they visit their supplier premises. On supplier visits, some of the responses were:

*We visit supplier farms to check on the quality of the product for forecasting and also to check on input usage*

*We visit suppliers to assess production hectarage in order to forecast accurately*

These findings are also corroborated by supplier interviewees who also noted that customers (agro processing companies) visit for various reasons, some of which are:

*The Company visits our farms to assess the plant and its quality and estimate tonnage of produce*

*Customer visits farms and offers employees who provide service to farmers such as issuing of fertilizers and application of chemicals*

*Coordinator visits, research, soil sampling is done for free, seminars and training*

The findings from both groups of interviewees show that supplier visits are done for the purpose of checking the quality of the product to enable companies to forecast production accurately. The other reasons for supplier visits include assessment of hectarage planted, inputs distribution, soil sampling, and training of suppliers on new products and farming methods. The findings also show that farmer associations play a very crucial role in management of relationships between buyers and suppliers through provision of technical, financial and social assistance to its members. The

association assists suppliers through market linkages, training, and facilitation of loans from institutions for its members and interpretation of contracts.

### **7.5 Applicability of theories to Coordination of Supply Chain to Zimbabwean Agro-Processing organisations**

Theories that address coordination of agro processing companies' supply chain include Williamson's (1975, 1991) Transaction Cost Theory (CTC), Barney and Clark (2007) Resource Based Theory (RBV) and the Network Theory.

#### ***7.5.1 Transaction Cost Theory***

The transaction cost theory was used to explore transactions among Zimbabwean agro processing organisations and its role in enhancing relationships between partners through learning, knowledge sharing and trust-building process (Boyce 2001). The theory was used to assess the effects of transaction factors on coordination of supply chain activities among Zimbabwean agro processing organisations. The study also sought to assess the applicability of the TCT to Zimbabwean agro processing organisations. The theory addressed the economic environmental factors and uncertainty in the operating environment which may lead to bounded rationality during the transactions. The findings show that some actors in the sector engaged in opportunistic behaviour where self-interests were advanced at the expense of business and the organisation. From in-depth interviews with farmers' union, findings show that even though the union helps farmers with the interpretation of contract terms and other linkages, agro processing companies pay the union incentives to receive "blessings" for the transactions to go through.

Findings from both quantitative and qualitative information from the sector show that agro companies communicate frequently and share information with each other. As the actors communicate, trust is built over time as discussed in the antecedents of coordination. Information sharing among companies help to reduce transaction cost and opportunistic behaviour as the information shared enhances supply chain effectiveness in the sector. The findings are in line with Zineldin and Johnsonn (2000) who posit that communication builds trust and commitment in buyer seller relationships. Findings also show that agro processing companies engage in transaction specific investments through joint investments in the relationship. Findings show that communication, opportunism, trust, uncertainty and transaction specific investments have an



influence on the coordination of Zimbabwean agro processing organisations' supply chains, hence the applicability of the transaction cost theory in this study.

The PLS model results show that transaction specific investments have an impact on supply chain coordination and organisational performance as discussed in 7.5 where the hypothesis that:

*H3: Transaction Specific Investments among supply chain players has a significant effect on SSC was rejected and*

*H5: Transaction Specific Investments among supply chain players has a significant effected on Organisational Performance was accepted.*

### ***7.5.2 Resource Based Theory***

The resource based theory was found applicable to this study due to the fact that it addresses resource sharing issues between Zimbabwean agro processing organisations. Findings from both the quantitative and qualitative strand of the study show that actors in the sector's supply chain share resources with each other. Resources shared include; knowledge, infrastructure (sharing water canals, premises), and experience (intangible capabilities and competences, for example, technical training of suppliers by companies or training of customer employees by suppliers) as indicated by interviewees through in-depth interviews.

Findings from the PLS structural model results show that technology as a resource has a significant effect on supply chain coordination while supplier relationship capabilities and characteristics have no significant effect on supply chain coordination, therefore the following hypotheses were noted.

*H8: Supplier Relationship Characteristics have a significant impact on Supply Chain Coordination was not supported.*

*H9: Technology levels among supply chain players have a significant effect on Supply Chain Coordination was supported.*

The same variables were again tested to assess their impact on organisational Performance through hypothesis testing and the results of the test were:

*H10: Supply Chain Coordination has an impact on Organisational Performance was accepted*

*H11: Supplier Relational Characteristics have a significant impact on Supply Chain Coordination was supported.*

*H12: Technology levels among supply chain partners have a significant effect on Supply Chain Coordination was supported*

Findings show that superior supplier resources in the form of infrastructure and technology as in the dairy sector, give the supplier a competitive edge in developing long-term collaborative relationships with buyers (Kotabe and Murray 2004).

### **7.5.3 Network Theory**

The network theory was found applicable for this study as it provides a framework for analysing structures of interpersonal and inter-group interactions. Findings show that networks among Zimbabwean agro processing organisations have benefited participants through investments as most agro processing companies invested in their supplier organisations through input supplies and infrastructural development. Through trust and commitment, actors in the Zimbabwean agro sector have contributed to value addition while engaging in long-term contracts. The sector is characterised by contractual agreements between agro processing companies and their suppliers to ensure continuity in production through access to raw materials.

Findings from the PLS structural model show that:

*H13: Information sharing among supply chain players has a significant impact on Supply Chain Coordination*

*H14: Collaboration among supply chain players has no significant effect on Supply Chain Coordination so the hypothesis is rejected.*

*H15: Supply Chain Coordination among Zimbabwean agro processing organisations has a significant effect on Organisation Performance*

*H16 Information Sharing among supply chain players has a significant effect on Organisation Performance so the hypothesis is supported.*

*However, there is no significant effect of Collaboration among supply chain players on Organisation Performance so the hypothesis (H17) is rejected.*

## **7.6 Supply Chain Framework Models could be used by Zimbabwean Agro-Processing Companies to gain competitive advantage and improve Organisational Performance**

This study contributes to supply chain knowledge through the analysis of antecedents of supply chain coordination and its impact on the performance of the agro processing industry. The need to fill the knowledge gaps identified in literature, as well as to create conceptual frameworks that can guide Zimbabwean agro processing organisations managers in coordinating their supply chain activities culminated in the development of the following conceptual frameworks:

- Conceptual Framework for Upstream Supply Chain Coordination
- The Buyer-Seller Framework for Supply Chain Coordination

### **7.6.1 A Conceptual Framework for Supply Chain Coordination**

Although there are frameworks on supply chain coordination, the literature reviewed for this study showed that there is no framework addressing the coordination of supply chain activities from the supply (upstream) side. This resulted in the development of a coordination framework from the upstream supply chain perspective. The framework was named “Conceptual Framework for Upstream Supply Chain Coordination” highlighting factors that affect the coordination of supply chains from the supply side.

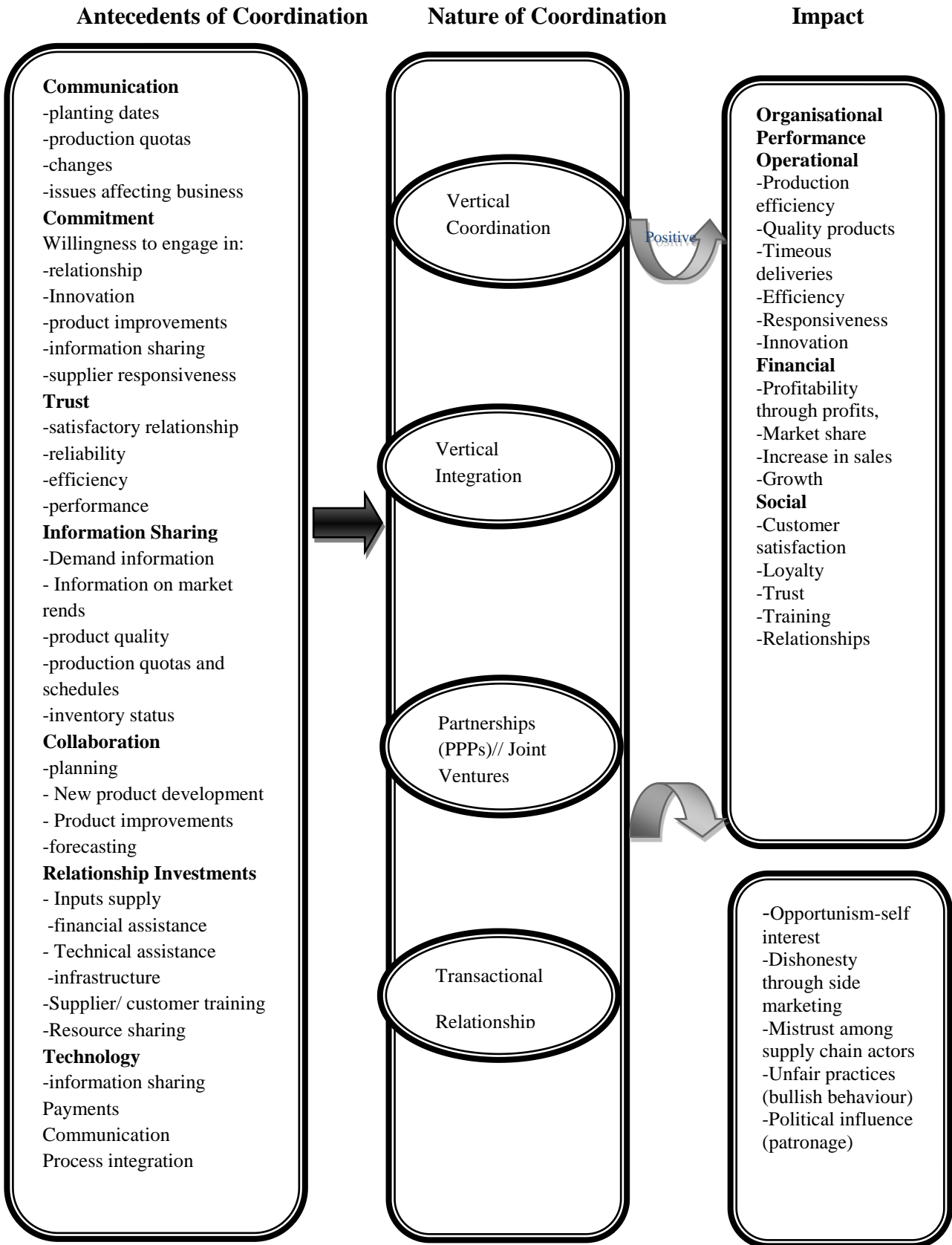
#### ***7.6.1.1 Antecedents of supply chain coordination***

The research findings showed that several factors influence the coordination of the Zimbabwean agro processing organisations supply chain. The agro processor and suppliers indicated that their supply chains are influenced by factors such as communication of planting dates, production schedules and quotas in order to meet product specifications in terms of quality. Other areas where agro processing companies communicate with suppliers include informing the customer about issues that affect their businesses and communication of changes on suppliers’ side. Other factors that were highlighted to be important for coordination of the supply chain include commitment through supplier willingness to deliver, share information with customer, engagement in innovative activities, product improvements and supplier responsiveness. The findings also show that the agro processing organisations share information on product quality, price, trends in the market, demand, inventory, business knowledge and operational activities. Information sharing enables the participants to effectively coordinate supply chain activities in the sector.

The findings also show that the agro processing organisations in Zimbabwe engage in collaborative activities such as; forecasting and planning, joint decision making, new product development, planning and research and development. The sector also engages in reward and risk-sharing across the supply chain. In terms of investments in the relationship, the findings show that agro processing companies have invested tremendously through assisting suppliers with inputs (raw materials), resources(water), infrastructural developments, training and inclusion of suppliers in innovative programmes. Findings from all participants indicated that the sector has embraced technology

which is used as a platform for sharing information, communication, integration of processes and payments.

**Figure 7.1: A Conceptual Framework for Upstream Supply Chain Coordination**



### ***7.6.1.2 Nature of Coordination***

The findings of the study show that the Zimbabwean agro processing supply chain is coordinated through four (4) different coordination mechanisms, that is through vertical coordination in the form of contracts, vertical integration, public-private partnerships and transactional relationships. The coordination mechanisms have positive or negative consequences on the performance of companies in the agro processing organisations as presented in figure 7.1. However, these mechanisms do not uniformly apply across different supply chain coordination settings, owing to variations in geographical, political, economic and technological settings.

### ***7.6.1.3 Impact of Supply Chain Coordination.***

The framework shows that coordination of the supply chain may result in positive benefits for participating companies in the form of operational performance which was measured through: improved organisational performance, production efficiency, quality products, timeous deliveries, efficiency, responsiveness and innovation. Another positive impact of coordination on organisational performance was the achievement of financial performance by the survey participants. Financial performance was measured by profitability through increased profits, improvements in market share, company growth and increase in sales. The social performance was also another outcome of coordination among Zimbabwean agro processing organisations where it was measured by customer satisfaction, customer loyalty, trust, free training and development of buyer-seller relationships.

On the other hand, coordination of the supply chain has perceived negative results such as; opportunistic behaviour where actors pursue self/ personal interests at the expense of the company, dishonesty through side marketing, mistrust among supply chain actors, unfair practices (bullish behaviour) by the powerful partner and political influence (patronage), where companies lose business partners due to political alignment.

#### ***7.6.1.4 Significance of the Conceptual Framework***

To fill that gap in the literature, the proposed conceptual framework provides a framework which can guide agro processing companies on the coordination of their supply chains. The framework shows the factors that agro processing companies consider when coordinating their supply chains. The framework can assist companies in coordinating their supply chains and evaluate the mechanisms used to accrue positive benefits for all supply chain actors.

However, the framework is based on findings from a study carried out in the agro processing organisations in a developing country and the results may not accurately mirror the situation in different settings. It must also be noted that the antecedents of supply chain coordination that were identified in this study are not exhaustive. These antecedents may not be uniformly applied across different supply chain settings owing to variations in geographical, political, economic and technological settings as previously highlighted.

### **7.7 The Buyer- Seller Framework for Supply Chain Coordination**

From the literature reviewed, existing frameworks do not address buyer-seller relationships in coordinating their supply chains. This resulted in the development of a buyer-seller framework for supply chain coordination from the upstream supply chain perspective. The framework was named “The Buyer-Seller Framework for Supply Chain Coordination” highlighting factors that affect coordination of supply chains from the supply side.

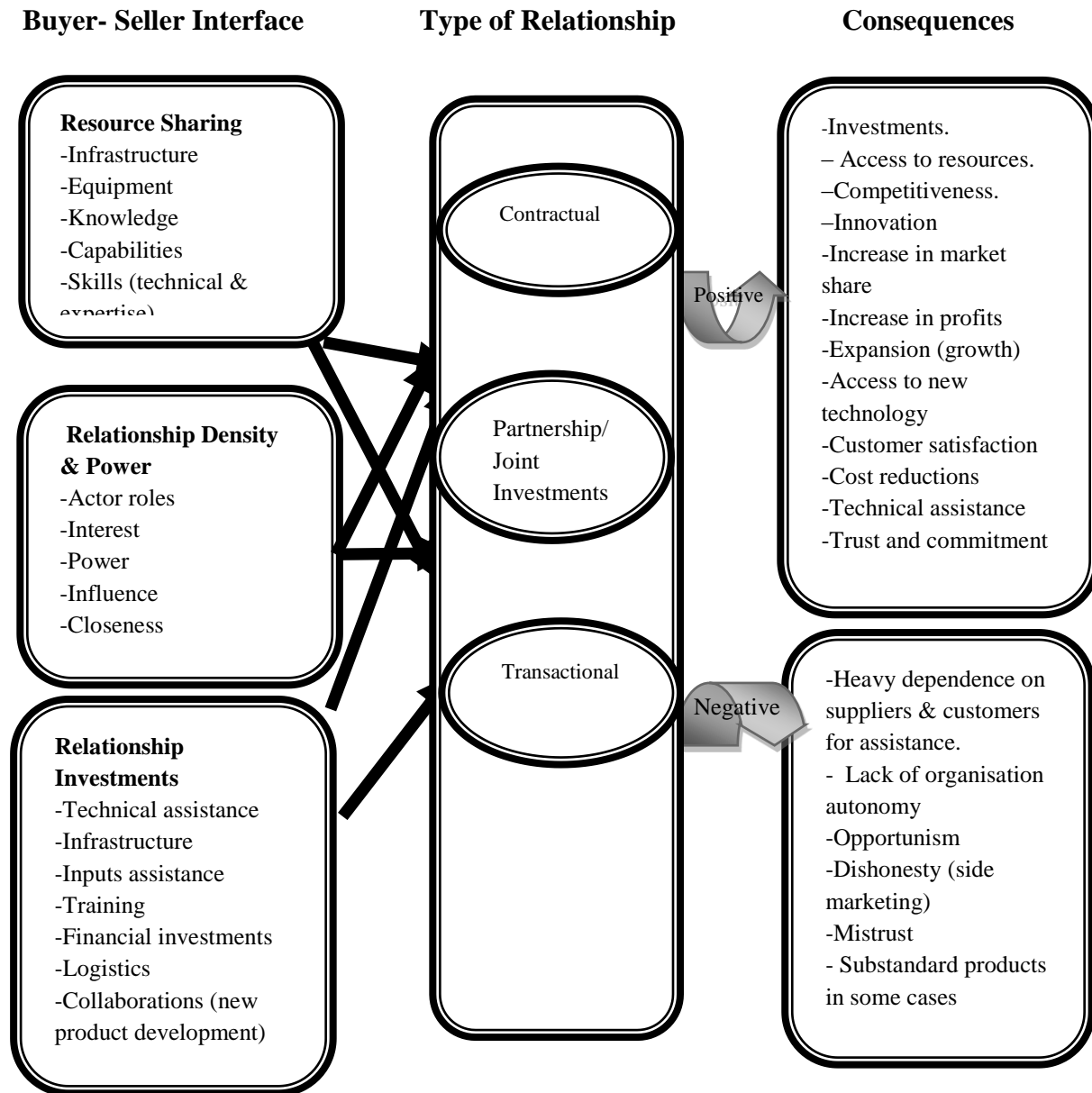
#### ***7.7.1 Buyer-Seller Interface***

The research findings showed that several factors influence the buyer-seller relationship among Zimbabwean agro processing organisations supply chain.

##### ***Resource Sharing***

Suppliers and agro companies indicated that their relationships are characterised by resources sharing, which include sharing infrastructure, equipment and knowledge among supply chain participants. Findings also show that players in the supply chain take advantage of the capabilities (assets& knowledge) and skills (technical & expertise) of their partners to achieve competitive advantage throughout the entire supply chain.

**Figure 7.2: The Buyer- Seller Framework for Supply Chain Coordination**



*Relationship Density & Power*

The findings from both agro processing companies and suppliers indicated that the actors in the supply chain play different roles in coordinating the supply chain activities and development of relationship within the sector. Companies have their own coordinators and in some cases coordination was done by associations representing the suppliers. Findings also show that

coordinators had company interests based on their level of involvement and responsibilities or benefits derived from their involvement within the supply chain. Findings also showed that the participants in the survey, both agro companies and suppliers indicated that the contracting companies have more bargaining power and influence to make decisions within the sector. This shows that the decision-making process in the sector is done by the big companies while the small suppliers see it as a privilege to be involved in the relationship. Findings show that the actors who were close to both sides (supplier and customer) exerted influence on both sides and had more bargaining power since they are strategically located to control information flow within the supply chain.

### *Relationship Investments*

The findings from both the suppliers and agro processing companies show that the buyer -seller interface is characterised by investments in the relationship. Investments such as; offering technical assistance to suppliers helped in relationship development and maintenance so as to get quality raw material. Agro companies also invested in their suppliers through infrastructural development or sharing, assistance with inputs to guarantee supplies, training suppliers on new production and farming techniques, financial assistance, providing logistics and transport to suppliers for raw materials and collaborations with suppliers in new product development so as to maintain quality in the supply chain.

### **7.7.2 Type of Relationship**

The findings from the study show that Zimbabwean agro-processing organisations engage in three types of relationships. The organisations engage in transactional relationships with certain suppliers and the main determinant factor for this type of relationship is the price. This type of relationship is normally used for commodities where a list price is charged. The other type of relationship that was highlighted by the agro-processing organisations was a contractual type of relationship where partners sign contractual agreements. This is a common practice among Zimbabwean organisations so as to protect themselves from unscrupulous behaviour of supply chain partners. Thirdly, Zimbabwean agro-processing organisations engage in public-private



partnerships so as to pull resources together and take advantage of other partner resources, experience and expertise.

### ***7.7.3 Impact of Supply Chain Coordination***

Buyer-seller relationships are perceived as having positive consequences by companies as they may realise such benefits as; investments, access to resources, competitiveness, innovation, increase in market share, increase in profits, expansion (growth), access to new technology, customer satisfaction, cost reductions, technical assistance, trust and commitment.

Buyer-seller relationships are perceived as having a negative effect by companies as they may experience such negative consequences as; heavy dependence on suppliers & customers for assistance, lack of organisation autonomy, opportunism, dishonesty (side marketing), mistrust and substandard products in some cases.

### ***7.7.4 Significance of the Conceptual Framework***

This framework attempts to address the buyer-seller relationships focusing on a sector in a developing country. The Framework takes note of the fact that buyer-seller relationships face challenges since they have different backgrounds and experience.

The conceptual framework can increase knowledge on the antecedents, nature and consequences of engagement of suppliers while shedding some light on some of the grey areas supply chain coordination literature. However, the framework is based on empirical finding from a study carried out in one country, on in a single sector, and as such results, may not accurately mirror the situation in sectors.

## **7.8 Chapter Summary**

This chapter attempted to address the seven research questions. In a bid to bridge the knowledge gaps that were identified supply chain coordination literature, two conceptual frameworks were developed from the study's empirical findings. The next chapter will present an overview of the thesis, its contributions to knowledge, the conclusions, recommendations, implications and limitations of the study.

## **CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS**

### **8.0 Introduction**

The previous chapter discussed the research findings in relation to the study's research questions. This chapter presents an overview of the study, the contribution of the study to the body of knowledge and conclusions drawn from data analysis and presentation. The study in this chapter presents implications for management, directions for future research and concludes with a discussion on the limitations of the study.

### **8.1 Overview of the Study**

The study used an explanatory research design to assess the impact of upstream supply chain coordination on organisational performance of Zimbabwean agro processing organisations and develop a framework that can bridge existing practical and theoretical knowledge gaps in the coordination of supply chains in the different sectors of the Zimbabwean economy.

Through the analysis of supply chain coordination literature, the study identified a few gaps in the existing body of knowledge on the subject. The literature may fail to accurately capture factors affecting the coordination of Zimbabwean agro processing organisations' supply chain as it is based on studies that were conducted in Europe, Asia and other developed countries operating under different economic, social, political and technological environments from those prevailing in Zimbabwe.

The convergent parallel research design was adopted as the guiding model for the data collection, analysis and interpretation process in this study. Data for this study were collected concurrently during the data collection period as a cost reduction strategy. The study used the convergent parallel design due to time constraints, interviews were carried out the same time when questionnaires were administered. The study was predominantly quantitative in nature and qualitative data was used primarily to augment the quantitative data.

Data generated by questionnaires were analysed using the SPSS Version 21.0, quantitative data analysis software and Stata version 14 quantitative data analysis software. The NVivo 10 qualitative software package was used to analyse qualitative data collected through semi-structured interviews. UCINET qualitative software package was also used to analyse data collected through

semi-structured interviews to present the social relationships that exist among Zimbabwean agro processing organisations' supply chain actors.

## **8.2 Knowledge Contributions**

This thesis contributes to the existing knowledge by providing supply chain coordination frameworks that can be adopted by managers in the agro processing organisations for coordination of activities in the supply and management of business relationships. The study contributed through the development of a model /framework under a new setting, which was based on existing theories that apply to the current settings.

From the theoretical perspective, the study used three theories to provide a background for understanding coordination of the supply chain and its impact on organisational performance. Factors such as trust, communication, commitment, opportunism, asset specificity and transaction specific investments were derived from the transaction cost theory of economics and used to explain coordination of supply chain activities from the transactions within the supply chain. On the other hand, factors such as collaboration, information sharing, supplier capabilities and resource sharing were also used to explain coordination from the resource-based theory perspective. The development and management of buyer- seller relationship were explained by factors such as power/ dependence activities in the supply chain based on the network theory. All three theories were found applicable and useful in the coordination of buyer-seller relationships.

Therefore, the study contributes to knowledge by applying these theories to the study as they were generalised and extended to a new setting, coordination of upstream supply chain activities in a developing country.

The study also contributed to knowledge by bridging the literature gap through the development of two conceptual frameworks to address coordination of supply chains. Through the Conceptual Framework for Supply Chain Coordination, the study highlighted factors that are considered important for coordinating supply chains. The second framework coined Buyer-Seller Framework for Coordination was proposed to assist supply chain managers understand the factors to consider when engaging in business relationships in order to improve organisational performance and achieve competitive advantage.

### **8.3 Conclusions**

The study was conducted to assess the impact of coordinating upstream supply chain activities on the performance of Zimbabwean agro processing organisations and development of a framework that can bridge existing practical and theoretical knowledge gaps in coordination of supply chains in Zimbabwe.

#### **8.3.1 Describing the nature of supply chain coordination among Zimbabwean agro-processing companies.**

##### **8.3.1.1 Adoption of supply chain as a business strategy**

The study established that Zimbabwean agro processing organisations have adopted supply chain coordination as a business strategy. On this aspect, the study identified three factors from both the agro processing companies and suppliers that explain the adoption of supply chain coordination as; adoption of supply chain as a business strategy, formalisation of supply chain activities and coordination of supply chain activities. The study also established that formalisation of supply chain activities in this sector is done through rules and procedures which have a positive relationship with supply chain effectiveness. Zimbabwean agro processing organisations use contracts as the main mechanism for coordinating supply chain activities.

##### **8.3.1.2 Nature of supply chain coordination among agro processing organisations**

The study established that Zimbabwean agro processing organisations are vertically coordinated through contracts with farmers. The study noted that vertical coordination is practised in almost every sector of the agro processing industry so as to guarantee product quality and timeous deliveries through contractual agreements with suppliers who are assisted with inputs and other forms of assistance by the customer (agro processing companies). This study also noted that the industry is vertically integrated where some agro processing companies own the farms and means of production for raw materials so as to reduce costs and ensure timeous deliveries and quality consistency. The study also established that Zimbabwean organisations use trust, price, contracts and bargaining power as coordination mechanisms.

#### **8.4. Identifying the antecedents of supply chain coordination among Zimbabwean agro-processing companies.**

The study identified several factors that which were considered necessary and important in

coordinating the Zimbabwean agro processing organisations supply chain. The study also established that the Zimbabwean agro processing organisations supply chain coordination activities are influenced by factors such as trust, which is measured by satisfactory relationship, keeping promises, benevolence, supplier confidence, trustworthy and reliability. These factors were considered important in building trust between supply chain members. Communication was also considered an important factor as it facilitates in building trust and commitment through informing customers about business issues and communicating changes on the supplier side. The study established that trust and communication have a significant impact on supply chain coordination while transaction specific investments has no significant impact. However, the study through hypothesis testing established that although transaction specific investments had no impact on coordination, it had an impact on organisational performance together with supply chain coordination and trust.

Other factors that were considered important for coordination activities include a commitment of the parties/ participants in the sector, information sharing on issues affecting businesses, price changes, demand fluctuations, inventory levels and operational activities and challenges. It was also established that collaboration among supply chain members is considered as an influencing factor in coordination of supply chain activities, as through collaboration members' leverage on the resources of other supply chain partners. Areas of collaboration included new product development, forecasting, planning, joint decision making and investments in order to be responsive to customer needs so as to achieve competitive advantage.

On information sharing and collaboration, factors that were used to explain the network theory (NT), the study through hypothesis testing established that information sharing had a significant impact on supply chain coordination while collaboration had no significant impact. However, the study established that variables, supply chain coordination, information sharing had a significant impact on organisational performance. On the other hand, the study established that collaboration had no impact on supply chain coordination.

The study also established adoption and usage of information technology as a major factor in coordination of the supply chain as it facilitates communication within the supply chain, information exchange and financial exchange. Although technological adoption in the sector is slow, its relevance was highlighted through its facilitation of payments using online and mobile platforms given the current economic situation in the country.

#### **8.4.4 Evaluating the Impact of supply chain coordination on the performance Zimbabwean agro organisations**

The study identified notable benefits that have been accrued by participating companies from the coordination of the supply chain. The study established that coordination among Zimbabwean agro processing organisations had positive results as presented in Chapter 6, where 17 hypotheses were proposed and only communication (H6) and collaboration (H17) had no significant impact on organisational performance while transaction specific investments (H3), Supplier relationship characteristics (H8) and collaboration (H14) had no impact on supply chain coordination of Zimbabwean agro processing organisations' supply chains.

The study established that coordination of upstream activities among Zimbabwean agro processing organisations has a positive impact in the sector through the achievement of competitive advantage, timeous deliveries of raw materials and supplies and improvements in product quality. Other positive impacts achieved were organisational profitability, customer satisfaction, increase in market share, increase in profit margins and cost reductions.

Coordination of supply chain activities among Zimbabwean agro processing organisations has enabled the companies in the agro sector to achieve customer satisfaction, increase return on investment, improved flexibility, efficiency, responsiveness, reduction in customer complaints and loyalty. The study also established that organisations have also benefited through resource sharing, access to markets, knowledge sharing, innovation and investments from customers.

Although there were positive impacts on organisations, the study established that there were also negative effects from coordination of the Zimbabwean agro processing supply chain activities. Some of the negative impacts faced in the coordination of activities among agro processing organisations are; dishonesty from suppliers through sale of inputs and side marketing, costs, poor record keeping by suppliers, missing agreed dates for planting and other activities and mistrust. It was also established that due to lack of foreign currency for importation of raw materials, organisations face a challenge of distorted exchange rates where suppliers have adopted a triple currency system (Bond rate, USD rate and electronic transfer rate). The study also established that political interference affected coordination of supply chain activities as inputs and other agro materials are accessed according to patronage.

#### **8.4.5 Identifying buyer-supplier relationships that exist between Zimbabwean agro processing organisations.**

The study identified three main types of buyer-seller relationships that exist between Zimbabwean agro processing organisations. The relationships that were highlighted were contractual agreements where participants share valuable resources, such as technical capability, organisational capability, knowledge and innovative capability. This type of relationship is characterised by trust, commitment, communication and information sharing. The study also established that Zimbabwean agro processing organisations engage in public private partnerships which are characterised by joint investments in infrastructure and equipment, resource sharing, skills development, joint planning and collaborative planning and forecasting for the benefit of the parties involved and supply chain efficiency.

Although the sector engages in contractual based relationships and partnerships, the study also established that companies engage in transactional relationships with some suppliers due to high demand. In this type of relationship, there is no commitment from both parties and each maintains its own autonomy. The actors only engage each other during transactions.

The study also established that organisations engage in vertical integration where agro processing companies have a stake or completely own the supplying organisation. This type of relationships enables the companies to manage supply chain activities and maintain the required quality standards of the raw materials and flow of materials from the supplier.

#### **8.4.6 Assessing the extent to which existing theories address coordination of supply chain in the Zimbabwean agro-processing sector.**

The existing coordination theories provided a theoretical framework that guided the study and these theories were found applicable to Zimbabwean agro processing organisations. The transaction cost theory was used was found to be applicable as transaction specific factors such as communication, opportunism, trust, uncertainty and transaction specific investments have an influence on the coordination of activities among Zimbabwean agro processing organisations. Its contribution was noted in the benefits accrued from relationships between partners through learning, knowledge sharing and the trust-building process. The study, in line with the transaction cost theory established that actors from different organisations in the supply chain engaged in opportunistic behaviour where self-interests were advanced at the expense of business and the

organisation. The study established that participants in the sector engage in transaction specific investments through joint investments in the relationship. From the discussions presented in chapter seven and hypothesis testing, the study established that factors discussed in the transaction theory presented in chapter 3 were applicable to the Zimbabwean situation. The study, therefore, concluded that transaction cost theory (TCT) is applicable to Zimbabwean agro processing organisations as supported by the hypothesis of this study in the PLS model in Figure 6.19. Although communication had a significant impact on supply chain coordination, it was found to have no significant impact on organisational performance.

On the resource-based theory, the study established that actors among the Zimbabwean agro processing organisations share resources with each other. Resources shared include knowledge, infrastructure (sharing water canals, premises), and experience (intangible capabilities and competences, for example technical training of suppliers by companies or training of customer employees by suppliers). From the study it was established that superior supplier resources in the form of infrastructure and technology as in the dairy sector, give supplier a competitive edge in developing long-term collaborative relationships. The study established that technology as a resource has a significant impact on supply chain coordination while supplier relationship characteristics have no significant effect on coordination. However, the variables, supply chain coordination, supplier relationship characteristics and technology all have a significant effect on organisational performance, therefore the hypothesis that the resource-based theory is applicable to Zimbabwean agro processing organisations is supported as evidenced in the PLS Estimation model 2 in Figure 6.21.

The network theory was found applicable for this study as it provides a framework for analysing structures of interpersonal and inter-group interactions. From the theory, participants in the sector have benefited through investments as most agro processing companies invested in their supplier organisations through input supplies and infrastructural development. The participants were not operating in isolation but working together as networks of organisations that depend on each other for survival. Although the networks were not pronounced, their existence is visible through supply chain coordination activities. The findings of the study show that networks exist among Zimbabwean agro processing organisations and this was supported by hypothesis on information sharing and collaboration of activities in the sector. Therefore, the study concluded that the network theory is applicable to Zimbabwean agro processing organisations as presented in the PLS



model 3 in Figure 6.22.

Although the theories were found applicable to the Zimbabwean agro processing organisations, they leave gaps relating to:

- Cultural implications on business activities and relationships
- Policy issues and the regulatory framework guiding supply chain activities in the sector
- Community engagement and corporate social responsibility.

#### **8.4.7 Developing a supply chain framework model that could be used by Zimbabwean agro-processing companies to gain competitive advantage and improve organisational performance.**

Two conceptual frameworks were developed to bridge existing practical and theoretical knowledge gaps in the coordination of the supply chain in the various sectors. These are:

**1. Conceptual Framework for Upstream Supply Chain Coordination** - which was proposed to address the lack of a conceptual framework on supply chain coordination from the focal organisation to the supplier side.

**2. The Buyer-Seller Framework for Supply Chain Coordination-** which was proposed to explain buyer-seller relationships and interactions in the coordination of supply chains in a different setting to the current existing frameworks.

The conclusions drawn on each of the seven subsidiary objectives of the study show that the study achieved the goal of explaining the coordination activities among Zimbabwean agro processing organisations. Two conceptual frameworks were developed to bridge existing practical and theoretical knowledge gaps in supply chain coordination in the country. It can, therefore, be concluded that the primary and subsidiary goals of the study were achieved.

## **8.5 Implications of the Study**

### **8.5.1 Managerial Implications**

- The findings of this study have implications for supply chain actors and policy implications for policymakers. Supply chain actors can use the findings of this study to improve their operations through the coordination of their supply chains for competitive positioning and improvements in organisational performance. Managers in the sector can use the findings of the study to engage and train suppliers on the management and coordination of the supply chain.
- Policymakers can use the findings of this study to understand the role of supply chain coordination and identify appropriate interventions and policies that can improve coordination and organisational performance in the country. This study can provide insights to policymakers and the government, through assisting them to make adjustments in policies so as to increase information flow and improve relationships between actors in supply chains by engaging all stakeholders in the sector. Through the Ministry of Agriculture, policymakers could conduct training by offering extensions services to suppliers so as to facilitate seamless flow of coordination among Zimbabwean agro processing organisations to improve supply chain performance.
- The study recommends the Ministry of agriculture and policymakers to embrace smart agriculture so as to improve agricultural productivity so as to achieve the goals of Command Agriculture (an agricultural intervention spearheaded by the ministry of Agriculture) and ensure food security in the country.
- The study highlighted problems such as power challenges, political interference, financial, lack of credit terms, dishonesty and opportunistic behaviour of actors. To minimize these problems, managers should increase the degree of coordination in the supply chain through continuous engagement, resource sharing, inputs availability, invest in alternative power sources and improvements in information sharing structures.

### **8.5.2 Implications for Further Studies**

This study suggests the following areas of future research:

- Since the study focused on the agro processing organisations which are predominantly agro-based and form the backbone of the economy, it is necessary for future studies to focus on the engagement of policymakers in the regulation and development of a framework to guide the operations of the sector.
- Future studies can also focus on conducting studies to validate the conceptual frameworks that were proposed in this study to bridge the knowledge gaps that were identified in supply chain coordination literature.
- The models developed from this research portray different types of relationships that exist among supply chain actors and can be employed to study relationships in other sectors of the economy.
- This research has highlighted the impact of supply chain coordination in the agro processing organisations, and opens up the possibility of undertaking further research on coordination of the supply chain in other sectors of the economy in the country.

### **8.6 Limitations of the Study**

The literature sources which provided a theoretical framework for the study were not written from a Zimbabwean perspective, therefore they may fail to accurately explain supply chain coordination in the Zimbabwe agro processing organisations as they are based on studies that were carried out on organisations that operate under economic, political, socio-cultural and technological conditions which are different from those in Zimbabwe.

Limitations from the methodology used are that the results from the qualitative strand of this study which were based on small sample sizes, so there might be a challenge on the representativeness of the data and the generalisability from the findings. The qualitative strand of the study was used

to gather in-depth information on coordination of the Zimbabwean agro processing organisations' supply chains in order to meet the exploratory purpose of the study.

The integration of qualitative and quantitative methods used in this study was done as a measure to strengthen the validity of the results. Due to the use of mixed methods in research, this study was labour and capital intensive and was difficult for the researcher to have expertise in both qualitative and quantitative methods. To minimise the limitation of expertise, the researcher engaged research assistants to compliment her efforts.

Although there were limitations to the study, the objectives of the study were achieved.

## **8.7 Summary**

This chapter presented a brief overview of the thesis, its contribution to knowledge, and the conclusions drawn from the analysis and discussions, the study's implications for management, theory and directions for future research, and the limitations of the study.

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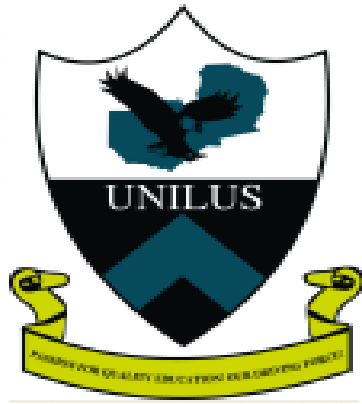
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## APPENDICES

### APPENDIX 1: QUESTIONNAIRE FOR AGRO PROCESSORS



# UNIVERSITY OF LUSAKA

My name is Judith Charumbira, a PhD student at the University of Lusaka, Zambia. I am carrying out a research titled: **The impact of upstream supply chain coordination on the performance of agro processing organisations in Zimbabwe** in partial fulfillment of the Doctor of Philosophy (PhD) in Marketing. I am excited about the opportunity to carry out research on this topic and to contribute to the growing body of knowledge on supply chain coordination and their performance in the agro processing organisations of Zimbabwe and developing countries as a whole. I am kindly requesting you to answer questions in the attached questionnaire that are an essential part of my research project. All the information provided will be used for academic purposes only and will be treated in the strictest confidence.

I express my sincere appreciation for taking your precious time to read this letter and to complete the questionnaire.

Your support and cooperation will be greatly appreciated.

Regards

Mrs Judith Charumbira

Email: [jcharumbira2004@gmail.com](mailto:jcharumbira2004@gmail.com)

Cell: +263772269029/ +263712093301/ +263734980966

**Section A: Socio- Demographic information of respondent** (Tick where appropriate)

1. Province.....

2. Gender:

Male		Female	

3. Your Job title/ position in company.....

4: Age		5. Level of Education		6.Main field of experience		7.Number of years in current position		8.Professional experience	
20-29 years		No formal education		Marketing		1-2 years		1-2 years	
30-39 years		Primary Education							
40-49 years		Secondary		Accounting		3- 5 years		3- 5 years	
50-65 years		Certificate		Purchasing & Supply Chain		6-10 years		6-10 years	
Over 65 years		Diploma		Management		11-15 years		11-15 years	
		First Degree		Finance		16-20 years		16-20 years	
		Postgraduate		Economics		21-25years		Above 20 years	
		Other (Specify)		Other (Specify)		Above 25 years			

**Section B**

9. Which Industry is your company operating in?

.....

**10. What is the nature of your business? Please tick the appropriate one**

Type of Business	Tick
Agro processor	
Food Manufacturing	
Beverage Manufacturing	
3 <sup>rd</sup> party logistic service provider	
Middlemen	
Auction floor	
Other (specify.....)	

**11. How long have you been in business? (Length in Business)**

Less than 5 years		6-10 years	
11-15 years		16-20 years	
21-25 years		26-30 years	
31-35 years		36- 40 years	
51-50 years		More than 50 years	

**12. Which products does your company produce?**

Product	Tick
Beef	
Pork	
Poultry	
Dairy	
Sugar	
Ethanol	
Foodstuff	
Timber	
Cotton	
Tea	
Beverages	
Seed	
Coffee	
Other ( Specify).....	

**13. Please indicate the extent to which you agree with the following statements on nature of supply chain coordination by ticking the appropriate box:**

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
We have adopted supply chain management as a business strategy							
We coordinate activities within the supply chain							
Our company marketing manager is the coordinator							
Coordination activities within the supply chain are formalized							
Our supply chain relationship is transactional							
We use contracts to coordinate our supply chain							

We use price as a coordination mechanism							
We use quantity discounts as a coordination mechanism							
We use trust as a coordination mechanism							
We use bargaining power to coordinate the supply chain							
Our supply chain is vertically coordinated							
Our supply chain is horizontally coordinated							
We have no relationship with suppliers							

14. Please indicate the extent to which you agree with the following statements on supplier selection and relationship management by ticking the appropriate box:

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<b>Supplier Evaluation Criteria</b>							
Quality is an important criterion for selecting our suppliers							
Price is important in selecting our suppliers							
<b>Commitment</b>							
Supplier standardization and certification processes							
Supplier willingness to deliver on time							
Suppliers willingness to joint problem solving							
Supplier willingness to share information							
Supplier willingness to show commitment							
Suppliers involvement in innovation and new product development processes							
Suppliers willingness to be included in planning and goal- setting activities							
Supplier willingness to adopt new technology							
<b>Supplier Characteristics</b>							

Our suppliers deliver on time							
Our supplier is consistent on quality							
Our suppliers fulfill orders with accuracy							
Our suppliers offer very flexible options for changing order quantities							
<b>Relationship Characteristics</b>							
Our relationship with main supplier is satisfactory							
Our supplier performance is satisfactory							
Our supplier always keeps promises							
We have confidence in our suppliers							
Coordination with suppliers is effective							
Changes on the buyers side are communicated with the suppliers in advance							
Suppliers inform the buyer about issues that affect the business							
Suppliers share business knowledge about core processes with the company							
The company assists its suppliers to improve their product quality							
The company has continuous improvement programs that include its key suppliers							
Our suppliers are responsive to our needs							
We have compatible culture							
We have common customer service goals and focus							
We have a long term relationship with our suppliers							
<b>Information Sharing</b>							
Suppliers share relevant information with the company							
We share information on price changes with suppliers							

We share information on inventory data with suppliers							
We share on demand data with suppliers							
We share information about trends in the market with our suppliers							
We share operational data with suppliers							
We share product quality data with suppliers							
<b>Trust</b>							
The coordinator is reliable							
We have confidence in the coordinator							
Supplier is trustworthy							
Supplier is efficient							
Supplier is effective							
Supplier shows commitment to the relationship							
<b>Technology</b>							
Technology is sufficient for coordination purposes							
Supplier has proper technology for coordination purposes							
Our technology is compatible with supplier technology							
Supplier has skilled and qualified employees							
We use technology to control stock movement							
We use technology for sharing information with suppliers							
Technology is used to pay suppliers							
Technology is used for research and new product development							
Our suppliers have access to our database							
<b>Collaboration</b>							
We plan production schedules with our suppliers							
We collaborate with our suppliers in new product development							
We engage in collaborative forecasting and							

replenishment with suppliers							
We collaborate with our suppliers in research and development of new products							
We are both committed to product improvements for the benefit of the relationship							
We share rewards and risks with our suppliers							
We engage in joint decision making with our suppliers when required							
We mutually understand each other							
We have engaged in joint investments with our suppliers							
Our suppliers adapt to our needs							

**15. Please indicate the frequency of contact and communication by ticking the appropriate box:**

<b>Statement</b>	<b>Daily</b>	<b>Once a week</b>	<b>Twice a week</b>	<b>Once a month</b>	<b>Twice a month</b>	<b>Quarterly</b>	<b>Not at all</b>
We contact our suppliers for coordination purposes							
We visit our suppliers premises							
We have meetings with our suppliers							
<b>Communication</b>							
We call our suppliers							
We communicate face to face with our suppliers							
We use written communication with our suppliers							
We communicate with our suppliers through skype							



**16. Please indicate the extent of importance of the following statements by ticking the appropriate box:**

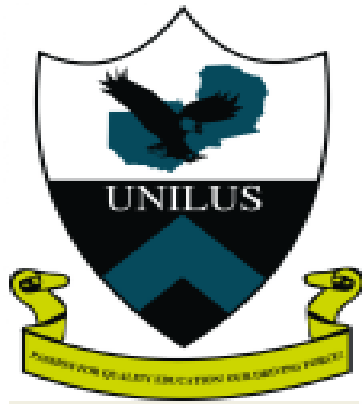
Statement	Not Important at All	Of Little Importance	Of Average Importance	Very Important	Absolutely Essential
Understanding customers' requirements					
Analysing reports of supply chain performance					
Forecasting demand and supply accurately					
Matching demand and supply effectively					
Managing market changes effectively					
Making constant improvements in performance					

**17. Please indicate the extent to which you agree with the following statements by ticking the appropriate box:**

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<b>Challenges Faced</b>							
We face a challenge of poor products / raw materials							
We have outdated equipment							
We have limited access to market due to trade barriers							
We are faced with a challenge of power shortages							
We are affected by high transaction costs							
We are affected by poor infrastructural developments							
We have outdated training materials and extension messages							
Lack of institutional support							
Poor government policies							
<b>Impact of Coordination</b>							
Coordination has increased our profits margin							
Coordination with suppliers has reduced our inventory levels							

Coordination has minimized our transaction costs							
Our market share has increased because of coordination							
We have improved our product quality							
Our return on investment has increased							
Coordination enables on time delivery							
Coordination has led to a reduction in customer complaints							
We have improved flexibility because of coordinating with suppliers							
Waste has been reduced							
Our customers are satisfied							
Coordination has improved our profitability							
Coordination has increased customer loyalty							
Coordination has led to competitive advantage							

## APPENDIX 2: SUPPLIERS QUESTIONNAIRE



# UNIVERSITY OF LUSAKA

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I express my sincere appreciation for taking your precious time to read this letter and to complete the questionnaire.

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Regards

Mrs Judith Charumbira

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Cell: +263772269029/ +263712093301/ +263734980966

**Section A: Socio- Demographic information of respondent** (Tick where appropriate)

1. Province.....

2. Gender:

Male		Female	

3. Your Job title/ position in company.....

4: Age		5. Level of Education		6. Category of Business		7.Number of years in current position		8.Pending from government	
18-29 years		No formal education		A1 Farmer		1-2 years		Offer letter	
		Primary Education							
30-39 years		Secondary Education		A2 Farmer		3- 5 years		Leasing	
40-49 years		Certificate		Commercial farmer		6-10 years		Management contract	
50-65 years		Diploma		Communal Farmer		11-15 years		99 year lease	
Over 65 years		First Degree		Other (Specify)		16-20 years		Title deeds	
		Postgraduate				21-25years		Illegal settlement	
		Other (Specify)				Above 25 years		Other (specify)	

**SECTION B: PRODUCTION AND MARKETING**

**9. Which products do you produce at your farm? Please tick the ones you produce**

Product category	
Beef	
Flowers	
Pork	
Poultry	
Maize	

Wheat	
Sorghum	
Tobacco	
Milk	
Cotton	
Sugar cane	
Timber	
Vegetables	

**10. Please indicate the extent to which you agree with the following statements on nature of**

**supply chain coordination by ticking the appropriate box:**

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
We coordinate activities within the supply chain							
Our company is the coordinator							
Coordination activities within the supply chain are formalized							
We sell our products to anyone							
We have contracts with our customers							
We are more concerned about the price our customers offer							
We offer discounts for bulk purchases							
We trust each other							
We have more power than our customers							
Our supply chain is vertically coordinated							
Our supply chain is horizontally coordinated							
We have no relationship with our customers							

**11. Please indicate the extent to which you agree with the following statements on supplier selection and relationship management by ticking the appropriate box**

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<b>Customer/Supplier Evaluation Criteria</b>							
Quality is an important criterion for selecting customers							

Price is important in selecting our customers							
Customer willingness to pay on time							
Customer willingness to share information							
Customer willingness to show commitment							
Customer involvement in production processes through input supplies							
<b>Customer Characteristics</b>							
Our customers pay on time							
Our customer is consistent on payments							
Our customer offer very flexible options for changing order quantities							
<b>Relationship Characteristics</b>							
Our relationship with main customer is satisfactory							
Our customer performance is satisfactory							
Our customer always keeps promises							
We have confidence in our customers							
Coordination with our customers is effective							
Changes on the customers side are communicated in advance							
The customer assists us to improve our product quality							
The customer has continuous improvement programs that include us							
Our customers are responsive to our needs							
We have compatible culture							
We have common customer service goals and focus							
We have a long term relationship with our suppliers							
<b>Information Sharing</b>							
Customers share relevant information with us							
The customer share information on price changes with us							
The customer share on demand data with us							

The customer share information about trends in the market with us							
<b>Trust</b>							
The customer coordinator is reliable							
Our customers are trustworthy							
Our customers are efficient & effective							
The customer shows commitment to the relationship							
We meet our customers' requirements							
It is easy to get inputs from customers & suppliers							
We meet our customer specifications							
<b>Technology</b>							
Our customer has proper & sufficient technology for coordination purposes							
Our customer has skilled and qualified employees							
We use technology to communicate with customers							
We use technology to control stock movement							
We use technology for sharing information with customers							
Technology is used by our customers for payments							
Technology is used for research and new product development							
<b>Collaboration</b>							
We plan production schedules with our customers							
We engage in collaborative forecasting and replenishment with customers							
We collaborate with our customers in research and development of new products							
We are both committed to product improvements for the benefit of the relationship							
We share rewards and risks with our customers							

We have engaged in joint investments with our customers'							
We adapt to our customers' needs							

**12. Please indicate the frequency of contact and communication by ticking the appropriate box:**

Statement	Daily	Once a week	Twice a week	Once a month	Twice a month	Quarterly	Not at all
We contact our customers for coordination purposes							
We visit our customers premises							
We have meetings with our meetings							
We call our customers							
We communicate face to face with our customers							
We use written & email communication with our customers							
We communicate with our customers through skype							

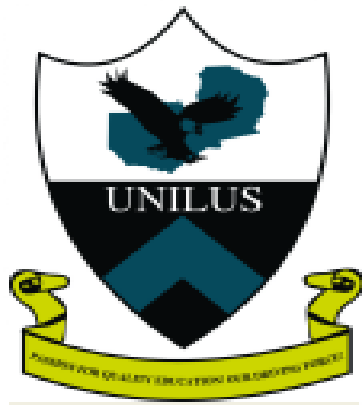
**13: Please indicate the extent to which you agree with the following statements by ticking the appropriate box:**

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
<b>Challenges Faced</b>							
Shortage of inputs							
Shortage of Fertilizers							
We face a challenge of poor products / raw materials							
We have outdated training manuals and irrigation equipment							
Lack of technical knowledge							
Lack of market knowledge							
We are faced with a challenge of power shortages							
We are affected by high production costs							
Lack of marketing knowledge							
Low prices for products							
Lack of institutional support							
Poor government policies							
Lack of training							



<b>Impact of Coordination</b>							
Coordination has increased our profits margin							
Coordination has minimized our production costs							
We have improved our product quality							
Our return on investment has increased							
Coordination enables on time delivery							
Coordination has led to a reduction in customer complaints							
We have improved flexibility because of coordinating with customers							
Our customers are satisfied							
Coordination has improved our profitability							
Coordination has increased customer loyalty							
Coordination has led to competitive advantage							

### APPENDIX 3: INTERVIEW GUIDE FOR AGRO PROCESSORS



UNIVERSITY  
OF  
LUSAKA

My name is Judith Charumbira, a PhD student at the University of Lusaka, Zambia. I am carrying out a research titled: **The impact of upstream supply chain coordination on the performance of agro processing organisations in Zimbabwe** in partial fulfillment of the Doctor of Philosophy (PhD) in Marketing. I am excited about the opportunity to carry out research on this topic and to contribute to the growing body of knowledge on supply chain coordination and their performance in the agro processing organisations of Zimbabwe and developing countries as a whole. I am kindly requesting you to answer questions in the attached questionnaire that are an essential part of my research project. All the information provided will be used for academic purposes only and will be treated in the strictest confidence.

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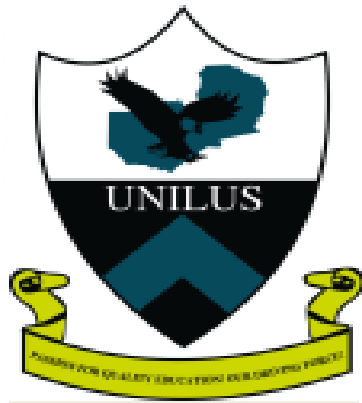
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Cell: +263772269029/ +263712093301/ +263734980966

1. Province .....
2. In which industry are you operating in?
3. What products do you process?
4. How long have you been in business?
5. What is your highest educational qualification?
6. Do you have any business related professional qualification?
7. Are you in purchasing, marketing, management or accounting? Any other, specify?
8. How long have you been in this position?
9. Have you been trained on supply chain?
10. Do you engage your suppliers in your company activities? How?
11. What is the nature of the relationship between your company and your suppliers?
12. What type of relationship exists between your company and your suppliers? Explain
13. Who has more power in the relationship? Elaborate
14. What do you think should be done to improve the relationship?
15. Have you ever assisted your suppliers? In what way?
16. Are you committed to the relationship?
17. Do you collaborate with your suppliers in product development? How?
18. In which other areas have you collaborated with your suppliers? Explain
19. Do you visit your supplier premises? Why?
20. How often do you visit your suppliers?
21. What measures have you put in place to ensure sustainability of the relationship?
22. Who coordinates activities with suppliers of the company? Explain
23. Who is the coordinator in your organization?
24. Are there any other ways of coordinating your supply chain? Please elaborate.
25. Which coordination mechanisms do you use to coordinate with your suppliers? Why?
26. Are your processes integrated with your supplier processes? How?
27. Do you have top management support in coordination of activities? In what way?
28. Do you share resources with your suppliers and which ones? Which ones?
29. What do you think should be done to improve resource sharing in the supply chain?

30. Are your suppliers reliable? Elaborate
31. What measures have you put in place to ensure reliability?
32. Do you trust your supply chain members? Explain why?
33. How effective are your suppliers in meeting your requirements? Explain your answer
34. Do your suppliers meet your product and quality specifications? Elaborate
35. Are your suppliers efficient in fulfilling promises? Elaborate
36. How do you communicate with your suppliers?
37. How often do you communicate?
38. What do you think could be done to improve communication?
39. Do you share information with your suppliers?
40. What type of information do you share? Please explain
41. Do you have the technology to facilitate information exchange? Explain
37. Have you faced any challenges in coordinating your supply chain members? Please elaborate
38. How could these challenges be minimized?
39. What have been the benefits of supply chain coordination to your company?

## APPENDIX 4: INTERVIEW GUIDE FOR SUPPLIERS



# UNIVERSITY OF LUSAKA

My name is Judith Charumbira, a PhD student at the University of Lusaka, Zambia. I am carrying out a research titled: *The impact of upstream supply chain coordination on the performance of agro processing organisations in Zimbabwe* in partial fulfillment of the Doctor of Philosophy (PhD) in Marketing. I am excited about the opportunity to carry out research on this topic and to contribute to the growing body of knowledge on supply chain coordination and their performance in the agro processing organisations of Zimbabwe and developing countries as a whole. I am kindly requesting you to answer questions in the attached questionnaire that are an essential part of my research project. All the information provided will be used for academic purposes only and will be treated in the strictest confidence.

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Cell: +263772269029/ +263712093301/ +2637349809

1. Province
2. Please specify the type of farmer you are:
  - a) A1 Farmer

- b) A2 Farmer
  - c) Commercial
  - d) Communal
3. In which age group do you belong?
  4. For how long have you been a farmer?
  5. What is your position on the farm?
  6. Do you have professional qualifications in agriculture? Elaborate
  7. Have you received any formal training on farming? Please Explain
  8. Do you have knowledge of supply chain? Please explain
  9. Are you able to coordinate activities between your company and you suppliers or customers? Please explain
  10. What do you think could be done to improve coordination activities between your companies?
  11. Have been formally trained on supply chain coordination? Please elaborate
  12. Do you have adequate resources for production purposes? Explain
  13. Which products do you produce? Why?
  14. Are you a contract farmer or independent farmer? Why? Explain
  15. What type of contract do you have with the customer and supplier? Explain
  16. Where do you get your farming inputs from? Explain
  17. Where do you sell your produce? Explain
  18. What logistic strategies do you have to market your products?
  19. In your opinion, what should be done to improve logistics with your customers?
  20. Do you have a relationship with your suppliers and customers?
  21. What type of relationship do you have with your customers? Please explain
  22. From your relationships with suppliers and customers, have you ever received any assistance from them? What kind of assistance have you received?
  23. How do you communicate with both suppliers and customers?
  24. How often do you communicate?
  25. How effective is the communication in coordinating activities between farmers and other stakeholders?
  26. Are your suppliers and customers committed to the relationship? Please explain
  27. How trustworthy are your suppliers and customers?
  28. Are your suppliers and customers reliable?
  29. Have you ever been invited to company functions by your suppliers and customers?
  30. Do they ever visit your farm? Why?
  31. How often do they visit?
  32. What could be done to improve your buyer seller relationships?
  33. What challenges have you faced in your business? Please Explain
  34. Are there any challenges that you have faced in coordinating your supply chain? Please indicate the challenges
  35. As a company, how can you minimise these challenges?
  36. What have been the benefits of coordination of your supply chain? Please indicate
  37. How has the relationship with your suppliers and customers improved your performance?

38. Do you have suggestions for improvements in coordinating your chain?
39. What can be done to improve organizational performance?

**APPENDIX 5: STUDY REQUEST LETTER FOR AGRO PROCESSORS AND SUPPLIERS**



UNIVERSITY  
OF  
LUSAKA

Dear Sir / Madam

**RE: APPLICATION TO BE GRANTED PERMISSION TO USE THE ORGANISATION AS A CASE STUDY.**

My name **Judith Charumbira** a lecturer in the department of Marketing at NUST studying towards a Doctor of Philosophy Degree in Marketing at the university of Lusaka in Zambia. I am requesting to be granted permission to use your organisation as a case study. The topic is Upstream Supply Chain Coordination in the Agro processing organisations in Zimbabwe.

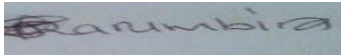
Your Organisation's participation in the study entails answering the questions contained in the attached questionnaire and interview guide. Participation in this research is voluntary. There is no risk involved. The data collected will be analysed for my thesis and the results may appear in publications over the next five years. The results will be reported in a manner which does not enable you or your organization to be identified. I will provide your organization with the findings and recommendations of the study upon completion and hopes that they will be useful in improving your supply chain coordination activities.



If the request is acceptable, I propose to administer the instrument in face to face interview session.  
If you have any queries regarding this project please phone me at NUST on 09-282842, extension:  
2145 or 0772269029, email: **jcharumbira2004@gmail.com** or **judith.charumbira@nust.ac.zw**

I would like to thank you in advance for your assistance.

Yours Faithfully.

A rectangular box containing a handwritten signature in dark ink, which appears to read "Charumbira".

Your corporation will be highly valued.

Thank you.

**Mrs Judith Charumbira**

## APPENDIX 6: INFORMED CONSENT FORM FOR PARTICIPANTS



UNIVERSITY  
OF  
LUSAKA

### **Purpose of study:**

You are being asked to participate in a Doctor of Philosophy in Marketing which seeks to assess **the impact of upstream supply chain coordination on the performance of Zimbabwean agro processing organisations.**

### **Procedure and duration:**

You are being asked to participate in an interview. The interview will take approximately one hour. It will take place at your office/home or at another location convenient for you. With your permission, the interview will be audio taped. The tape will be transcribed; your name or other identifying information will **not** be included on the transcript. Your participation is completely voluntary. You may stop participating in this research at any time or choose not to answer any question, without penalty.

Although disclosure of your identity is a possible risk, every precaution will be taken to protect your privacy and the confidentiality of any records generated by this research. Only the principal investigator (Judith Charumbira) and her research assistants will have access to the audio tapes of the interviews and the transcripts. The audio tapes will be kept in a locked file; at the end of the research project, the tapes will be erased. Your name and any other identifying information will not appear in any reports or documents that are published as a result of this research project.

If you do not understand any of the questions that I will ask you, I will be pleased to clarify or provide a complete explanation. So questions are welcome at any time during the interview or if you have after thoughts you can call me on the following Cell Phone numbers: 0772269029 or 0782799226 at any time.

I .....have been informed of any and all possible risks or discomforts. I have read the statements contained herein, have had the opportunity to fully discuss my concerns and questions, and fully understand the nature and character of my involvement in this research and the attendant risks and consequences.

I agree to participate in the research and give my permission to audio/video tape this interview.

Yes/ No

**Signed** ..... **Date** .....

**Research Participant**