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A Network Modelling of Supply Chain Coordination in the Zimbabwean Agro Processing Sector

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Abstract: The subject of the article is the criticism of anthropocentrism from the point of view of Platonic concepts. The argumentative "limit" of anthropology is environmental issues, one of the most acute problems of our time. The article analyzes the direction of "deep ecology", which is associated with the philosophy of Heidegger, considered by researchers as a criticism of anthropology. At the end of the article, a refutation of Heidegger's "criticality" is proposed, and new ways of criticizing anthropology are outlined.

Keywords: Anthropocentrism, Deep Ecology, Metaphysics, Platonism, Philosophy, Ecology.

BACKGROUND OF THE STUDY

The Zimbabwean agro-processing sector relies heavily on the agricultural sector for raw materials since agriculture is the backbone of the Zimbabwean economy, accounting for 18 per cent of the GDP and 22.8 per cent of the foreign exchange earnings by 2006 (Mahofa 2007). Mahofa (2007) notes that before the 2000 land reform, resources have been concentrated on improving the performance of agriculture in the communal land through supporting cotton and maize production. Before and after the 1980 independence, the Zimbabwean commercial area has highly contributed to the production of cotton, grain and other products but shrunk significantly as a result of the Fast Track Land Reform Programme (FTLRP). The uncoordinated land reform programme disrupted the existing supply chain such that from 2001 agricultural output in the country has been on a negative trend and this has impacted negatively on the performance of the agro-processing sector. Availability of raw materials has a huge bearing on productivity in this sector. Zimbabwe, being an agro-based economy, has been affected by 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 sector, leaving the country with the new farmers (briefcase farmers) taking over. This land grabbing, still in progress has affected the coordination that used to exist between companies and their upstream suppliers. These supply chain disruptions have seen the country falling from being the breadbasket of Africa to a basket case where there has been an over-reliance on imports and donor-funded projects and feeding schemes. The country has suffered from severe droughts and food shortages that have affected the majority of the rural population.

The study sought to evaluate the effect of information sharing in relationships and collaboration through cooperative behaviour on the coordination of upstream supply chain activities and assess its impact on the performance of the Zimbabwean agro processing sector. The network theory was found applicable to this study since supply chain actors engage in cooperative behaviour when they collaborate in new product development and lead time reduction. It was also noted that supply chain actors engage in relationships through information sharing. 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 is 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 the network have long term contractual

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agreements leading to the development of strong partnerships. Håkansson and Ford (2002) note that the position of an organisation in a network influences a firm's performance leading to competitive advantage. Zimbabwean agro processing organisations use networks to achieve competitive advantage through contracts with supply chain partners.

The paper is divided into five sections as follows, introduction, conceptual framework and study hypothesis, Literature review and theoretical framework, methodology, research findings, concludsions and recommendations.

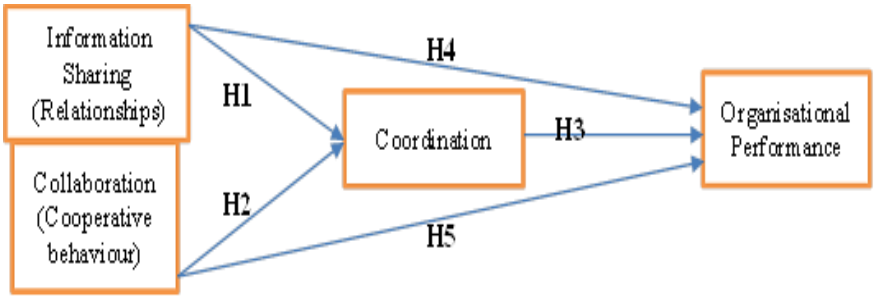

Figure 1: Conceptual Framework

Hypothesis of the study

H1: Information sharing among supply chain players has a positive influence on Supply Chain Coordination
H2: Collaboration among supply chain players has a positive influence on Supply Chain Coordination
H3: Supply chain coordination has a positive influence on Organisational Performance
H4: Information sharing among supply chain players has a positive influence on Organisational Performance
H5: Collaboration among supply chain players has a positive influence on Organisational Performance

LITERATURE REVIEW

Supply Chain Coordination encompasses the integration of information exchange during the development, production and deliverance of a product or service to the end market (Cao et al. 2008). Malone and Crowston (1994), suggest that coordination can be viewed as a combination of several objects to achieve supply chain objectives. Therefore coordination of the supply chain involves aligning and harmonising several 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. Similarly, Gittell (2011) corroborates this notion by viewing supply chain coordination as 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 supply chain members is important for effective coordination in the supply chain. Stank *et al.* (1999) observed that effective communication systems, 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.

Simatupang *et al.* (2002) note that coordination combines some objects (actions, objectives, decisions, and information, and knowledge, funds) to facilitate the achievement of the chain goal. In support of Simatupang et al. (2002), Arshinder *et al.* (2006) argue that supply chain 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) also note that supply chain coordination can be achieved with the joint decision-making of all processes of the supply chain which include procurement, production, distribution, warehousing and economic allocation of the requirement of resources among SC members. 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 sustaining relationships for the attainment of effective organisational goals.

Coordination in Agro Supply Chains

Hastuti (2007) suggests that the supply chains of agricultural products have 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 & 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).

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Simatupang & Sridharan (2000) suggest that the overall performance of the agricultural supply chains could be improved if actors in the supply chains could be able to orchestrate their actions, such that each member could benefit from the compromises made during the coordination process. Taylor and Fearne (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.

The Network Theory in Supply Chain Coordination

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. 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 & Ford (2002) define a network as a structure where several nodes are related to each other by specific threads. 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.* (2013), 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 & 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.

Business networks as 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 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. Network theory was found applicable to this study since supply chain actors engage in cooperative behaviour when they collaborate in new product development and lead time reduction. It was also noted that supply chain actors engage in relationships through information sharing.

Networks in business relationships are beneficial to companies through investments and actions of other players in the supply chain (Håkansson & 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 & 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.

Information Sharing

According to Simatupang *et al.* (2002), information sharing is 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

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responsibility interdependence, as suggested by Bailetti *et al*. (1998) 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. It is, therefore, necessary for companies to create strong information linkages with their chain partners 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 a coordinated flow of information in the supply chain, leading to higher profits for the organisations involved.

Collaboration in Supply Chains

According to Mentzer *et al.* (2012), *"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 can mutually determine how to synchronise product flows, reduce inefficiencies, and share 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.* (2011) 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. Detoni and Zamolo (2005), note that the reason for the 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.

METHODOLOGY

We used the abductive approach, with more emphasis on the deductive approach since there is abundant literature on supply chain coordination. 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 combines both deductive and inductive reasoning, yet the focus is on the deductive approach (Johansson 2003, Suddaby 2006). 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). We also used a concurrent parallel mixed methods research design, which involved the collection of both quantitative and qualitative data simultaneously, with the data analysis done separately then merged and interpreted but with more emphasis on the quantitative strand of the study (Creswell & Plano Clark 2011).

A questionnaire survey for the whole country was conducted to collect data from agro processing companies and suppliers. 105 questionnaires were distributed (75 agro processing companies and 30 suppliers), 79 were completed and returned (59 from agro processing companies and 20 from suppliers). To measure the causality of the dependent and independent variables in the questionnaire, the study used the 7-point Likert scales, ranging from 1 representing "Strongly Disagree" to 7 representing "Strongly Agree" for the construct measures. The One-sample T-Test in the SPSS Data Analysis Software, Version 21, was used to analyse data. Structural Equation Modelling (SEM) in AMOS was used to analyse quantitative data to provide a model for hypothesis testing.

Semi-structured interviews were used to collect data on antecedents and consequences of supply chain coordination in the Zimbabwean agro-processing sector. 20 interviews were scheduled with managers of agro processing companies during the data collection period and 13 were successful. 7 that were not successful due to work commitments. For suppliers 20 interviews were scheduled and 13 were successful. 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

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provide their details, perspectives, beliefs, practices, interactions and concerns.

RESULTS AND FINDINGS

In this section we present the bothe the quantitatitive and qualitative research findings. Quantitative findings are based on the proposed hypothesis of the study. The quantitative findings are presented in the form of tables and figures and qualitative findings are presented in the form of word cloud, tables and narrative technique.

Table 1. One-Sample T-Test on Factors Affecting Supply Chain Coordination

Factor	Statement	N	Mean	Std Dev	Std. Error Mean
	INFORMATION SHARING				
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
	COLLABORATION				
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

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 2.

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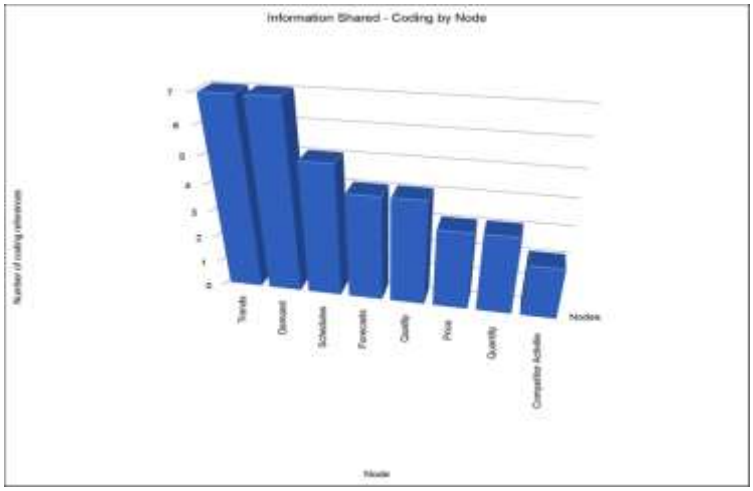

Figure 2: Information Shared

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 (5coding 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 a need for improvements in product quality. Other areas where information is shared include the price and quantity required at any given time (3 coding references, 8.6%each). Competitor information has the least number of coding references (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.

Collaboration

We 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 have 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. We also sought to find out areas in which these partners have collaborated. results from the interview are presented in Figure 3.

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Figure 3: Word Frequency Query Results on Collaboration

Results from Figure 3 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 2.

Table 2. Coding Reference Percentage on Collaboration

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

Table 2 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.

We 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 the in-depth interview include:

- *Our processes are coordinated with those of CYMMIT the NGO we partner in new product development;*
- *Our processes are not 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.

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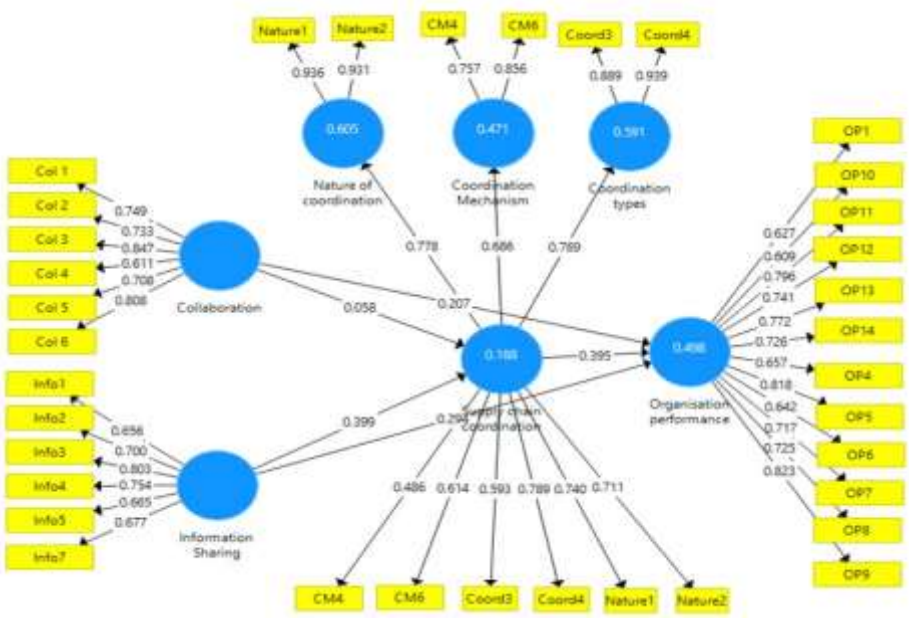

Figure 4: PLS Path Model Estimation

Table 3. Outer Loadings Model

Constructs (Latent Variables)	Outer loadings
Supply Chain Coordination	
Nature of Coordination	
Nature1	0.936
Nature2	0.931
Coordination Mechanism	
CM4	0.757
CM5	0.856
Coordination Types	
Coord3	0.889
Coord4	0.939
Information Sharing	
Info1	0.656
Info2	0.700
Info3	0.803
Info4	0.754
Info5	0.665
Info7	0.677
Collaboration	
Col1	0.749
Col2	0.733
Col3	0.847
Col4	0.611
Col5	0.708
Col6	0.808
Organisation Performance	
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

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OP14	0.726

Internal Consistency Reliability

The composite reliability 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).

Convergent Validity and Discriminant Validity

The AVE for the latent construct *Supply Chain Coordination, Information Sharing, Collaboration and Organisation Performance* is shown in Table 4 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.

The table 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* was much larger than the corresponding LVC.

Table 4. Convergent Validity and Discriminant Validity

	1	**2**	**3**	**4**
Information Sharing	*0.711*			
Organisation Performance	0.578	*0.725*		
Supply Chain Coordination	0.431	0.580	*0.664*	
Collaboration	0.550	0.478	0.277	*0.746*

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).

Evaluation of the Structural Model in PLS-SEM: Collinearity Assessment

The collinearity assessment results are summarized in Table 5 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 5. Collinearity Assessment Model

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; Dependent variable: Organisation performance

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), 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.

Path Coefficient

From the Table below, it can be seen that three out of five of the structural model relationships are significant, confirming some of the 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 by Information Sharing (0.294). Collaboration had the least effect on Organisation Performance (0.207).

Table 6. Significance Testing Results of the Structural Model Path Coefficients

	Path:	**Path Coefficients**	**t-values**	**p-value**
H1	Information Sharing →Supply Chain Coordination	0.399	3.234	0.001
H2	Collaboration →Supply Chain Coordination	0.058	0.424	0.672
H3	Supply Chain Coordination →Organisation Performance	0.395	3.953	0.000
H4	Information Sharing →Organisation Performance	0.294	2.687	0.007
H5	Collaboration →Organisation Performance	0.207	1.766	0.078

Predictive Relevance (*Q2*)

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

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model has good predictive relevance for the endogenous variables. Chin and Ntizl (2017) suggest that a model demonstrates good predictive relevance when its Q^2 value is larger than zero (see Table 7).

Table 7. Results of Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Latent Variable	R^2 Value	Q^2 Value
Supply Chain Coordination	0.188	0.067
Organisation Performance	0.498	0.226

The f^2 Effect Size

In general, the exogenous variables had low to medium effect sizes on the endogenous variables (see Table 8).

Table 8: Results of f^2

	Supply Chain Coordination		Organisation Performance	
	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

Table 9. Summary of Hypotheses Testing

	Hypotheses	Supported? (Yes/No)
H1	Information Sharing →Supply Chain Coordination	Yes
H2	Collaboration →Supply Chain Coordination	No
H3	Supply Chain Coordination →Organisational Performance	Yes
H4	Information Sharing →Organisational Performance	Yes
H5	Collaboration →Organisational Performance	No

DISCUSSION OF FINDINGS

Three of the hypotheses were supported, and the results are summarized in Table 9. Information sharing had a significant impact on Supply Chain Coordination (H1). However, there was no significant effect of Collaboration on Supply Chain Coordination so the hypothesis (H2) was rejected. There was also a significant effect of Supply Chain Coordination and Information Sharing on Organisational Performance so the hypotheses (H3 and H4) were supported. However, there was no significant effect of Collaboration on Organisational Performance so the hypothesis (H5) was rejected.

CONCLUSIONS

The study concludes that coordination among Zimbabwean agro processing organisations has a positive impact through profitability (profits in monetary terms), growth (market share) and competitive advantage. As a result of coordination, Zimbabwean agro processing organisations have managed to achieve customer satisfaction, product/service quality and organisational performance. It was also noted that participants in the Zimbabwe agro processing 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. It was also concluded that information sharing among companies help to reduce transaction cost and opportunistic behaviour as the information shared enhances supply chain effectiveness in the sector. 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 applies to Zimbabwean agro processing organisations.

Limitations and Further Research

The main limitation of this study is its failure to consider cultural implications on business activities and relationships which could affect these relationships, therefore further research can incorporate these factors. Further research can also be done to consider community engagement and corporate social responsibility. Further research can be done on policy issues and the regulatory framework guiding supply chain activities in the sector

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