# MAKERERE UNIVERSITY Business School

VERTICAL COLLABORATION, COMMUNICATION TECHNOLOGIES, TRUST, COMMITMENT AND PHYSICAL DISTRIBUTION SERVICE QUALITY (A CASE OF SOFT DRINKS INDUSTRY IN UGANDA)

BY

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#### DECLARATION

I, the undersigned, Friday Derek declare that, to the best of my knowledge, the work presented in this dissertation is truly my original work and has never been submitted for the requirement of the award of a degree in this or any other university of learning. Where work of others has been used, due acknowledgement has been made.

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#### APPROVAL

This is to certify that this dissertation has been submitted in partial fulfillment of the requirement for the award of a Master's of Science in Procurement and Supply Chain Management degree of Makerere University with my approval as University Supervisor.

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## **DEDICATION**

I dedicate this research report to my late mother; Ms. Kahinju Peninnah and the rest of the family and friends who have supported me in every way.

#### ACKNOWLEDGEMENTS

I thank my supervisors: Dr. Joseph Ntayi and Dr. Muhwezi Moses for their guidance during this research study. My sincere gratitude goes to MUBS for the support extended to me to accomplish this study.

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# LIST OF ABBREVIATIONS

PDSQ	Physical Distribution Ser	rvice Quality
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- **UBOS** Uganda Bureau of Statistics
- PD Physical Distribution
- **SPSS** Statistical Package for Social Scientists
- UGSH Uganda Shillings
- ANOVA Analysis of Variance

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#### ABSTRACT

The purpose of the study was to investigate the relationship between Vertical Collaboration, Communication Technologies, Trust, Commitment and Physical Distribution Service Quality among Manufacturers and Distributors in Uganda's soft drink industry with specific reference to Kampala. The research was guided by five (5) hypothesis statements that where developed from reviewed literature.

The study followed both a quantitative and cross sectional research design. Primary data was collected using self administered questionnaires issued to a total of 285 Manufacturers and Distributors of soft drinks as the sample compiled from the Uganda National Bureau of Statistics (UBOS) and had a response rate of 99.3%.

The Data was analysed using SPSS where; a Content Validity Index was ran to assess the validity of each construct and the reliability of the variables was assessed using Cronbach alpha at a cut off level of 0.5. Pearson's rank correlation coefficient was used to measure the strength of the relationship between variables and a Regression analysis to determine the extent to which the independent variables could predict a change in the dependent variable.

The findings indicated a positive and significant relationship between vertical collaboration, communication technologies, commitment and physical distribution service quality and an insignificant relationship between vertical collaboration and trust. From this study, it is recommendable that in the quest to improve PDSQ, other factors like; inadequate storage facilities, low electricity and information communication technology penetration rates among other factors, should be given attention.

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#### CHAPTER ONE INTRODUCTION

#### **1.1 BACKGROUND TO THE PROBLEM**

Retail businesses that provide end distribution points for consumers of Soft drinks; carbonated, non carbonated and non alcoholic constitute over 80% of businesses in Uganda, (Kyamutetera, April 2009; Ohairwe, 2008). Given the necessity of soft drinks, manufacturers and distributors are obliged to provide distribution systems that are highly responsive to customer demands with the aid of distributors, (Ntayi. et al, 2009).

Responsiveness to customer demands can be achieved through vertical collaboration; collaboration between the soft drinks manufacturers and the distributors downstream, (Shan and Norm, 2007; Stephen, 1997). However, 60% of collaborations are known to occur between manufacturing firms and suppliers as compared to 56% between the manufacturers and customers in Logistical demand chains, (Sandberg, 2007). These collaborations need a high level of information sharing, collaborative planning, decision synchronization and the alignment of incentives, (Simatupang and Sridharan, 2004). These enablers are still not fully exploited by Uganda's manufacturers and distributors of soft drinks implementing vertical collaboration in their distribution systems, (Heloise, 2006 and Okello, et al. 2007). This study adds the private sector dimension of collaboration in logistics on the only collaboration study in public procurement in Uganda undertaken by Muhwezi, (2008).

The information shared is inadequate among the demand chain members. Internet for email purposes and telephone calls comprise the communication technologies under use. Uchumi Supermarket has an information system that could be networked with suppliers to allow quick access to information, but this is not operational, (Uchumi Supermarket Records, 2009). This is not possible due to the low information technology development in the demand market. Crown Beverages Ltd's Central Distribution Teams share daily reports with the warehouse and distribution manager pertaining the stock and purchasing levels through telephone calls, (Crown Beverages Ltd company records, June 2009). With a breakdown or bad signal, such information may not be received or delayed.

Although decisions by manufacturers are taken without the consent of distributors, collaborative planning at the strategic level is only noticed during building awareness and promotional programmes. Incentive alignment is evidenced in manufacturers setting lower prices; UGsh.400 for 300mg Pepsi cola for distributors in Kampala to allow retail distributors make profit by selling above UGsh.600. Provision of proper packaging and labeling also creates efficient handling of products reducing damages in the entire demand chain (Century Bottling Ltd company records, June 2009; Crown Beverages Ltd company records, June 2009 and Uganda Breweries Ltd records, June 2009).

Effective collaboration depends on the level of trust, commitment and the quality of information shared in the demand chain, (Danese, 2007; Goran, 2005; Janjaap and Ghijsen, 2005; Zineldin and Jonsson, 2000). Trust and commitment can increase the level of integration, (Simatupang and Sridharan, 2005; Soonhong. et al, 2005). However, trust levels in Uganda are below the published expectations with the business relationships characterized with every party in a relationship suspecting the

other, betrayal and dishonesty. This was blamed on weak or no organizational and administrative structures in Uganda, poor sharing mechanisms, weak governance systems, and a unique cultural context under which collaborations exist, (Muhwezi, 2009).

Ugandan customers complain of the lengthy lead time and unreliable delivery (Ntayi, et al. 2009). Leading soft drinks manufacturers in Uganda; Century Bottling Ltd, Crown Beverages Ltd, Mukwano, Uganda Breweries Ltd, Britannia, and Rafiki, face delivery inefficiencies in the downstream chain due to wrong forecasts based on inadequate customer demand information, (Okello, et al. 2007).

Physical Distribution (PD) forms part of a broader logistics which ranges from marketing customer service to the delivery of products, (Rabinovich and Bailey, 2004). Uganda's logistical - physical distribution functions; transport, warehousing, packaging, information accessibility, order processing and handling have not been fully exploited given the poor road network, Bimbona (2008), inadequate cooling/storage facilities, Masiga (January 27, 2009), unreliable power grid and poor communication technologies given an internet penetration of just 4% (African E-Index), (Heloise, 2006).

Soft drinks routinely make their way to the farthest corners of the country but there availability is often less reliable when needed in specific areas; an indicator of poor physical distribution service quality (PDSQ), (Durgavich, Nabirumbi and Ochaka, 2008; Rabinovich and Bailey, 2004). During an interview with the CEO – Century Bottling Ltd, Mr. Basil Gadios also emphasized the need for a sure haulage and

distribution system to reach the new and existing customers in the country, (Kyamutetera, April 2009).

#### **1.2 STATEMENT OF THE PROBLEM**

Soft drinks manufacturers in Uganda practice arms length vertical collaboration downstream without optimizing information sharing, decision synchronization and incentive alignment. This has affected the physical distribution service quality of the industry.

#### **1.3 PURPOSE OF THE STUDY**

The purpose of the study was to investigate the relationship between vertical collaborations, communication technologies, trust and commitment and physical distribution service quality (PDSQ) in the demand chains of soft drinks manufacturers in Uganda.

#### **1.4 RESEARCH OBJECTIVES**

- i. To establish the relationship between vertical collaboration and communication technologies in the downstream chain of soft drinks manufacturing firms.
- ii. To examine the relationship between vertical collaboration and trust in the downstream chain of soft drinks manufacturing firms.
- iii. To establish the relationship between vertical collaboration and commitment in the downstream chain of soft drinks manufacturing firms.

- iv. To examine the relationship between vertical collaboration and physical distribution service quality in the downstream chain of soft drinks manufacturing firms.
- v. To establish the impact of vertical collaboration, communication technologies, trust and commitment on physical distribution service quality in the demand chain of soft drinks manufacturing firms.

#### **1.5 HYPOTHESIS**

- **Hypothesis: I.** The existence of communication technologies leads to increased information sharing in vertical collaborations in the demand chain.
- **Hypothesis: II.** Trust increases the level of decision synchronization in vertical collaborations in the demand chain.
- **Hypothesis: III.** Commitment predicts the successfulness of the collaborations between the manufacturers and distributors in the demand chain.
- **Hypothesis: IV.** Vertical collaboration increases the level of physical distribution service quality in the demand chain.
- **Hypothesis V:** Vertical collaboration, communication technologies, trust and commitment positively relate to physical distribution service quality in the demand chain.

#### **1.6 SIGNIFICANCE OF THE STUDY**

- i. The study will help manufacturing firms in making informed decisions on how much information should be shared and at what level in collaborations with their distributors.
- ii. The research will avail more information from the Ugandan market regarding how best manufacturing firms can improve their physical distribution service quality through collaborations with the help of communication technologies.
- iii. The research will create new information on collaborations and physical distribution service quality in Uganda that could be used for future reference by upcoming researchers and academicians.
- iv. The study will provide more efficient distribution options that could be applied by the soft drinks manufacturing firms to increase customer services and satisfaction.
- v. The study will aid the demand chain partners on how to build social capital (trust and commitment) to promote collaborations and improve their physical distribution service quality.

#### 1.7 SCOPE OF THE STUDY

#### **1.7.1** Conceptual scope

The research focused on vertical collaboration, communication technologies, trust, commitment and their implication on physical distribution service quality in the demand chains of soft drinks industry in Uganda, (Stephen, 1997).

#### **1.7.2 Geographical Scope**

The study focused on selected manufacturing firms that run physical distribution operations in central Uganda, Kampala to be specific. Other areas where left out

because Kampala is the hub for all the physical distribution operations and putting into consideration the likely limitations on funding, the time frame within which this research should be completed, it was not possible that the whole country could be covered effectively. However, the findings from Kampala provided a true representation of physical distribution service quality in the country.

#### **1.8 CONCEPTUAL MODEL**



Source: Rabinovich and Bailey, (2004); Simatupang and Sridharan, (2005); Sambasivan, et al (2009); Zineldin and Jonsson, (2000).

#### **1.9 DESCRIPTION OF THE MODEL**

The essence of the research framework for this study is that physical distribution service quality can be improved through vertical collaboration among the downstream members of the demand chain.

Vertical collaboration can improve the physical distribution service quality through optimization of information sharing, decision synchronization and incentive alignment among the manufacturers and distributors in the demand chain, (Simatupang, and Sridharan, 2005).

Ensuring that products are made available at the right time requires a reliable distribution system that can be achieved with the application of efficient communication technologies to allow seamless flow of information for quicker order processing, accurate matching of demand and supply forecasts networking of distribution centers, (Rabinovich and Bailey, 2004; Sambasivan, et al (2009).

Communication technologies can increase both the efficiency of the physical distribution service quality and the effectiveness of the vertical collaborations in the demand chain by providing timely and reliable information to be shared among the demand chain enterprises, (Rabinovich and Bailey, 2004; Sambasivan, et al. 2009; Simatupang and Sridharan, 2004).

Collaborations on the other hand to be effective, need a high level of trust and commitment that requires enterprises to have adaptable production processes, agreement to bonds, share values across the distribution channel members and avoid opportunistic behavior, (Zineldin and Jonsson, 2000).

#### CHAPTER TWO LITERATURE REVIEW

#### 2.1 INTRODUCTION

This chapter reviews available literature on Vertical Collaboration, Communication Technologies, Trust, Commitment and Physical Distribution Service Quality.

#### 2.2 Vertical collaboration and communication technologies

Vertical collaboration is an effort by two or more organizations to achieve results that they cannot achieve by working in isolation, (Wang and Archer, 2007). Sandberg (2007) and Chwen, et al. (2006), introduce interdependence, openness and trust where there is risk, rewards and cost sharing as other dynamics in collaborations between manufacturers and distributors.

Integrating the demand chain through vertical collaboration to reduce costs and to improve service levels is facilitated by the adoption of developments in information communication technology (ICT), (Mason, et al. 2007). The involved parties share information, synchronize decision making and align incentives (Simatupang and Sridharan, 2005) with the help of communication technologies such as Electronic Data Interchange (EDI), Radio Frequency Identification (RFID), Electronic Point of Sale (EPOS), Enterprise Resource Planning (ERP) to facilitate a smooth flow of information exchange necessary for improved collaborations in the demand chain, (Chwen, et al. 2006; McLaren, et al 2002; Soonhong. et al, 2005; Zhenx. et' al, 2001)

Accurate and frequent communication acquired through efficient communication technologies, is essential to build a high level of trust in manufacturer - distributor

alliances. Communication fosters confidence in the continuity of the relationship and reduces dysfunctional conflict which will lead to higher levels of collaboration, (Janjaap and Ghijsen, 2005).

There is minimal collaboration among members in the demand chain downstream because of the barriers of logistical collaborations that have not been successfully tackled; those related to communication technologies and human beings, (Sandberg. 2007).

Demand chain vertical collaborations require communication technologies; EDI, Bar coding, EPOS, ERP, RFID, in their information structures to allow a seamless flow of information exchange among the members to build stronger collaborative relations, (Chwen, et al. 2006; Zhenxin, et al. 2001). Capitalizing on vertical collaboration opportunities, that is; better demand planning, inventory visibility, reduced inventory and cost saving and increased responsiveness, requires information sharing through EPOS data, (Soonhong. et al, 2005).

From the discussion, studies on the role of communication technologies in vertical collaboration in soft drinks manufacturing firms in Uganda have not been given much attention and therefore lead to the development of the following hypotheses.

**Hypothesis:** I. The existence of communication technologies leads to increased information sharing in vertical collaborations in the demand chain.

#### 2.3 Vertical collaboration and trust

Trust is a generalized expectancy held by a member in the demand chain that the word of another member can be relied upon. Studies show that collaborative relationships among manufacturers and distributors rely on forms of exchange characterized by high levels of trust, (Zineldin and Jonsson, 2000). This includes exchange of information on forecasts and financial data to determine operational costs for an agreed upon incentive alignment scheme.

Distribution relationships have been managed basing on aspects of ownership and vertical integration and the use of power, (Zineldin and Jonsson, 2000). Power has a significant influence on factors that are critical to the relationship between manufacturers and distributors on the level of cooperation. Accordingly, dependence on power provides the platform on which, process integration of logistical activities can be developed, (Chwen, et al. 2006; Sandberg, 2007). When a party is dependent, they value the collaborative relationship and want to maintain it, (Chwen, et al. 2006; Janjaap and Ghijsen 2005; Sandberg, 2007).

However, vertical collaboration will require two facets of trust: mutual and interactive trust. Interactive trust is endless and describes a continuous process of trust which is more appropriate for decision synchronization, information sharing and incentive alignment. Mutual trust on the other hand is temporary and describes a discontinuous process of trust, thus making it inappropriate for longer and stronger relations among manufacturers and distributors, (Goran, 2005). From the above discussion, the following is hypothesized:

**Hypothesis: II.** Trust increases the level of decision synchronization in vertical collaborations in the demand chain.

#### 2.4 Vertical collaboration and commitment

Commitment is the enduring desire to maintain a valued relationship in the demand chain. It predicts the successfulness and duration of collaborative relationships between manufactures and distributors, (Zineldin and Jonsson, 2000). Members must demonstrate a willingness to commit to a given relationship through specific investments of resources to agreed upon logistical activities or projects in the demand chain for a successful collaboration, (Chwen, et al. 2006).

According to Nakatani, (2003), commitment is a relative concept that grows following the development of collaboration between parties in the demand chain, thus a premise needed for the establishment of collaborative relationships. Simatupang and Sridaharn, (2002) on the other hand agree that commitment is the most essential feature for the success of any collaboration in the demand chain.

Katrina, (2003) on the other hand reveals that commitment is an essential characteristic that separates collaboration from preceding relationships in supply chains. For example, there is greater commitment in collaboration to allow companies share a vision and employ sophisticated processes such as joint planning and operation in the service of that vision. Parties are able to develop demand chain collaborations if they invest a great deal of resources, cultivate trust and commitment, and share long-term strategic goals.

At an operational level, implementation of vertical collaboration in the demand chain calls for commitment through driving change on; shifting roles on who handles which activity, building personal relations to allow quicker information sharing, manager and worker buy-in and commitment, throughout the entire demand chain to achieve any improvements in the relationships, (Vereercke and Muylle, 2006). From the discussion, the following is hypothesized:

**Hypothesis: III.** Commitment predicts the successfulness of the collaborations between the manufacturers and distributors in the demand chain.

#### 2.5 Vertical collaboration and physical distribution service quality

Physical distribution service quality is concerned with timely and reliable flow of goods from the receipt of an order until the goods are made available to the customer, (Rabinovich and Bailey, 2004; Rabinovich, et al. 2006). It requires optimization of logistics elements; production planning and demand forecasting, information management, routing and tracking, transportation, order processing, material control and warehousing (Aguezzoul, 2007; Krauth, et al. 2003) with the aid of communication technologies to allow efficient sharing of information, decision synchronization and incentive alignment, to achieve improvement in the customer service levels, (Simatupang and Sridharan, 2005; Soonhong. et al, 2005).

Due to globalization aspects, organizations are competing as demand chains for global customers to meet the customer service levels. Manufacturers and distributors form alliances with shipping and other transportation firms (Venus, et al. 2009) to allow quick exchange of information, decision synchronization and incentive alignment so as to consolidate their competitive strength in the global markets, (Simatupang, 2004, ). The sharing of information, decision synchronization and incentive alignment aid the members maximize their market share, minimize running costs and ensure reliable

and timely delivery of products to customers, (Gunasekarana, et al. 2004; Sandberg, 2007).

Internet retailer relationships with suppliers tap on global opportunities through vendor managed inventory and Just in Time inventory techniques by employing the drop-shipping strategy by the end physical distribution service providers to allow timely and reliable delivery of products to online buyers, (Rabinovich, et al. 2008). However, this is only possible through integration of the logistical activities with the help of communication technologies, (Zineldin and Jonsson, 2000). From the discussion, the following is hypothesized.

**Hypothesis: IV.** Vertical collaboration increases the level of physical distribution service quality in the demand chain.

# 2.6 Vertical collaboration, communication technologies, trust, commitment and physical distribution service quality.

Collaborative planning, forecasting and replenishment (CPFR) between manufacturers and distributors can lead to timely and reliable delivery of products to customers. Through integration of logistical activities with the aid of communication technologies and top management support, overall performance of the demand chain can be achieved due to vertical collaboration, (Rabinovich and Bailey, 2004; Sandberg, 2007). However, effective collaborative planning depends on the level of trust, commitment and the quality of information shared in the demand chain, (Danese, 2007; Goran, 2005; Janjaap and Ghijsen, 2005; Zineldin and Jonsson, 2000).

Trust and commitment have an effect on both the level of integration of logistical activities and information shared in the demand chain. Trust and commitment can increase the level of integration with the help of communication technologies, which

in turn determines the amount of exchanges among the demand chain members downstream. The reverse is true if the level of trust and commitment is low, (Simatupang and Sridharan, 2005; Soonhong. et al, 2005). Higher levels of integration increase the overall performance of the demand chain, (Sandberg, 2007).

The impact of internet technology on the relationship between vertical collaboration and physical distribution service quality points to the importance of the communication technologies in facilitating information exchange in collaborations, asserting that; reliability, timeliness and availability of products, can be achieved through integration of logistical activities using web-enabled communication technologies. Internet resolves traditional supply chain integration tradeoffs and allows all the members to exchange information on order placement and processing efficiently, (Sambasivan, et al. 2009).

A high degree of web-based demand chain integration can lead to the high levels of operational performance for manufacturers in terms of; faster delivery times, reduced transaction costs, greater profitability, and enhanced inventory turnover, (Vereercke and Muylle. 2006). Brynjolfsson, (1994), identified increased quality, variety, customer service, speed and responsiveness (Ntayi, et al. 2009) as some of the benefits accruing to demand chains as a result of integration of logistical activities in the demand chain with the help of communication technologies.

The management of transport, warehousing, order processing, routing and trucking of fleet consignments downstream requires the use of communication technologies like; Radio Frequency Identification (RFID), ERP, EDI, to enhance trust, visibility and

security of the distribution system. Strategic alliances between transport and distribution firms requires the deployment of communication technologies to achieve a timely and reliable physical distribution system, (Venus, et al. 2009).

The sharing of inventory data precludes information distortion thus minimizing the bull whip effect whose implications include: excess costs, excess inventories, slow response and lost profit, to increase the quality of the physical distribution system, (Ntayi, et al. 2009; Vereercke and Muylle, 2006; Zhenx, et al. 2001). The elimination of the bull whip effect that creates uncertainties in production and distribution in the demand chain given its effect on demand forecasting, order batching, and rationing inventory, allows demand chains to create reliable and timely physical distribution systems, (Zhenxin, et al. 2001). It was observed that, among the means to reduce delivery costs, is through application of automation alternatives that are supported by communication technologies like the EDI and EPOS, (Gunasekarana, et al. 2004).

Sambasivan, et al. (2009) applies the following metrics to measure the performance of communication technologies in E-demand chains physical distribution performance; E-Document management metric, Invoice presentation and payment metric, E-Response metric, Web-enabled service metric, Data reliability metric and Time and cost metric. Alternatively, Huerta E and Villanueva identified a general Balance Score card framework with four perspectives; user orientation, business value, internal processes, and future readiness to measure IT performance. From the discussion, the following is hypothesized.

**Hypothesis V:** Vertical collaboration, communication technologies, trust and commitment positively relate to physical distribution service quality in the demand chain.

#### 2.7 Conclusion

Physical distribution performance for any given demand chain highly centers on customer service than total logistics costs, an indicator that vertical collaborations under physical distribution alliances aim at customer satisfaction than cost reduction. Information sharing, decision synchronization and incentive alignment between manufacturers and distributors are given more attention to allow customer retention and increase on the level of competitiveness through increased customer service levels.

Vertical collaboration however, requires a high level of information sharing through the various communication technologies like, EDI, EPOS, ERP for on time information sharing and increase on trust and commitment. However, there is need for the members in the demand chain to show commitment to the relationship by investing resources in the specific relationships to ensure a timely and reliable physical distribution system that will make products available in the chain.

#### CHAPTER THREE METHODOLOGY

#### **3.1** Introduction

This section presents the research methods that were used to carry out the study. It covers the research design, target population, sample design, sample size, measurement of variables, research instrument, administration, data analysis and anticipated problems of the study.

#### **3.2** Research Design

The researcher used a cross sectional study given the time limitation accorded to the research. A correlation survey research design was applied and a quantitative research design was found appropriate for the study.

#### **3.3** Target Population

The researcher used registered manufacturers and distributors of soft drinks in Kampala. The research was limited to Kampala because according to the Uganda Business Register of 2006/2007, 61.4% of (51 out of 83) the beverage manufacturing firms are located, has the highest level of information technology development and is a highly strategic point for both the national and international market. The population consisted of: Manufacturers (51), Whole sale distributors (110), Restaurants and bars (971) to make a total of 1132, (Uganda Business Register 2006/2007, UBOS).

#### 3.4 Sample Design

The researcher used a stratified sampling design given that respondents were falling in different categories. Then, simple random sampling was used to select respondents from the different strata to allow an equal probability for the all the members to be represented.

#### 3.5 Sample Size

The Uganda Bureau of Statistics (UBOS) provided the total population of registered manufacturers and distributors and using the Krejice and Morgan (1970) table (Appendix III), a total of 285 (Two hundred and eighty five) respondents was selected to constitute the sample size.

CATEGORY	POPULATION	SAMPLE SIZE
	IN KAMPALA	FOR KAMPALA
Manufacturers	51	13
Whole sale distributors	110	28
Restaurants and bars	971	244
TOTAL	1132	285

Source: Uganda Business Register 2006/2007; Krejice and Morgan (1970)

#### **3.6** Measurement of Variables

A self administered questionnaire was provided for respondents to select a suitable number on the Likert type; ranging from Strongly Disagree (SD) = 1 to Strongly Agree (SA) = 5, as response to measure their perception on the given variables. The structured questionnaire was measured using the following variables.

- i. Vertical collaboration was measured using decision synchronization, incentive alignment and information sharing, (Simatupang and Sridharan, 2005). These metrics have been used in other studies; Soonhong, et al. (2005); Simatupang and Sridharan, (2004); Vereercke and Muylle (2006).
- ii. Trust was measured using; agreement to bonds, shared values across the distribution channel members and avoidance of opportunistic behavior,

(Zineldin and Jonsson, 2000). Scholars like: Thomas, et al. (2003), Abu Saleh and Yunus, (2007) have used the above metrics in their studies.

- iii. Commitment was measured using adaptable production processes, agreement to bonds, shared values across the distribution channel members and avoidance of opportunistic behavior, (Zineldin and Jonsson, 2000). Scholars like: Abu Saleh and Yunus, (2007); Thomas, et al. (2003), have used the above metrics in their studies.
- iv. Communication technologies was measured by web enabled service metric, data reliability metric, time and cost metric, E response metric, invoice presentation and payment metric, E document management metric, (Sambasivan, et al. 2009). Krauth, et al. (2003) has used some these measures as performance indicators in logistics service provision.
- v. Physical distribution service quality was measured by availability, timeliness, reliability of the soft drinks to end users, (Rabinovich and Bailey, 2004).

#### **3.7** Research Instrument

Data was collected using a structured questionnaire that was given to respondents and asked to complete the questionnaire.

#### 3.8 Administration

The researcher got an introduction letter to soft drinks manufacturing firms, whole sale distributors, restaurants and bars. Appointments were made to determine the convenient time when the questionnaire could be administered. At each company, permission was sort from the administrators in charge before the questionnaire was administered.

#### **3.9** Data analysis

Editing and coding of data was done when questionnaires were collected, there after data was analyzed. The researcher used qualitative and quantitative data analysis to establish the impact of vertical collaboration, communication technologies, trust and commitment on physical distribution service quality.

Quantitative data analysis was carried out using computer soft ware called Statistical Package for Social Scientists (SPSS). The impact of vertical collaboration, communication technologies, trust and commitment on physical distribution service quality was analyzed using correlation coefficient to establish the direction and strength of the relationships between variables. A regression analysis was carried out to determine the predictive strength of the independent variable on the dependent variable.

A Content Validity Index was used to assess the validity of each construct in the model while the reliability of the variables was assessed using Cronbach alpha. A cut off level of 0.5 was accepted as according to Cronbach, (1951).

		Cronbach	
Variable	Anchor	Alpha Value	CVI
Vertical Collaboration	5 point	0.863	0.643
Communication Technologies	5 point	0.677	0.600
Trust	5 point	0.573	0.600
Commitment	5 point	0.617	0.800
Physical Distribution Service	5 point		
Quality		0.690	0.867

 Table 3.2: Showing the Content Validity Index and Cronbach Alpha results

Source: Primary Data

The results show that the instrument was both valid and reliable as indicated by the values of both coefficients which were above 0.5.

#### CHAPTER FOUR DATA PRESENTATION, ANALYSIS AND INTERPRETATION

#### 4.1 INTRODUCTION

This chapter includes the presentation and interpretation of results on Vertical Collaboration, Communication Technologies, Trust, Commitment and Physical Distribution Service Quality. The chapter starts with the description of the Sample characteristics using cross tabulations. Inferential statistics are later used to make conclusions on Physical Distribution Service Quality.

#### 4.2 SAMPLE CHARACTERISTICS

Using cross tabulations, this section provides background information regarding the respondents.

			Firm Category Distributor Manufacturer		Total
Sales Range	Below 12m	Count	17		17
		Row	100.0%		100.0%
		Column	6.3%		6.0%
	13m - 360m	Count	204	1	205
		Row	99.5%	.5%	100.0%
		Column	75.6%	7.7%	72.4%
	More Than 360m	Count	49	12	61
		Row	80.3%	19.7%	100.0%
		Column	18.1%	92.3%	21.6%
Total		Count	270	13	283
		Row	95.4%	4.6%	100.0%
		Column	100.0%	100.0%	100.0%

Table 4.1: Distribution of the Sales Range (UgSh) by Firm Category

Source: Primary Data

Table 4.1 reveals that most of the firms in the study were earning between 13-360m (72.4%). In addition, Firms earning over 360m and Less than 12m from their sales,

comprised 21.6% and 6.0% respectively. On the other hand, Distributors dominated the sample (95.4%) and Manufacturers were the minority (4.6%). Among the Distributors, 75.6% were earning between 13-360m, 18.1% earn More than 360m and only 6.3% earn below 12m. It was also noted that none of the manufacturers earned below 12m.

		Firm Category		Total	
	Distributor	Manufacturer	Total		
	Less Than 4	Count	4		4
		Row	100.0%		100.0%
		Column	1.5%		1.4%
	5 - 50	Count	250	1	251
Number of Employees		Row	99.6%	.4%	100.0%
		Column	92.6%	7.7%	88.7%
	More Than 50	Count	16	12	28
		Row	57.1%	42.9%	100.0%
		Column	5.9%	92.3%	9.9%
		Count	270	13	283
Total		Row	95.4%	4.6%	100.0%
		Column	100.0%	100.0%	100.0%

 Table 4.2: Number of Employees and Firm Category Distribution

Source: Primary Data

From the findings in table 4.2, most firms have between (5-50) employees (88.7%). The distributors represented 100% in the category of firms with less than 4 employees. In addition, the distributors dominated in the categories of firms employing between 5 - 50 employees (92.6%) and that of firms employing more than 50 employees (57.1%). It was noted that most manufacturers employed more than 50 employees (92.3%). However, firms employing between 5 - 50 employees dominated

the sample (88.7%), with distributors representing (92.6%) and manufacturers (7.7%) respectively.

			Firm Category		Tatal
			Distributor	Manufacturer	Total
	Registered	Count	262	12	274
		Row	95.6%	4.4%	100.0%
Organization Status		Column	97.0%	92.3%	96.8%
Organization Status	Not Registered	Count	8	1	9
		Row	88.9%	11.1%	100.0%
		Column	3.0%	7.7%	3.2%
	Count	270	13	283	
Total	Row	95.4%	4.6%	100.0%	
	Column	100.0%	100.0%	100.0%	

**Table 4.3: Organization Status and Firm Category Distribution** 

Source: Primary Data

From the analysis in table 4.3, the category of registered firms dominated this sample (96.8%). However, the distributors dominated in the category of registered and not registered firms (95.6%) and (88.9%) respectively. Most of the manufacturers were in the category of registered firms (92.3%) with only (7.7%) in the not registered category.
			Gender		Total	
			Male	Female	10181	
		Count	20	8	28	
	High School	Row	71.4%	28.6%	100.0%	
		Column	9.6%	10.8%	9.9%	
		Count	71	23	94	
	Diploma	Row	75.5%	24.5%	100.0%	
		Column	34.0%	31.1%	33.2%	
		Count	79	31	110	
	Degree	Row	71.8%	28.2%	100.0%	
andomin Ouolific-ti		Column	37.8%	41.9%	38.9%	
Academic Quantication	Masters	Count	9	3	12	
		Row	75.0%	25.0%	100.0%	
		Column	4.3%	4.1%	4.2%	
		Count	2		2	
	Professional	Row	100.0%		100.0%	
		Column	1.0%		.7%	
		Count	28	9	37	
	Others	Row	75.7%	24.3%	100.0%	
		Column	13.4%	12.2%	13.1%	
		Count	209	74	283	
Total		Row	73.9%	26.1%	100.0%	
		Column	100.0%	100.0%	100.0%	

 Table 4.4: Academic Qualification and Gender Distribution

Source: Primary Data

From the findings in table 4.4, most of the respondents had attained an academic qualification of a degree (38.9%) while the professional category had the least (0.7%). The male dominated the gender category (73.9%) with female representing (26.1%) of the respondents. The category of respondents with an academic qualification of a degree dominated the sample, (37.8%) for the male and (41.9%) for the female. The study also revealed that respondents had also acquired other academic qualifications besides those stipulated in the questionnaire (13.1%). Overall the male respondents

dominated in all the academic categories, high school (71.4%), Diploma (75.5%), Degree (71.8%), Masters (75.0%), Professional (1.0%) and other qualifications (75.7%) respectively.

			Ger	Tatal	
			Male	Female	Totai
		Count	21	6	27
	Below 25 yrs	Row	77.8%	22.2%	100.0%
		Column	10.0%	8.1%	9.5%
		Count	117	42	159
	25-35 yrs	Row	73.6%	26.4%	100.0%
		Column	56.0%	56.8%	56.2%
		Count	52	24	76
Age Group	36-45 yrs	Row	68.4%	31.6%	100.0%
		Column	24.9%	32.4%	26.9%
		Count	18	2	20
	46-55 yrs	Row	90.0%	10.0%	100.0%
		Column	8.6%	2.7%	7.1%
		Count	1		1
	Above 55 yrs	Row	100.0%		100.0%
		Column	.5%		.4%
		Count	209	74	283
Total		Row	73.9%	26.1%	100.0%
		Column	100.0%	100.0%	100.0%

 Table 4.5: Age Group and Gender Distribution

Source: Primary Data

From table 4.5, the age group between 25 - 35yrs dominated the sample (56.2%) while the category of those above 55yrs had the least (0.4%). It was noted that the male category had a higher number of aged respondents in the 46 – 55yrs category as compared to the female (90.0%) and (10.0%) respectively.

#### 4.3 RELATIONSHIP BETWEEN THE VARIABLES

Results for the relationships between the variables were as indicated in the table 4.6.

These were made possible through the use of the Pearson (r) correlation coefficient.

	Vertical Collaboration	Communication Technologies	Trust	Commitment	Physical Distribution Service Quality
Vertical Collaboration	1.000				
Communication Technologies	.355**	1.000			
Trust	.110	.024	1.000		
Commitment	.202**	.075	.300**	1.000	
Physical Distribution Service Quality	.342**	.254**	.140*	.212**	1.000
** Correlation is significant at the (	).01 level (2-tai	led).			
* Correlation is significant at the 0.	05 level (2-taile	ed).			

**Table 4.6: Showing the Relationship Between Variables.** 

Source: Primary Data

# Vertical Collaboration and Communication Technologies

The results in the table 4.6 above showed a significant positive relationship between Vertical Collaboration and Communication Technologies ( $r = .355^{**}$ , p < .05). Implying that communication technologies improve the level of information sharing in vertical collaboration downstream.

# **Vertical Collaboration and Trust**

The table 4.6 above shows that there was no significant relationship between vertical collaboration and trust (r = .110, p > .05). This implies that issues of honesty, suspicion of other party's action, keeping of promises and consideration of another party's business success to be important between manufacturers and distributors may not lead to improved vertical collaboration in the demand chain.

#### **Vertical Collaboration and Commitment**

The findings in table 4.6 above show a significant positive relationship between vertical collaboration and commitment ( $r = .202^{**} p < .05$ ). This implies that there will be an improvement in vertical collaboration between manufacturers and distributors where both parties show intent to maintain and develop the relationship.

#### Vertical Collaboration and Physical Distribution Service Quality

Findings in table 4.6 show there is a significant relationship between vertical collaboration and physical distribution service quality ( $r = .342^{**} p < .05$ ). This implies that sharing of point of sale data, aggregate demand forecast, incentive alignment and making of joint decision between the manufacturers and distributors leads to an improvement in the Physical distribution service quality.

# Vertical Collaboration, Communication Technologies, Trust, Commitment and Physical Distribution Service Quality

Given the results in the table 4.6 above, it was observed that Vertical Collaboration has a significant positive relationship with communication technologies (r= $.355^{**}$  p<.05), commitment (r =  $.202^{**}$  p<.05) and Physical distribution service quality (r =  $.342^{**}$  p<.05) and an insignificant relationship with trust (r=.110 p>.05).

Commitment on the other hand, had a significant positive relationship with trust (r =  $.300^{**} p < .05$ ) but had no significant relationship with communication technologies (r = .075 p > .05).

Physical distribution on the other hand had a significant positive relationship with vertical collaboration (r =  $.342^{**}$  p < .05), communication technology (r =  $.254^{**}$  p < .05), Trust (r =  $.140^{*}$  p < .05) and commitment (r =  $.212^{**}$  p < .05).

From the findings, the optimization of vertical collaboration with communication technologies, commitment and trust, will lead to a significant positive improvement on physical distribution service quality.

## 4.4 Regression Model.

The regression model was generated to explore the degree to which Vertical Collaboration, Communication Technologies, Trust and Commitment can predict the change in Physical Distribution Service Quality.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model	В	Std. Error	Beta		
(Constant)	2.441	.354		6.889	.000
Vertical Collaboration	.143	.034	.254	4.221	.000
Communication Technologies	0.090	.035	.153	2.596	.010
Trust	0.087	.073	.069	1.184	.237
Commitment	.145	.065	.131	2.227	.027
Dependent Variable: Physical	<b>Distribution Servi</b>	ce Quality			
R	.405				
R Square	.164				
Adjusted R Square	.152				
Std. Error of the Estimate	.629				
Change Statistics					
F Statistic	13.455				
Sig.	.000				

Table 4.7: Showing the combined regression analysis.

Source: Primary Data

It was noted from table 4.7 that the variables in the study can only predict a 15.2% change in Physical Distribution Service Quality (Adjusted R Square = .152). It was also revealed that among the predictors, Vertical Collaboration (Beta = .254, p < .01) is a better predictor of PDSQ than Communication Technologies (Beta = .153, p < .01), Commitment (Beta = .131, p < .01) and Trust (Beta = .069, p < .01) respectively.

# 4.5 Analysis of Variance (ANOVA) Results

The results in the table 4.8 below show the ANOVA results for Distributors and Manufacturers and how they are ranked on the variables in the study.

		Mean	Std. Deviation	Std. Error	F	Sig.
	Distributor	3.27	1.22	0.07	3.250	.072
Vertical Collaboration	Manufacturer	3.88	0.87	0.24		
	Total	3.30	1.21	0.07		
	Distributor	3.51	1.17	0.07	2.942	.087
Communication Technologies	Manufacturer	4.08	0.86	0.24		
	Total	3.54	1.16	0.07		
Trust	Distributor	4.14	0.53	0.03	2.499	.115
	Manufacturer	4.38	0.65	0.18		
	Total	4.16	0.54	0.03		
	Distributor	4.17	0.61	0.04	0.264	.608
Commitment	Manufacturer	4.08	0.76	0.21		
	Total	4.16	0.61	0.04		
Physical Distribution Service Quality	Distributor	4.19	0.69	0.04	0.372	.542
	Manufacturer	4.31	0.48	0.13	3.250	
	Total	4.20	0.68	0.04		

Table 4.8: ANOVA results of firm category by variable

Source: Primary Data

The results in table 4.8 show that Distributors and Manufacturers did not differ significantly on Vertical Collaboration, Communication Technologies, Trust, Physical Distribution Service Quality and commitment (p > .05) respectively.

		Mean	Std. Deviation	Std. Error	F	Sig.
	Registered	3.33	1.20	0.07	6.693	.010
Vertical Collaboration	Not Registered	2.28	1.25	0.42		
	Total	3.30	1.21	0.07		
	Registered	3.54	1.15	0.07	.002	.969
Communication Technologies	Not Registered	3.56	1.51	0.50		
	Total	3.54	1.16	0.07		
	Registered	4.15	0.54	0.03	.143	.705
Trust	Not Registered	4.22	0.44	0.15		
	Total	4.16	0.54	0.03		
	Registered	4.16	0.62	0.04	.717	.398
Commitment	Not Registered	4.33	0.50	0.17		
	Total	4.16	0.61	0.04		
	Registered	4.19	0.67	0.04	.015	.903
Physical Distribution Service Quality	Not Registered	4.22	0.97	0.32		
Zunniy	Total	4.20	0.68	0.04		

Table 4.9: ANOVA results for Registration Status of Firm by Variable.

Source: Primary Data

Results in Table 4.9 indicate that on average, registered manufacturers and distributors are committed to vertical collaboration as compared to non-registered manufacturers and distributors. This could be because of the non registered manufacturers and distributors' inability to enter legally binding agreements and can therefore not commit to the collaboration. The statistical test also reveals that the variations in responses between the registered and the non-registered on vertical collaboration statistically differ (p = 0.01 < 0.05).

On the other hand, registered Distributors and Manufacturers did not differ significantly on Communication Technologies, Trust, Commitment and Physical Distribution Service Quality (p > .05) respectively.

		Mean	Std. Deviation	Std. Error	F	Sig.
	Below 12m	3.35	1.48	0.36	3.342	.037
Vertical Collaboration	13m - 360m	3.19	1.22	0.09		
vertical Collaboration	More Than 360m	3.64	1.05	0.13		
	Total	3.30	1.21	0.07		
	Below 12m	3.65	0.93	0.23	4.159	.017
Communication Technologies	13m - 360m	3.42	1.20	0.08		
	More Than 360m	3.90	1.00	0.13		
	Total	3.54	1.16	0.07		
Trust	Below 12m	3.71	0.77	0.19	6.627	.002
	13m - 360m	4.18	0.48	0.03		
	More Than 360m	4.20	0.60	0.08		
	Total	4.16	0.54	0.03		
	Below 12m	3.94	0.83	0.20	1.827	.163
C	13m - 360m	4.20	0.55	0.04		
Commitment	More Than 360m	4.10	0.75	0.10		
	Total	4.16	0.61	0.04		
	Below 12m	4.06	1.09	0.26	1.686	.187
Physical Distribution	13m - 360m	4.17	0.64	0.05		
Service Quality	More Than 360m	4.33	0.65	0.08		
	Total	4.20	0.68	0.04		

# Table 4.10: ANOVA results for Sales Range Volumes by Variable.

Source: Primary Data

From table 4.10, both manufacturers and distributors in the three sales range volume categories significantly differed in their perception on vertical collaboration, (p = .037 < .05).

This can be attributed to the fact that enterprises downstream do not optimize vertical collaboration because they practice transactional collaboration on the different logistical activities.

On average, there was also a significant variation among manufacturers and distributors in all the sales range volume categories on communication technologies, (p = .017 < .05). This can be attributed to the low level penetration (4%) of information communication technology in the country, (Heloise, 2006) and availability of funds to invest in the acquisition of communication technologies.

From the table 4.10, the manufacturers and distributors in the 13m - 360m and more than 360m sales range volume categories significantly differed from those in the below 12m category on trust, (p = .002 < .05). This can be attributed to the fact that the enterprises making more than 12million do not believe that those in the below 12million category can fulfill their promises in committing resources to improve the efficiency of the distribution system.

However, table 4.10 also revealed that, the manufacturers and distributors in all the sales range volume categories did not differ significantly on commitment and physical distribution service quality, (p > .05) respectively.

**Table 4.11: Showing the Hypothesis Statements** 

Hypothesis	Supported/Not
	Supported
<b>Hypothesis I</b> - The existence of communication technologies leads to increased information sharing in vertical collaborations in the demand chain.	Yes
<b>Hypothesis II</b> - Trust increases the level of decision synchronization in vertical collaborations in the demand chain.	No
<b>Hypothesis III</b> - Commitment predicts the successfulness of the collaborations between the manufacturers and distributors in the demand chain.	Yes

<b>Hypothesis IV</b> - Vertical collaboration increases the level of physical distribution service quality in the demand chain.	Yes
<b>Hypothesis V</b> - Vertical collaboration, communication technologies, trust and commitment positively relate to physical distribution service quality in the demand chain.	Yes

Source: Primary Data

Table 4.11 shows that all the hypothesis statements were supported with the exception of hypothesis II where study findings revealed no significant relationship between vertical collaboration and trust.

## CHAPTER FIVE DISCUSSION, CONCLUSION AND RECOMMENDATIONS

#### 5.1 INTRODUCTION

This chapter presents the discussions, conclusions, recommendations and areas for further research. The discussion is derived from the stated objectives and the findings in chapter four.

# 5.2 DISCUSION OF THE STUDY FINDINGS

## 5.2.1 Vertical Collaboration and Communication Technologies.

From the analysis, there existed a significant positive relationship between Vertical Collaboration and Communication Technologies. This implied that manufacturers and distributors of soft drinks in Uganda need to adopt communication technologies such as EDIs and EPOS in their delivery operations to allow a seamless flow of information to improve collaboration on the different activities.

This further implied that a high speed transmission of data coupled with low error rates and a quick response to information that is facilitated by communication technologies will improve vertical collaboration in the demand chains of soft drinks manufacturers and distributors. Communication fosters confidence in the continuity of the relationship and reduces dysfunctional conflict which leads to higher levels of collaboration according to; (Chwen, et al. 2006; Janjaap and Ghijsen, 2005; Zhenxin, et al. 2001).

Communication technologies will aid the manufacturers and distributors in optimizing vertical collaboration opportunities through demand planning, creating inventory

visibility and increasing the level of responsiveness to information by providing real time information, (Soonhong. et al, 2005).

Communication technologies facilitation of an increase in the level of communication can lead to increased trust; an important aspect in collaboration among the demand chain members, Janjaap and Ghijsen, (2005). However, from the study, this may not be possible given that there is no significant relationship between communication technologies and trust among manufacturers and distributors of soft drinks in Uganda.

From the study, hypothesis I was accepted given that the existence of communication technologies leads to increased information sharing in vertical collaborations between manufacturers and distributors of soft drinks, thus implying an improvement in the levels of collaboration, (Simatupang and Sridharan, 2005).

## 5.2.2 Vertical Collaboration and Trust.

From the study, it was confirmed that there is no significant relationship between variables; vertical collaboration and trust. This reaffirmed the fact of suspicious business relations in Uganda characterized by dishonesty and betrayal, leading to low levels of trust between manufacturers and distributors, (Muhwezi, 2009).

It further implied that issues of honesty, suspicion of other party's action, keeping of promises and consideration of another party's business success is not considered to be important between manufacturers and distributors in Uganda, thus the justification for no influence by trust on vertical collaboration in the demand chain. This however, is in contradiction with the view that effective vertical collaboration is dependent on trust, (Danese, 2007; Goran, 2005; Janjaap and Ghijsen, 2005; Zineldin and Jonsson, 2000).

It was also discovered from analysis that trust alone does not improve the level of vertical collaboration through increased decision synchronization in the demand chain as per (Goran, 2005; Zineldin and Jonsson, 2000). However, the findings show a positive significant relationship between commitment and vertical collaboration, then between commitment and trust. From this, it can be concluded that trust only improves collaboration where there is commitment between manufacturers and distributors in the demand chain.

Study findings revealed an insignificant relationship between vertical collaboration and trust in Uganda's beverage industry downstream, thus leading to the rejection of hypothesis II.

## 5.2.3 Vertical Collaboration and Commitment.

The findings showed a significant positive relationship between vertical collaboration and commitment implying that, improvement in vertical collaboration between manufacturers and distributors can be achieved where both parties show intent to maintain and develop the relationship.

Both distributors and manufacturers require that either party shows intent on developing a successful collaboration through investing specific resources in driving change on; shifting roles on who handles which logistical activity, building personal relations to allow quicker information sharing, manager and worker buy-in and commitment, throughout the entire demand chain to achieve any improvements in the collaboration, (Vereercke and Muylle, 2006).

It can further be stated that Uganda's manufacturers and distributors of soft drinks use commitment by either party to predict the successfulness or duration of collaboration, (Chwen, et al. 2006; Zineldin and Jonsson, 2000). Therefore, the perceived amount of resources committed by entities will determine the existence of collaboration in the demand chain logistical activities.

The study findings revealed a positive significant relationship between vertical collaboration and commitment meaning that commitment predicts the successfulness of the collaborations between the manufacturers and distributors, thus the acceptance of hypothesis III.

#### 5.2.4 Vertical Collaboration and Physical Distribution Service Quality.

From the findings, there was a significant relationship between vertical collaboration and physical distribution service quality. This implied that sharing of point of sale data, aggregate demand forecast, aligning of incentives and making of joint decision between the manufacturers and distributors leads to an improvement in the availability, reliability and timeliness of soft drink products to end users.

The use Internet for email purposes and telephone calls as the major communication technologies for information sharing in Physical distribution requires improvement by adopting the use of RFID, EPOS, EDI among other technologies to increase timely delivery of soft drinks. Creating of communication networks with distribution points like Uchumi Supermarket to allow quick access to information, will have a positive impact on the service delivery.

Manufactures need to involve distributors in decision making beyond operational levels like promotional awareness campaigns to more strategic levels to improve the reliability of the demand chain to deliver soft drinks to the downstream consumers.

Aligning of incentives evidenced by the demand chain members through setting lower prices for distributors to profit by selling at a higher price, provision of proper packaging and labeling services by manufacturers, strategic location by distributors, marketing of the product among others, can improve the availability and timely delivery of soft drinks in the country.

Given the positive significant relationship between vertical collaboration and physical distribution service quality, hypothesis IV is accepted. Implying that, vertical collaboration increases the level of physical distribution service quality in Uganda's beverage industry.

# 5.2.5 Vertical Collaboration, Communication Technologies, Trust, Commitment and Physical Distribution Service Quality.

From the study, the independent variables could only predict a 15.2% of the change in Physical Distribution Service Quality. Implying that, there is a possibility of other intervening variables not captured by this study, besides the insignificant relationship between vertical collaboration and trust that are responsible for the low percentage. It was also revealed that among the predictors, Vertical Collaboration is a better predictor of PDSQ than Communication Technologies, Commitment and Trust respectively.

Physical distribution service quality on the other hand had a significant positive relationship with vertical collaboration, communication technology, Trust and commitment. This implied that the optimization of information sharing, synchronization of decisions and aligning of incentives with the aid of communication technologies, trust and commitment will lead to a 15.2% significant positive improvement in the reliability, availability and timely delivery of soft drinks downstream.

The other factors like inaccessibility of some areas due poor infrastructure development in terms either no paved roads, bridges, inadequate electricity supply, low information communication technology penetration rate, unreliable communication systems such as poor phone grids, poor storage facilities, ignorance and illiteracy of the distributors to optimize business collaborations, explain the low percentage prediction of the independent variables on physical distribution service quality in uganda, (Heloise, 2006).

Overall, optimization of vertical collaboration between manufacturers and distributors in the demand chain to improve PDSQ was limited by the low levels of trust and other likely intervening factors not covered in this study, thus the low predication of 15.2% by the independent variables. However, vertical collaboration, communication technologies and commitment had a significant positive relationship with PDSQ and will therefore improve on the timeliness, reliability and availability of soft drinks to end users.

#### 5.3 CONCLUSION ON STUDY FINDINGS

Improvement in the level of customer service is a preferred metric for physical distribution performance than total logistical cost for demand chains, implying that manufactures and distributors of soft drinks need to strike a balance between these dynamics.

Information sharing, decision synchronization and incentive alignment between manufacturers and distributors to increase PDSQ should be given more attention to allow customer retention and increase on the level of competitiveness through increased customer service levels than reduction of logistical costs. However, entities need to bear in mind the need to make a profitable margin to survive or grow in the business.

From the study, vertical collaboration emerged as the best predictor for a positive change in PDSQ. However, communication technologies had a positive significant relationship with vertical collaboration and PDSQ among the mediating factors. Commitment had a positive significant relationship with vertical collaboration and with all the other variables except communication technologies. Trust had no significant relationship with all the other variables except commitment. Trust that is highly needed for better vertical collaboration can be developed by emphasizing commitment in the demand chain.

Justification for this study is revealed from the fact that sharing of information, synchronizing of decisions and aligning of incentives in the demand chain with the aid of communication technologies, trust and commitment can lead to positive significant improvement in the availability, reliability and timeliness of soft drinks in Uganda's beverage industry. However, factors like; low levels of trust, the lack of adequate infrastructure inform of accessible roads, unreliable electricity and access to communication technologies among others, explain the low predication levels of the variables on PDSQ in Uganda when compared to similar studies in other countries.

## 5.4 **RECOMMENDATIONS**

From the study, the manufacturers and distributors of soft drinks in Uganda realize the importance of vertical collaboration, communication technologies, trust and commitment on PDSQ downstream. Therefore, it's recommendable that the following be implemented to improve the PDSQ.

#### Vertical collaboration

- i. Manufacturers should increase on the amount of incentives distributed among the demand chain members besides lower prices to offering other logistical incentives like; more storage facilities such as refrigerators, provision of promotional materials like T-shirts, key holders, bottle openers among others, to increase the availability of soft drinks downstream.
- ii. Manufacturers and distributors of soft drinks should set up communication structures to allow sharing of real time information. This can be through setting up of organisation intranets and extranets that can be configured to allow faster flow of information and higher integration of logistical activities in the demand chain.
- iii. Consultation during decision making Firms should endeavor to consult with all the stake holders before making independent decisions to facilitate decision synchronization in the demand chain. Consultation will help eliminate

conflicts and allow optimization of vertical collaboration to improve PDSQ downstream.

Commitment -The demand chain members need to optimize vertical collaboration by committing more resources to logistical activities through offering training for participants, developing legally binding agreements and meeting everyones' side of the bargain (trust) to increase PDSQ.

Communication Technologies - There is need for both parties to tap onto the available opportunities likely to arise from the developing information communication technologies in the Uganda. Besides email services, internet could be used to integrate the different logistical activities like order processing, routing and scheduling and access to real time information to ensure timely delivery of goods downstream.

### 5.5 **RESEARCH LIMITATIONS**

- i. The unwillingness and uncooperativeness of respondents to fill in the questionnaires for fear of losing classified information to competitors. The researcher's intentions were clearly explained as highly academic in the introduction letter to win the respondents confidence.
- ii. Failure to receive the filled questionnaires back and on time from the respondents due to their busy schedules at work. An appropriate time was set to allow busy respondents fill the questionnaire within the research timeframe.
- iii. Limited access and scarcity of local secondary data on Vertical Collaboration and Physical Distribution Service Quality in the Ugandan soft drinks industry. The researcher used foreign literature that was relevant to the study to cover the local literature gap.

- iv. Given that the relationship study required a longitudinal to a cross sectional approach, this could not be applied due to the time limitation within which the research report should be submitted. A good analysis of the findings and adequate literature review aided the researcher to develop inferences.
- v. It was established that respondents found it challenging to decide on which distributor or manufacturer to focus on while responding to the questionnaire given that they collaborated with many entities of all sizes, thus the likely hood of some bias in the study results. The researcher controlled this variation by designing general constructs applicable to any of the parties targeted.
- vi. Inability to predict the research outcomes hypothesizes where stated to predict the possible change in the dependent variable. This posed a challenge given other intervening variables that were not covered in this study. The researcher however identified mediating factors that had higher significance on the vertical collaboration and physical distribution service quality.

#### 5.6 POSSIBLE AREAS FOR FURTHER RESEARCH

- The study shows that the variables could only explain 15.2% of the change in Physical distribution service quality. This means there are still other significant vacant variables that can cause a positive significant change in PDSQ. For example, communication technologies can be studied as an independent variable rather than a mediating factor to establish its impact on PDSQ.
- ii. Though vertical collaboration had a positive significant relationship with PDSQ, studying other demand chain relationships such as partnerships and

alliances could also shade more light on how to improve the reliability and timeliness of the distribution system in the soft drinks industry.

 The role of the transport function given our poor road infrastructure, can be studied to establish its effect on Physical distribution Service Quality given that it takes the highest percentage compared to other logistical components in physical distribution.

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# **APPENDIX I**

# MAKERERE UNIVERSITY BUSINESS SCHOOL GRADUATE AND RESEARCH CENTRE

## **Questionnaire (Distributors)**

Dear respondent, your company has been selected to participate in a study on **VERTICAL COLLABORATION, COMMUNICATION TECHNOLOGIES, TRUST, COMMITMENT AND PHYSICAL DISTRIBUTION SERVICE QUALITY**. This is a Makerere University Business School (MUBS) sponsored study intended for only academic purposes. The information provided will be treated as highly CONFIDENTIAL. The researcher guarantees the destruction of the acquired information by shredding or burning once the data has been analyzed and inferences drawn. Your co-operation is highly appreciated.

# BACK GROUND INFORMATION (Please tick as appropriate)

# a) Highest Academic qualification of the respondent.

High school	Diploma	Degree	Masters	Professional	Others (specify)

# b) Age of respondent

Below 25 years	25-35 years	36-45 years	46-55 years	Above 55 years

#### c) Sex of the respondent

Male	Female

#### d) Range of sales revenue per year

Below Ugsh.12,000,000	13,000,000 - 360,000,000	More than 360,000,000

#### e) Number of employees

Below 4 Employees	5 – 50 Employees	More than 50 Employees

# f) Status of the organization

Registered	Not registered

# VERTICAL COLLABORATION

	Information Sharing	N d	e	e.		<b>N</b> ()
		Strongl	Disagre	Not sur	Agree	Strongl agree (5
1	The manufacturers inform us about which products are on promotion.					
2	The manufacturer informs us about price changes of the different products.					
3	The manufacturer openly shares confidential information on on-hand inventory levels.					
4	We share Point of Sale data with manufacturers in the distribution chain.					
5	There is an aggregate demand forecast for the likely products to be distributed.					
	Decision Synchronization					
6	There is joint planning with the manufacturer on promotional events.					
7	There is consultation and agreement with the manufacturer on the pricing policy.					
8	There is a joint decision with the manufacturer on inventory requirements.					
9	There is joint resolution with the manufacturer on demand forecasts.					
10	There is a joint resolution with the manufacturer on order processing time.					
	Incentive Alignment					
11	There are subsidies inform of lower retail prices from the manufacturer.					
12	There are shared savings on reduced inventory costs.					
13	The manufacturer is willing to share risks with us.					
14	We have made some investments with the manufacturer					

# **COMMUNICATION TECHNOLOGIES**

		Strongly Disagree	Disagree	Not sure	Agree (4)	Strongly agree (5)
1	There is high speed transmission of data to and from					
	manufacturer.					
2	There is quick response to information sent to the manufacturer.					
3	The daily completed number of transactions is high due to the use					
	of computer related technologies.					
4	All payments to manufacturers are done using Electronic Funds					
	Transfer (EFT).					
5	The error rate in exchange of data with the manufacturer and is					
	low due to the use of computer technologies.					

# TRUST

		Strong	ly D:	Disagr	Not	Agree	Strong
1	The manufacturer considers it important that your business is successful.						
2	There is no reason for the manufacturer to be suspicious of your actions.						
3	There is a high level of trust that has been developed with the manufacturer.						
4	The manufacturer always keeps his promises.						
5	The manufacturer is always honest when transacting with you.						

	COMMITMENT	Strongly Disagree	Disagree (2)	Not sure (3)	Agree (4)	Strongly agree (5)
1	There is an intention to maintain and develop the relationship with the manufacturer.					
2	The relationship with the manufacturer requires maximum effort and involvement.					
3	There is enough energy spent in relationship with the manufacturer.					
4	There is satisfaction with the level of cooperation with the manufacturer.					
5	There is full openness and honesty in the relationship with the manufacturer.					

# PHYSICAL DISTRIBUTION SERVICE QUALITY

	Inventory Availability	Strongly	Disagree	Not sure	Agree (4)	Strongly
1	The manufacturer is aware of your inventory levels.					
2	The manufacturer is updated continuously on your stock levels.					
3	The manufacturer delivers stocks on demand.					
4	There times when you run out of stock needed to meet customer orders.					
	(R).					
5	There times when there is more stock than what is required to meet					
	customer demand.					

# Timeliness in the duration of order delivery cycle

6	Orders are processed manually through the filling of forms and signing			
	documents			
7	The manufacturer instantly receives and processes the orders.			
8	Delivery of stock is made within the agreed time once an order is			
	placed.			
9	Orders are entered and processed by computers.			
10	There is an agreed upon procedure to be followed when placing orders.			

# **Reliability in order fulfillment**

11	There is trust that the manufacturer will deliver products within the			
	agreed time.			
12	The manufacturer receives information regarding order placement			
	accurately with no distortion.			
13	The manufacturer keeps inventory readily available to meet the changes			
	in demand.			
14	The manufacturer readily avails stock regardless of the business location.			
15	The required amount of stock is always available to meet customers'			
	orders.			

# APPENDIX II

# MAKERERE UNIVERSITY BUSINESS SCHOOL GRADUATE AND RESEARCH CENTRE

## **Questionnaire (Manufacturers)**

Dear respondent, your company has been selected to participate in a study on **VERTICAL COLLABORATION, COMMUNICATION TECHNOLOGIES, TRUST, COMMITMENT AND PHYSICAL DISTRIBUTION SERVICE QUALITY.** This is a Makerere University Business School (MUBS) sponsored study intended for only academic purposes. The information provided will be treated as highly CONFIDENTIAL. The researcher guarantees the destruction of the acquired information by shredding or burning once the data has been analyzed and inferences drawn. Your co-operation is highly appreciated.

# BACK GROUND INFORMATION (Please tick as appropriate) a) Highest Academic qualification of the respondent.

High school	hool Diploma Degree Masters		Professional	Others (specify)	

# b) Age of respondent

Below 25 years	25-35 years	36-45 years	46-55 years	Above 55 years

#### c) Sex of the respondent

Male	Female

#### d) Range of sales revenue per year

Below Ugsh.12,000,000	13,000,000 - 360,000,000	More than 360,000,000				

## e) Number of employees

Below 4 Employees	5 – 50 Employees	More than 50 Employees					

### f) Status of the organization

Registered	Not registered

# VERTICAL COLLABORATION

	Information Sharing			e		
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		S C	Ď	ک ۲	A	St
1	The distributor is informed about which products are on for promotion.					
2	The distributors are informed about price changes of the different					
-						
3	There is open sharing of confidential information with the distributor on on-hand inventory levels.					
4	There is sharing Point of Sale data with every distributor in the					
	distribution chain.					
5	There is an aggregate demand forecast for the likely products to be					
	distributed.					
	Decision Synchronization					
6	There is joint planning with the distributor on promotional events.					
7	There is consultation and agreement with the distributor on the pricing					
	policy.					
8	There is a joint decision with the distributor on inventory requirements.					
9	There is joint resolution with the distributor on demand forecasts.					
10	There is a joint resolution with the distributor on order processing time.					
	Incentive Alignment					
11	There are subsidies inform of lower retail prices offered to the					
	distributor.					
12	There are shared savings on reduced inventory costs.					
13	The distributor is willing to share risks with us.					
14	We have made some investments with the distributor					

# COMMUNICATION TECHNOLOGIES

		Strongly Diseared	Disagree	Not sure	Agree (4)	Strongly
1	There is high speed transmission of data to and from the distributor.					
2	There is quick response to information sent to the distributor.					
3	Daily completed number of transactions is high due to the use of					
	computer related technologies.					
4	All payments by the distributor are received through Electronic Funds					
	Transfer (EFT).					
5	The error rate in exchange of data with the distributor is low due to the					
	use of computer technologies.					
## TRUST

		Strongly Disagree	Disagree	Not sure	Agree (4)	Strongly
1	The distributor considers it important that your business is successful.					
2	There is no reason for the distributor to be suspicious of your actions.					
3	There is a high level of trust that has been developed with the distributor.					
4	The distributor always keeps his promises.					
5	The manufacturer is always honest when transacting with you.					

## COMMITMENT

		Strongly Disagrae	Disagree	Not sure	Agree	Strongly
1	There is an intention to maintain and develop the relationship with the					
	distributor.					
2	The relationship with the distributor requires maximum effort and					
	involvement.					
3	There is enough energy spent in relationship with the distributor.					
4	There is satisfaction with the level of cooperation with the distributor.					
5	There is full openness and honesty in the relationship with the					
	distributor.					

## PHYSICAL DISTRIBUTION SERVICE QUALITY

	Inventory Availability			0		
		ly oo	ee	sure	(4)	jly S
		ong aar	agr	<b>9</b> 2	ee.	ong
		Str Die	Dis	Not	Agı	Str
1	The distributor is aware of your inventory levels.					
2	The distributor is updated continuously on your stock levels.					
3	Stocks are delivered to distributors on demand.					
4	There times when you run out of stock needed to meet the distributors'					
	orders. (R).					
5	There times when there is more stock than what is required to meet the					
	distributors' demand.					
	Timeliness in the duration of order delivery cycle					
6	Orders are processed manually through the filling of forms and signing					
	documents					
7	Orders from the distributor are instantly received and processed.					
8	Delivery of stock is made within the agreed time once an order is					
	placed.					
9	Orders are entered and processed by computers.					
10	There is an agreed upon procedure to be followed when receiving					
	orders.					
	Reliability in order fulfillment					
11	The distributor trusts that products will be delivered within the agreed					
	time.					
12	Information regarding order placement s received accurately with no					
	distortion.					
13	Inventory is readily available to meet the changes in the distributors'					
1.4	demand.					
14	Stock is readily availed to the distributor regardless of location.					
15	The required amount of stock is always available to meet the					
	distributor's orders.					