REVERSE LOGISTICS CAPABILITIES AND SUPPLY CHAIN PERFORMANCE IN UGANDAN PHARMACEUTICAL INDUSTRY.

BY

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A DISSERTATION SUBMITTED TO THE KYAMBOGO UNIVERSITY GRADUATE SCHOOL IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER'S DEGREE IN BUSINESS ADMINISTRATION OF KYAMBOGO UNIVERSITY

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DECLARATION

I, Namweseza Zam, hereby declare that this research dissertation entitled "Reverse logistics capabilities and supply chain performance in Ugandan pharmaceutical industry" is my original work and has not been submitted to any other institution of higher learning for any academic award.

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APPROVAL

This is to certify that this dissertation has been prepared by Namweseza Zam and it was done under my supervision. It is now ready for submission to the Graduate School Kyambogo University in partial fulfillment for the requirements of the award of Master's Degree of Business Administration.

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DEDICATION

I dedicate this dissertation to my beloved family especially my new born daughter Arinda Kailyne.

May God bless you always.

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To my family; my husband, Musinguzi Brighton and my girls Alaine, Johanne and Kailyne who endured my long absence from home, I say thank you for your love, patience and support. I will always treasure you.

And above all, Glory and Honor return unto God that has granted me wisdom and energy to complete this project.

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ABBREVIATIONS AND ACRYNOMS

RL	:	Reverse Logistics
SCOR	:	Supply Chain Operations Reference model
NDA	:	National Drug Authority
CSCMP	:	The Council of Supply Chain Management Professionals
EDI	:	Electronic Data Interchange
RFID	:	Radio Frequency Identification
SCM	:	Supply Chain Management
RBT	:	Resource Based Theory
LIMC	:	Logistics Information Management Capability

ABSTRACT

Efficient Reverse logistics in pharmaceutical industry is necessary for proper management of returns and recalls because medicines are high value products and very critical to the health of consumers as well as the environment. The aim of this research was to establish the effect of Reverse Logistics Capabilities on Supply Chain Performance and the moderating effect of Top Management Support. The study specifically addressed the following study objectives; To examine the effect of Logistics information management capability on supply chain performance; To examine the effect of Process formalization capability on supply chain performance; To examine the effect of flexibility capability on supply chain performance; To examine the moderating effect of Top management support between reverse logistics capabilities and supply chain performance. A cross sectional survey design was used, the study utilized a structured closed ended questionnaire for data collection from pharmaceutical supply chain companies including manufacturers, wholesale pharmacies and retail pharmacies in Kampala-central region, Uganda. A study population of 445 companies was considered for collection of quantitative data where a sample of 205 was used. The results of multiple regression support the hypothesis that reverse logistics capabilities affect supply chain performance. The effect of logistics information management systems, process formalization capability and flexibility capability on supply chain performance were all significant. The hierarchical regression however did not find any significant moderating effect of top management support between reverse logistics capabilities and supply chain performance. This may imply that top management doesn't have to get directly involved in reverse logistics activities as long as the necessary capabilities have been provided.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter entails the background of the study describing the historical, theoretical, conceptual and contextual background, statement of the problem, purpose of the study, the specific objective of the study, research hypothesis, conceptual framework, the significance of the study, scope of the study and definitions of key terms and concepts.

1.1 Background to The Study

The background is subdivided into historical, theoretical, conceptual and contextual background.

1.1.1 Historical back ground

Reverse logistics has evolved over years since it gained recognition in the early nineties when The Council of Logistics Management first published its definition. In the seventies, Literature referred to it as “reverse channels” or “reverse flows”(Ginter & Starling, 1978). The term Reverse logistics at the time was used to refer to logistics activities related to recycling, waste management and disposal (de Brito & Dekker, 2004). Other authors redefined the term reverse logistics by providing for a sense of direction of movement of goods from the consumer towards the producer (Murphy & Poist, (1989), Pohlen & Farris, (1992)).

In the late nineties, Carter & Ellram, (1998) introduced the term “environment” in the definition of Reverse logistics through activities such as recycling, reuse and material reduction. Rogers & Tibben-Lembke, (1999) provided a more acceptable definition recognized to date by stressing the purpose of reverse logistics.

Globally, there are several factors driving reverse logistics across industries. These include; 1) direct economic benefits either through recapturing value of returned products or reduction in operation costs as a result of implementation of efficient RL systems, 2) environmental concerns due to increase in amount of waste and emissions, 3) resource depletion as a result of increased consumption of materials and energy, 4) competitive pressures forcing retailers and manufacturers to liberalize return policies to satisfy their customers, and 5) government regulations holding producers accountable for collection and recycling of their products and packages (de Brito, Dekker, & Flapper (2005), Vahabzadeh & Yusuff, (2015)). Therefore Reverse logistics has been pivotal in achieving sustainable development and many companies have begun investments in reverse logistics activities of their supply chains (Rogers & Tibben-Lembke, 1999).

Majority of studies on reverse logistics focused on other industries that display high percentage volumes of returns other than the pharmaceutical industry, among which include automobile industry, electrical, electronics, paper and plastics recycling etc., Nevertheless the pharmaceutical industry poses a great concern on environmental and waste disposal management implications due to high waste to product ratios (Narayana, 2012).

1.1.2 Theoretical Back ground

This study is guided by Resource based theory. The resource-based theory is built on assumption of heterogeneity and immobility of resources across firms. The central point argues that a firm can achieve competitive advantage by leveraging valuable, rare, inimitable and non-substitutable resources and capabilities. Firm resources are defined as “all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness.” (Barney, 1991).

Reverse logistics capabilities include firm's internal resources and processes that are employed to efficiently and effectively manage activities of the reverse flow. There are three firm capabilities considered in this study for Reverse logistics i.e., Logistics information management capability, Process formalization capability, and flexibility capability. Logistics information management capability utilizes different information management systems to collect, analyze, use and share information required in monitoring status of pharmaceuticals within the reverse distribution channels to ease accountability, traceability and security. The uncertainty involved in reverse logistics requires firms to learn and use the knowledge acquired to better manage future events thus Process formalization capability aims at optimizing reverse logistics operations through effective workflows that yields minimum costs. Flexibility capability relates to adaptation to unexpected circumstances and managing uncertainties to minimize disruption in the supply chain.

1.1.3 Conceptual Back ground.

The key concepts of the study comprise of reverse logistics capabilities as independent variable and supply chain performance as the dependent variable.

Genchev, Landry, Daugherty, & Roath (2010) defined reverse logistics capabilities as organizational abilities arising from reverse logistics programs that potentially create sources of competitive advantage, differentiation and enhanced firm performance. Based on that definition, three reverse logistics capabilities were identified; 1) information management, 2) innovation and 3) Responsiveness. Based on the framework proposed by Lin & Hsu (2017) for investigating reverse logistics capabilities of E-tailers, reverse logistics capabilities consisted of IT support, Formalization and Flexibility. In their argument, formalization and flexibility were considered major dimensions of innovation as a result of resource commitment. Similar concepts have been applied in Logistic capabilities studies including process capability, flexibility capability and information integration capability (Liu & Luo, 2012).

In view of resource based theory, Vlachos (2016) considered Reverse logistics capabilities as the internal capabilities and processes that a firm deploys to effectively implement its reverse logistics activities. Based on the definition, RL capabilities were categorized as information management capabilities and products (or services) capabilities. The importance of Information management in reverse logistics was further emphasized by Jack, Powers, & Skinner (2010) who characterized it as the accuracy and availability of information, the process and timeliness of reverse logistics information, internal and external connectivity and usefulness of that information.

Based on the Resource based theory, this study focused on internal firm factors deployed to effectively manage reverse logistics activities. The reverse logistics capabilities considered for this study were; 1) Logistics information management capability, 2) process formalization capability and 3) Flexibility capability. Constructs were developed emphasizing the capabilities of returns handling at firm level as adapted from the previous research of Genchev et al. (2011), Barad & Sapir (2003), Bai & Sarkis (2013), Shafiq & Naqvi (2013), Vlachos (2016), and Liu & Luo, (2012).

Supply chain performance

Reverse logistics in pharmaceutical industry occurs in a reverse cascade causing disruption in the entire supply chain, it's in that light that this study is focusing on supply chain performance as opposed to individual firm performance.

Performance metrics for measuring supply chain performance were adopted from supply chain operations reference (SCOR) model conceptualized along 5 dimensions namely; Reliability, Responsiveness, Agility, Costs and Assets. Reliability, responsiveness, and agility dimensions are customer focused, whereas costs and assets dimensions are internally focused. This study focused only on customer focused dimensions as they better represent performance in pharmaceutical supply chain where reverse logistics is customer driven.

Reverse Logistics can apply to different types of products as well as industry and their different geographical locations. Therefore, the proposition of this study seeks to expand what is currently known about Reverse Logistics as well as the ability to generate insights from a different perspective and context.

1.1.4 Contextual Back ground

Uganda pharmaceutical manufacturing industry has evolved over the past twenty-five years from 2 manufacturing facilities registered in mid 1990s (Project, 2009) to fourteen licensed manufacturers in 2019. They are involved mainly in production of generic formulations and repackaging of finished dosage forms.

Local production of pharmaceuticals continues to be low compared to the imported products. Data is insufficient but it is estimated that on 10-20% of the demand is met by local production. Several challenges faced by local manufacturers have been reported by Ohairwe, Basheka, & Zikusooka (2015) and they include; High cost of operation, high cost of energy, unfair competition particularly on prices of imported products from India and China. Other challenges reported to impede the growth of local pharmaceutical production and their commercial viability include sourcing of technology, equipment and high skilled human resource from abroad, The necessity to import starting materials including Active pharmaceutical ingredients, excipients and some packaging materials (Project, 2009) , Failure of locally manufactured products to meet internationally recognized standards and lack of enabling policies (East African Community, 2017).

Pharmaceutical products are supplied through the private and public sectors, Non-government organizations, and not for profit organizations comprised of international aid agencies and faith-based organizations. Private sectors include wholesale pharmacies, retail pharmacies, hospital pharmacies and drug shops.

Uganda has 6,404 health facilities —3,084 (48 percent) public, 2,373 (37 percent) Private For Profit, and 947 (15 percent) Private Not For Profit (*Uganda National Supply Chain Assessment*, 2018). National medical stores (NMS) has the mandate to procure, store and distribute medicines and medical supplies to all government health facilities throughout the country but the responsibility of proper use, management and accountability of medicines stock lies with the facility managers or in-charges. This has posed challenges for management of expiry medicines in public health facilities due lack of clear guidance and policy on who is responsible for what. Uganda national redistribution strategy for prevention of expiry and handling of expired medicines was issued to provide guidance to the health facilities on redistribution as an essential part of reverse logistics that moves unused, unexpired stock between health facilities and districts where it is most needed but only applied to useable stock (MOH, 2012). However In 2018 the estimated quantities of expired medicines all over the country were believed to be about 1,200 to 1,500 tons (MOH, 2018).

A study by Nakyanzi, Kitutu, Oria, & Kamba (2010) on expiry of medicines in Uganda indicated that exchange of expired medicines with suppliers and return of medicines by customers were common in both public and private outlets, which is a clear indication that reverse logistics exists in the Uganda pharmaceutical supply chain. Further the study identified the causes of expiries of medicines which included procurement of medicines with short shelf lives, treatment and policy change, slow turnover of expensive medicines and medicines that treat rare diseases and existence of alternatives for some medicines

Drug recalls is another form of reverse logistics in pharmaceutical supply chain where drugs are withdrawn from the market by the marketing authorization holder because of quality related issues such as failure to meet quality specifications, adverse reactions, counterfeits, non-compliance to current good manufacturing practices(cGMP) among others. It can be voluntary or directed by the regulatory agencies and take on different levels depending on the risk to the consumers.

Efficient Reverse logistics systems in pharmaceutical industry is necessary for proper management of returns and recalls because medicines are high value products and very critical to the health of consumers as well as the environment (Narayana, 2012). Improper management may also result into medicines being dubiously thrown back into forward supply chain which is detrimental to public health (Kwateng et al., 2014). Lack of inventory visibility due to the fragmented nature of pharmaceutical supply chain coupled with a large number of stakeholders and lack of integration results into traceability challenges.

Reverse logistics in pharmaceutical supply chains require efficient management to provide for safe and secure mechanism of retrieval of medicines for proper disposition, minimize costs of return handling, protect the environment through proper disposal of pharmaceutical waste, provide valuable data trends for forecasting feature trends, promote good corporate and brand image through transparent awareness on stakeholder responsibilities, Reduce financial risks for downstream partners with effective credit, collection and replenishment processes. It is estimated that 3-4% of pharmaceutical products sold are returned and manufacturers spend up to 4% of cost of goods sold on reverse logistics (HDA research foundation, 2018).

1.2 Problem statement

Despite the benefits of reverse logistics highlighted in literature, Pharmaceutical industry is still struggling to establish capabilities to effectively manage the process of handling returns and recalls. Lin & Gao (2018) state that "Most drug enterprises lack a set of effective Reverse logistics system, which plays a key role in operation management system and information system resulting in return and recovery difficulties and confusion." National drug authority reports indicate an increase in drug recalls on Ugandan market with a total of 104 drugs recalled between 2018 and 2020 (NDA, 2020), The rate is expected to increase significantly with the increase in post marketing surveillance and public awareness. Therefore, Ugandan Pharmaceutical industry should be in position to handle the activities of reverse logistics by developing the necessary capabilities and ensuring that there's an improvement in supply chain performance otherwise critical issues on public health, safety and environment shall raise concern on proper handling of drugs recalled or returned to the facilities, important considerations being security and traceability of returned or recalled drugs up to final disposition.

Therefore, it is based on that insight that the study sought to establish the effect of reverse logistics capabilities on supply chain performance in Ugandan pharmaceutical industry.

1.3 Purpose of the study

The purpose of this study was to establish the effect of reverse logistics capabilities on supply chain performance in Ugandan pharmaceutical industry.

1.4 Objectives of the study

1. To examine the effect of Logistics information management capability on supply chain performance.
2. To examine the effect of Process formalization capability on supply chain performance.
3. To examine the effect of flexibility capability on supply chain performance.
4. To examine the moderating effect of Top management support between reverse logistics capabilities and supply chain performance.

1.5 Research Hypothesis

Following the research objectives, the research hypotheses were stated as follows.

H1: There is a significant effect of Logistics information management capability on supply chain performance.

H2: There is a significant effect of Process formalization capability on supply chain performance.

H3: There is a significant effect of flexibility capability on supply chain performance.

H4: There is a significant moderating effect of Top management support between reverse logistics capabilities and supply chain performance.

1.6 Scope of the Study

1.6.1 Content scope

The research concentrated on evaluating the effect of reverse logistics capabilities on supply chain performance and moderating role of top management support.

1.6.2 Geographical scope

The study was carried out at pharmaceutical companies of human medicines in Kampala-Central region as Licensed by National Drug Authority.

1.6.3 Time scope

The study was for a period of four months up to final research report, while literature review concentrated on the periods from 2010-2020.

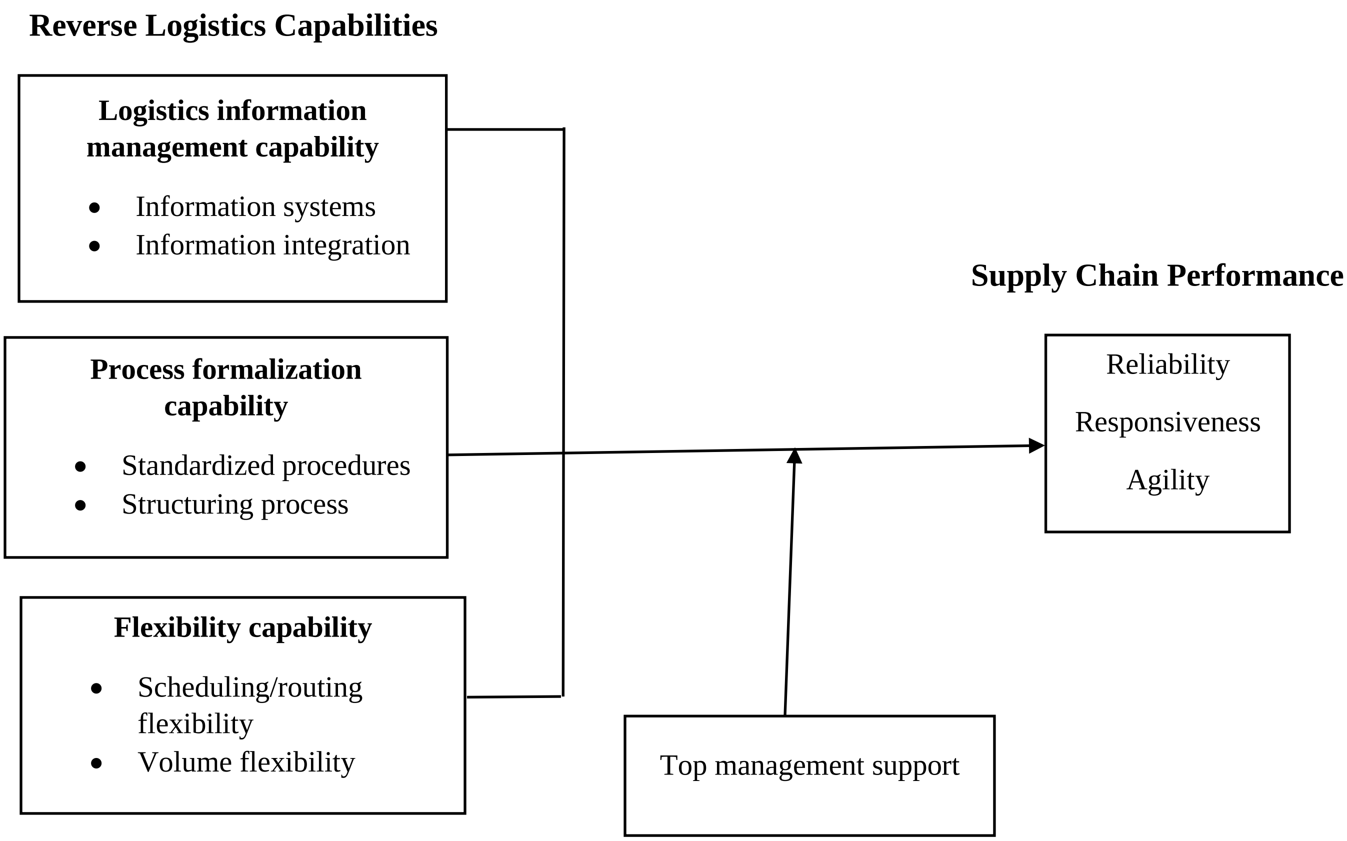
1.7 Significance of the study

The study intended to contribute knowledge to the field of reverse logistics in pharmaceutical industry in developing countries. Furthermore, to empower the practitioners with useful knowledge on what reverse logistics capabilities are required to influence the overall supply chain performance, thus enabling them to effectively allocate scarce resources in implementation of effective reverse logistics systems.

1.8 The conceptual framework

From the literature reviewed, the conceptual framework developed for this study is given in Figure below.

Figure 1. 1: Conceptual Framework



Source: Lin & Hsu (2017), Vlachos (2016) as modified by the researcher.

The independent variable is reverse logistic capabilities was measured as logistics information management capability, process formalization capability and flexibility capability. The dependent variable supply chain performance was measured as reliability, responsiveness, and agility. The moderating variable was top management support.

1.9 Definitions of key terms

For the purpose of this study the following terms were defined to have meaning as follows.

Reverse logistics; The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or proper disposal (Rogers & Tibben-Lembke, 1999).

Reverse logistics capabilities: Reverse logistics capabilities is the organizational abilities arising from reverse logistics programs that potentially create sources of competitive advantage, differentiation and enhanced firm performance (Stephen E Genchev et al., 2010).

Supply chain performance: Supply Chain Performance refers to the extended supply chain's activities in meeting end customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner (Hausman, 2005).

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The literature review of this study was composed of basic theories which provide evolution, definition and explanation about supply chain management and Logistics, Reverse logistic and RL capabilities, Supply chain performance metrics which was presented by different scholars and finally the conceptual framework of the study which was constructed based on the theoretical framework.

2.1 Logistics and Supply Chain management

The practice of Logistics dates back earlier than the 1950s in USA military industry where its role in solving issues related to the supply of soldiers and materials for military activity support efficiently on time was appreciated (Solomon, 2013). The practice was eventually introduced to manufacturing to facilitate movement of materials and supplies (Ghiani et al., 2013). The term Logistics became known in the Academic and business fields in early 1960s through the introduction of marketing logistics, Business logistics and the Logistics of distribution (Ha, 2012). The role of Logistics as part of organization strategy continued to be realized throughout the 1970s and 1980s (Mcginnis et al., 2010).

The Council of Supply Chain Management Professionals (CSCMP) defines Supply chain management as the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers.

CSCMP also defines Logistics management as that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third-party logistics services providers.

Logistics has evolved over the years through warehousing and transportation management, total cost management, integrated logistics management and supply management. The breakthrough of logistics development was perhaps the advancement in information communication technologies (ICTs) for example the Electronic Data interchange (EDI) and Radiofrequency identification (RFID) among others.

Due to globalization and high market competition, organizations are increasingly searching for innovative solutions to reduce their costs of doing business. This explains the increasing trends in outsourcing business activities such as logistics. Globally, companies are employing third party logistics with the aim of reducing operation costs, superior customer service, increased flexibility and concentrating on core competencies (Brat, 2012).

Supply chain management extends the integration of functions of individual organizations to all organizations within a supply chain (Min & Mentzer, 2004). The aim of supply chain management is to enhance customer value and satisfaction which translates into enhanced competitive advantage that results into profitability of the individual supply chain members as well as the entire supply chain (Mentzer et al., 2001). Given the constant change in customer needs and expectations, Reassessment of these needs regularly is required to redefine the customer value intended to be achieved and align it with supply chain strategy to achieve a sustainable competitive advantage (Min & Mentzer, 2004).

2.2 Reverse Logistics in Pharmaceutical supply chain.

Definitions

Reverse logistics dates back to the seventies at the time when it was mainly focusing on waste management. Overtime, the definition has evolved in both the process and purpose until the late nineties when a seemingly proper definition was put out by the European working group on reverse logistics as (Dekker et al., 2013);

"*The process of planning, implementing, controlling, backward flows of raw materials, in-process inventory, packaging and finished goods, from a manufacturing, distribution or use point, to a point of recovery or point of proper disposal*."

Rogers and Tibben-Lembke, (1999) redefined reverse logistics by including the purpose as follows;

"*The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or proper disposal*

Reverse logistics was considered the reverse flow of products in the supply chain from the point of consumption back to the producer. It was termed " the wrong way on a one way street," However Reverse logistics now has been used to incorporate environment protection issues with activities such as package reduction and use of recyclable packaging material being used which may not reflect the true sense of backward flow of products in the supply chain (Rogers & Tibben-lembke, 2001).

The evolution of Reverse logistics resulted from the negative impact of industrialization on environment and natural resources depletion. Increased public awareness coupled with the industry and government interests brought about the emergency of sustainability development, An approach that comprised of the principles of responsibility, closed-loop economy and cooperation (Nguyen, 2012). These principles fostered development of policies and regulations on protection of environment which later on emerged as waste management. The distinction between reverse logistics management and Closed loop management is given by Belvedere & Grando (2016) as referring to the design strategic intentions of reverse flow and the last targeting of the designed supply chain architecture. Which implies that Closed loop supply chains are designed from the corporate strategic goals to product and process design with the aim of value recovery throughout the supply chain. The closed loop economy renders the manufacturers fully responsible for the End of Life products that focuses on recovery and recycling.

For purposes of this study Reverse logistics shall be defined as the process of planning, implementing, and controlling the efficient, cost effective flow of finished goods and related information from the point of consumption to the point of origin for the purpose of proper disposal. This is mainly due to the nature of pharmaceutical reverse logistics where by the returned products rarely (to a small extent) end up back in the forward supply chain thus value recovery is not the main objective but rather proper disposal. Also, the study will concentrate mainly of the finished goods reverse flow within the supply chain.

A number of drivers that motivates organizations to participate in reverse logistics are highlighted in the Why perspective (Receiver) depicted in the framework for reverse logistics by de Brito & Dekker (2004) include Direct and indirect economic benefits, legislation and corporate citizenship. However, in the pharmaceutical industry particularly, motivation for reverse logistics is leaning more towards environmental (de Campos et al., 2017) and public health protection (HDA research foundation, 2018). Direct economic benefits might be realized by managing an efficient and effective reverse logistics process through reductions in transportation costs, inventory and warehousing costs (Huscroft Jr., 2010). Furthermore, improving reverse logistics capabilities can increase earnings by as much as 5% (Ha, 2012).

Due to the challenges faced by highly competitive pharmaceutical industry, there's need to adopt and constantly improve Reverse logistics strategies and capabilities to enable efficient reverse flow of drugs (de Campos et al., 2017). Reverse logistics is more complicated due to uncertainty in planning and forecasting quantity, quality and timelines, yet it requires quick responsiveness and efficiency (Ha, 2012).

A systemic literature review on reverse logistics practices by de Campos et al., (2017) stated that " Evidences show that studies on pharmaceutical reverse logistics are fragmented across the network of value delivery and fewer studies attempt to develop systemic solutions."

Many organizations give more emphasis on forward logistics management in order to manage costs involved as opposed to reverse logistics management (de Campos et al., 2017), which is likely to increase overall costs in the pharmaceutical industry where reverse logistics is unavoidable.

Reverse logistics in pharmaceutical supply chain involves all activities related to flow of starting materials, In-process materials, Finished products and related information from the point of use back to the point of origin or supply point. The pharmaceutical supply chain is composed of Manufacturers and suppliers of raw materials and components, Manufacturers of Finished products, carrying and forwarding agents, wholesalers, retailers and final consumers.

The pharmaceutical industry is characterized by returns and recalls (Abbas & Farooquie, 2013) which are mostly due to quality related issues for example non-compliance to defined specifications, adverse effects to the consumers, expired stocks and other quality related defects. Other factors that could trigger goods to be returned or recalled also include errors in order fulfillment, changes in regulatory requirements.

Lin & Gao (2018) characterized reverse logistics of abandoned drugs as follows; Difficult operation and management, pharmaceutical variety, diverse, urgent nature of recalls, and lack of attention which makes it different and complex. Reverse logistics in pharmaceutical industry also differs from other industries because the returned or recalled products are usually for destruction other than reprocess, recycle or reuse (Ali, 2017).Recapturing value is the main purpose of reverse logistics in other industries whereas in pharmaceutical industries it is mainly for proper disposal and prevention of use of defective products by consumers (public protection).

According to the study conducted in Ghana on reverse logistics practices, it indicated that 65% of respondents stated reason of return as damage to the drug content or its package, followed by recalls ordered by drug authority and expired product among others (Kwateng et al., 2014). This is a clear indication that most returns are customer driven and should be managed efficiently and effectively to enable customer satisfaction. The method of disposal of expired drugs was also a concern given the majority reported burning as the method used as opposed to incineration which is a better option. This could be attributed to the unavailability of incinerators and the high costs involved in utilizing them (Kwateng et al., 2014).

2.3 The role and importance of reverse logistics

Practically all companies must deal with reverse logistics (Richey et al., 2004).The exact magnitude of reverse logistics is difficult to measure as many companies do not account for the costs involved in reverse logistics activities. The impact of reverse logistics varies with different industries and channels, especially in industries where the value of products is high and where the rate of return is high. However it is believed that it is big and still growing with the economy (Rogers & Tibben-lembke, 2001).

Return of products represents cost attached to product through production and logistical costs incurred in forward distribution as well as the associated costs of reverse logistics (physical collection, transport, materials handling, and inventory Holding) and disposition costs. In the pharmaceutical industry, it is important to manage the activities of reverse logistics efficiently to reduce the costs involved because there is no value attached to the returned products and the cost of destruction is very high.

Effectively and efficiently managing RL can be beneficial to a Firm by achieving competitive advantage, increased customer satisfaction, better visibility, and more efficient operations through improved resource utilization (Li & Olorunniwo, 2008). RL also provides a means of differentiation from competitors through growth of corporate image in the eyes of customers and promotes longer term relationships if managed effectively (Daugherty et al., 2002).

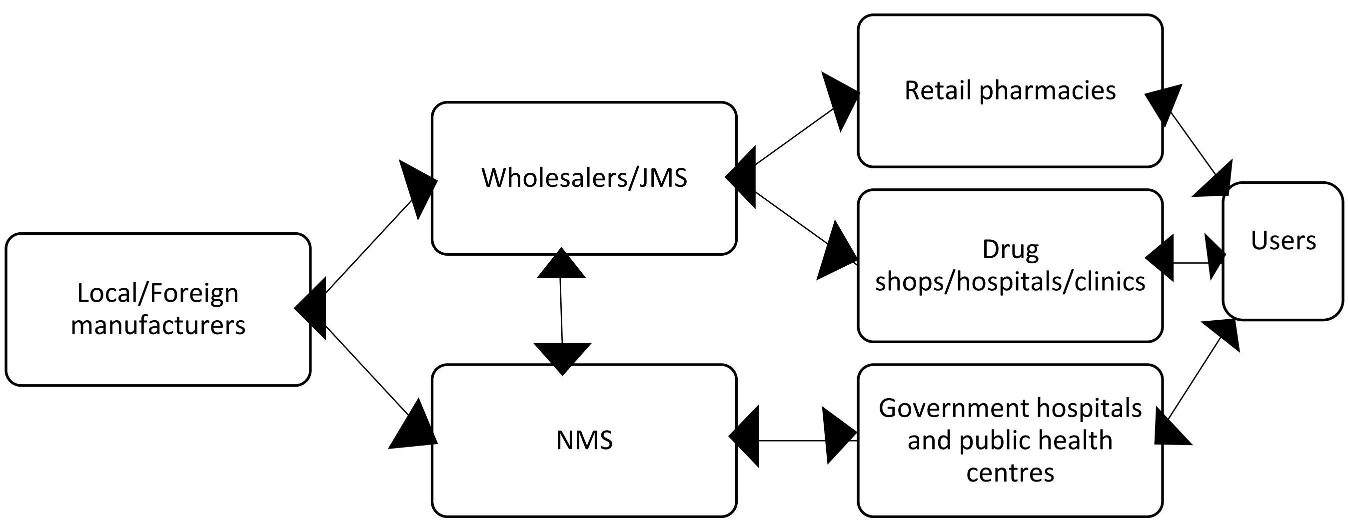
Despite the highlighted potential benefits of Reverse logistics, organizations have devoted too little or no resources and efforts to effectively manage the reverse flow of their products. This results into reactive mechanisms triggered by government regulations/directives and environmental groups for the companies to handle the reverse logistics (Daugherty et al., 2002).

2.4 Reverse Logistics Process

Reverse logistics process involves collection, inspection or sorting, direct recovery(re-use, re-sale, re-distribution)/indirect recovery(repair, refurbishing, remanufacturing, retrieval, recycling and incineration) (de Brito & Dekker, 2004).

The supply chain of Uganda pharmaceutical industry is composed of local and foreign manufacturers, wholesalers including JMS, National medical stores, retailers, drug shops, private hospitals, clinics, government hospitals and public health centres and finally the final consumers/users. The forward and reverse flow of the pharmaceutical products within the supply chain is illustrated in Fig.2 below.

Figure 2. 1 Ugandan pharmaceutical supply chain map.



Source: Own illustration

2.5 Theoretical review.

There are a number of theories that explain the link between Reverse logistics capabilities and Supply chain performance: However, to demonstrate and explain the effect between the two study variables, Resource Based Theory (RBT) was used.

2.5.1 Resource Based Theory

Performance management and Resource Based Theory (RBT) both utilize efficient and effective use of resources to enable a firm gain a competitive advantage (Hitt et al., 2015). But in order to sustain the advantage overtime, The resources must be unique and difficult to imitate or substitute by other firm's resources (Barney, 1991). Sirmon, Hitt, & Ireland (2007) also suggested that Unique inimitable resources alone cannot maintain the competitive advantage but Firms need to bundle resources to create capabilities and then leveraging those capabilities with appropriate strategies. This implies that Firms within the same industry are not identical and their performance is subject to differ given the difference in capabilities possessed by each (Hawawini et al., 2003).

Capabilities of a firm are defined by Caldart (2015) as the set of resources and competences that it relies on in order to survive and prosper. Resources are often classified in tangible (such as plants, money, equipment and employees) and intangible ones (management skill, knowledge, reputation, brand image, and customer relationships). Nguyen (2012) identified three types of resources that are used to develop reverse logistics capabilities namely; financial resources, technology resources, and managerial resources. Other Broad classifications include property-based resources and Knowledge-based resources (Das & Teng, 2000; Genchev, 2008; Genchev, Landry, Daugherty, & Roath, 2010).

Information flow has been a backbone in the logistic systems and processes enabling efficiency and effectiveness among activities within the supply chain. This has provided a competitive platform among competitors to leverage information technologies and encourage collaborative partnerships to facilitate efficient flow of information among the supply chain partners (Lu & Su, 2002).

Reverse logistics processes are resource intensive programs that require commitment to strategic resource allocation given the nature of uncertainty and complexity. Firms have to find means of integrating the reverse flow activities with the forward flow processes which are the core to business objectives in order to be more efficient in resource utilization. It is argued that a combination of developing efficient processes with dedication of resources result in enhanced reverse logistics capabilities.

2.6 Reverse Logistics Capabilities

2.6.1 Logistics Information Management Capability (LIMC) and Supply Chain Performance.

Reverse logistics heavily relies on Information technology and systems which facilitate information sharing with the aim of increasing visibility into the products throughout the reverse supply chain (Li & Olorunniwo, 2008). According to Jack, Powers, & Skinner, (2010), Reverse logistics capabilities include the accuracy and the availability of information that is used, the process and timeliness of reverse logistics information, the internal and external connectivity and usefulness of that information. These capabilities represent a bundle of information-related processes that enable a firm to better manage its reverse logistics activities that may in turn relate to cost savings.

Information systems and technology has proved to have positive relationship to cost and process effectiveness in reverse logistics (Huscroft Jr., 2010). An exploration study of RL practices in three companies by Li & Olorunniwo (2008) confirmed that their IT solutions allow effective information sharing with customers/ suppliers, enable return material authorization to be obtained speedily, and enable making correct decisions consistently in real-time. In other logistics research studies, Information integration capabilities were positively associated with a higher level of competitive advantage and firm performance (Liu & Luo, 2012).

This may not be different in the pharmaceutical industry in Uganda where supply chain partners have invested in information systems to manage the flow of information thus enhancing their supply chain performance. Whether the information systems are being used to manage reverse logistics activities and its effect on supply chain performance, requires further investigation. This motivated our first hypothesis stated below.

H1: *There is a significant effect of Logistics information management capability on supply chain performance.*

2.6.2 Process formalization capability and Supply Chain Performance.

Standardizing processes and procedures have long been used in pharmaceutical industry as a significant optimization method. This mainly promotes quality and consistency as the processes become routine and well-practiced through minimizing errors and delays. One of the common difficulties observed with reverse logistics is lack of standardization of processes which results into communication difficulties among people in the organization. Good reverse logistics processes begin by simplifying returns policies and procedures which translate into fewer labor hours dedicated to returns processing as well as higher quality decisions (Rogers & Tibben-

Lembke, 1998). Formalization can be achieved through written policies, defining roles and responsibilities, developing strategic and operational plans, defining objectives, processes standardization, and formalizing communication systems (Genchev et al., 2011).

Process formalization and its positive effect on performance has been widely discussed in the logistics literature. Bowersox and Daugherty (1992) identified formalization as a key characteristic of leading-edge logistics organizations that can be used as a valuable tool for streamlining processes. Benefit result from minimizing redundancy of tasks and a focus on formalization as a control mechanism contributing to organizational efficiency and effectiveness.

Empirical studies have supported positive effect of standardization of reverse logistics processes and procedures and defining management roles on cost and process effectiveness to enable organizations achieve a competitive advantage (Shafiq & Naqvi, (2013), Genchev et al. (2010)).

H2: *There is a significant effect of Process formalization capability on supply chain performance.*

2.6.3 Flexibility capability and Supply Chain Performance.

Reverse logistics is characterized by uncertainties which could be internal or external in origin. This is mainly because it’s a reactive process in response to external downstream partners and consumer requirements therefore firms do not proactively plan for it (Barad & Sapir, 2003). Flexibility is regarded as strategy for improving the systems responsiveness to changes (Barad & Sapir, 2003). Previous empirical studies in logistics capabilities have indicated that flexibility capability are positively associated with higher level of competitive advantage (Liu & Luo, 2012). A framework for flexibility in reverse logistics as proposed by Bai & Sarkis (2013) was subdivided into operational and strategic flexibilities. Operational flexibility includes product mix flexibility, volume flexibility, equipment flexibility, labor flexibility, supply flexibility and scheduling/routing flexibility across different reverse logistics processes. whereas Strategic flexibilities was subdivided into network and organization design flexibility dimensions. Two constructs that best represent flexibility in reverse logistics of pharmaceuticals have been selected for this study, these include scheduling/routing flexibility and volume flexibility.

H2: *There is a significant effect of flexibility capability on supply chain performance.*

2.7 Top Management support

Top management responsibilities include formulation of strategy, communication of the strategy to firm members and implementation. Formulating a proper strategy of RL may create significant effects on performance because it supports firms in identifying the strategic roles of RL, eliminating ambiguity, and clarifying priorities of resources for RL in the process of integrated supply chain management (Ha, 2012).

Top management support enables development and implementation of firm specific and relational capabilities among supply chain partners for mutual benefits (Paulraj et al., 2012). Management support involves commitment to resource allocation and alignment of the resources to strategic opportunities in order to leverage distinctive capabilities that result into competitive advantage. Capabilities are learned skills and competencies that require repetition to perfect them and while they are in pursuit of strategy, It is the task of management to continuously revisit the strategy and align it with expected future changes (Grant, 2009). This enables the firm to not only meet the current competitive advantage but also develop capabilities required to remain competitive in the future. A firm may have abundant resources but if they are poorly managed, it is unlikely to achieve a competitive advantage.

Huscroft Jr., (2010) identified seven driving factors of the reverse logistics process using the Delphi technique, He compared the seven factors to the reverse logistics construct framework by Carter & Ellram (1998). Five factors directly related to the nine framework constructs and they included; Customer support, Top management support, Communications, Timing of operations, and Environmental issues.

Top management support, leadership and commitment plays an important role in organization's strategies which ultimately impacts on the organization's performance. Likewise it is considered an important antecedent in the implementation of supply chain management thus impacting supply chain performance (Mentzer et al., 2001).Therefore, in this study, Top management support is considered as a moderating factor between the Independent and Dependent variables.

H4: *There is a significant moderating effect of Top management support between reverse logistics capabilities and supply chain performance.*

2.8 Supply Chain Performance

Performance metrics for measuring supply chain performance are adopted from SCOR model conceptualized along 5 dimensions. Reliability, responsiveness, and agility dimensions are customer focused, whereas costs and assets dimensions are internally focused.

It's deemed that internally focused supply chain performance measures prevailing in reverse logistic systems in pharmaceutical industry may not always be appropriate. Instead, this study used customer focused supply chain performance measure, emphasizing reliability, responsiveness and agility.

The Reliability attribute addresses the ability to perform tasks as required. Reliability focuses on the predictability of the outcome of a process. Typical metrics for the reliability attribute include: On-time, the right quantity, the right quality. The Responsiveness attribute describes the speed at which tasks are performed. The average time associated with Return Processes, Examples include return cycle-time metrics. The Agility attribute describes the ability to respond to external influences. the ability to respond to marketplace changes to gain or maintain competitive advantage. SCOR Agility metrics include Adaptability and Overall Value at Risk (Gordon, 2011).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter defines the methodology employed in this study. This includes the research design, study area and population, sample size, sampling technique, data collection methods and instrument, procedures of data collection, validity and reliability of instrument, measurement of variables, data analysis and ethical considerations.

3.1 Research Design

According to Saunders, Lewis & Thornhill, (2009), a research design should indicate the choice of research strategy, choices of data collection techniques, analysis procedures and the time horizon over which a research project would be under taken. In line with this undertaking, the study adopted a cross sectional survey aimed at establishing facts about the issues in the study. This design was also supported by Kothari, (2004) who suggested that this design may be used by studies that aim at establishing facts about the issue of study since data is collected from different entities at a given point in time

A cross sectional survey design was used in order to allow collection of data from pharmaceutical companies. Using this strategy, the study utilized quantitative method for data collection using a questionnaire.

The data collected was analyzed quantitatively using descriptive and inferential statistics. The time horizon over which the project was undertaken was cross sectional aimed at collection of data at a particular point in time.

3.2 The study area and population

The study population for this research was drawn from 445 pharmaceutical outlets including Manufacturers, wholesale and retail pharmacies of human medicines in Kampala-central region as licensed by National drug authority in year 2020. External stores were excluded from the study because they are extensions of wholesale pharmacies and manufacturers.

The study population selected consisted of staff in different departments directly participating in activities of reverse logistics including Warehouse, procurement, Sales, Marketing, and regulatory affairs.

3.3 Sample size

3.3.1 Sample size for Quantitative data

The sample size of 205 outlets is determined basing on statistical tables of Krejcie & Morgan, (1970) .

Table 3. 1:Showing total target population, Sample size, sampling technique

Outlets	Population	Sample size	Sampling technique
Manufacturers	8		
Wholesalers	134	205	Random sampling
Retailers	303		
Total	**445**		

Source: *Adapted from the National drug authority register for licensed outlets 2020 and Krejcie, Robert V., Morgan, Daryle W. 1970 Table for Determining Sample Size from a Given Population.*

3.4 Sampling techniques

3.4.1 Sampling technique for quantitative method

Stratified random sampling is where the population is divided into strata and a random sample is taken from each subgroup. Stratified sampling is often used where there is a great deal of variation within a population and Its purpose is to ensure that every stratum is adequately represented (Taherdoost, 2016a).

Stratified random sampling technique was used where selected pharmaceutical companies of manufacturers, wholesalers and retailers were considered as strata. Companies in a given stratum were selected using simple random sampling to collectively participate in the study. The simple random sample means that every case of the population has an equal probability of inclusion in sample (Taherdoost, 2016a).

3.5 Data collection methods and Instruments

3.5.1 Data collection using Questionnaires

A structured questionnaire was used for data collection with clear instructions to the respondents on how to complete each item. The first section of the instrument consisted of background information on respondent and company, section two consisted of reverse logistics capabilities constructs, section three consisted of Supply chain performance measurement and section four consisted of top management support. The questionnaire was subjected to pilot study based on which improvements were affected.

3.6 Procedures of data collection

Approval was sought from the graduate school to ensure compliance with ethical guidelines through the data collection process.

Data collection commenced with a pilot study, the questionnaires were administered to 20 participants and basing on the feedback. Modifications were made to the questionnaire.

In the main survey, self-administered questionnaires were entered in KoBoToolbox data collection tool and link sent to respondents. This enabled easy collection of data from various respondents in this Covid-19 pandemic and also eliminated submission of responses with missing items.

3.7 Validity and reliability of the instrument

3.7.1 validity

Validity explains how well the collected data covers the actual area of investigation (Taherdoost, 2016). Validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested (Kothari, 2004). The research instrument was proof read by Kyambogo University supervisors to establish the face validity. For further analysis, after data collection, construct validity tests were conducted for the research variables. Construct validity being the extent to which a particular item relates to other items was measured using factor analysis utilizing principal component analysis (PCA) with varimax rotation method. Items loaded above 0.30, which is the minimum recommended value in research were considered for further analysis. Also, items cross loading above 0.30 were deleted. Therefore, the factor analysis results satisfied the criteria of construct validity including both the discriminant validity (loading of at least 0.30, no cross loading of items above 0.30) and convergent validity (eigenvalues of 1, loading of at least 0.30, items that load on posited constructs) (Taherdoost, 2018).

3.7.2 Reliability

Reliability and consistency were examined by establishing internal consistency reliability of the measurement scales for the study variables as well as split-half reliability using the Cronbach's

Alpha (Cronbach, 1951; and Sekaran, & Bougie, 2010). All the reliability coefficients were above 0.70, a cutoff recommended by Taherdoost, (2018).

Table 3. 2: Reliability of the Research Variables.

Variables	No. of items	Cronbach Alpha
Logistics information management capability	6	0.828
Process formalization capability	6	0.878
Flexibility capability	6	0.836
Top management support	3	0.890
Supply chain performance	9	0.973

Source: Primary data, 2020

3.8 Measurement of study variables

3.8.1 Dependent Variable

The dependent variable was Supply chain performance and this was measured using Reliability, Responsiveness and Agility. These dimensions are developed based on SCOR model studies done by (Gordon, 2011).

3.8.2 Independent Variable

The independent variable was Reverse Logistics Capabilities measured using the Logistics information management capability, Process formalization capability and Flexibility capability. These dimensions were considered and covered when developing a data collection and the Likert scale of 1 to 5 (1= Strongly Agree (SA), 2= Agree (A), 3= Undecided (U), 4= disagree (D) and 5= Strongly Disagree (SD)) was used and means were computed to enable the analysis, Constructs were developed emphasizing the capabilities of returns handling at firm level as adapted from the previous research of Genchev et al. (2011), Barad & Sapir (2003), Bai & Sarkis (2013), Shafiq & Naqvi (2013), Vlachos (2016), and Liu & Luo, (2012).

3.9 Data analysis

3.9.1 Quantitative data analysis

In order to increase precision, consistency and reduce bias, data collected using an online questionnaire were imported into SPSS tool and coded. Data was analyzed by using inferential and descriptive statistics which has been presented using mean, standard deviation, the percentages and analysis has been presented in frequency tables. Simple regression analysis was done to determine statistical effect of reverse logistics capabilities on the supply chain performance.

The researcher applied the following simple regression model on each of the dimensions of reverse logistics capabilities to predict their effect on the dimensions of supply chain performance using a linear regression equation, $\mathbf{y = a + \beta x}$ (Judd et al., 2018).

RL = a + IC + e, RL = a + PC + e, RL = a + FC + e,

RS= a + IC + e, RS = a + PC + e, RS = a + FC + e,

AG = a + IC + e, AG = a + PC + e, AG = a + FC + e,

where, RL represents Reliability, RS represents Responsiveness, AG represents Agility, IC represents Information management capability, PC represents process formalization capability and FC represents flexibility capability.

To examine over the effect of reverse logistics capability on supply chain performance, a mean value from all the dimensions of variables using SPSS version 23.0 were used to analyze how the independent constructs, predict the dependent variable. Basing on this model, supply chain performance was treated as the dependent variable and reverse logistics capabilities as an independent variable. The responses were measured by computing the mean percentage score based on the responses collected.

The moderating effect of Top management support on the relationship between reverse logistics capabilities and supply chain performance were examined using the steps proposed by Baron & Kenny, (1986). To test for moderation, the researcher used hierarchical regression where several steps were followed.

The researcher started by running the direct effect of the reverse logistics capabilities and Top management support on supply chain performance using the linear regression model. The second step involved the researcher creating an interaction term where the independent and moderator variable was multiplied. Then, the moderator and the independent variable were centered and the interaction term was entered into the model to see whether it alters the relationship between reverse logistics capabilities and supply chain performance.

3.10 Ethical considerations

As part of the ethical considerations, the researcher obtained approval from Graduate School of Kyambogo in quest of permission to conduct the study. The respondents were not asked to indicate their names on the questionnaire for anonymity. The study ensured participants voluntarily participate in the study. All data gathered was used only for the purposes of the study and nothing else. The research respondents were explained to all respondents before they took part in the research and their informed consent was informed. All the sources of literature were acknowledged throughout the whole study through proper citing and referencing. Personal bias was avoided during the entire study that is during data analysis and reporting.

CHAPTER FOUR

ANALYSIS, PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction

The chapter presents the analysis and interpretation of the study findings arising from the raw data collected from the field using questionnaires. The following sections in this chapter therefore concentrate on the findings of this study on the evaluation of the effect of reverse logistics capabilities on supply chain performance in Uganda pharmaceutical industry. The first section presents the response rate followed by background information about the respondents and empirical findings and its interpretation in context of the research objectives.

4.1 Response Rate

The researcher expected to collect data from a total of 205 respondents. A total of 102 respondents were realized constituting of 49.76%.

According to Nulty (2008), a total response rate of 50% is a fair representation of the study population for online surveys. Therefore, at a rate of 49.76% it considered acceptable and this qualifies the study findings to be reliable.

4.2 Results on the background information of respondents

In this section, data was presented on the background information of the respondents which included; gender, age group, education level, length of service, department and category of organization. All the tables, are based on the 102 responses. The purpose of collecting background data on respondents was to help in establishing the respondent sample characteristics and be able to form appropriate opinions about the research findings. The detailed analysis of these characteristics and interpretation are presented in table 4.1 to table 4.6 below:

Table 4. 1: Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	68	66.7	66.7	66.7
	Female	34	33.3	33.3	100.0
	Total	102	100.0	100.0	

***Source**: Primary data, 2020*

Table 4.1 shows that 66.7% which was the majority of the respondents were male, 33.3% of the respondents were female. This finding implies that the study was representative since both female and male and was captured and there more male employees than their counter parts.

Table 4. 2:Age Group of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	30	29.4	29.4	29.4
	31-35 years	21	20.6	20.6	50.0
	36-40 years	18	17.6	17.6	67.6
	41-45 years	18	17.6	17.6	85.3
	Above 45 years	15	14.7	14.7	100.0
	Total	102	100.0	100.0	

Source: Primary data, 2020

The findings in table 4.2 above illustrates that 29.4% of the respondents were between 20-30 years of age, 20.6% were between 31-35 years of age, 17.6% were between 36-40 years of age, 17.6%

were between 41-45 years of age and 14.7% were above 45 years of age. This finding implies that this study was representative since the age category of respondents was regarded mature enough to understand and appreciate the issues of reverse logistics capabilities.

Table 4. 3: Education Level of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	4	3.9	3.9	3.9
	Bachelor's degree	74	72.5	72.5	76.5
	Masters	21	20.6	20.6	97.1
	PGD	2	2.0	2.0	99.0
	PhD	1	1.0	1.0	100.0
	Total	102	100.0	100.0	

Source: Primary data, 2020

The results in table 4.3 above indicates that 72.5% of the respondents hold a bachelor’s degree, 20.6% have attained a masters degree, 3.9% are diploma holders, 2.0% had undertaken a post graduate diploma and 1.0% were PhD holders. This indicates that the pharmaceutical industry has an educated workforce that is likely to have prior knowledge on reserve logistics and how it affects supply chain performance.

Table 4. 4: Length of Service of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 3 years	14	13.7	13.7	13.7
	3-6 years	25	24.5	24.5	38.2
	Above 6 years	63	61.8	61.8	100.0
	Total	102	100.0	100.0	

Source: Primary data, 2020

The results table 4.4 above inidcate that the pharmaceutical industry has a high experienced workforce with period of service above 6 years illustrated by 61.8%, 24.5% of the respondents have served for a period of 3-6 years and 13.7% have served for a period below 3 years. Employees with such years of service are presumed to have knowledge and understanding of reverse logistics capabilities and how they facilitate in the management of returned medicines.

Table 4. 5: Department of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Warehouse	10	9.8	9.8	9.8
	Procurement	12	11.8	11.8	21.6
	Sales	33	32.4	32.4	53.9
	Regulatory affairs	41	40.2	40.2	94.1
	Marketing	6	5.9	5.9	100.0
	Total	102	100.0	100.0	

Source: Primary data, 2020

Table 4.5 above indicates that majority of the respondents that participated in this study were from the regulatory affairs department represented by 40.2%, 32.4% were from the sales department, 11.8% were from the procurement department, 9.8% are working in the warehouse department and 5.9% respondent came from the marketing department. However, from the findings implies that the majority of respondents that participated in the study being regulatory affairs and sales, the information given for empirical data analysis will be relevant.

Table 4. 6: Category of Organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Retail	60	58.8	58.8	58.8
	Wholesale	37	36.3	36.3	95.1
	Manufacturing	5	4.9	4.9	100.0
	Total	102	100.0	100.0	

Source: Primary data, 2020

Table 4.6 above indicates that majority of respondents are working in Retail outlets represented by 58.8%, 36.3% of respondents work in wholesale outlets and 4.9% work in manufacturing facilities. This implies that the pharmaceutical industry is mainly composed of retail business and wholesale business.

4.3 Empirical results from the Quantitative Analysis

4.3.1 Logistics information management capability in Ugandan pharmaceutical industry

The study assessed the respondents' perceived level of logistics information management capability in Ugandan pharmaceutical industry. The items were measured on a five point Likert scale where 1=strongly agree, agree=2, undecided=3, disagree=4 and 5=strongly disagree. The mean value greater than or equal to 3 indicates lower perceived level of Logistics information management capability and a mean below 3 indicates a higher perceived level of Logistics information management capability in Ugandan pharmaceutical industry. The findings are presented in table 4.7 below;

Table 4. 7: Perceived Level of Logistics Information Management Capability

Item	SA %	A %	U %	D %	SD %	Mean	SD
My company has information systems to record, track and respond to return service requests from the customers.	9.8	39.2	40.2	6.9	3.9	2.56	0.907
My company's information systems are flexible to allow infusion of new methodology, tools and techniques of handling returns.	7.8	14.7	10.8	35.3	31.4	3.68	1.276
My company's information systems can reconcile stocks returned by customers.	13.7	15.7	31.4	32.4	6.9	3.03	1.147
My company can effectively collect and process information on returned products.	11.8	32.4	41.2	8.8	5.9	2.65	1.001
My company can share information on returned products between departments.	7.8	20.6	40.2	22.5	8.8	3.04	1.052
My company has established information integration with its suppliers and customers.	8.8	7.8	11.8	39.2	39.2	3.78	1.232

Source: Primary data, 2020

The findings in table 4.7 reveal that the pharmaceutical companies have information systems in place to record, track and respond to return service requests from the customers and can effectively collect and process information on returned products as indicated by a mean value of 2.56 and 2.65

respectively which is below the threshold of 3. The study found out that the information systems in place were not flexible to allow infusion of new methodology, tools and techniques of handling returns (Mean=3.68, SD=1.276) and could not reconcile stocks returned by customers (Mean=3.03, SD=1.147). The study also indicated that the companies were not able to share information on returned products between departments (Mean=3.04, SD=1.052) and had not established information integration with its suppliers and customers (Mean=3.78, SD=1.232).

Table 4. 8:Model Findings on the effect of Logistics Information Management Capability on Supply Chain Performance

Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.783[a]	.613	.609	.54773

a. Predictors: (Constant), Logistics information management capability

b. Dependent Variable: Supply chain performance

ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	47.444	1	47.444	158.140	.000[b]
	Residual	30.001	100	.300		
	Total	77.445	101			

a. Dependent Variable: Supply chain performance

b. Predictors: (Constant), Logistics information management capability

Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	.269	.216		1.244	.216
	Logistics information management capability	.843	.067	.783	12.575	.000

a. Dependent Variable: Supply chain performance

Source: Primary data, 2020

The model results in table 4.8 above show that logistics information management capability had a positive and significant effect on Supply chain performance in Ugandan pharmaceutical industry

(B=0.843, P-value<0.05). The model findings reveal that a unit increase in logistics information management capability results into an increase in Supply chain performance by 0.783.

The results from the ANOVA table show that the model fits well the data on logistics information management capability and supply chain performance as indicated by a p-value which is below 0.05 level of significance. This indicates that logistics information management capability statistically and significantly predicts supply chain performance in Ugandan pharmaceutical industry.

The results from the coefficient of determination (Adjusted R-square) show that 60.9% of the variations in supply chain performance are explained by logistics information management capability and the remaining 39.1% of the variations are explain by other factors.

The results that were obtained revealed a positive significant effect since the P-Value which is below 0.05 level of significance, therefore the null hypothesis (H1) was rejected in support of the alternative hypothesis, that There's a significant effect of logistics information management capability on supply chain performance.

4.3.2 Process formalization capability in Ugandan pharmaceutical industry

The study sought to find out the respondents' perceived level of process formalization capability in Ugandan pharmaceutical industry. The items were measured on a five-point Likert scale where 1=strongly agree, agree=2, undecided=3, disagree=4 and 5=strongly disagree. The mean value greater than or equal to 3 indicates lower perceived level of process formalization capability and a mean below 3 indicates a higher perceived level of process formalization capability in Ugandan pharmaceutical industry.

Table 4. 9:Process Formalization Capability in Ugandan Pharmaceutical Industry

Item	SA %	A %	U %	D %	SD %	Mean	SD
My company uses written procedures and guidelines for monitoring and controlling the return process.	12.7	38.2	39.2	5.9	3.9	2.50	0.931
My company clearly communicates the return-processing procedures to customers on receipt of return request.	8.8	20.6	52.9	12.7	4.9	2.84	0.931
My company uses written procedures and guidelines for analyzing the disposal process of returned products.	13.7	24.5	50.0	7.8	3.9	2.64	0.952
My company documents responsibilities, authority, and accountability of return processes in personnel job descriptions.	6.9	33.3	43.1	10.8	5.9	2.75	0.949
My company has highly formalized channels of communication (reporting structure) for return processes.	8.8	18.6	50.0	16.7	5.9	2.92	0.972
My company has skilled and qualified personnel to handle return processes.	8.8	21.6	53.9	10.8	4.9	2.81	0.920

Source: Primary data, 2020

The results from table 4.9 above show that pharmaceutical companies in Uganda use written procedures and guidelines for monitoring and controlling the return process (mean=2.50, SD=0.931), clearly communicate the return-processing procedures to customers on receipt of return request (mean=2.84, SD=0.931), use written procedures and guidelines for analyzing the disposal process of returned products (mean=2.64, SD=0.952), document responsibilities, authority, and accountability of return processes in personnel job descriptions (mean=2.75, SD=0.949), have highly formalized channels of communication (reporting structure) for return processes (mean=2.92, SD=0.972), and it was also evident from the study that pharmaceutical companies have skilled and qualified personnel to handle return processes (mean=2.81, SD=0.920).

Table 4. 10: Model Findings on the Effect of Process Formalization Capability on Supply Chain Performance

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723[a]	.522	.517	.60831

a. Predictors: (Constant), Process formalization capability

b. Dependent Variable: Supply chain performance

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40.440	1	40.440	109.285	.000
	Residual	37.004	100	.370		
	Total	77.445	101			

a. Dependent Variable: Supply chain performance

b. Predictors: (Constant), Process formalization capability

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.562	.232		2.427	.017
	Process formalization capability	.852	.081	.723	10.454	.000

a. Dependent Variable: Supply chain performance

Source: Primary data, 2020

The findings from the study show that there is a positive and statistically significant effect of process formalization capability on supply chain performance in pharmaceutical companies in

Uganda (B=0.852, P-value<0.05). The evidence in table 4.10 shows that an increase in process formalization capability by one unit significantly increases on supply chain performance by 0.723. The results from ANOVA table shows that the model fits well the data on the two variables since the P-value (0.000) for F-test is less than 0.05 level of significance (F=109.285, P-value=0.000). The results indicate that process formalization capability statistically predict supply chain performance in pharmaceutical companies in Uganda.

In addition, the model summary findings show that process formalization capability accounts for 51.7% of the total variations in supply chain performance in pharmaceutical companies in Uganda and 48.3% of the variations are accounted for by other factors which were not included in the model.

The results that were obtained revealed a positive significant effect since the P-Value which is below 0.05 level of significance, therefore the null hypothesis (H2) was rejected in support of the alternative hypothesis, that There's a significant effect of process formalization capability on supply chain performance.

4.3.3 Flexibility capability in Ugandan pharmaceutical industry

The study investigated the perceived level of respondents on flexibility capability in Ugandan pharmaceutical industry. The items were measured on a five-point Likert scale where 1=strongly agree, agree=2, undecided=3, disagree=4 and 5=strongly disagree. The mean value greater than or equal to 3 indicates lower perceived level of flexibility capability and a mean below 3 indicates a higher perceived level of flexibility capability in Ugandan pharmaceutical industry. The results are presented in the table 4.11 below;

Table 4. 11: The Perceived Level of Flexibility Capability in Ugandan Pharmaceutical Industry

Item	SA %	A %	U %	D %	SD %	Mean	SD
My company has capability to have collection schedules changed for returns.	7.8	17.6	37.3	31.4	5.9	3.10	1.020
My company has capability to handle short-term or long-term scheduling of returning products.	6.9	14.7	32.4	40.2	5.9	3.24	1.007
My company has capability to outsource the return process to a third party	4.9	30.4	40.2	16.7	7.8	2.92	0.992
My company has capability to handle small and large capacities of returned products economically.	10.8	18.6	33.3	31.4	5.9	3.03	1.085
My company can change warehouse storage capacity for returned products quickly.	6.9	6.9	11.8	42.2	32.4	3.86	1.152
My company has capability to economically disassemble smaller and larger lots of returned products.	8.8	15.7	40.2	26.5	8.8	3.11	1.062

Source: Primary data, 2020

The results from table 4.11 above show that pharmaceutical companies in Uganda have no capability to have collection schedules changed for returns (mean=3.10, SD=1.020), have no capability to handle short-term or long-term scheduling of returning products (mean=3.24, SD=1.007), have no capability to handle small and large capacities of returned products economically. (mean=3.03, SD=1.085), can't change warehouse storage capacity for returned products quickly (mean=3.86, SD=1.152), have no capability to economically disassemble smaller and larger lots of returned products (mean=3.11, SD=1.062), and it was evident from the study that pharmaceutical companies have capability to outsource the return process to a third party (mean=2.92, SD=0.992).

Table 4. 12: Model Findings on the Effect of Flexibility Capability on Supply Chain Performance

Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.716[a]	.512	.507	.61462

a. Predictors: (Constant), Flexibility capability

b. Dependent Variable: Supply chain performance

ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	39.669	1	39.669	105.013	.000[b]
	Residual	37.775	100	.378		
	Total	77.445	101			

a. Dependent Variable: Supply chain performance

b. Predictors: (Constant), Flexibility capability

Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	.326	.258		1.259	.211
	Flexibility capability	.802	.078	.716	10.248	.000

a. Dependent Variable: SCP

Source: Primary data, 2020

The findings from the study show that there is a positive and statistically significant effect of flexibility capability on supply chain performance in pharmaceutical companies in Uganda

(B=0.802, P-value<0.05). The evidence in table 4.12 shows that an increase in flexibility capability by one unit significantly increases on supply chain performance by 0.716.

The results from ANOVA table shows that the model fits well the data on the two variables since the P-value (0.000) for F-test is less than 0.05 level of significance (F=105.013, P-value=0.000). The results indicate that flexibility capability statistically predict supply chain performance in pharmaceutical companies in Uganda.

In addition, the model summary findings show that flexibility capability accounts for 50.7% of the total variations in supply chain performance in pharmaceutical companies in Uganda and 49.3% of the variations are accounted for by other factors which were not included in the model.

The results that were obtained revealed a positive significant effect since the P-Value which is below 0.05 level of significance, therefore the null hypothesis (H3) was rejected in support of the alternative hypothesis, that There's a significant effect of flexibility capability on supply chain performance.

4.3.4 Top management support in Ugandan pharmaceutical industry

The study investigated the perceived level of respondents on Top management support in Ugandan pharmaceutical industry. The items were measured on a five-point Likert scale where 1=strongly agree, agree=2, undecided=3, disagree=4 and 5=strongly disagree. The mean value greater than or equal to 3 indicates lower perceived level of Top management support and a mean below 3 indicates a higher perceived level of Top management support in Ugandan pharmaceutical industry. The results are presented in the table 4.13 below;

Table 4.13: Perceived Level of Top Management Support in Ugandan Pharmaceutical Industry

Item	SA %	A %	U %	D %	SD %	Mean	SD
Top Management considers reverse logistics as an important strategy to supply chain performance.	8.8	7.8	19.6	48.0	15.7	3.54	1.123
Top Management commits resources to development of reverse logistics capabilities.	6.9	9.8	28.4	35.3	19.6	3.51	1.124
Top management directly involves in the reverse logistics activities	5.9	5.9	19.6	46.1	22.5	3.74	1.062

Source: Primary data, 2020

The results from table 4.13 above show that Top management doesn't consider reverse logistics as an important strategy to supply chain performance (Mean=3.54, SD=1.123), doesn't commit resources to development of reverse logistics capabilities (Mean=3.51, SD=1.124) and doesn't directly involve themselves in the reverse logistics activities (Mean=3.74, SD=1.062) within pharmaceutical companies in Uganda.

4.3.5 Supply chain performance in Ugandan pharmaceutical industry

The study investigated the perceived level of respondents on Supply chain performance in Ugandan pharmaceutical industry. The items were measured on a five-point Likert scale where 1=strongly agree, agree=2, undecided=3, disagree=4 and 5=strongly disagree. The mean value greater than or equal to 3 indicates lower perceived level of Supply chain performance and a mean below 3 indicates a higher perceived level of Supply chain performance in Ugandan pharmaceutical industry. The results are presented in the table 4.14 below;

Table 4.14: Supply Chain Performance in Ugandan Pharmaceutical Industry

Item	SA %	A %	U %	D %	SD %	Mean	SD
My company is able to have the right product returned.	10.8	16.7	43.1	24.5	4.9	2.54	1.105
My company is able to execute the return process on scheduled time.	13.7	22.5	40.2	16.7	6.9	2.96	1.024
My company is able to have the right quantity of product returned.	17.6	34.3	31.4	9.8	6.9	2.80	1.090
My company is able to achieve average return cycle time as per internal procedures.	8.8	16.7	37.3	31.4	5.9	3.09	1.035
My company is able to reduce the average time associated with authorizing the return of products.	8.8	21.6	40.2	23.5	5.9	2.96	1.024
My company is able to reduce the time taken to issue credit note for returned products.	7.8	26.5	37.3	20.6	7.8	2.94	1.051
My company is able to replace quantities returned from customers.	11.8	36.3	28.4	15.7	7.8	2.72	1.111
My company is able to minimize the Overall value at risk in handling returns.	9.8	12.7	35.3	36.3	5.9	3.16	1.051
My company is able to reduce the time taken to recover from the disruption of returns.	8.8	22.5	40.2	23.5	4.9	2.93	1.007

Source: Primary data, 2020

The results from table 4.14 above show that pharmaceutical companies in Uganda are able to have the right product returned. (mean=2.54, SD=1.105), execute the return process on scheduled time (mean=2.96, SD=1.024), have the right quantity of product returned (mean=2.80, SD=1.090), reduce the average time associated with authorizing the return of products (mean=2.96, SD=1.024), reduce the time taken to issue credit note for returned products (mean=2.94, SD=1.051), replace quantities returned from customers (Mean=2.72, SD=1.111) and reduce the time taken to recover from the disruption of returns (Mean=2.93, SD=1.007). it was also evident from the study that pharmaceutical companies were not able to achieve average return cycle time as per internal procedures (mean=3.09, SD=1.035) and not able to minimize the Overall value at risk in handling returns (Mean=3.16, SD=1.051).

4.3.6 The moderating effect of Top management support on the relationship between reverse logistics capabilities and supply chain performance

The researcher examined the moderating effect of Top management support on the relationship between reverse logistics capabilities and supply chain performance using the steps proposed by Baron & Kenny, (1986). To test for moderation, the researcher used hierarchical regression where several steps were followed.

The researcher started by running the direct effect of the reverse logistics capabilities and Top management support on supply chain performance using the linear regression model. The second step involved the researcher creating an interaction term where the independent and moderator variable was multiplied. Then, the moderator and the independent variable were centered and the interaction term was entered into the model to see whether it alters the relationship between reverse logistics capabilities and supply chain performance. The results are shown in different tables below;

Table 4. 15: Model Goodness of Fit with Supply Chain Performance as the Dependent Variable and Reverse Logistics Capabilities, Top Management Support, and Interaction term as Independent

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.835[a]	.697	.691	.48697	.697	113.791	2	99	.000
2	.835[b]	.697	.688	.48893	.001	.206	1	98	.651

a. Predictors: (Constant), Top management support, Reverse logistics capabilities

b. Predictors: (Constant), Top management support, Reverse logistics capabilities, Interaction term

c. Dependent Variable: Supply chain performance

The model 1 with Top management support and Reverse logistics capabilities as the independent variables and Supply chain performance as the dependent variable produced F-change (2, 99) = 113.791 and P-value<0.05. The model has revealed that Top management support and Reverse logistics capabilities have a statistically significant effect on Supply chain performance. The variations in Supply chain performance accounted for by Top management support and Reverse logistics capabilities is 69.1% and 30.9% is accounted for by other factors.

In model 2, Top management support and Reverse logistics capabilities were centered and the interaction term (Top management support X Reverse logistics capabilities) was entered into the model. The R-change was 0.001 which was an increase in variations accounted for over model 1 though the increase was not statistically significant at 5% level. The second model shows that the effect of Top management support, Reverse logistics capabilities, and interaction term on Supply chain performance was not statistically significant, F-change (1, 98)= 0.206 and P-value>0.05. The variations in Supply chain performance accounted for by Top management support, Reverse logistics capabilities, and the interaction term was 68.8% leaving 31.2% accounted for by other factors.

Table 4. 16: Model Coefficients with Supply Chain Performance as the Dependent Variable and Reverse Logistics Capabilities, Top Management Support, and Interaction term as Independent

Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	-.321	.219		-1.466	.146
	Reverse logistics capabilities	.924	.097	.735	9.536	.000
	Top management support	.118	.068	.135	1.749	.083
2	(Constant)	-.104	.527		-.198	.844
	Reverse logistics capabilities	.835	.220	.664	3.801	.000
	Top management support	.054	.157	.061	.343	.732
	Interaction Term (Reverse logistics capabilities * Top management support)	.025	.055	.135	.454	.651

a. Dependent Variable: Supply chain performance

The results from the model coefficients show that before including the interaction term in model 2, model 1 produced Reverse logistics capabilities model coefficient of 0.735, t-test value of 9.536, and was statistically significant (P-value<0.05). The model coefficient of Top management support was 0.135 with t-test value of 1.749 and was not statistically significant at 5% level (p-value=0.083).

After including the interaction term, the model coefficient of Reverse logistics capabilities reduced to 0.664 with a t-test value of 3.801 and was statistically significant at 5% level (p-value=0.000). The model coefficient of Top management support reduced to 0.061 with a t-test value of 0.343 and was not statistically significant at 5% level (p-value=0.732). The interaction term (Reverse logistics capabilities * Top management support) was not significant at 5% level (p-value=0.651, beta coefficient=0.135). This indicates that there is no significant moderating effect of Top management support on the relationship between Reverse logistics capabilities and Supply chain performance in Ugandan pharmaceutical industry.

The results that were obtained revealed no significant moderating effect since the P-Value which is greater than 0.05 level of significance, therefore the null hypothesis (H4) was accepted, that There's no significant moderating effect of Top management support between reverse logistics capabilities and supply chain performance.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter focuses on the discussion of the findings of the study and their relation to the research objectives, the summary of the ideas developed from the findings of the study, conclusion with final remarks on the findings and their significance on the research topic, recommendations derived from the findings and areas for further study.

5.1 Summary of major findings

5.1.1 Reverse logistics capabilities in Ugandan pharmaceutical industry

Logistics information management system and supply chain performance.

The study revealed that the pharmaceutical companies have information systems in place to record, track and respond to return service requests from the customers and can effectively collect and process information on returned products. The study found out that the information systems in place were not flexible to allow infusion of new methodology, tools and techniques of handling returns and could not reconcile stocks returned by customers. The study also indicated that the companies were not able to share information on returned products between departments and had not established information integration with its suppliers and customers.

The regression results revealed a positive significant effect of Logistics information management capability on supply chain performance.

Process formalization capability and supply chain performance.

The study showed that pharmaceutical companies in Uganda use written procedures and guidelines for monitoring and controlling the return process, clearly communicate the return-processing procedures to customers on receipt of return request, use written procedures and guidelines for analyzing the disposal process of returned products, document responsibilities, authority, and accountability of return processes in personnel job descriptions, have highly formalized channels of communication for return processes, and it was also evident from the study that pharmaceutical companies have skilled and qualified personnel to handle return processes.

The regression results revealed a positive significant effect of process formalization capability on supply chain performance.

Flexibility capability and supply chain performance.

The study showed that pharmaceutical companies in Uganda have no capability to have collection schedules changed for returns, have no capability to handle short-term or long-term scheduling of returning products, have no capability to handle small and large capacities of returned products economically, can't change warehouse storage capacity for returned products quickly, have no capability to economically disassemble smaller and larger lots of returned products, and it was evident from the study that pharmaceutical companies have capability to outsource the return process to a third party.

The regression results revealed a positive significant effect of flexibility capability on supply chain performance.

5.1.2 Top management support in Ugandan pharmaceutical industry

The study showed that Top management doesn't consider reverse logistics as an important strategy to supply chain performance, doesn't commit resources to development of reverse logistics capabilities and doesn't directly involve themselves in the reverse logistics activities within pharmaceutical companies in Uganda.

The regression results revealed no significant moderating effect of Top management support between reverse logistics capabilities and supply chain performance.

5.1.3 Supply Chain performance in Ugandan pharmaceutical industry

The study showed that pharmaceutical companies in Uganda are able to have the right product returned, execute the return process on scheduled time, have the right quantity of product returned, reduce the average time associated with authorizing the return of products, reduce the time taken to issue credit note for returned products, replace quantities returned from customers and reduce the time taken to recover from the disruption of returns. it was also evident from the study that pharmaceutical companies were not able to achieve average return cycle time as per internal procedures and not able to minimize the Overall value at risk in handling returns.

5.2 Discussions of major findings of the study.

5.2.1 Reverse logistics capabilities in Ugandan pharmaceutical industry

Logistics information management capability and supply chain performance.

The first objective was to examine the effect of Logistics information management capability on supply chain performance. The study revealed that logistics information management capability had a positive significant effect on Supply chain performance in Ugandan pharmaceutical industry. This research result is consistent with Huscroft Jr., (2010), Jack et al., (2010), Li & Olorunniwo, (2008).

Therefore, companies should consider to invest in information systems with the aim of managing returns efficiently and effectively. The information systems should not only be able collect information but also should facilitate sharing this information with stakeholders to enable visibility and traceability of inventory within the return process.

Information integration is still lacking in the pharmaceutical industry which poses challenges to supply chain visibility of medicines and other healthcare products, this creates opportunity for defective products to exist within the supply chain which may cause danger to public health.

Process formalization capability and supply chain performance

Process formalization capability was found to have a significant effect on supply chain performance. the study results are in agreement with previous empirical studies by Bowersox and Daugherty (1992), Genchev et al. (2010), Shafiq & Naqvi, (2013).

Having documented procedures describing the handling of return process enables the process to be managed efficiently and effectively. This is because the staff know what to do and when to do it and get well versed with the process which eliminates irregularities in return handling.

Defining roles, responsibilities and authorities and having formalized communication channels through well-organized reporting structures enables for timely decision making on the return process which eliminate delays in removing defective products from the supply chain.

Flexibility capability and supply chain performance

The study revealed that flexibility capability had a significant effect on supply chain performance although it was the least predictor for variance in supply chain performance.

The finding and observations are supported by other scholars such as Liu & Luo, (2012) who regarded Flexibility as a strategy for improving the systems responsiveness to changes.

It was also evident from the study that pharmaceutical companies had not developed their own flexibility capabilities in terms of scheduling/routing and volume flexibilities, however majority were able to outsource the activities of reverse logistics to a third-party provider.

Due to the unpredictable nature of returns in pharmaceutical industry, companies should develop flexibility capabilities to be in position to handle the magnitude of the uncertainties given the detrimental effects it could have to entire public health.

5.2.2 Top management support in Ugandan pharmaceutical industry

The study revealed no significant moderating effect on supply chain performance. This is contradictory to the empirical evidence that considered top management support an important antecedent in the implementation of supply chain management thus impacting supply chain performance (Mentzer et al., 2001).

The study further indicated that Top management doesn't consider reverse logistics as an important strategy to supply chain performance, doesn't commit resources to development of reverse logistics capabilities and doesn't directly involve themselves in the reverse logistics activities within pharmaceutical companies in Uganda.

This may be due to the fact that management of reverse logistics in pharmaceutical industry is not considered as a strategic activity given its undesirable nature, therefore there's lack of planning for handling returns.

5.3 Conclusions

The study sought to examine the effect of reverse logistics capabilities on supply chain performance in Ugandan pharmaceutical industry. Based on the findings of this study, reverse logistics capabilities play an important part in attaining supply chain performance in terms of reliability, responsiveness and agility. It concluded that in order to manage returns appropriately, logistics information management, process formalization and flexibility are necessary capabilities that guarantee supply chain performance. It was also concluded that Top management doesn't have to get directly involved in reverse logistics activities as long as the necessary capabilities have been provided.

5.4 Recommendations

Having confirmed the validity of the effect of reverse logistics capabilities on supply chain performance in the management of returns in pharmaceutical industry, the study recommended that companies must invest in logistics information management, process formalization and flexibility capabilities to enable them manage returns more efficiently and effectively. The study also recommended that further research should be considered to learn how reverse logistics capabilities can be integrated with forward logistics capabilities for process optimization.

5.4 Areas for Further Study / Research

This study focused on the effect of reverse logistics capabilities on supply chain performance in Ugandan pharmaceutical industry. Since the study concentrated on reverse logistics capabilities, a similar study should be conducted to examine the reverse logistics strategies employed in pharmaceutical industry in Uganda. Furthermore, the sample of respondents was drawn solely from the pharmaceutical industry in Uganda. Therefore, future research should examine the reverse logistics capabilities in other contexts and countries.

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APPENDICES

APPENDIX 1 QUESTIONNAIRE

I am **Namweseza Zam,** a Masters Student at Kyambogo University, currently carrying out a research study in partial fulfillment of the requirement for the award of a Master's degree in Business administration. My research study is focusing on Reverse Logistics capabilities and supply chain performance in Pharmaceutical industry in Uganda.

Reverse logistics is the return of medicines from the customer back to the saler/distributor/ manufacturer(backwards). In this questionnaire "Company" refers to pharmaceutical outlet in the supply chain including manufacturer, wholesaler and retailer.

I am kindly requesting you to spare your precious time and participate in this exercise by attending to this questionnaire.

SECTION A: BACKGROUND INFORMATION

General questions about the respondent & Company.

(*Kindly tick the appropriate box corresponding to a particular question)*

A1. **Gender**	
Male ☐	Female ☐
A2. **Age group*(please tick appropriate group)***	
20-30 ☐ 31-35 ☐ 36-40 ☐ 41 -45 ☐ Above 50 ☐	
A3. **Education Level *(please tick appropriate group)***	
Certificate ☐ Diploma ☐ Bachelor's degree ☐ Masters ☐ PDG ☐ PhD ☐	
A4. **Length of service *(please tick appropriate group)***	

below-3years ☐	3-6years ☐	Above 6 years ☐

A5. Which department do you belong to

Warehouse ☐ Procurement ☐ Sales ☐ Regulatory affairs ☐ Marketing ☐ Others ☐

A6. Category of Oranisation/company

Retail ☐ Wholesale ☐ Manufacturing ☐

SECTION B: REVERSE LOGISTICS CAPABILITIES.

This section will assess reverse logistics capabilities in the Ugandan pharmaceutical industry. It seeks to find out how you consider the reverse logistics capabilities in your company in terms of logistics information management capability, process formalization capability, and flexibility capability.

Please indicate the degree to which you agree or disagree with each of the statements presented below by ticking on the most appropriate option on the following 5-point scale;

strongly agree (1), agree (2), Undecided (3), disagree (4) and strongly disagree (5).

	Statement	**1**	**2**	**3**	**4**	**5**
INFORMATION SYSTEMS (IS)						
IS.1	My company has information systems to record, track and respond to return service requests from the customers.					
IS.2	My company's information systems are flexible to allow infusion of new methodology, tools and techniques of handling returns.					

IS.3	My company's information systems can reconcile stocks returned by customers.					
INFORMATION INTEGRATION (II)						
II.1	My company can effectively collect and process information on returned products.					
II.2	My company can share information on returned products between departments.					
II.3	My company has established information integration with its suppliers and customers.					
STANDARDIZED PROCEDURES (SS)						
SS.1	My company uses written procedures and guidelines for monitoring and controlling the return process.					
SS.2	My company clearly communicates the return-processing procedures to customers on receipt of return request.					
SS.3	My company uses written procedures and guidelines for analyzing the disposal process of returned products.					
STRUCTURING PROCESS (SP)						
SP.1	My company documents responsibilities, authority, and accountability of return processes in personnel job descriptions.					
SP.2	My company has highly formalized channels of communication (reporting structure) for return processes.					
SP.3	My company has skilled and qualified personnel to handle return processes.					

SCHEDULING/ROUTING FLEXIBILITY (SF)						
SF.1	My company has capability to have collection schedules changed for returns.					
SF.2	My company has capability to handle short-term or long-term scheduling of returning products.					
SF.3	My company has capability to outsource the return process to a third party.					
VOLUME FLEXIBILITY (VF)						
VF.1	My company has capability to handle small and large capacities of returned products economically.					
VF.2	My company can change warehouse storage capacity for returned products quickly.					
VF.3	My company has capability to economically disassemble smaller and larger lots of returned products.					

SECTION C: SUPPLY CHAIN PERFORMANCE.

This section seeks to find out how you consider your company's supply chain performance while handling returns.

Please indicate the degree to which you agree or disagree with each of the statement presented below by ticking on the most appropriate option on the following 5-point scale;

strongly agree (1), agree (2), Undecided (3), disagree (4) and strongly disagree (5).

	Statement	1	2	3	4	5
Reliability (RL)						
RL.1	My company is able to have the right product returned.					
RL.2	My company is able to execute the return process on scheduled time.					
RL.3	My company is able to have the right quantity of product returned.					
Responsiveness (RS)						
RS.1	My company is able to achieve average return cycle time as per internal procedures.					
RS.2	My company is able to reduce the average time associated with authorizing the return of products.					
RS.3	My company is able to reduce the time taken to issue credit note for returned products.					
Agility (AG)						
AG.1	My company is able to replace quantities returned from customers.					
AG.2	My company is able to minimize the Overall value at risk in handling returns.					
AG.3	My company is able to reduce the time taken to recover from the disruption of returns.					

SECTION D: TOP MANAGEMENT SUPPORT

This section seeks to find out how you consider your company's Top management support while handling returns.

Please indicate the degree to which you agree or disagree with each of the statement presented below by ticking on the most appropriate option on the following 5-point scale;

strongly agree (1), agree (2), Undecided (3), disagree (4) and strongly disagree (5).

	Statement	**1**	**2**	**3**	**4**	**5**
Top management support (TM)						
TM.1	Top Management considers reverse logistics as an important strategy to supply chain performance.					
TM.2	Top Management commits resources to development of reverse logistics capabilities.					
TM.3	Top management directly involves in the reverse logistics activities					

APPENDIX II RELIABILITY TEST

Reliability for Logistics information management systems

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.828	.834	6

Reliability for Process formalization capability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.878	6

Reliability for Flexibility capability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.836	.835	6

Reliability for Supply chain performance

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.943	.944	9

Reliability for Top management support

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.890	.890	3