IMPACT OF REVERSE LOGISTICS ON EFFECTIVE PRODUCT RETURNS: A case study of Ugandan Pharmaceutical Industry

MUHAMMED MASANSO

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DECLARATION

I Masanso muhammed, hereby declare that this research dissertation entitled "impact of reverse logistics on effective product returns in Ugandan pharmaceutical industry" is my original work and has not been submitted to any other institution of higher learning for any academic award.

Signature..... **Date**.....9th/ September 2023

Masanso muhammed

J21b12/001

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APPROVAL

This is to certify that this dissertation has been prepared by Masanso muhammed and it was done under my supervision. It is now ready for submission to the Graduate School Uganda Christian university in partial fulfilment for the requirements of the bachelors of procurement and logistics management

Signature ..... **Date** .....

Mr. MULOOSI PASCAL

PRINCIPAL SUPERVISOR

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DEDICATION

I dedicate this dissertation to my beloved family especially my mother NAKAYIZA REHEMA.

May God bless you always.

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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 ACRONYNOMS

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

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ABSTRACT

Impact of 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 find out the impact of reverse logistics on effective product returns. and the moderating effect of Top Management Support.

The study specifically addressed the following study objectives to find out the impact of reverse logistics on effective product returns. To assess the effectiveness of current reverse logistics strategies in handling returned products, and identify opportunities for improvement. To investigate the KPI's for reverse logistics 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.

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CHAPTER ONE

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 TheCouncil of Logistics Management first published its definition. In the seventies, Literature referredto it as “reverse channels” or “reverse flows” (Ginter & Starling, 1978). The term Reverse logisticsat 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 providingfor 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 thepurpose of reverse logistics.

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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 manufacturersto 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 pharmaceuticalindustry poses a great concern on environmental and waste disposal management implications dueto 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 assumptionof heterogeneity and immobility of resources across firms. The central point argues that a firm canachieve 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).

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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 logisticsactivities. Based on the definition, RL capabilities were categorized as information management capabilities and products (or services) capabilities. The importance of Information management inreverse logistics was further emphasized by Jack, Powers, & Skinner (2010) who characterized itas 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,

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) have 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 inpublic 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 medicineswas 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 whereit is most needed but only applied to useable stock (MOH, 2012). However, in 2018 the estimatedquantities of expired medicines all over the country were believed to be about 1,200 to 1,500 tons(MOH, 2018) 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 existenceof 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 theregulatory agencies and take on different levels depending on the risk to the consumers.

Efficient Reverse logistics systems in pharmaceutical industry is necessary for proper managementof 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 safeand 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 costof 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 logisticssystem, which plays a key role in operation management system and information system resultingin 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 shouldbe in position to handle the activities of reverse logistics by developing the necessary capabilitiesand ensuring that there's an improvement in supply chain performance otherwise critical issues onpublic 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 logisticscapabilities 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 Study Objectives

The objective of this study was to examine the impact of reverse logistics on effective product returns in Ugandan pharmaceutical industry.

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The study is guided with the following objectives.

1) To find out the impact of reverse logistics on effective product returns.
2) To assess the effectiveness of current reverse logistics strategies in handling returned products, and identify opportunities for improvement.
3) To investigate the KPI's for reverse logistics

1.3.1 Purpose of the study.

1) To investigate the current state of reverse logistics practices and their impact on the overall supply chain.
2) To assess the costs and benefits of managing reverse logistics for returned products.
3) To evaluate the effectiveness of current reverse logistics strategies in handling returned products.
4) To identify opportunities for improving reverse logistics processes and strategies.
5) To develop recommendations for best practices in managing reverse logistics for returned products.
6) To explore the impact of reverse logistics on the key performance metrics such as customer satisfaction, environmental sustainability, and corporate social responsibility.
7) To understand the role of technology and data analytic in improving efficiency and effectiveness of reverse logistics for returned products.
8) To provide insights for businesses, policy makers, and researchers on the challenges associated with managing reverse logistics for returned products.

1.4.1 Specific objectives.

1) To understand the concept of reverse logistics and effective product returns in Ugandan pharmaceutical industry.
2) To identify the factors that impacts the effectiveness of product returns such as customer satisfaction, environmental concerns and operational efficiency.
3) To examine the role of reverse logistics in improving the effectiveness of product returns, including the strategies and processes used to manage returned products.
4) To analyze the challenges and opportunities associated with implementing reverse logistics processes and strategies including technological advancements, regulatory compliance, and stakeholder engagement.

1.5 Research question.

1) What is the impact of reverse logistics on the effectiveness of product returns in Ugandan pharmaceutical industry?

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2) How do customers perceive the effectiveness of product returns and what role does reverse logistics play in meeting their expectations?
3) What are the key factors that influence the effectiveness of product returns, and how does reverse logistics address these factors?
4) What benefits and drawbacks of implementing reverse logistics for managing product returns, and how do they impact the financial performance of the company?

What are the challenges and opportunities associated with implementing reverse logistics for managing **product returns, and how can they be addressed?**

***1.6 Scope of the study*.**

1) Analysis of reverse logistics process.
2) Customer behaviour and expectations.
3) Environmental impact.
4) Business impact.
5) Marketing.

1.6.1 Content scope.

Overview of reverse logistics.

Factors affecting effective product returns.

Environmental impact of reverse logistics.

Business impact of reverse logistics.

Best practices and recommendations

1.6.2 Time scope.

The research on the impact of reverse logistics on effective product returns will take a period of three months.

1.6.3 Geographical scope.

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

1.7 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 fromthe point of consumption to the point of origin for the purpose of recapturing or creating value orproper disposal (Rogers & Tibben-Lembke, 1999).

Reverse logistics capabilities: Reverse logistics capabilities is the organizational abilities arisingfrom 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 the impact of reverse logistics on effective product returns, current reverse logistics strategies in handling returned products, and opportunities for improvement and key performance metrics of reverse logistics by different scholars and finally the conceptual framework of the study which was constructed based on the theoretical framework.

2.1.1Reverse 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 reverselogistics as (Dekker et al., 2013); “The process of planning, implementing, controlling,

backward flows of raw materials, in-processinventory, 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," HoweverReverse 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 industryand 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 throughoutthe supply chain. The closed loop economy renders the manufacturers fully responsible for the End-of-Life product that focuses on recovery and recycling.

2.1.2 IMPACT OF REVERSE LOGISTICS ON EFFECTIVE PRODUCT RETURNS

The main purpose of reverse logistics is to save (to minimize costs and increase profits). Reverse logistics assures cost-effective alternative materials to replace the original ones, thus saving natural resources, effort and energy. Reverse logistics is an opportunity to recover the value of the returned product, through recovery/reuse/repair process. The share of the dollar in reverse logistics is huge. Logistics represents 9.9 per cent of the economy in the United States, as equivalent was 1.3 trillion dollars in 2006. Although reverse logistics is not sufficiently

developed to be estimated (Rogers & Tibben-Lembke, 2009, p. 5), in 1997 reached a value of 35 trillion $, in 2007 - 56 trillion $, which is equal to four percent of the total cost of logistics in the United States (Beltran, 2002, pp. 4-8). The advantage of the regeneration of the product, may be shortening the time of delivery, with the demand for spare parts is caused by regeneration of returned products, instead of initiating the re-delivery, which implementation will continue much longer (Minner, 2003). For example, in IBM, lease programs significantly reduced the uncertainty of the return flow (Fleischmann, 2001).

Reverse logistics reduces the amount of waste, deposited in the environment (the materials are reused instead of consuming new resources) by reducing dependence on landfills and energy. Saving energy is another worthy goal ecology. For example, the recycling of aluminium requires only 5 % more energy than processing the same number of primary aluminium ore. Costs unsolicited material sent to landfill, continues to increase, which encourages organizations and businesses to make other economic alternatives to disposal. In addition, many products cannot be longer sent to landfill, as this is prohibited by environmental regulations (Grabara, Kolcun & Kot, 2014). By implementing reverse logistics, companies save money, reduce energy consumption, emit fewer pollutants into the air and water, save natural resources, reduce waste and avoid waste storage capacity. Some models of reverse logistics functions are considering as multidimensional environmental objectives to improve their environmental performance.

Reverse logistics has improved the marketing image of several companies. Many companies today appeal to their customers that they are "environmentally friendly", it is part of their marketing image. The pressure on companies is increasing, as customers began to choose environmentally friendly products. In the past two decades the companies have done their utmost to create eco-profiles, especially in markets dominated by customers, who care about the environment. In addition, companies are responsible for the environmental activities of their suppliers, customers and stakeholders since they have treated their actions as common. For example, in 2005, Dell has increased the level of recovery of International Letters of Social and Humanistic Sciences Vol. 26 139 used computers obtained from their customers by 72 percent compared to 2004, due to recycling and seminars relating to suppliers and customers. Public environmental concern in conjunction with the principle of sustainable development, has created opportunities for organizations to create eco-friendly products that will distinguish them from the competition (Johnson & Wang, 1988).

Reverse logistics has widened the marketing share and exhibition of companies. In addition to reducing costs, many organizations take over the products of their competitors, which are used

as a supplement to their own products, in order to increase market share. Some companies offer a collection of all brands of the product in exchange for a discount price of its own brand. For example, Dell receives all brands of computers and accessories (eg, keyboard, mouse, monitor or printer) from the door for fee, or offers this service for free, with the purchase of a new Dell computer (Kulwiec, 2009, p. 6).

Reverse logistics has also led to protection if assets in organisations. High-tech companies encourage their customers to return their products, for fear that technological knowledge may leap to competitors, and to avoid competing with the secondary markets, which can be used to purchase their products. IBM used reverse logistics by recovering valuable part from older products that it can deal with the recycling without the help of intermediaries (Fleischmann, 2009, p. 7).

Reverse logistics has also led to Forrester effect reduction. In the traditional supply chain, Forrester effect is the gain variation orders in the supply chain from the lowest to the highest level. These are the only studies that discuss the Forrester effect in the context of reverse logistics (Vlăduţescu & Ciupercă, 2013). The authors showed that the returned products can reduce this effect, by absorbing fluctuations in demand at the beginning of the chain to the extent, that reverse logistics is cheaper than the traditional variable costs, even if the recovery cost is higher than the cost of manufacture of a new product.

CONCLUSIONS

Companies do not know how many products will be returned to them and what it will be. Reverse logistics let company to prepare for these circumstances; it is better "take care" of them. Companies using reverse logistics, build the image of a responsible company, producing products from recycled materials. Also reduce the generation of debris, and the level of use of non-renewable raw materials, by using the socalled. "Clean technologies" and integrated supply chain.

2.1.3 CURRENT REVERSE LOGISTICS STRATEGIES IN HANDLING RETURNED PRODUCTS, AND OPPORTUNITIES FOR IMPROVEMENT.

High quality reverse logistics can promote longer-term relationships, according to Daugherty, Myers & Richey (2002), as buyers are more likely to repurchase from vendors who do a good job at handling returns. With the increase of online purchases, many customers are concerned with how an online purchase will translate into a store return (Jack, Powers & Skinner, 2010). According to Daugherty, Myers & Richey (2002) information support is particularly critical to achieving efficient reverse logistics operations. With reverse logistics, companies are dealing

with the non-routine events of product returns, recalls, refusals, reworks and rejects. Technology provides a critical link to a successful system, which is the need for rapid timing and processing of goods. Information coordination, however, is complicated because of multiple parties involved (Daugherty, Myers & Richey, 2002).

Growing concern for the environment, coupled with economic incentives and legislative compulsions, has enhanced producer's responsibilities to take back end of life and used products from the consumers (Patel, Li, Bose, Timmer, & Gonzalez (2006). In the past, companies have not had much incentive to refurbish returned products. Returns, in essence, were a liability to be disposed of as cheaply as possible which often meant sending them to a local landfill. Increasing restrictions on what can be placed in a landfill and the cost of land filling have made disposal a less attractive option (Rogers & Tibben-Lembke, 2001).

The operational factors of reverse logistics consist of cost-benefit analysis, transportation, warehousing, supply management, remanufacturing and recycling and packaging (Dowlatshahi, 2000). Reverse logistics can be broken into two general areas, depending on whether the reverse flow consists primarily of product or packaging (Rogers & Tibben-Lembke, 2001).

Product could be in the reverse flow for remanufacture, refurbishment or simply because a customer returned it. Packaging, however, flows back because it is reusable (i.e. pallets) or because regulations restrict its disposal (i.e. corrugated). Operational factors of reverse-logistics systems include: cost-benefit analysis, transportation, warehousing, supply management, remanufacturing and recycling, and packaging (Dowlatshahi, 2000). The importance of these operational factors can be different depending on the organization so they should be weighed according to their importance. The customers of today expect and demand the ability to return defective or unwanted products and efficiently as possible. In addition, monitoring the performance of any logistics system should include measures both internal and external to the firm (Stank, Crum and Arango, 1999).

The e-commerce business and online transactions have brought a new dimension to the buying and selling of goods and services during this period. Today the e-commerce industry is on the ramp up, thanks to the phenomenal success of amazon.com and other similar online enterprises (Jayaraman, Srivastava, Balgi, & Prasad, 2013). Reverse logistics of e-commerce refers to the return, counter-flow or reverse-flow of products which are ordered on the Internet from customers to suppliers (XiaoYan, Han, Qinli & Stokes, 2012). These products can be returned for a number of reasons including poor quality, incorrect product or size, product was not needed or wanted, product did not match the description on the Website or in

the catalog, product did not fit the customer's expectations or the company shipped the incorrect product or size. Compared with traditional bricks and mortar facility, e-commerce is becoming more acceptable and popular among consumers because of its high efficiency, convenience and low cost. In addition, the explosive growth in this area can be linked to the development of technology such as smart phones, computer tablets and the Internet. An example of reverse logistics with e-commerce can be found in the retail fashion industry. According to Nitse, Parker, Krumwiede & Ottaway (2004), as the number of Internet purchases of fashion items increases, the problem of inaccurate color representation on the Web becomes more significant. Something such as color inaccuracy can end up having many negative consequences for retailers including loss of sales, increased returns and complaints, and customer defections. This can also lead to higher costs, as customer service representatives try to resolve complaints and the reverse logistics system is used to handle a returned product and possibly send out a new one at the company's expense. In a survey by Nitse, Parker, Krumwiede & Ottaway (2004) a majority of the respondents indicated that they would not make additional purchases from an e-commerce retailer if they received items in colors different than they expected.

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Reverse logistics models based on e-business environment have received a degree of attention (Ni & Liao, 2009). Generally, there are three typical forms and these include manufacturing collecting, online retailer collecting and the third-party logistics providers (3PL) collecting suppliers (XiaoYan, Han, Qinli & Stokes, 2012). In the early stages of e-business, the most adopted models were the first two. That has changed, however, as companies struggled to satisfy customers since the reverse logistics process was more complex and more costly than anticipated. Furthermore, as more retail stores are setting up or refining their Internet presence, pressure to run an effective and efficient reverse logistics process has intensified. Therefore, owing to concerns to reduce logistics costs and improve efficiency, it is hardly surprising that enterprises tend to prefer outsourcing it to the third-party reverse logistics service providers (XiaoYan, Han, Qinli & Stokes, 2012). Companies can then focus on their core business. The outsourcing of logistics to 3PLs has become an increasingly powerful trend in modern companies. 3PLs are used to perform traditional logistics functions, such as inbound transport, outbound transport, warehousing and for other services, such as reverse logistics (Qureshi, Kumar & Kumar (2008). Companies can leverage 3PLs to set themselves apart from the competition. Such differentiation may allow firms to maintain or gain market share, increase revenue, and possibly reduce transportation and inventory costs through efficiencies gained within their reverse logistics processes (Daugherty et al., 2002).

Conclusion

The rapid growth of reverse logistics is likely to continue. Managing reverse logistics is becoming an important element of supply chain management and, in some cases, a profit generating function (Rogers & Tibben-Lembke, 2001). For years companies thought that once the products would leave their warehouses that the products were no longer their responsibility. At that point the product belonged to their customers. There was little with regards to regulations, environmental concerns or public expectations. Logistics for years was focused on the company's ability to get products to the buyer as effectively and efficiently as possible. With increased competition, advancements in technology and demanding customer expectations companies had to make efforts to improve their effectiveness and efficiency in their supply chain. Reverse logistics was one way in which companies could increase their competitiveness in the marketplace as well as address the issues just mentioned.

2.2.3KEY PERFORMANCE METRICS OF REVERSE LOGISTICS

The author's findings show that reverse logistics can reduce costs (Klausner &

Hendrickson, 2000), increase profitability (Rogers & Tibben-Lembke, 2001), improve customer satisfaction (Daugherty, Myers & Richey, 2002), create customer value (Dowlatshahi, 2000) and enhance environmental performance (Li & Luo, 2012). The value of an effective, measurable, and efficient reverse logistics system will prove invaluable to an organization. Sarder et al (2009) warn that by ignoring this important field of reverse logistics, many enterprises may be missing a prospect to turn burdens into valuable property. In addition, environmental and legal requirements support efforts to execute a sound reverse logistics strategy. While many companies have begun to recognize the need to address reverse logistics, it appears that few have strategically examined the opportunity or established explicit contribution objectives and formal processes/metrics for asset refurbishment, resale or disposal. Reverse logistics has become a sustainable development issue for several reasons, including economics, corporate citizenship and legislation (Huang & Yang, 2014). A firm that can develop and properly monitor reverse logistics processes in product returns and reverse logistics can be a mutually beneficial situation for both the firm and the customers (Stock & Mulki, 2009). Logistics and supply chain managers can also develop incentive and reward systems that recognize employee involvement in reverse logistics activities and success. Otherwise, reverse logistics will simply become a "burden" that employees will be unwilling to fit into their already full schedules (Carter & Ellram, 1998).

Performance indicators are the criteria with which the performance of products, services and production processes can be evaluated. Besides, performance indicators are operationalized process characteristics, which compare the efficiency and/or effectiveness of a system with a norm or target value (Van der Vorst, 2000). Performance Indicators provide management with a tool to compare actual results with a pre- set target, and to measure the extent of any deviation. This tool is extremely important for forward logistics and reverse logistics (Stank et al., 2003). Different methodologies for the categorization of indicators have been presented in many studies, stressing the importance of quality service in the logistics field (Stank, et al. 2003, Van Hoek, 1998, Gunasekaran, et al. 2001, 2003, 2007).

Customer satisfaction is one of the key performance indicators of reverse logistic. There has been a general acceptance of relations of service quality with improved supply chain performance (Nitin et al., 2006). As customers become increasingly sophisticated in their purchasing decisions and environmental laws take root, many companies will seek new ways to develop or enhance return systems, in order to achieve customer

satisfaction. On the other hand, customer's satisfaction leads to customer loyalty, which is actually the result of an organization creating a benefit for a customer, so that they will maintain or increase their purchases from the organization.

There are many factors that affect customer satisfaction. Li and O"Brien (1999) proposed a model to improve supply chain efficiency and effectiveness based on four criteria: profit, lead-time performance, delivery promptness and waste elimination. Beamon (1999) suggested a system of three dimensions: resources (i.e., efficiency of operations), output (i.e., high level of customer service), and flexibility (i.e., ability to respond to extraordinary customer services requests). Aramyan et al., (2007) has developed a framework for reverse logistics chain performance indicators, which are grouped into four main categories: efficiency, flexibility, responsiveness and traceability.

According to Wisner (2003), customer satisfaction is affected by the behavior of the employees (courteous, knowledgeable, helpful), accuracy of billing, billing timeliness, competitive pricing, service quality, delivery, good value, billing clarity, quick service and flexibility. For the majority of customers quality comes first. Prompt delivery, extra costs and information regarding the available reverse logistic services affect the quality of the reverse logistic services. The customer must obtain sanctions and approvals for the payout, as wellas answers to questions in the process, since price escalations irritate customers (Barber, 2008).

Financial performance: As competitive and economic pressures continue to have a significant impact on the service segment, many companies see the reverse logistics service chain as a process that may be used to manage costs and drive additional revenues through the management and tracking of the return, repair, refurbishment and remarketing of assets (Persson et al. 2002). In addition, many firms are also taking a greater interest in the disposition of spent assets and the ways in which costs can be further contained and additional revenues can be driven out of existing reverse logistics operations. Traditional business performance measures have been mostly financial – measuring rate of return on investment, cash flow and profit margins (Gunasekaran et al., 2007). In financial performance the reverse logistic services of repricing such as used/overstocked or renaming products and financial credit processing are also included. Typical indicators for financial performance are this which measure how effectively the firm is using its resources, these which measure the extent to which the firm has been financed by debt, these that measure management"s overall effectiveness in generating

profits and these that measure the firm‟s ability to maintain itseconomic position in the growth of the economy and industry (Li et al. 1999).

According to Barrat (2004), performance indicators should relate to both effectiveness and efficiency of the supply chain and its actors, such as the economic growth of the industry. The percentage of sales from recycled or remanufactured products is also important for the financial performance of the reverse logistic chain, an indicator that is proposed by the authors. Reverse flow offers profit margins to the company, increase the number of its customers‟, help the company to gain different markets, and the above indicator can easily quantify these results of reverse flow.

Internal business process perspective as a KPI of reverse logistics the strategic focus of the Internal Business Process Perspective is to determine the business processes an organization must excel, in order to satisfy both its shareholders and customers. In this perspective there are three processes included (Bititci et al, 1997). The innovation process, for which the management should choose measures that would enable a business to identify future customer preferences, and deliver new products that satisfy such preferences. For the operations process, management should focus its measures on the efficient, consistent, and timely delivery of products and services to customers. Furthermore, the postsale services processincludes time (response time to complaints), quality, and cost (number of customers handled on a service call), warranty, repair, and customer after sale service (Sanders et al., 2002). In the internal business process perspective, the service of inspection of reverse logistics activities is also included. Typical indicators are percentage of sales from new products; new product introduction compared to competitors, time-to-market, and many traditional indicators such as quality, productivity, and cycle time (Larsen, 2000). A critical indicator can be the introduction of new products in the supply chain, which will result in the expansion of the offered products and services of the company.

Warehousing is also another KPI of reverse logistics. Warehousing facilities and operations play a vital role in the overall supply chain process, which includes reverse logistics. Warehouses should achieve both efficiency and effectiveness in supply chains, and provide some perspective on current challenges. The proper operation of the warehouse can turn the loss due to the cost of disposal into a profit for the company, as well as, improve customer satisfaction (Dabholkar,2000). At a company that operates reverse logistics, any item that has been returned is received into the warehouse and stored until it is examined for repair or enter the next hub in the reverse logistics channel.

This shows the extremely high value of warehouse space, for reverse logistics operations. Reverse logistics services such as repackaging, relabeling, and restocking is also included in warehousing. Some performance indicators of warehouse for reverse logistics are the cost of the process to receive back product, productivity (volume received per man-hour), quality of returned products, quality of the package of the products, and cycle time (time taken to process a return to the next hub of reverse logistics channel) (Beamon 1999, Parker, 2000). We believe that critical indicators can also be the cost of the collection, which increases warehousing costs, as well as the quality of the returned products, which affects the time and materials that will be needed for the processes of repackaging and relabeling.

Transportation is also a KPI of reverse logistics. The role of transportation in reverse logistics is essential as, inbound and outbound transportation are the lifeblood of reverse logistics operations. The services of transport of the returned products, the redistribution as well as the visibility are also included in transport. Without proper transit of returned goods from the point of consumption to the processing service centres and then shipping the remanufactured products to new customers, reverse logistics operations cannot be sustained. The transportation of various raw materials and products in different stages of their manufacture is a very complicated process that involves many firms, places, and miles. Transportation costs play, an important role in the viability of the entire reverse logistics system (Hobbs, 1996). If the transportation cost is prohibitive, the viability and profitability of reverse logistics systems will be severely curtailed.

A performance indicator for reverse transport can be the percentage utility of cargo capacity or truckload. Other, obvious indicators include transit time, freight cost per unit shipped, number of units delivered over a period of time and different points of loading, and combination of forward and reverse flow regarding the allocation of products. (Franceschini et al. 2000, Perlman, 2009) Finally an important indicator is the combination of forward and reverse flow of the products, as it can minimize transportation costs and multiply customers‟ satisfaction at the same time, an indicator that is proposed by the authors.

CHAPTER THREE METHODOLOGY

3.1 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.

3.2 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 bystudies that aim at establishing facts about the issue of study since data is collected from differententities 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 dataat a particular point in time.

3.3 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.

3.4 Sample size

Sample size for Quantitative data

The sample size of 205 outlets was 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 2023 and Krejcie,Robert V., Morgan, Daryle W. 1970 Table for Determining Sample Size from a Given Population.

3.5 Sampling techniques

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 variationwithin 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 are considered as strata. Companies in a given stratumare 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).

3.5.1 Data collection methods and Instruments

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 is subjected to pilot study based on which improvements were affected.

3.6.1 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 is administered to 20participants and basing on the feedback. Modifications are made to the questionnaire.

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

3.6.2 Validity and reliability of the instrument

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 byUCU 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 analysisutilizing 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 least0.30, items that load on posited constructs) (Taherdoost, 2018).

3.6.1 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 are0.70, a cut off recommended by Taherdoost, (2018).

Alpha (Cronbach, 1951; and Sekaran, & Bougie, 2010). All the reliability coefficients were above0.70, a cutoff recommended by Taherdoost, (2018).

3.6.2Measurement of study variables

Dependent Variable

The dependent variable was effective product returns and this was measured using Reliability, Responsiveness and Agility. These dimensions are developed based on SCOR model studies doneby (Gordon, 2011).

Independent Variable

The independent variable Reverse Logistics measured using the logistics capability, Process formalization capability and Flexibility capability. These dimensions are considered and covered when developing a data collection and the Likertscale 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 are computed to enable the analysis, Constructs are 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).

3.6.3Data analysis

Quantitative data analysis

In order to increase precision, consistency and reduce bias, data collected using an onlinequestionnaire were imported into SPSS tool and coded. Data is analyzed by using inferential anddescriptive 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 alinear 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, ICrepresents Information management capability, PC represents process formalization capability andFC 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 theindependent 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 and Top management support on supply chain performance using the linear regression model. The secondstep involved the researcher creating an interaction term where the independent and moderator variable was multiplied. Then, the moderator and the independent variable were centred and theinteraction term was entered into the model to see whether it alters the relationship between reverse logistics capabilities and supply chain performance.

3.7 Ethical considerations

As part of the ethical considerations, the researcher obtained approval from Graduate School of UCU in quest of permission to conduct the study. The respondents were not asked to indicatetheir names on the questionnaire for anonymity. The study ensured participants voluntarilyparticipate in the study. All data gathered is used only for the purposes of the study and nothingelse. 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 are acknowledgedthroughout 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 respondentswere 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.

4.1.1 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 backgrounddata 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 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, 2023*

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 femaleand male and was captured and there more male employees than their counter parts.

Table 2 Age Group of Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
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
Valid				
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, 2023

The findings in table 4.2 above illustrates that 29.4% of the respondents were between 20-30 yearsof 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 thatthis study was representative since the age category of respondents was regarded mature enough to understand and appreciate the issues of reverse logistics capabilities.

Table 3 Education Level of Respondents

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
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
Valid				
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, 2023

The results in table 4.3 above indicates that 72.5% of the respondents hold a bachelor's degree, 20.6% have attained a master's 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 hasan educated workforce that is likely to have prior knowledge on reserve logistics and how it affectssupply chain performance.

Table 4: Showing Length of Service of the Respondents

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

Source: Primary data, 2023

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. Employeeswith such years of service are presumed to have knowledge and understanding of reverse logisticscapabilities and how they facilitate in the management of returned medicines.

Table 5: Showing Department of the Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Warehouse	10	9.8	9.8	9.8
Procurement	12	11.8	11.8	21.6
Sales	33	32.4	32.4	53.9
Valid				
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, 2023

Table 4.5 above indicates that majority of the respondents that participated in this study were fromthe 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 6: Showing Category of Organization

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

Source: Primary data, 2023

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 andwholesale business.

Empirical results from the Quantitative Analysis

4.6 IMPACT OF REVERSE LOGISTICS ON EFFECTIVE PRODUCT RETURNS.

The study assessed the respondents' perceived level of logistics information managementcapability in Ugandan pharmaceutical industry. The items were measured on a five-point Liker 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 reverse logistics in Ugandan pharmaceutical industry. The findings are presented in table 4.7 below;

Table 7: Showing Perceived Level of impact of reverse logistics on effective product returns Logistics on effective product returns.

Item	SA %	A %	U %	D %	SD %	Mean	SD
	9.8	39.2	40.2	6.9	3.9	2.56	0.907
To minimize costs and increase profits							
Reduces the amount of waste, deposited in the environment	7.8	14.7	10.8	35.3	31.4	3.68	1.276
Improved the marketing image of several companies	13.7	15.7	31.4	32.4	6.9	3.03	1.147
Widened the marketing share and exhibition of companies	11.8	32.4	41.2	8.8	5.9	2.65	1.001
Protection if assets in organisations.	7.8	20.6	40.2	22.5	8.8	3.04	1.052
Forrester effect reduction.	8.8	7.8	11.8	39.2	39.2	3.78	1.232

Source: Primary data, 2023

The findings in table 4.7 reveal that the pharmaceutical companies minimize costs and increase profits 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 they Reduce the amount of waste, deposited in the environment (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 have improved the marketing image of several companies (Mean=3.04, SD=1.052) and protection of assets in organisations, Forrester effect reduction. (Mean=3.78, SD=1.232).

Table 8: showing Model Findings on the important of reverse logistics on effective product returns

Model Summary

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

1. Predictors: (Constant), reverse logistics
2. Dependent Variable: product returns.

4.7 CURRENT REVERSE LOGISTICS STRATEGIES IN HANDLING RETURNED PRODUCTS, AND OPPORTUNITIES FOR IMPROVEMENT

This section will assess the current reverse logistics process 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).

industry.

Table 8:current reverse logistics strategies in handling returned products, and opportunities for improvement

Item	SA %	A %	U %	D %	SD %	Mean	SD
Growing concern for the environment, coupled with economic incentives and legislative compulsions	12.7	38.2	39.2	5.9	3.9	2.50	0.931
The operational factors of reverse logistics consist of cost-benefit analysis, transportation, warehousing, supply management, remanufacturing and recycling and packaging.	8.8	20.6	52.9	12.7	4.9	2.84	0.931
The e-commerce business and online transactions have brought a new dimension to the buying and selling of goods and services during this period.	13.7	24.5	50.0	7.8	3.9	2.64	0.952
Reverse logistics models based on e-business environment have received a degree of attention.	6.9	33.3	43.1	10.8	5.9	2.75	0.949

Source: Primary data, 2023

The results from table 4.8 above show that pharmaceutical companies in Uganda are growing with concern for the environment, coupled with economic incentives and legislative compulsions (mean=2.50,

SD=0.931), clearly communicate the operational factors of reverse logistics consist of cost-benefit analysis, transportation, warehousing, supply management, remanufacturing and recycling and packaging (mean=2.84, SD=0.931), use e-commerce business and online transactions have brought a new dimension to the buying and selling of goods and services during this period. (mean=2.64, SD=0.952), reverse logistics models based on e-business environment have received a degree of attention (mean=2.75,SD=0.949)

4.10 KEY PERFORMANCE METRICS OF REVERSE LOGISTICS

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 presentedbelow 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).

4.11 KEY PERFORMANCE METRICS OF REVERSE LOGISTICS

Item	SA %	A %	U %	D %	SD %	Mean	SD
Warehousing is also another KPI of reverse logistics.	7.8	17.6	37.3	31.4	5.9	3.10	1.020
Financial performance.	6.9	14.7	32.4	40.2	5.9	3.24	1.007
Transportation is also a KPI of reverse logistics.	4.9	30.4	40.2	16.7	7.8	2.92	0.992
The percentage utility of cargo capacity or truckload.	10.8	18.6	33.3	31.4	5.9	3.03	1.085
Internal business process perspective	6.9	6.9	11.8	42.2	32.4	3.86	1.152

Source: Primarydata,2023

The results from table 4.11 above show that pharmaceutical companies in Uganda have Warehousing for returns (mean=3.10, SD=1.020), have financial performance (mean=3.24,

SD=1.007), have Transportation as a KPI. (mean=3.03, SD=1.085), The percentage utility of cargo capacity or truckload (mean=3.86, SD=1.152), Internal business process perspective (mean=3.11, SD=1.062).

Table 9: Model Findings on the key performance metrics of reverse logistics

ModelSummary

Model	R	Square	Adjusted Square	Std.Errorofthe Estimate
1	.716[a]	.512	.507	.61462

a.Predictors: (Constant), reverse logistics

b.DependentVariable: product returns

ANOVA

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

a.DependentVariable:reverse logistics

b.Predictors:(Constant),product returns

Coefficients

Model		UnstandardizedCoefficients		Standardized Coefficients	T	Sig.
		B	Std.Error	Beta		
1	(Constant)	.326	.258		1.259	.211
	Reverse logistics	.802	.078	.716	10.248	.000

a.DependentVariable:product returns

Source: Primarydata,2023

CHAPTER FIVE :SUMMARY, DISCUSSION, CONCLUSIONANDRECOMMENDATIONS

5.0 Introduction

This chapter focuses on the discussion of the findings of the study and the irrelation 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

Impact of reverse logistics in Ugandan pharmaceutical industry, current reverse logistics strategies in handling returned products, and opportunities for improvement and key performance metrics of reverse logistics. 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.

Current reverse logistics strategies in handling returned products, and opportunities for improvement 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 appositive significant effect to current reverse logistics strategies in handling returned products and areas for improvement.

5.1.2 KEY PERFORMANCE METRICS OF REVERSE LOGISTICS

The study showed that much as the key performance metrics of reverse logics are in place, many companies don't rely on them but rather use traditional means to detect the defects within the supply chain.

The regression results revealed no significant moderating effect to the key performance metrics of

reverse logistics.

5.3 Conclusions

The study sought to examine the impact of reverse logistics on effective product returns in Ugandan pharmaceutical industry. Based on the findings of this study, current reverse logistics 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 key performance metrics of reverse logistics are necessarily crucial to companies.

5.4 Recommendations

Having confirmed the validity of the impact of reverse logistics on effective product 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.

5.6 Areas for Further Study/Research

This study focused on the impact of reverse logistics on effective product returns 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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QUESTIONAIRE

I am **Masanso muhammed,** a bachelor's Student at Uganda Christian University, currently carrying out a research study in partial fulfilment of the requirement for the award of a bachelor's degree in procurement and logistics management. My research study is focusing on impact of reverse logistics on effective product returns in pharmaceutical industry in Uganda.

Reverse logistics is the return of medicines from the customer back to the sale/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 attendingto this questionnaire.

SECTION A: BACKGROUND INFORMATION

General questions about the respondent & Company.

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

Gender

- Male
- Female.

Age group (please tick appropriate group)

- 20-30
- 31-35
- 36-40
- 41-45
- Above50

Education Level (please tick appropriate group)

- certificate
- Diploma

- Bachelor's degree
- Masters
- PDG
- PhD

Length of service (please tick appropriate group)

- below-3year
- 3-6years
- Above 6 years

Which department do you belong to

- Warehouse
- Procurement
- Sales
- Marketing
- Regulatory affairs
- Others

Category of Organisation/company

- Retail
- Wholesale
- Manufacturing

SECTION B: IMPACT OF REVERSE LOGISTICS ON EFFECTIVE PRODUCT RETURNS.

This section seeks to find out the impact of reverse logistics on effective product returns in Ugandan pharmaceutical industries

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**
Impact of reverse logistics on effective product returns.						

IS.1	To minimize costs and increase profits					
IS.2	Reduces the amount of waste, deposited in the environment					
1S.3	Improved the marketing image of several companies					
IS.4	Widened the marketing share and exhibition of companies					
IS.5	Protection if assets in organisations.					
IS.6	Forrester effect reduction.					

SECTION C: CURRENT REVERSE LOGISTICS STRATEGIES IN HANDLING RETURNED PRODUCTS, AND OPPORTUNITIES FOR IMPROVEMENT

This section will assess the current reverse logistics process 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**
Current reverse logistics strategies in handling returned products, and opportunities for improvement						
CR.1	Growing concern for the environment, coupled with economic incentives and legislative compulsions					
CR.2	The operational factors of reverse logistics consist of cost-benefit analysis, transportation, warehousing, supply management, remanufacturing and recycling and packaging.					
CR.3	The e-commerce business and online transactions have brought a new dimension to the buying and selling of goods and services during this period.					
CR.4	Reverse logistics models based on e-business environment have received a degree of attention.					

SECTION D: KEY PERFORMANCE METRICS OF REVERSE LOGISTICS

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 presentedbelow 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**
Key performance metrics of reverse logistics						
KPI.1	Warehousing is also another KPI of reverse logistics.					
KPI.2	Financial performance.					
KPI.3	Transportation is also a KPI of reverse logistics.					
KPI.4	The percentage utility of cargo capacity or truckload.					
KPI.5	Internal business process perspective					

UGANDA CHRISTIAN UNIVERSITY

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SCHOOL OF BUSINESS

1st Aug 2023

TO WHOM IT MAY CONCERN

Name: Masanso Muhammed Reg. No. J21B12/001.

A bachelor's student who is seeking permission from your office to collect data for his/her dissertation titled

"IMPACT OF REVERSE LOGISTICS ON EFFECTIVE PRODUCT RETURNS".

We shall be grateful if you could render assistance to him/her in collecting the necessary data for his/her dissertation

The Uganda Christian University School of Business thanks you in advance

.....

Mukisa Simon Peter
Research coordinator