

# The Effects of Reverse Logistics on Organizational Performance of Pharmaceutical Manufacturing Companies: A Case Study in The Ashanti Region of Ghana

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**ABSTRACT:** *There is a growing concern on how pharmaceutical products are managed in the market when they are damaged or reach end of life. As the society becomes informed, Pharmaceutical industries are experiencing the challenge of complying with many regulatory requirements from various regulatory institutions. Reverse logistics sometimes referred to as “product-take-back” is seen as one of the concepts as the wider concept of green supply chain management that can possibly address this problem. The study seeks to examine the effects of reverse logistics on organizational performance in the Pharmaceutical Manufacturing Companies in Ashanti region. A descriptive cross-sectional study was used to obtain empirical evidence to help address the existing gap. The study considered all Pharmaceutical Manufacturing Companies in the region and therefore census sampling was done. The study sample consisted of 30 managers of Pharmaceutical industries. Thirty (30) top managers of Pharmaceutical Manufacturing Companies were recruited using a simple random sampling technique. With the aid of the Open Data Kit (ODK) software designed for Android OS, data was collected using mobile phone device. The results indicated that reverse logistics forms part of the strategic positions of most pharmaceutical manufacturing companies in Kumasi (83.3%), and it has a positive effect on performance ( $r=0.44$ ,  $p=0.015$ ). Assurance of information quality systems ( $r=0.60$ ,  $p=0.00$ ) and promotion of collaboration among the actors of the supply chain ( $r=0.74$ ,  $p=0.00$ ) have positive effect on the performance of pharmaceutical companies. To ensure higher returns on investment*

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*in pharmaceutical manufacturing companies, stakeholders should encourage and welcome efforts that seek to guarantee and foster information quality systems, collaboration among supply chain actors, and the adoption of reverse logistics systems.*

**KEY WORDS:** reverse logistics, organizational performance, information quality systems, supply chain actors, strategic positions

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## INTRODUCTION

Recently, there is a growing trend in how manufacturers manage and dispose of their products. The introduction of reverse logistics is now the order of the day in many manufacturing industries both locally and internationally. The relevance of this concept has been made possible due to a number of reasons including; environmental, economic and legal issues (Ravi & Shankar, 2005). For instance, the buyer's increase realization of the need to deal with the issue of uncertainty and wastage in their activities has led to the shot up in the flow of products returns; ranging from warrant returns, product recalls, end of use or life returns, service returns among others. This has helped most countries to reduce the burden of waste in our environment and also achieve value for money (Ravi & Shankar, 2005; D. S. Rogers & Tibben-Lembke, 2001)

Reverse Logistics is the process of monitoring the life-cycle of product after they arrive at the end user or consumer. It includes how a product could be reused, how it should be properly disposed of and any other way where an expired product can create value. D. S. Rogers & Tibben-Lembk( 2001) defined it as the "movement of goods from a consumer towards a producer in a channel of distribution" making the scope of this concept basically what (Lambert & Stock, 1982) described as one way street, since most of the flow comes from a one direction. An effective reverse logistics which directly impact supply chains are mostly the return of products from the end consumer back to the manufacturer. It is a broader concept involving logistics management and the disposal of unwanted supplies both hazardous and non-hazardous. The supplies and information however, flows in opposite direction of the usual logistics activities, hence the name reverse logistics. According to Amemba, (2013) reverse logistics is likening to green operations (Amemba, Nyabokey, Osoro, & Mburu, 2013). It is explained that, green operations is about the product manufacture or remanufacture, usage, logistics and waste management after a product has been designed.

The concept goes beyond reusing containers and recycling packaging materials researching further into how a product can be reproduced and put to good use. It includes all processes and activities associated with a product or services after their sales with the final goal to make efficient aftermarket activity with the aim of saving revenue and other environmental resources (Association of Reverse logistics). When industries investigate the re-manufacturing, reusability and recyclability of their products, then there will be fewer disposals. This can benefit companies or industries and the environment, because it enables organizations to adopt efficiently and

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effective environmental friendly procedures to reuse, recycle and the quantity of material wastage in manufacturing. (C. R. Carter & Ellram, 1998; D. S. Rogers & Tibben-Lembke, 2001). Conceptually, reverse logistics can promote alternate uses of resources that can be cost effective and ecologically friendly by extending product's normal life cycles (Melbin, 1995). The adoption of reverse logistics plays significant contributions to organization's finances, because it is one of the ways of ensuring value for money. A study by (D. S. Rogers & Tibben-Lembke, 2001) revealed that reverse logistics forms 4% of the total logistics cost and about one half percent of US GDP. However, there is always the problem of most company's inability and commitment to track the cost associated with the business it renders.

Reverse Logistics has gained so much popularity in recent times because of the benefits we are getting from it; environmental degradation, improve social and operational performance. According to Lord Kelvin (2010), improved operations ensure exceptional customer service, public health and safety, fiscal responsibility and community support through appropriate corporate social responsibility processes. Improved operations leads to increase in the amount of goods delivered on time, decrease in inventory levels, decrease in scrap rates, increase in product quality, increase in product line, improved capacity utilization (Ninlawan, Seksan, Tossapol, & Pilada, 2010).

The manufacturing industry plays a critical role in every economic growth. Globally, in developed countries, reverse logistics has created many employments for the working force and also helped to reduce the impact of waste and pollution in the environment. The increase acceptance of reverse logistics has led to the proliferation of third party reverse logistics companies with the expertise to provide services needed. The wide ranges of service are including transportation, warehousing, reengineering, value added services among others all serves as avenue for employment creation in the industry indirectly (Kaynak, Koçoğlu, & Akgün, 2014). The manufacturing industry in the low and middle income countries is still a growing industry in the economy. In 2016, the industry sector in Ghana had a Gross Domestic Product (GDP) share of 24.3% (Ghana Statistical Service, Provisional Annual GDP April 2017).

The focus of this research is to determine the effect of reverse logistics on a firm's performance in the pharmaceutical manufacturing industry in Ghana. Through this research, we seek to provide valuable insights into whether the implementation of reverse logistics by manufacturing industries have achieved great improvement in their performance especially low and middle countries like Ghana, when they adopted reverse logistics strategy. Specifically, this research aims to achieve the following objectives:

1. To examine the effects of reverse logistics on performance of pharmaceutical manufacturing companies in the Ashanti Region of Ghana?
2. To examine the mediating role of information quality in the relationship between Reverse Logistics and Organizational performance.
3. To examine the effects of collaboration on reverse logistics.

To navigate this uncharted territory, our research raises the following essential research questions:

1. What are the effects of reverse logistics of pharmaceutical manufacturing companies **in the Ashanti Region of Ghana?**
2. What is the mediating role of information quality between Reverse logistics and organizational performance?
3. What is the effect of collaboration on reverse logistics?

## **LITERATURE REVIEW**

Chapter two deals with the review of relevant literature on reverse logistics practices, the benefits of reverse logistics, theoretical review (stakeholder theory, resource based view and institutional theory), empirical review, product reuse and organizational performance.

### **Reverse Logistics Practices**

Reverse Logistics is concerned with how a company or firm gets products from its customers rather than natural forward flow of goods to consumers and is expected to be consumed than the other way round. Reverse Logistics can be defined by the European Working Group (2004) cited by the Price Water House Coopers (2008) as the process of planning (PricewaterhouseCoopers, 2008), implementing and controlling the flow of materials, in-process inventory and finished goods, from a manufacturing, distribution or use to a point of recovery or point of disposal . In reverse logistics, products either get to the customer and are returned or do not and are reprocessed in the supply chain. It describes the end of life of product management. This means that reverse logistics is mainly concerned with return or take-back products and materials from the point of consumption to the forward supply for the purpose of recycling, reuse, remanufacture, repair, refurbishing or safe disposal (C. R. Carter & Ellram, 1998). While this is costly to any organization the long term benefits is enormous. The products that are usually returned are due to the following reasons; expiry date of the product, poor packaging, quality issues or problems, warranty claims, manufacture recall and so on.

Reverse Logistics undergo through three stages; reuse, remanufacture and recycling (Hazen, Cegielski, & Hanna, 2011). Reuse is a situation where a consumer returns a product to either a wholesaler or retailer due to defects, warranty issues, expiry and among others. Remanufacture on the other hand is where a product is refurbished into a refined product and recycling is where a product is redesigned in order to suit a customer's need, want or desire.

Successful organizations always consider the following strategies;

- i) Customer satisfaction. An organization that is successful always think about the customer. Satisfying a customer is the sole objective or aim of the organization aside it profit making.

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- ii) Uses of advance technology in its processes. Firms that employ advance technology in the daily running of their organization are able to monitor their product returns from customers and also track on how the systems is being used.
- iii) Environmentally friendly. Through the use of reverse logistics, an organization is able to adopt an environmental friendliness and thereby reducing the level of pollution in the environment. Moreover, jobs are created thereby giving back to society what has been taken.

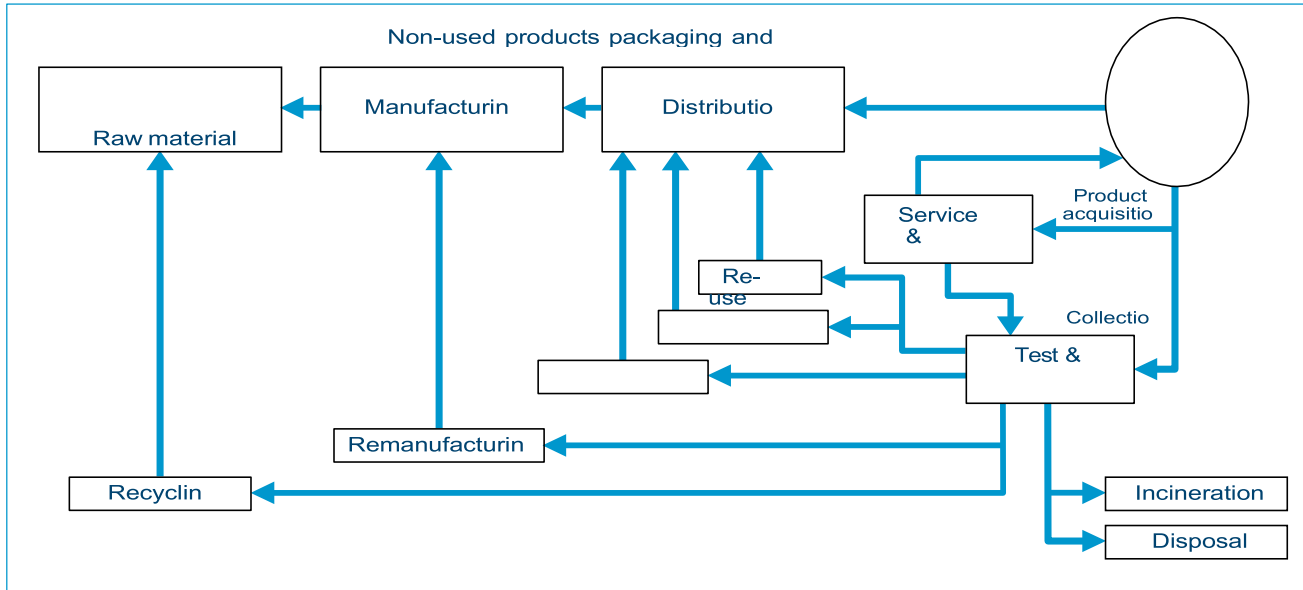
Reverse logistics enhance an organization to be closer to their customers by understanding their need when products are returned to the organization, wholesaler or retailers. Reverse logistics focuses on getting products back from customers in order to maintain trust and confidence in the products rather than moving products to customers only.

### **Reverse Logistics in Ghana**

Firms are now competing with each other because customers have several alternatives and can only have control over their rivals by satisfying the needs of the customers. These has given rise to competition even in the supply chain.

Research has showed the environment is also key to the sustenance of a business. In Ghana, the introduction of reverse logistics is not common or popular as compared to most developed countries like the United States of America (USA) who has practiced reversed logistics for several decades. The implementation of reverse logistics is moderate according to Amoah, et al (2017)(Amoah, Nusrat-Jahan, & Koomson, 2017). In low and middle income countries, most consumers and or customers are ignorant of reverse logistics and are therefore not pushing for its implementation. The environmental pollution in Ghana is on the rise which is unhealthy for humans and living things for that matter. From number.co the pollution rate is estimated at 97.8% in the middle of 2016 (Amoah et al., 2017). Ravi & Shankar (2005) indicated that stakeholder awareness is important to the implementation of reverse logistics and lack of knowledge is also one of the problems that prevent its implementation. There are so many reasons accounting for this lack of implementation (Ravi & Shankar, 2005). Notable amongst them is the lack of monitoring regulatory bodies, financial constraints or challenges, human resource and lack of company policies. For reverse logistics to be fully implemented in Ghana, more sensitization must be done by the government and other regulatory bodies indicating the importance of practicing it and the benefits the country will derive when it is implemented. Few researches have been done on reverse logistics by few researchers in Ghana. Some of them are K. Owusu Kwateng et al who conducted a research on reverse logistics practices in pharmaceutical manufacturing industry: experiences from Ghana. According to K. Owusu Kwateng et al (2014), they concluded that a central location point should be provided for the collection of returned products. By the implementation of this, the level of pollution will be reduced. Amoah et al (2017) also researched on investigating the factors accounting for the effective implementation of reverse logistics in Ghana. Amoah et al in their recommendations suggested that for reverse logistics to be implemented in Ghana there should be availability of infrastructure and also the help to protect the

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 environment and reduce waste, the environmental protection agency (EPA) must put in place laws to be strictly followed by the populace (Amoah et al., 2017).



Source: Pricewaterhouse Coopers, 2008

**Figure 1: Reverse Logistics**

**Pharmaceutical Manufacturers Association of Ghana (PMAG)**

The Pharmaceutical Manufacturers Association was established on 16<sup>th</sup> March, 1999. It is the association of all pharmaceutical manufacturing companies in Ghana. Currently it has thirty two (32) members in the association. Its members include the following;

- Ernest Chemist Ltd
- Pokupharma Ltd
- Aspee Pharmaceuticals Ltd
- Phyto-Riker (Gihoc) Pharmaceuticals
- Amponsah-Efah Pharmaceuticals
- Aspee Pharmaceuticals Ltd
- African Global Pharma
- Ayrton Drugs Manufacturing Limited
- Midland Pharmaceuticals
- Kinapharma Ltd,

- Pokupharma Ltd and so on.

These members are healthcare professionals who practice in pharmacy, the field of health sciences who focuses on safe and effective medication use. They have undergone through a higher level of education in order to acquire the needed skills and to understand the biochemical mechanisms and action of drugs, drug use, therapeutic roles, side effects, potential drug interactions and the monitoring of parameters.

Their objectives are the following;

- To encourage local pharmaceutical manufacturing and promotion to contribute to National Health Delivery programme at an affordable cost.
- To practice a good manufacturing among local manufacturing companies.
- To provide solutions on matters that pertains to industries operating in Ghana to Government and drug regulatory bodies.
- To affiliate, cooperate and associate with any organization internationally or locally having common goals or objectives as the association.
- To identify all problems manufacturers encounter and promote the interest of all manufacturing industries in Ghana.

Their mission is to promote pharmaceutical manufacturing in Ghana creating a favorable economic, regulatory and political environment that enables the pharmaceutical manufacturing industry to meet the growing healthcare needs and expectations of the nation in particular and international community in general.

Their vision is to establish a modern and sustainable pharmaceutical manufacturing industry in Ghana which enables people to have an equal and early access to the best and safest medicines which are manufactured locally, ensure the highest security of the medicines supply chain and also contribute significantly to economic growth.

### **Product Reuse**

Reuse is an important tool in the growth of every business. Reuse is when a customer returns an unused product back to the wholesaler or retailer. While the ultimate value of the product is reduced, the organization has possession of it into use either for different purpose or into the supply chain. It helps the firm to earn additional income, provide employment for the community it is operating within and above all, it helps to reduce the level of pollution in the environment.

Product reuse can therefore be defined as the process of collecting unused or partially used products from the consumer and put them back into the supply chain without any upgrade or processing (Eltayeb, Zailani, & Ramayah, 2011). These used products are normally used to enhance a new product or are used to produce a different product to perform a different function or to dispose of the unnecessary ones at the land field site.

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This research examines how product reuse will affect the performance of these manufacturing companies. According to Amemba (2003), reuse is one of the strategies of waste management that is environmentally friendly (Amemba et al., 2013). According to Reuse Development Organization (2014), there are three different benefits of product reuse which are;

- i) Product Reuse benefits the environment. These benefits help to reduce the impact of pollution in the air and the environment.
- ii) It helps the community at large. It helps the firm to be socially responsible by improving the social welfare of the society. Example providing social amenities likes electricity and water.
- iii) It provides economical or financial benefits. It helps to recover value that could have been lost. Through product reuse, a firm will be able to recover costs due to the new products it will produce out of the old products (returned products).

Products are usually returned when they are completely used or partially used (Hazen et al). For a product that is returned, it must be modified or channeled to the manufacturer or organization for repair, refurbishment or development into a new product.

Practices under reuse include the return of used products and packaging to suppliers for reuse, setting of quality standards for reuse, generating energy from renewable sources of energy and designing products for reuse (Rao & Holt, 2005).

### **Product Remanufacture**

Remanufacture is where a product is taken, cleaned, repaired and is reassembled to be used. It occurs when a product is no longer in use and is not of any economic or financial value. Remanufacture consists of repair, refurbishment or overhauling. If it is properly handled, it can create a business opportunity for the indigenes in the society which the organization is working (Toffel, 2004). Remanufacture happens when the defective parts of the products are refurbished for new ones. For it to be successful there should be training of employees, acquisition of repairing workshops and warehouses to store the products among others.

### **Recycling in Reverse Logistics**

This is where a product that is to be thrown away is converted into a new material or product for use. A practice under recycling includes sensitization to the buyer and the return of a product for recycling and packaging. Products are normally recycled when it is assumed that it will bring value to the organization. When a product is recycled, its identity and use of the original product is lost (Eltayeb et al., 2011).

If there is no recycling, the product is usually sent to the landfill for disposal. Recycling is done to curb the amount of waste or pollution in the environment. Organizations are finding ways to help reduce the waste in the environment (green logistics) and to explore to recover value in reverse logistics (Daugherty, Myers, & Richey, 2002; Klausner & Hendrickson, 2000). If the cost of the recycling is normally high, it becomes a challenge for organizations to continue. This is because



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organizations believe that they must get value for money. Government must therefore subsidize these costs in order to encourage organizations to maintain the recycling system.

### **Theoretical Review**

This study is guided by three theories namely; institutional theory, stakeholder theory and resource based theory that seeks to describe how reverse logistics is implemented in the day-to-day running of the firm. Firms must be able to have systems that will guide them in their daily activities. These systems include culture and norms that will direct them as to what to do and what not to do.

### **Institutional Theory**

This is one of the commonest theory used to determine how organizations develop and implement their operational strategies (Laosirihongthong, Adebajo, & Choon Tan, 2013). Organizations have structures that guides them. Firms institutionalize their practices due to the fear that they may lose their competitiveness in the market (J. R. Carter, Smeltzer, & Narasimhan, 2000). There are usually stakeholders who might also have their own stake in the organization. Therefore, the organization must put in measures to satisfy these people and also the environment. Issues are raised about the environment usually when there is pressure from the external stakeholders. This is why reverse logistics has become imperative in order to carter for these needs. When these environmental practices are instituted, organizations will also have a competitive edge or advantage over their competitors (Zhu, Sarkis, & Lai, 2007).

### **Stakeholder Review**

Stakeholders in all over the world have a great influence in the managing of every organization, therefore their interest is paramount. Stakeholders are either internal or external stakeholders. Internal stakeholders include managers, employees and external stakeholders are the government, suppliers, customers, non-governmental organizations (NGOs), and the community among others.

Stakeholder Theory looks at the relationship between organizations and its stakeholder and the way they conduct or go about their activities. This theory states that the relationship that the organization have with these stakeholders must be maintained and their interest balanced in order to prevent any problems in the future (Clarkson, 1998; Freeman & Evan, 1990; Jones & Wicks, 1999). This relationship if managed well will help the organization to conduct its activities effectively without hindrances. Pressure is usually given to government and other non-governmental organizations to address the issue of environmental pollution. This has therefore led to the adoption of strict laws and regulations to guide these issues (Delmas & Toffel, 2004).

Hendriques and Sardosky (1999) is of the view that, higher pressure normally comes from suppliers, customers, and employees whereas environmental pressure emanate from the media and other organizations (Henriques & Sadorsky, 1999). Organizations can either respond to these pressures in a proactive or reactive manner. Therefore addressing these issues will go a long way to help the organization to gain a good image and also be able to carry out its activities effectively.

### **Resource Based View**

A resource can be defined as anything of value to a person in the form of an asset in order to accomplish a need or want (Hobfoll, 2002). Resources can either be personal (example energy, possessions, and competencies) or economic (money).

Resource Based theory aims at how a firm's resources will enable it to be competitively advantageous over its contenders or competitors. It is not only tangible but also intangible (such as knowledge or competencies). To have enough resources does not necessarily mean a firm will be competitive but also must have put in place certain measures in place. These include the manageability of the firm, allocation of resources and also exploiting the resources.

There are a lot of management issues that prevent an organization from managing and allocating its resources properly. Some of these issues may be through complacency and lack of proper communication. Research shows that there is a relationship between resources and capabilities which gives them a long term approach (Mellewight and Nothnagel, 2011). Capabilities are the ability of a person to carry out an objective through the use of his skills and knowledge. Through the implementation of reverse logistics practices, a firm or organization can be competitive among its competitors. This can be done through the tackling of sustainability and environmental issues (Mellewight and Nothnagel, 2011).

### **Empirical Review**

Reverse logistics has helped many organizations to recover their cost and also gain income. Through this, the purchase of materials or parts will be reduced (Y. Rogers, Sharp, & Preece, 2011). The return of goods has brought a long term relationship between the firm and its customers thereby preventing competition. This is because customers are able to send out their concerns back to the organization, wholesalers or retailers and it is addressed. Through this the relationship between these parties are strengthened.

The amount of savings in reverse logistics should lead to both environmental and economic performance of the firm. This should therefore enable the firm to accept customer demands for sustainable products and services that will satisfy them. In being environmental friendly, competitors will be side lined because their weakness will come to bear. When this happens, the organization always gain the more because the needs and concerns of their customers are addressed and therefore more people will be prepared to work with them thereby enlarging the customer strength.

Studies has been conducted by researchers on green logistics and performance (Laosirihongthong et al., 2013; Muma et al., 2014). It was realized that implementation of legislations is key to environmental practices such as reverse logistics. Studies have been made and it is revealed that reverse logistics adoption is not popular in many manufacturing companies. Some of these reasons are due to the believe that it is impossible to be implemented and also there is lack of knowledge and understanding of how reverse logistics works. Shumon et al (2010) revealed that most

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organizations see reverse logistics as nuisance with no benefit attached (Shumon, Arif-Uz-Zaman, Rahman, & Khulna, 2010). In his studies it can be realized that although these criticisms are bound to happen, there are benefits associated with it which included gaining improvement and friendly environment. This study is further to put to bear that indeed reverse logistics will affect the performance of an organization.

### **Organizational Performance**

An organizational performance is when it is able to produce products and dispatch them in order to provide customer satisfaction (Zhu et al., 2007). Organizational performance is important in every organization since it determines whether the organization is on track with its customers or not. When there is efficiency in organizational performance, it leads to delivery of products on time, increases in the level of quality products the organization produces and also increase in the product line (Ninlawan et al., 2010).

In order to achieve effectiveness and efficiency in performance, management must put in place the following measures; firstly, allocating resources to the best use. When resources are properly allocated, there will be increase in the level of production thereby bringing about an increase in profits and reduction in production cost. Secondly when workers are given incentives. Every worker wants to be rewarded for good work done. Therefore when they are given the proper motivation, they will be able to work as expected; if not, productivity will reduce.

For an organization to be successful in its performance, it must know where it is heading to and look for mechanisms to achieve it (Keller & Prince, 2011).

### **Conceptual Framework and Hypothesis**

The conceptual framework below shows how reverse logistics impact on organizational performance. This section will describe each variable and the hypothesized relationships;

#### **Influence of Reverse Logistics on performance**

Reverse logistics has been known worldwide as an important aspect in the supply chain management that should be taken seriously. This is because it tends to bring about a lot of cost benefits to the organization and the environment as a whole. Research found out that the firm's reverse logistics system is attributed to environmental issues and how it implements its ethical standards and how friendly it is with the environment.

Amemba et al (2013) sees reverse logistics as partners coming together, uncertainty of suppliers, forecast and speculation (Amemba et al., 2013). He also reveals that reverse logistics must be related to the environment. From previous studies it is revealed that reverse logistics comprise of three areas; remanufacturing, reuse and recycling (Hazen et al., 2011).

When reverse logistics is implemented, remanufacturing becomes an important process that reproduce a new product from an old product. It brings back to life dead or unused product that is returned to the organization. Products that are beyond repair are remanufactured. Organizations

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are able to obtain valuable information from wholesalers and consumers that help in improving the products. Reverse Logistics helps in understanding the needs of the consumer through information sharing. By incorporating the views of the consumer, this enhances the product which is likely to improve customer confidence and trust. This is likely to result in increased revenue of the firm since the products are likely to meet the needs and demands of the customer.

Product reuse has helped the supply chain to prevent environmental pollution (Amemba et al, 2013). Many products after its initial or original use, can be reused for another purpose. In many instances, it might not be the original manufacturer who is putting the product in a different use. The ability to reuse a product reduces the production cost and also increase profitability.

Another important concept in the supply chain is the recycling of the products into new ones. While it helps to reduce the amount of waste in the environment, raw materials to feed the industry is readily available since the product that is used goes into recycling. For instance, most plastics are now recycled into so many products like plastic blocks for building, plastic containers amongst others.

The above analysis show that if the three components of reverse logistics; remanufacturing, reuse and recycling is effectively implemented in an organization, it will in turn increase performance of the firm and thereby bring about value and increase in profits of the organization

From the above analysis, the hypothesis below can be deduced;

**H1:** Reverse Logistics has a positive relationship with performance.

### **Influence of Collaboration on Performance**

Collaboration guides an organization as to how to relate to its partners. For it to survive, it must collaborate with its partners. Supply chain collaboration is a relationship between two parties to achieve the same goal.

Collaboration is necessary due to the following reasons; provides the ability to integrate information. Through collaboration, information is coordinated and both parties are made aware of their roles in order to achieve their objective; it also helps to monitor the activities in the supply chain to know whether they are on track or not; it also helps to manage the processes in the system so that corrective actions can be taken.

Collaboration between supply chain partners is important for the free flow of materials and information in reverse logistics. A policy must therefore be instituted as to how products are returned to the supply chain. When products exceeds the warranty time, it must be rejected since it can slow down the supply chain process. In collaboration there should also be trust since this will determine the success and improvement in the performance of the firm (Vlachos & Bourlakis, 2006). There are two kinds of collaboration, internal and external collaboration. Internal Collaboration helps to bring expertise to the day-to-day running of the organization's operations.

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Functional teams are connected and corporate decisions made on how information should be disseminated. Internal collaboration is normally focusing on the customer.

External collaboration on the other hand is dealing with partners outside the organization by giving them information on order patterns and valuable service feedback. They must be educated enough as to what information to give and what not to as this might affect either positively or negatively to the organization. It helps to make relationships with consumers stronger, increase revenue and also improve customer service.

For reverse logistics to be successful there must be proper collaboration between partners through the use of technologies like barcoding and RFID (radio frequency identification). The reason for many failures is in miscommunication which causes conflict and misunderstanding among partners (Tuten & Urban, 2001). In collaboration, there should be a win-win situation for all partners to achieve a business synergy. With collaboration, people are able to bring to bear their competencies and also learn new things in addition to what they already have. This will lead to an increase in the performance of an organization since everybody is given the chance to bring to the table their skills and experiences in the supply chain. Collaborative relationship enables firms to share their risks, assess resources, increase productivity and reduce the transaction cost of an item. Research shows that the more the level of collaboration between partnership relationships, the better or higher the firm performance (Duffy & Fearne, 2004; Mohr & Spekman, 1994).

From the above analysis, the hypothesis below can be deduced;

**H2:** Collaboration is positively related to performance.

### **2.18 Influence of Information Quality on organizational performance**

Organizations have come to the realization that in order for them to work effectively and efficiently they have to be competitive. Information quality is how credible, adequate, timely and accurate information is communicated or exchanged. Researchers have found out that there should be up to date information on an organization's data in every step of the supply chain.

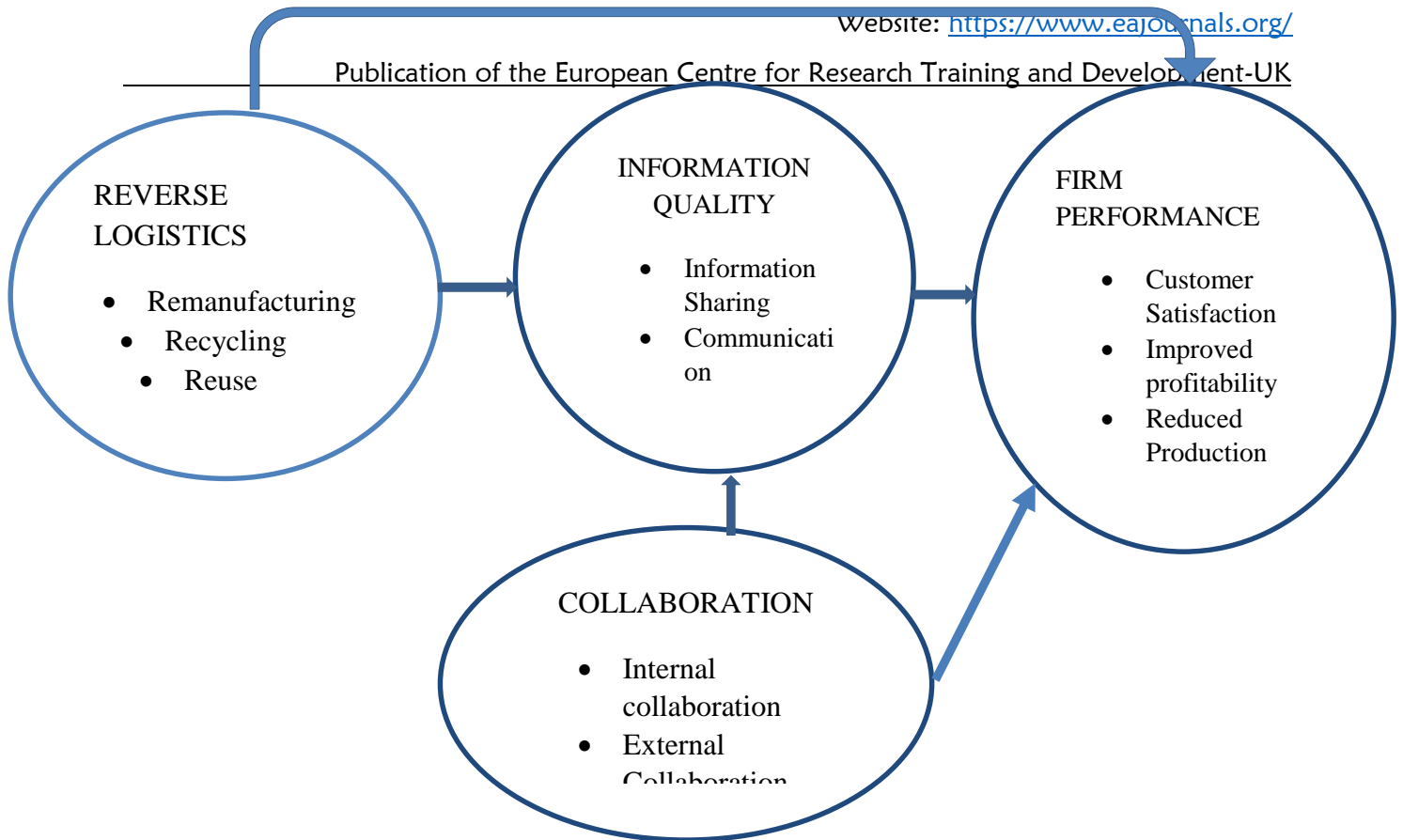
By the sharing of data with other partners, organizations can speed up their activities in the supply chain and also respond quickly to customers' needs. In doing so, they can be competitive. The information that is shared must be threaded with caution so that competitors or rivals will not get access. This is the main reason why organizations sometimes fear about what is being shared. They see it as a loss of power to them. Due to this, information is sometimes distorted by not even getting to suppliers and customers. In order to reduce the level of distortion in the supply chain, information must be accurate as possible.

Information sharing is how a firm share accurate, confidential information with the supply chain (Angeles & Nath, 2001; Cagliano, Caniato, & Spina, 2003; Sheu, Rebecca Yen, & Chae, 2006). The significance of how information is imparted in the supply chain is dependent on how, when, what and with whom it is shared. After the information is shared, it must be properly

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communicated for the receiver to know exactly what is being put across. Most at times information is shared without properly explaining and due to this the information is interpreted according to how it is received. For quality information to be shared there should be a strategy in place to prevent the barriers to information sharing. Management should provide guidance for quality information to be shared properly. When information is shared, there should be transparency and trust since this will help the supply chain to be strengthened and also increase performance. Top management must understand the importance of sharing quality information and sharing it without distortion. They must provide the vision, guidance and the support for its implementation. If information is properly disseminated, automatically it increases performance since each partner is abreast with information needed to work efficiently.

From the above analysis, the hypothesis below can be deduced;

**H3:** Information Quality has a positive relationship with performance.



**Figure 2: Conceptual Framework**

## **RESEARCH METHODOLOGY**

### **Research Design**

A descriptive cross-sectional survey design was employed in this study. Descriptive survey is scientific methods which involves observation and also show the character of an individual without it having any effect in any way.

Survey is defined by Mugenda and Mugenda (1999) as a method that is used to take data from a larger population through the use of questionnaires and interview (Mugenda & Mugenda, 1999). The use of cross-sectional survey is good for this study since it is effective for collecting information from a targeted population.

### **Population of the study**

The study population consisted of Pharmaceutical manufacturing companies in the Ashanti region of Ghana. The study recruited top management of Pharmaceutical companies who were duly registered under the Ghana Association of Pharmaceutical Manufacturing Companies. The total number that is registered under this Association is thirty two members (32).

### **Sample size and Sampling Techniques**

The estimated sample size was calculated using the formula below.

A simple random sampling strategy was employed to recruit the Pharmaceutical Manufacturing Companies. The respondents' for this study were top management. These category of managers were the focus for administering the questionnaires, on the fact that they are in a better position to be able to give out information that will help to address the objectives set for this study. It involves groups or individuals who are experienced and knowledgeable with a phenomenon or area of study (Cresswell & Plano Clark, 2011).

### **Data Collection**

Data collection was by the use of a structured questionnaire. Questionnaires are preferable because it can be analyzed easily and also saves time (Oso and Onen, 2011). The questionnaire was designed in accordance with study set objectives and was administered by face-to-face interview. Administrative permission was sought from each Pharmaceutical Manufacturing Company while consent was obtained from respondents before the commencement of interview. The questionnaire consists of both closed and open ended questions. It was divided into five sections; the first part sought for general information of the firm, second section was on reverse logistics, third section is on the influence of information quality on performance, fourth section is the influence of collaboration on performance and the last section is on organizational performance. Data on the extend of adoption of reverse logistics were collected using five leveled Likert scale adopted from the works of Odhiambo Jenton, while information quality on performance was also accessed using a scale adopted from the works of D.J. Power et al (2001). Similarly data on collaboration and organizational performance was adopted from Angeles and Nath (2001) and Li et al (2006) respectively.

The collection of the data was done by mobile phone using the Open Data Kit (ODK) software designed for Android OS. Trained research assistant were provided with a basic smartphone with good functionality in Android OS. The smartphone was uploaded with questionnaire template used to capture the information from respondents. Respondents were informed that besides administering of the questionnaire, no other information would be taken or voice recorded. The ODK was protected for data safety and confidentiality. The phones had passwords, known only to the research assistant (RA). Lastly, the data was cleaned by the principal investigator who had access to the data collected when transmitted to the server.



**Data Analysis**

The administered questionnaires were checked for completeness, accuracy and consistency. Data was downloaded from the server and cleaned using Stata statistical software. Central tendencies such as mean, proportion and standard deviation were used to summarize the data. Correlation was used to determine the relationship between independent variables (reverse logistics) and dependent variables (organizational performance). Further analysis was performed with techniques such as Confirmatory Factor Analysis using Stata and SPSS. The coded data was analyzed using SPSS (Statistical Product and Service Solution).

**RESULTS AND FINDINGS**

This chapter presents the results of data obtained in line with objectives. These results are presented as follows; demographic characteristics of the respondents, reverse logistics and stock returns status of pharmaceutical companies, practice of reverse logistics by pharmaceutical companies, effects of reverse logistics on relationship between reverse logistics and organizational performance, relationship between reverse logistics and organizational performance and the extent of reverse logistics adoption by these pharmaceutical manufacturing companies

**Demographic Characteristics of Respondents**

Majority of the respondents were males (83.3%). The respondents have an average age of about 31 years. Most of the respondents worked in the quality control department of the pharmaceutical companies (40%). The respondents have spent about 7 years on average working.

**Table 1: Demographic Characteristics of Respondents**

Variable	<i>n=30 (%)</i>	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>SD</i>
<b>Gender</b>					
Male	25 (83.3)				
Female	5 (16.7)				
<b>Age</b>		20	42	31.10	5.56
<b>Work Department</b>					
Accounts	8 (26.7)				
Administration	2 (6.7)				
Audit	4 (13.3)				
Laboratory	1 (3.3)				

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Marketing	1 (3.3)				
Quality Control	12 (40.0)				
Warehouse	2 (6.7)				
<b>Years of Work Experience</b>	30 (100.0)			6.72	7.19

**Reverse Logistics and Stock Returns Status of Pharmaceutical Companies**

Majority of the respondents indicated that the pharmaceutical companies they work with practice reverse logistics (83.3%), with most of the respondents indicating that stocks were usually returned by clients on quarterly basis (36.7%). Damaged pharmaceutical products accounted for the major reasons for returns (76.7%), and these returns are mostly done by retailers (63.3%).

**Table 2: Reverse Logistics and Stock Returns Status of Pharmaceutical Companies**

Variable	<i>n</i> (%)
<b>Company Practices Reverse Logistics</b>	
Yes	25 (83.3)
No	5 (16.7)
<b>Frequency of Returning Stocks</b>	
Daily	8 (26.7)
Weekly	6 (20.0)
Monthly	4 (13.3)
Quarterly	11 (36.7)
Annually	1 (3.3)
<b>Reasons for Returning Stocks</b>	
Damage of product/package	23 (76.7)
Temperature excursion damage	9 (30.0)

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Expired products	7 (23.0)
Food and Drugs Authority (FDA) order	6 (20.0)
Wrong shipment	5 (16.7)
<b>Clients Who Normally Return Stocks</b>	
Wholesalers	16 (53.3)
Retailers	19 (63.3)
Both Retailers and Wholesalers	7 (23.3)

### Practice of reverse logistics by Pharmaceutical Manufacturing companies in Ashanti Region

Respondents were asked to confirm whether the company they work with practices reverse logistics. The results indicated that most pharmaceutical companies practice reverse logistics (83.3%) (See table 2).

### Summary Statistics for performance, reverse logistics, collaboration, and information quality.

#### a. Performance

On average, the overall rate of 72.7% for performance in pharmaceutical manufacturing companies in Kumasi. Respondents were found to notice the sales growth item (79.2%); this suggest that pharmaceutical companies in Ashanti region have experienced growth in sales of their products.

**Table 3: Summary Statistics for Items in the Performance Scale**

Statements	Percent(%)
Sales growth has increased	79.2
There is return on investment	70.0
There is a growth in return on investment	69.2
The profit margin on sales has increased	72.5
<b>Overall Score for Performance</b>	<b>72.7</b>

**b. Reverse Logistics**

On average, the respondents gave an overall rate of 65.9% for the adoption of reverse logistics systems in the pharmaceutical companies they work with. The first item was rated the highest rate in the adoption of reverse logistic systems; this suggest that the pharmaceutical manufacturing companies have well established supply chain systems in place. While support from supply chain partners on reverse logistics recorded the least rate (56.6%); this suggest that there is little support from supply chain partners on reverse logistics.

**Table 4: Summary Statistics for Items in the Reverse Logistics Scale**

		M
1	The company has a well-established supply chain	74.2
2	The company has incorporated reverse logistics practices in its supply chain	65.8
3	Reverse Logistics is in the company's strategic plans	70.0
4	Related equipment, facilities and infrastructure is adequate	67.5
5	Support from investors and shareholders is adequate	61.7
6	Accurate cost records of reverse logistics activities exist	60.0
7	Reverse Logistics are monitored and have clear key performance indicators	71.7
8	Support from supply chain partners on reverse logistics	56.7
9	Top Management is committed to reverse logistics	65.8
	<b>Overall Score for Reverse Logistics Scale</b>	<b>65.9</b>

**a. Information quality**

The average rate for information quality assurance in pharmaceutical manufacturing companies is 71.8%. The average rate for each of the item indicates that the pharmaceutical companies have well established information quality assurance systems. The second item was rated the highest on the information quality scale; this suggest that top management of pharmaceutical manufacturing companies in Kumasi understands the importance of sharing quality information without delay and distortion.

**Table 5: Summary Statistics for Items in the Information Quality Scale**

	Statements	Percent (%)
1	The company has incorporated information quality in its vision	71.7
2	Top management understands the importance of sharing quality information without delay and distortion	74.2
3	The uncertainty of suppliers has made it important to share quality information to reduce uncertainty from suppliers and also impact on the supply chain	72.5
4	Information technology enables the organization to share quality information timely, accurately and reliably	71.7
5	Information technology help secure information sharing and quality	69.2
	<b>Overall Score for Information Quality</b>	<b>71.8</b>

**a. Collaboration**

The overall average rate for collaboration in pharmaceutical manufacturing companies in Kumasi is 67.83%. The third item was rated the highest on the collaboration scale; this suggest that pharmaceutical manufacturing companies in Kumasi experience improved performance by integrating operations with supply chain partners.

**Table 6: Summary Statistics for Items in the Collaboration Scale**

	Statements	Percent(%)
1	There is an agreement on the importance of collaboration across the supply chain	63.3
2	The organization and supply chain partners exchange relevant information	66.7
3	The organization experiences improved performance by integrating operations with supply chain partners	70.0

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4	There is an increase in operational flexibility through supply chain collaboration.	69.2
5	The organization and supply chain partners share timely information.	70.0
	<b>Overall Score for Collaboration Scale</b>	67.8

**a. Creation of Composite Variables**

Composite scores were created for adoption of reverse logistics systems, collaboration, information quality, and performance. Adoption of reverse logistic systems was measured with nine items on a five point Likert scale; collaboration was measured with five statements and a five point Likert scale; information quality was measured with five statements on a five point Likert scale; performance was measured with five statements on a five point Likert scale. The values respondents assigned to statements measuring each of the constructs were summed to create the composite score.

**Research Hypothesis One**

The relationship between the extents of reverse logistics adoption by these pharmaceutical manufacturing companies in Ashanti region.

H<sub>0</sub>: The practice of reverse logistics has a negative relationship with performance of pharmaceutical companies in Ashanti region.

H<sub>1</sub>: The practice of reverse logistics has a positive relationship with performance of pharmaceutical companies in Ashanti region.

The relationship between extent of adoption of reverse logistics system and performance of pharmaceutical companies was examined using Pearson product-moment correlation coefficient. The Pearson correlation coefficient revealed that there was a significant positive relationship between the adoption of reverse logistics system and performance ( $r= 0.44, p=0.015$ ). Adoption of reverse logistics explains 19.4% of differentials in performance of pharmaceutical companies. In view of the result, adoption of reverse logistics has a positive influence in the performance of pharmaceutical manufacturing companies.

**Table 7: Relationship between adoption of reverse logistics system and performance of pharmaceutical manufacturing companies.**

Independent Variables		1	2	<i>r</i>	P-value
				0.44	0.015
1	Adoption of reverse logistics	1			
2	Performance		1		

**Research Hypothesis Two: Relationship between collaboration and performance of pharmaceutical companies.**

H<sub>0</sub> Collaboration has a negative relationship with performance of pharmaceutical companies in Kumasi.

H<sub>1</sub> Collaboration has a positive relationship with performance of pharmaceutical companies in Kumasi.

The relationship between collaboration and performance of pharmaceutical manufacturing companies in Kumasi was examined using Pearson product-moment correlation coefficient. There was a significant positive relationship between collaboration and performance, ( $r= 0.74, p=0.000$ ). Collaboration explains 54.76% of differentials in performance of pharmaceutical companies in Kumasi. In view of the result, the researcher failed to accept the null hypothesis; therefore, the alternative hypothesis has been accepted.

**Table 8: Relationship between collaboration and performance of pharmaceutical companies.**

Independent Variables		1	2	<i>r</i>	P-value
				0.74	0.00
1	Collaboration	1			
2	Performance		1		

**Research Hypothesis Three Relationship between information quality and performance of pharmaceutical companies.**

H<sub>0</sub> Information quality has a negative relationship with performance of pharmaceutical companies in Kumasi.

H<sub>1</sub> Information quality has a positive relationship with performance of pharmaceutical companies in Kumasi.

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The relationship between information quality and performance of pharmaceutical manufacturing companies in Kumasi was investigated using Pearson product-moment correlation coefficient. The Pearson correlation coefficient revealed that there was a positive relationship between information quality and performance,  $r= 0.60$ ,  $p=0.000$ . Information quality explains 36% of differentials in performance of pharmaceutical manufacturing companies in Kumasi. In view of the result, the researcher failed to accept the null hypothesis; therefore, the alternative hypothesis has been accepted.

**Table 9: Relationship between information quality and performance of pharmaceutical manufacturing companies.**

Independent Variables		1	2	<i>r</i>	P-value
				0.60	0.00
1	Information Quality	1			
2	Performance		1		

### Multiple Linear Regression Model

The impact of adoption of reverse logistics, information quality, and collaboration on performance of pharmaceutical manufacturing companies in Kumasi using multiple linear regression was used to assess the level of association. The multiple linear regression model for the analysis is as follows:

$$Y_i = B_0 + B_1 (\text{adoption of reverse logistics}) + B_2 (\text{Information quality}) + B_3 (\text{Collaboration}) + E.$$

where  $Y_i$  stands for performance.

Table 6 presents the results after performing the multiple linear regression in SPSS. The model explained 49% of the variability in performance of pharmaceutical manufacturing companies in Kumasi. Only collaboration made statistically significance contribution to the model. One unit increase in the score for collaboration will result in 0.58 increase in performance. The result suggest that, after accounting for the effects of information quality and the adoption of reverse logistics, systems that seek to promote collaboration among workers, departments, and supply chain actors in pharmaceutical manufacturing companies have positive effect on performance.



**Table 10: Reverse logistics, information quality, and collaboration regressed on performance of pharmaceutical manufacturing companies in Kumasi**

				t	P-value	95.0% CI for B	
	$\beta^a$		$\beta^b$			Lower	Upper
(Constant)	3.86	2.67		1.44	0.16	-1.64	9.35
Reverse Logistics	0.03	0.11	.045	0.24	0.81	-0.20	0.25
Information Quality	0.01	0.20	.012	0.05	0.96	-0.40	0.42
Collaboration	0.58	0.18	.703	3.27	0.00	0.21	0.94
<b>a:</b> Unstandardized Coefficients; <b>b:</b> Standardized Coefficients							
Adjusted R <sup>2</sup> =0.49, F (3, 26)=10.39, p=0.00							

### Summary of Finding

The findings from the study were based on results obtained from the data using self-administered questionnaires. The discussions were based on the study specific objectives which sought to examine the effect of reverse logistics on organizational performance of pharmaceutical manufacturing companies, relationship between reverse logistics and organizational performance and the extent to which pharmaceutical manufacturing companies have adopted reverse logistics

The study had a hundred percent response rate. The respondents interviewed were from various departments and these officers were from the accounts, administration, audit, marketing, laboratory, quality control and warehouse with their roles relating to reverse logistics in one way or the other.

### The extent of reverse logistics by adoption, collaboration and information quality on performance of these pharmaceutical manufacturing companies in Kumasi

In an attempt to examine the extent of the adoption of reverse logistics by these companies, Pearson's correlation test was conducted. The study hypothesized that practice of reverse logistics has a negative relationship with performance of pharmaceutical companies in Kumasi as the null hypothesis; while practice of reverse logistics has a positive relationship with performance of pharmaceutical companies in Kumasi as the alternative hypothesis on the other hand. The findings revealed that there was a significant positive relationship between adoption of reverse logistics and the performance level of the pharmaceutical companies. The test revealed that adoption of reverse

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logistics influenced the organizational performances by 19.36 %. In this breadth, we failed to accept the null hypothesis.

A similar test was conducted to examine the relationship between collaboration and performance of pharmaceutical manufacturing companies. Similarly, there was a positive correlation between collaboration and performance among the pharmaceutical companies. Fifty-four percent of the changes in Performance level in the organizations could be explained by collaboration. Based on this finding we failed to accept the null hypothesis, which stated that collaboration has a negative relationship with performance of pharmaceutical companies in Kumasi.

The study further hypothesized that information quality could have either a positive or negative effect on the performance of the pharmaceutical companies. The Pearson correlation coefficient revealed that there was a significant positive relationship between information quality and performance. Information quality had thirty-six percent effects on performance. Therefore, we failed to accept this null hypothesis

**The impact of impact of adoption of reverse logistics, information quality, and collaboration on performance of pharmaceutical manufacturing companies in Kumasi.**

The impact of adoption of reverse logistics, information quality and collaboration on performance of these of pharmaceutical manufacturing companies were assessed using liner logistics regression model. The model demonstrated a variability of forty-nine percent in performance of the pharmaceutical manufacturing companies in Ashanti region. The study revealed that adoption of reverse logistics and information quality in the pharmaceutical manufacturing companies does not have any significant impact on the organizational performance. However, collaboration among workers between various departments had a significant impact on the performance level of pharmaceutical manufacturing companies. After adjusting for the effect of all other factors, an increase in collaboration by a unit could contribute to 58% change in the performance of these companies positively.

**DISCUSSION**

This study was conducted at Kumasi in the Ashanti Region of Ghana and was aimed at establishing the effects of reverse logistics on organizational performance in the pharmaceutical manufacturing companies. The summary of the research findings is presented and discussed below;

Reverse logistics has become very important in the supply chain and for that matter in organizational performance. Even though developing countries are now coming to terms with its introduction in their supply chain as indicated previously, it can be realized that it has come to stay since it comes with a lot of benefits which has already been stated earlier in this research. Due to the influx of competition which is as a result of globalization and technological advancement, it has become important for organizations to improve upon their performance. From the research, it was revealed that reverse logistics has impacted enormously in the pharmaceutical manufacturing companies. The findings also indicated that all the reverse logistics variables have a positive

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impact on organizational performance. The analysis indicated that all the variables were highly correlated and there is a significant influence on organizational performance as a result of their interactions.

Return of products generally was the first step in reverse logistics flow. A number of reasons accounts for these returns which includes the following; due to damages, defects, manufacturers failing to meet deadlines and expectations of customers. Product returns are either for safe disposal of Pharmaceutical products which plays an important role in reverse logistics especially pharmaceutical companies. Concerning how it affects organizational performance, a study conducted in Kenya by Gitau et al, 2016 reveals that 83% of respondents felt that reverse logistics have a positive impact on performance as compared to this study which shows that the overall performance rate is 72.7%. The ability of a company to handle returns have become imperative and very critical in reverse logistics process. This is due to the fact that the level of competition is high and also built a better relationship with stakeholders.

This research has also provided a succinct explanation on collaboration. It revealed that collaboration can be achieved when all parties or partners in the supply chain from suppliers to customers cooperate effectively. This research have highlighted on the importance of collaboration in achieving an organizational performance. Previous studies have defined the interrelationship between supply chain collaboration and organizational performance (Deveraj et al., 2007). The study has provided us with evidence of the performance of collaboration. This study has addressed the concerns of researchers who have emphasized on the need for research on the outcome of collaboration (Jap, 1999). The research strongly support the claims that collaboration impact or have a positive influence on organizational performance.

It can be recognized that the level of information sharing is influenced by the level of trust in the various organizations supply chain partners and vision between supply chain partners. As stated already, the results also agree that top management support information quality. Top management from the results indicated that they understand the need for information to be shared without distortion. A good organizational relationship is needed in order to improve information quality in the supply chain of the various organizations.

### **IMPLICATION TO RESEARCH AND PRACTICE**

Due to the influx of competition which is as a result of globalization and technological advancement, it has become important for organizations to improve upon their performance. From the research, it was revealed that reverse logistics has impacted enormously in the pharmaceutical manufacturing companies

### **CONCLUSION**

From the study finding, we can conclude that performance levels of these pharmaceutical manufacturing companies are largely dependent on collaboration between the various departments

Publication of the European Centre for Research Training and Development-UK within the organization. Finding from the study conforms to similar researches conducted among other manufacturing companies, which concluded that collaboration between the manufacturer, retailers and other internal departments enables firms to share their risks, assess resources, increase productivity and reduce the transaction cost of an item which in the long run promote better or higher the firm performance (Duffy & Fearne, 2004; Mohr & Spekman, 1994).

### **FUTURE RESEARCH**

Further research should be conducted with a larger population and it could be the entire country to give us a greater perspective on the impact of inventory management practices and reverse logistics practices on organizational performance.

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