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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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 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

1. 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, Nyaboke, 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 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.

2 . MATERIALS AND METHODS

2.1 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.

2.2 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).

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).

2.3 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, whiles 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.

2.4 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 Factory Analysis using Stata and SPSS. The coded data was analyzed using SPSS (Statistical Product and Service Solution).

3. RESULTS AND DISCUSSION

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 reveres 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

3.1 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	***n=30 (%)***	***Min.***	***Max.***	***Mean***	***SD***
Gender					
Male	25 (83.3)				

Female	5 (16.7)				
Age		20	42	31.10	5.56
Work Department					
Accounts	8 (26.7)				
Administration	2 (6.7)				
Audit	4 (13.3)				
Laboratory	1 (3.3)				
Marketing	1 (3.3)				
Quality Control	12 (40.0)				
Warehouse	2 (6.7)				
Years of Work Experience	30 (100.0)			6.72	7.19

3.2 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	*n* (%)
Company Practices Reverse Logistics	
Yes	25 (83.3)
No	5 (16.7)
Frequency of Returning Stocks	
Daily	8 (26.7)
Weekly	6 (20.0)
Monthly	4 (13.3)
Quarterly	11 (36.7)

Annually	1 (3.3)
Reasons for Returning Stocks	
Damage of product/package	23 (76.7)
Temperature excursion damage	9 (30.0)
Expired products	7 (23.0)
Food and Drugs Authority (FDA) order	6 (20.0)
Wrong shipment	5 (16.7)
Clients Who Normally Return Stocks	
Wholesalers	16 (53.3)
Retailers	19 (63.3)
Both Retailers and Wholesalers	7 (23.3)

3.3 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).

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

3.4.1 . 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
Overall Score for Performance	72.7

3.4.2 . 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
	Overall Score for Reverse Logistics Scale	**65.9**

3.4.3. 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
	Overall Score for Information Quality	**71.8**

3.4.4. 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
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
	Overall Score for Collaboration Scale	67.8

3.5 Research Hypothesis One

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

H_0: The practice of reverse logistics has a negative relationship with performance of pharmaceutical companies in Ashanti region.

H_1: 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	*r*	P-value
				0.44	0.015
1	Adoption of reverse logistics	1			
2	Performance		1		

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

H_0 Collaboration has a negative relationship with performance of pharmaceutical companies in Kumasi.

H_1 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	*r*	P-value
				0.74	0.00
1	Collaboration	1			
2	Performance		1		

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

H_0 Information quality has a negative relationship with performance of pharmaceutical companies in Kumasi.

H_1 Information quality has a positive relationship with performance of pharmaceutical companies in Kumasi.

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	*r*	P-value
				0.60	0.00
1	Information Quality	1			
2	Performance		1		

3.8 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:

$Y_i = B_0+B_1$ (adoption of reverse logistics) $+B_2$ (Information quality) $+B_3$ (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

	β^a		β^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
a: Unstandardized Coefficients; **b:** Standardized Coefficients							
Adjusted R^2 =0.49, F (3, 26)=10.39, *p*=0.00							

3.9 . 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; whiles 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 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.

4 . 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 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.

5. 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 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).

6. RECOMMENDATION

It is recommended that management of the various pharmaceutical manufacturing companies in Ghana should put in place certain structures or measures that will encourage them to adopt reverse logistics practices fully. Even though the findings reveal that reverse logistics is good, more effort needs to be done by stakeholders of the various companies. Some of these needs include making sure that pharmaceutical manufacturing companies create departments that will support and encourage environmental practices to monitor and audit reverse logistics practices. Government should also sensitize the general public about the need for reverse logistics and its impact on the environment and economy as a whole.

In the Pharmaceutical industry, damage and expired drug can be very toxic to individuals that consumer the products. It is recommended that retailers and wholesalers should be encouraged to return products that have expired to will stop it use by the public. The department handling reverse logistics should also be strengthened and given the proper logistics and motivation in order for them to function effectively and efficiently.

Compliance with Ethical Standards

Disclosure of conflict of interests

No conflict of interest.

Statement of Informed Consent

Informed consent was obtained from all individual participants included in the study.

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