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Influence of Distribution Management on Performance of Pharmaceutical Manufacturing Firms in Kenya

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Abstract: **In Kenya, in the pharmaceutical manufacturing sector, for the last 7 years, the performance of many firms remains a significant challenge with the entrance of many competitors in the industry. The decline in firm performances can be attributed to the application of distribution management systems. In over 50% of pharmaceutical manufacturing firms in Kenya, distribution management costs comprise over 25% of the total cost of sales, and these costs continue rising leading to declined firms performance. The main objective of this study is to examine the influence of distribution management on the performance of pharmaceutical manufacturing firms in Kenya. The specific goals include examining the effect of information communication technology, customer and supplier relationships, use of inventory management, and manufacturing planning on the performance of pharmaceutical manufacturing firms in Kenya. A descriptive research design was used in the process of data collection. The targeted population included 5 selected manufacturing pharmaceutical firms in Nairobi County as well as 310 employees. To choose the 175 respondents the study utilized the stratified random sampling so that to ensure that there was equal representation. The issuance of questionnaires supported the process of data collection. The reliability of these questionnaires was determined through a pilot study. The processes of data analysis and presentation involved the use of both inferential and descriptive statistics to conduct an analysis of the data collected and present the results using charts and tables.**

Keywords: **Distribution, Supplier and Customer Relationship, Inventory management.**

1. INTRODUCTION

In the global marketplace, distribution management is a fundamental feature of company logistics that has proven to be significant in the distribution of pharmaceuticals. USAID (2010) asserts that distribution management plays an imperative role in the supply chain activities related to pharmaceutical products. Supply chain management (SCM) is an essential element in the operations of a firm as it involves distribution, inventory management, transport and procurement of goods (Achuora, Guyo, Arasa & Odhiambo, 2015). Distribution management consists of the process of controlling the movement of goods down the distribution channel. This term is all-embracing as it is used to refer to the different activities and processes for example logistics, supply chain, warehousing, inventory, and packaging. Effective control of the management of distribution activities and processes results in success in distribution management which determines the profit maximization function and corporate longevity (Lysons, 2012).

According to Gerald (2012) in the USA, many manufacturers have adopted various automated distribution systems. These systems have aided both carriers and exporting organizations to enhance their distribution activities as well as the general performances. An example of such systems includes the MicroAnalytic that is issued in solving the routing problem hence helping traffic managers. These systems help in maximizing the use of vehicles, reducing mileage to enhance routing and satisfy service requirements. This service allows users in reducing the costs of distribution by up to 30 percent. Automation of the way customers submit purchase orders is yet another development in the pharmaceutical distribution sector. For example, delivery of products is enhanced by the use of Electronic Data Interchange (EDI).

In Africa, pharmaceutical and healthcare companies operate within a highly dynamic market. Several factors relate to the efficacy of distribution of pharmaceuticals. Global regulatory requirements guide the parties involved in the pharmaceutical supply chain. These international guidelines determine the distribution, storage, and handling of environmentally sensitive products. The aim is to maintain the quality and efficacy by providing cold chain management that can be used for temperature sensitive products. As a result, distribution management is a critical element of the renewal of corporate operations (Prabhakarsri, 2010).

The manufacturing sector in Kenya has experienced rapid changes over the last one or two decades. This is a crucial variable in the spurring the growth of an economy. Much of the developing countries in the world are experiencing rapid economic growth. The manufacturing sector aims to generate revenue and growth in Kenya. The Kenya Economic Survey of 2015 estimated that the manufacturing sector contributed 11% to the GDP hence explaining the favorable environment policies and campaigns in place to encourage the growth of the sector (Kariithi, 2017). In Kenya, pharmaceutical manufacturing firms are implementing various distribution management strategies as an effort to improve manufacturing planning, inventory management, supplier and customer relationship and information communication technology application. Lack of effective distribution management systems has made many pharmaceutical firms to lose a significant share of the local pharmaceutical market share to the international competitors. In Kenya, under the local pharmaceutical manufacturers, there are only 32 listed companies such as GlaxoSmithKline (GSK). Different pharmaceutical multinationals operating in Kenya makes it a significant player in the region. According to Oketch (2012), most of the pharmaceutical firms in Kenya have invested in plant and equipment so that to satisfy the good manufacturing practices (GMP) standards.

2. STATEMENT OF THE PROBLEM

The manufacturing sector in Kenya has experienced rapid changes over the last one or two decades. The Kenya Economic Survey of 2015 estimated that the manufacturing sector contributes 11% to the GDP thus explaining the favorable environment policies and campaigns in place to encourage the growth of the sector (Kariithi, 2017). In 2000, only agriculture was larger subsector than the manufacturing industry however in 2010; it fell behind communication, transport and retail trade into the fourth position (World Bank 2012). For that reason, the contribution manufacturing sector to the GDP has significantly reduced to 9.2% in 2012 from 13.6% in the early 1990s (Mmwangangi, 2016).

In Kenya, pharmaceutical manufacturing sector, for the last 7 years, the performance of many firms remains a significant challenge with the entrance of many competitors in the sector. This declined in performance can be attributed to the operating distribution management systems. In over 50% of pharmaceutical manufacturing firms in Kenya, distribution management costs comprise over 25% of the total cost of sales, and these costs continue rising leading to declined firms performance. The pursuance of more market opportunities has increased distribution cost (Achuora, Guyo, Arasa, & Odhiambo, 2015). However, the distribution costs can be reduced with the implementation of effective distribution management systems.

Although many studies have been conducted on firms' performance in manufacturing, most studies have focused on different areas of supply chain management and have not addressed the link between distribution management firms' performance. The studies have also been undertaken in different organizations. A study conducted by Achuora (2015) focused on how the performance of manufacturing firms in Kenya is influenced by the use of green supply chain management practices. A study by Mmwangangi (2016) examined how the incorporation of logistics management affects the performance of manufacturing firms in Kenya. On the other hand, Kariithi (2011) conducted a study that investigated the aspects that influence the performance of manufacturing firms in Kenya. Therefore, these studies cannot be used to establish how the performance of pharmaceutical manufacturing firms in Kenya is affected by distribution management. This situation highlights a noticeable literature gap that exists on the topical phenomenon. Therefore, this study focused on bridging the manifested gap in the literature by establishing the effect of distribution management on the performance of pharmaceutical manufacturing firms in Kenya.

3. EMPIRICAL LITERATURE

Effect of Manufacturing Planning on Supply Chain Performance

A study by Macmillan (2009) revealed that manufacturing planning plays a significant role towards promoting supply chain performance in many manufacturing firms in South Africa. Danese (2007) conducted a study that found out that the adoption of central information systems has enhanced the success of VMI approach. These systems enable manufacturers/distributors to access crucial information on the distribution channels. Within the supply network, the order

cycle processes and production planning are supported by these systems on two distinct levels. First, it is based on sales forecasting for 18 months. Second, it is based on the decisions of suppliers/manufacturers regarding the confirmation of orders while taking into the consideration the possibility of unexpected requirements (Murray, 2007).

The intranet of the pharmaceutical groups provides supply network members with results of these elaborations. Concerning a VMI project the required results are occasionally communicated to the independent suppliers. Supply network actors plan activities that are to be conducted in the frozen period due to the availability of the information on 18-month sales forecast at different centers of distribution. This information primarily contains the distribution plans as well as the stocking points for the supply network (Powell, 2007). With the support of information systems, the second level is represented by this part of order cycle processes and productions planning that are brought about by each supply network member. For example, the distributions centers that are replenished with the manufacturing plants which are in turn replenished by raw material

Inventory Management

Storey (2006) contended that inventory management practices are a fundamental element of supply chain management and application of inventory management methods that do not obey the principle of economic order quantity lowers the effectiveness of organization SCM practices. Emberson (2007) argued that three critical aspects of an inventory require individuals to balance the different tasks of inventory management. Time is an essential feature in the first aspect. To include a product in the general inventory, it is imperative that suppliers understand the time it takes for a supplier to process and execute an order (Godsell, 2006).

Effective management of the inventory is dependent on the calculation of the buffer stock. This situation describes the stock of additional units that exceeds the minimum number of units required for maintaining the production levels. For instance, often managers recognize the importance of keeping various extra units of a machine so that they can come in handy during times for an emergency. According to Harrison (2006), the creation of buffers reduced the probability of interruptions on the chances of production as a result of lacking essential parts in the supply inventory of operation items.

Supplier and Customer Relationship

Lee (2002) affirmed that SRM is a discipline within an organization working harmoniously with its suppliers considering they are significant to the success of an organization since they capitalize on the possible values of that relationship. SRM forms the precedence on which supply network managers develop mutually beneficial relationships with their valuable supply partners. The intention is to provide higher levels of competitions that could be attained through independent operations.

Peters (2004) contended that to devote sufficient time to different supplier relationships SRM managers should be responsible for managing no more than three at a time. To run SRM activities effectively then the staff involved should possess the right combination of interpersonal, technical, and commercial skills. Of great importance to the production process are project management expertise, analytical abilities, market knowledge, and commercial awareness. The development of strong, trusting working relations is influenced by "softer" skills regarding change management, listening, and communication. By seeing issues from the supplier's point of view, SRM managers can understand the business and strategic goals of their selected suppliers this can be balanced with their organizational priorities.

Information Communication Technology

A firm can attain a competitive advantage through the use of IT systems (Levi, 2005; Porter & Miller, 2005). The effectiveness of SCM is enabled by the incorporation of IT systems in company operations. To satisfy the demand of products many organizations have extended distribution channels that deliver the orders to customers both upstream and downstream while focusing on other functional areas within a company. Communication is boosted by the implementation of IT systems that also spur the coordination of specific value-added activities with the parties involved in their operations. Besides, IT advancements have provided significant opportunities for improving customer services, increasing response time, increasing flexibility and reducing the production costs (Lee, 2012).

According to Bowersok (2000) before 1980 the exchange of information between the different levels and functions of production within an organization was primarily based on paper. This mode of communication was slow and inconveniencing. During this period a lot of valuable information was ignored as the value it possessed to supply chain network was not fully comprehended (Mitra, 2008). Due to the availability of IT systems business activities have attained considerable competitive advantage brought about by the implementation of redesigned cross-functional processes. The

change in the implementation of IT in SCM is impacted by various factors (Singhal, 2008; Martinez, 2009). The management of the supply chain network involves the interaction of infrastructure, IT, and human behavior.

4. METHODS

The research adopted a descriptive research design. This research design portrays the participants in an accurate way (Crossman, 2013). According to Sekeran (2003), descriptive research studies are majorly non-experimental as they naturally determine variables as opposed to a laboratory setting. This research design makes it easy for a researcher to focus on and analyze the relationships between relevant variables that are based on past conditions or events (Mugenda, 2008). There are various modes of data collection; use of questionnaires, in-depth study of individuals or groups, case study, viewing and recording participants, and observational (Orodho, 2009). The study considered a descriptive research design since the research variables were identified thus it was easy to determine their relationship with the dependent variable. Descriptive research was also considered appropriate since the target population was large and respondents will be accessed through the use of a stratified random sampling technique (Cooper & Schindler, 2003).

The researcher settled for a probability sampling design; therefore, to select the sample size the researcher used a stratified random sampling technique. This approach involves the process of dividing the targeted population into strata and then randomly selecting respondents (Cooper & Schindler, 2003). Stratified random sampling is acknowledged as the most appropriate technique since it eliminates bias by giving all respondents equal chances of being selected (Orodho, 2009). Therefore, this approach made it easy for the researcher to come up with generalized findings.

The number of respondents was represented by a sample size selected from the targeted population. The sample size selected mirrored the characteristics of the general population; therefore, it represented the actual number of the selected respondents. The researcher used stratified sampling to categorize the targeted respondents into five strata. To select from the different stratum, the researcher utilized simple random sampling so that to identify the selected sample. These techniques provided the researcher with 175 respondents (67% of the targeted population).

The formula that calculated the sampling size was the Yamane sample calculation technique (Yamane, 1967) which main aim was to determine the sample sizes of the study based on the population size chosen. The Yamane sample size states that: n = N / (1 + Ne^2) Where n = corrected sample size, N = population size and e = Margin of error (MoE), e = 0.05. It assumes a 95% confidence level and a probability of 0.05. Using this formula, the research sample size was calculated as: The sample size was calculated based on Yamane's formula (Yamane, 1967).

$$n = \frac{N}{1+Ne^2}$$

.

where n = the sample size

N = the size of population

e = the error of 5 percentage point

Applied as;

$n = 310/\{1+310\ (0.05)^2\ \}$

$n = 175$

By using Yarmane's formula of sample size with an error of 5% and with a confidence coefficient of 95% (Yarmanne, 1967), the calculation from a population of 310 provided a sample size of 175 respondents which constituted 67% of target population from each population stratum.

Table: 4.1

Departments	Target population	Sample Size
Finance Department	40	23
Sales and Marketing Department	60	33
HR and Administration Department	40	23
Logistics and Dispatch Department	80	45
Procurement and Warehousing Department	90	50
Total	**310**	**175**

5. RESULTS

Response Rate

The response rate is used to state the total number of people that responded and from whom a complete questionnaires were collected from. The response rate is obtained by dividing the total number of the respondents who sent completely filled questionnaires with the total sample size as stipulated by (Fowler, 2004). The questionnaires were administered to a total of 175 sample size in which only a total of 140 respondents were collected from questionnaires that were filled as per requirements.

From the study a response rate of 80% was obtained after dividing the total target population with the sample size total number. The response rate is of great confidence with minimal error as indicated by Babbie (1990) who stated that a response rate of 50% is adequate while a 70% response rate and above is very reliable for the analysis. He further urged that is response rate is larger there will result less non-response error.

Table 5.1: Sample size for companies

Departments	**Pharmaken Ltd**	**Chemolife Ltd**	**BOC Kenya Ltd**	**Medisyst Ltd**	**Medispec Kenya Ltd**	**Totals**
Finance	5	5	4	4	5	23
Sales and Marketing	5	5	8	5	10	33
HR and Administration	5	5	4	5	4	23
Logistics and Dispatch	10	5	15	10	5	45
Procurement and Warehousing	10	10	10	10	10	50
Totals	**35**	**30**	**41**	**34**	**34**	**174**

Response Rate

	Sample targeted	**Response**	**Percentage response**
Pharmaken Ltd	35	30	86%
Chemolife Ltd	30	25	83%
BOC Kenya Ltd	41	30	73%
Medisyst Ltd	34	25	74%
Medispec Kenya Ltd	34	30	88%
Total	**174**	**140**	**80.4%**

Collinearity Statistics

Variable	**Tolerance**	**VIF**
Manufacturing Planning	0.38282	1.90292
Inventory Management	0.38989	1.09393
Supplier and Customer Relationships	0.28882	1.38292
ICT Application	0.92292	1.29011

Multiple Regression

The regression analysis was done to analyze to what extent or how significant manufacturing planning is significant against influence of distribution management.

The scatter plot diagram shows a straight line of best fit increase positively upwards to which implies a positive relation between manufacturing planning and influence of distribution management.

R	R Square	Adjusted R Square	Std. Error Estimate
.895[a]	.481	0.54765	0.549123

ANOVA, Multiple Regressions

As per the presentation the coefficient R square is 0.989999 and R is 0.566 . the coefficient of determination R square shows 25% of variation on effective distribution management explained by manufacturing planning. A good fit model is outlined as the R square appears high. R square is 0.998999 which is more than R square. The R square can be further increased by adding factor that would influence dependent variable.

Analysis Of Variance (ANOVA) is used to show the results of significance between manufacturing planning and influence of distribution management performance. There is a significance of 0.00 in which predictor coefficient is not equal to zero and is less than 0.05 which show a line of good fit model.

The beta coefficient of manufacturing planning verses effective distribution management was determined as 0.884. the t statistics is 46.21 and p-value of 0.000 which is less than 0.005. a confidence of 98% confidence was confirmed from p-value significance. This indicates that manufacturing planning and effective distribution management has a positive significance level.

ANOVA

	Sum off Squares	DF	Mean Square	F	Sig
Regression	52.870251	5	20.7756	882.5463	.000[b]
Residual	0.3455678	28	0.10657		
Total	64.289000	34			

Coefficient of Overall Regression Model

	B Coefficients	Std. Error	t	Sig.
(Constant)	-0.435	0.16372	-1.8291	0.45362
Manufacturing Planning	0.3678	0.27288	7.45781	0.45000
Inventory Management	0.4353	0.45819	3.72881	0.45910
Supplier and Customer Rshp	0.3346	0.52711	2.78899	0.34102
ICT	0.4524	0.56882	2.4588	0.74529

In order to determine if the independent variables affected the dependent variables, a multiple regression model was fitted. The variables notably X_1=Manufacturing Planning, X_2=Inventory Management, X_3=Supplier and Customer Relationship and X_4=Information Communication Technology. The variables affected the dependent variable Y=influence of distribution management. Therefore the multiple regression is used to analyze the relationship that exist between independent variables and the dependent variable.

The following multiple regression model was used to test the significance relationship of independent variables against the dependent variable.

$$Y = B_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i$$

Where:

Y=Performance (Dependent Variable)

B0 = constant of regression

X_1 = Manufacturing Planning (Independent Variable)

X_2 = Inventory Management (Independent Variable)

X_3 =Supplier and Customer Relationship (Independent Variable)

X_4= ICT (Independent Variable)

έ. = error term

Coefficient of determination R square was 97.4% on effective implementation of procurement practices by independent variables set X_1=Manufacturing Planning, X_2=Inventory Management, X_3=Supplier and Customer Relationship and X_4=Information Communication Technology. R square is between 0%-100% with 0% showing none variability, with above 80% R square indicate a good fit.

6. CONCLUTION

From the finding it can be concluded that influence distribution management on performance of pharmaceutical manufacturing firms is determined by Information Communication and Technology as the first crucial factor of consideration with a level significance of 0.06. An increase in ICT will result to an increase in level of distribution management performance by 0.63636. This insinuates that ICT has a positive influence on distribution management. The factor of ICT which are Communication Channel, Information Sharing and Automation have great effect on distribution management performance.

The second important factor is supplier and customer relationship with a significance of 0.547 on effective distribution management. Supplier and customer relationship worked with factors that relate with distribution management effectiveness as; supplier integration, customers integration and organization's competence

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