

Transport Outsourcing and Supply Chain Performance of the Pharmaceutical Industry in Mombasa County

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Abstract- Studies reveal that the total logistics cost of the companies reduced from 44% to 36% as a result of outsourcing logistics services. However, as in business practices, the inefficient and ineffectiveness in logistics management systems together with the inefficient internal management would disable the organization to respond to the needs of customers with the lowest price at the shortest feasible time frame. Hence, the study sought to examine the effects of logistics outsourcing on the supply chain performance of the pharmaceutical industry in Mombasa County, Kenya. Theory of Constraints (ToC), guided the study. The study used descriptive cross-sectional research design targeting 36 pharmaceutical firms comprising 4 local pharmaceutical manufacturing, 11 importing firms, and 21 drug wholesalers and retailers in Mombasa County. From this a sample of 69 pharmaceutical firms were selected using systematic random sampling. The unit of observation were the supply chain managers. Data was collected through questionnaires and data sheets. The study conducted a pilot test on 7 respondents and established reliability and validity of the data collection tool. Both descriptive and inferential statistical methods were used to analyse the data which were then presented in tables and discussed. The study found that that transport outsourcing had a significant association with the improvement of the supply chain performance of the pharmaceutical industry in Mombasa County Kenya. The study, therefore, recommended that pharmaceutical firms need to do more outsourcing of their transport logistics to specialized firms which have better route planning and management systems.

Indexed Terms- Pharmaceutical Firms, Transport Outsourcing

I. INTRODUCTION

Logistics is generally the detailed organization and implementation of a complex operation. In a general business sense, logistics is the management of the flow of items between the point of origin and the point of consumption to meet the requirements of customers or corporations (Minashkina & Happonen, 2020). Logistics entails planning and organizing all movement of said product or service. The aim is to optimize the supply chain in the most cost-effective way, helping companies to build a competitive edge. Managing and securing the movement of goods as well as essential control thereof from supplier to customer has become an ever-increasing need within companies across the globe (Bolumolw, Frankel & Naslund, 2018). Supply chain and logistics management is integral in contributing towards the profitability of any organization. However, with increasing supply chain demand for higher penetration for better integration with the retailers and consumers, logistics outsourcing is rapidly gaining prominence within the supply chain.

Outsourcing means getting advantage of the expertise and structure of an external provider. In recent years outsourcing has become a major factor in organizations' performance and can no longer be ignored (Ishizaka et al., 2019). Outsourcing was not formally identified as a business strategy until 1989 (Säntti, 2023). However, most organizations were not totally self-sufficient, so they outsourced those functions for which they had no competency internally. Outsourcing is, thus, the strategic use of outside resources to perform business functions traditionally managed by internal staff. Firms have sought improved performance by outsourcing activities not considered a core competency of the business. The outsourcing of a number of services ranging from cleaning, logistics, and compound

maintenance among others has become a significant force in global outsourcing trend services.

In several industries, however, outsourcing of logistics activities is not yet common, especially in the pharmaceutical industry (Kithuka, 2023). The pharmaceutical industry is one of the biggest industries, only a small part of the non-core logistics activities is outsourced. In relation to other industries the outsourcing of logistics activities in the pharmaceutical industry is limited. A reduction in supply chain costs provides one of the best means to decrease the costs of goods sold and improve profit margins. This is especially the case in the pharmaceutical sector where Supply Chain costs cover 5% to 15% of total costs of goods sold (Zarbakshnia, Govindan, Kannan & Goh, 2023). In this margin improvement process, the outsourcing of logistics activities within the pharmaceutical supply chain can definitely be a valuable tool to increase supply chain efficiency and to derive a competitive advantage.

As economic globalization speeds up and as modern IT develops rapidly, logistics outsourcing is growing rapidly worldwide, becoming an emerging industry that has revolutionary influence on world economic system. Level of logistics outsourcing development is now a major indicator which measures the competitiveness of a nation or region (Raue & Wieland, 2015). The global third-party logistics (3PL) market which accounts for most logistics outsourcing reached \$75 billion in 2014, and grew to \$157 billion in the US; demand growth for 3PL services in the US (7.4% YoY) outpaced the growth of the US economy in 2014. The global 3PL market is estimated to reach more than USD 1.7 trillion by 2025, registering a CAGR of more than 8% over the forecast period, 2020 - 2025. As of 2014, 80 percent of all Fortune 500 companies and 96 percent of Fortune 100 used some form of 3PL services (Raue & Wieland, 2015).

The World Bank (2020) acknowledged the importance of logistics performance and initiated a study to measure the logistics competitiveness of countries. In the report, the African continent was not performing well in logistics compared to other continents as the report confirmed that the top four countries were from Europe, the fifth one was from Asia however, the bottom five were all from Africa. East African

community comprises of eight countries. These countries include; Kenya, Uganda, Tanzania, Rwanda, Burundi, Ethiopia, Eritrea and Djibouti. There is a tremendous development in terms of logistics and logistics management. East Africa has amongst the highest freight and transport costs in the world - freight logistics costs in East Africa per Km are more than 50% higher than the USA and Europe. These costs seriously erode the competitiveness of goods exported by East African countries and raise the cost of living. Kenya is the biggest maker of pharmaceutical items among COMESA countries controlling 50% of the regions market (Pharmacy and Poisons Board, 2021). An estimate of the Kenyan pharmaceutical market by Business Monitor International (BMI, 2020) showed that expenditure on prescription medicines in 2016 was Ksh 32.3billion which constituted 90.7% of the total market. The drug distribution system in Kenya can be classified into public (government), NGO, and private channels. The private sector is served by distributors (UNIDO, 2012). The forecast of Kenyan market by 2020, is KES136.08bn (USD1.28bn), experiencing a compound-annual growth rate (CAGR) of 13.2% (BMI, 2019).

II. LITERATURE REVIEW

Abdul et al. (2019) study on the impact of logistics management on organizational performance focusing on Dangote Flour Mills PLC, Nigeria as a case study. Descriptive survey research design was used to sample 115 employees of Dangote Flour Mills Ilorin. The study revealed that transportation management affects organizational effectiveness with a R² value of 0.769. The study further found that; transport management has a significant effect on Organizational effectiveness. The need for materials movement along a supply chain puts transport management at the core of logistics which is why organizations must pay proper attention to transport management if they want to record success in logistics management.

Orji, Kusi-Sarpong, Gupta and Okwu (2019) evaluated challenges to implementing eco-innovation for freight logistics sustainability in Nigeria. The study therefore identified the challenges to implementing eco-innovation practices for freight logistics sustainability to aid management to take informed decisions to overcome these challenges before the

environmental burdens become critical. The Best-Worst method is adopted to evaluate and rank these challenges in terms of their relative importance in Nigeria, an emerging economy, which is characterized by increased consumption due to huge population size coupled with government green requirements. The results depict that unavailable funds, lack of clarity on the financial benefits of eco-innovation practices, poor technology infrastructure and reluctant attitude towards eco-innovation practices are the most pressing challenges amongst the challenges faced by Nigeria freight logistics companies.

Owuor and Zaman (2019) examined the influence of logistics outsourcing on performance of large retail firms in Nairobi City County, Kenya. The study adopted a descriptive research design and the targeted 32 large retail companies in Nairobi Central Business, Nairobi County, Kenya. The unit of observation comprised of procurement personnel in the firms. A census was used whereby all the 32 companies were included in the study. A structured questionnaire was used to collect data for the study which was analyzed through mixed-method, where both qualitative and quantitative data were incorporated. The findings were presented in form of figures and tables. The study findings established that transport outsourcing and financial services positively and significantly influence performance of large retail firms in Nairobi County. The study recommended that the management of large retail firms should focus on enhancing transport outsourcing practices since the practice bears a positive and significant influence on performance of the firms. The management can achieve this by having transport outsourcing practices that transfer the risks of transportation operations to the logistics provider, that protects the organization from penalties, a Transport Management Software technology provides the custom data you desire, that increases operational control and that makes sure transportation operations never fall victim to the constantly changing supply chain environment.

Gachui (2020) examined the effect of rail freight transportation on operational performance of logistics firms in Kenya. The study's population was 1,884 logistics firms based in Nairobi and Mombasa. Proportionate stratified random sampling was employed to arrive at a suitable sample size. A

structured questionnaire was employed to gather data. Descriptive statistics and regression were applied to analyze data. The findings implied a significant relationship among the dependent and independent variables applied. Network and infrastructure, travel time, equipment availability, safety/damage and pricing had a statistically positive influence on operational performance. A coefficient of determination R^2 of .694 was obtained, which implied that 69.4% of the total variance of operational performance is justified by the model while 30.6% is justified by exogenous factors. The study proposed the utilization of rail freight transportation by logistics firms and policy formulation which will shift more freight to rail.

Mutangili (2019) carried out a study on the influence of transportation and logistics law on supply chain performance of energy development agencies in Kenya Power and Lighting Company Limited. The article employed a desk study review methodology. Past studies on modes of transportation and the influence of transportation and logistics were critically and thoughtfully analyzed. A critical review of the empirical literature is conducted to identify the main thematic concepts of the paper. From empirical studies, it was established modes of transportation and logistics law are fundamental to the supply chain performance. The study recommended that KPLC should be keen to implement laws and regulations from importation to transportation. Other local key laws and regulations include National Transport and Safety Authority Operation of Commercial Service Vehicles) Regulations, 2018 in order to build and integrate the transport management in the daily operations.

Makworo and Kyalo (2021) investigated the effect of logistic management on distribution performance in footwear manufacturing firms in Kenya. The study deployed descriptive research design. Moreover, the study population consisted of 326 staff in finance, supply chain, sales/distribution and operations departments in the 11 footwear manufacturing companies in Kenya. This study employed a stratified random sampling in order to select 179 staff from the study population. The study utilized primary data which was gathered using self-administered semi-structured questionnaires. In this study, inferential

statistics comprised of Pearson correlation as well as multivariate regression analysis. From the results, the study found that transport management had a significant influence on distribution performance in footwear manufacturing firms in Kenya. The study recommends that footwear manufacturing firms should adopt fleet management system, automated tracking systems and fuel management system to monitor and control firms' vehicle fuel consumption as well as movement of the firms' vehicle.

III. MATERIALS AND METHODS

Descriptive cross-sectional research design was used in this study. This study was cross-sectional in nature since it studied many units at the same time. Descriptive purpose focuses on finding key phenomena in order to identify patterns and trends in a situation with the aim to draw conclusions from the data that are described (Yin 2003). The unit of observation were the supply chain managers in each firm. Therefore, a total of 123 supply chain managers from the firms are targeted in this study. Nassiuma (2000) formula was used to select an appropriate sample size would be 69 firms. The study used structured questionnaire for data collection. Before collecting data, the researcher sent a letter to the sampled pharmaceutical firms seeking permission to carry out the study in their premises. After obtaining permission, the researcher then proceeded to the respondents to whom she also explained the purpose of her visit. The researcher used the computer software Statistical Package for Social Scientists (SPSS) Version 24 for windows to conduct initial data analysis using simple descriptive statistical measures such as, mean, standard deviation and variance to give glimpse of the general trend. However, deeper analysis involving correlation analysis and multiple regression analysis was used to determine the nature of the relationship between variables at a generally accepted conventional significant level of P=0.05 (Sekaran, 2003). Multiple regression analysis was applied to analyze the relationship between a single dependent variable and each of the independent variables respectively (Hair et al., 2005).

IV. FINDINGS AND DISCUSSIONS

This section presents the results of the descriptive statistical analyses of the data and their interpretations. The descriptive statistics helped to develop the basic features of the study and form the basis of virtually every quantitative analysis of the data. The results were presented in terms of the study objectives.

Transport Outsourcing and Supply Chain Performance
 The first objective of the study was determine the influence of transport outsourcing on supply chain performance of the pharmaceutical industry in Mombasa County. This variable was described in terms of; Supply transport, Distribution transport, and Specialized transport. A five-point Likert scale was used to rate responses of this variable and it ranged from; 1=strongly disagree to 5= strongly agree and was analysed on the basis of the mean score and standard deviation. The closer the mean score on each item was to 5, the more the agreement concerning the statement. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest disagreement regarding the statement posed. The findings are presented in Table 1.

Table 1 Transport outsourcing on supply chain performance of pharmaceutical

	Mean	Std. Dev
We have long term arrangements with third-party logistics firms for supply trucks for transportation of supplies to our premises from suppliers	3.88	0.629
We lease supply trucks for our distribution needs to our clients	3.6	0.576
Outsourcing supply trucks is more advantageous to us given our location and limited parking and storage of trucks	3.38	0.774
We have long term arrangements with third-party logistics firms for motorcycles for distributing our supplies to our clients	3.81	0.835
We outsource motorcycles to enable us distribute less bulky supplies to our customers	3.66	0.946

We prefer outsourcing motorcycles for our distribution and then factoring in the costs to our clients	3.83	0.838
We have arrangements with mobile clinics for distribution of our products	3.43	0.764
Mobile clinics enables us to expand our distribution networks	3.57	1.009
Through partnering with mobile clinics, we are able to establish the new demands for our products	3.28	0.834
Aggregate score	3.604	0.801

Table 4.3 shows that the aggregate mean was $M = 3.604$ and $SD = 0.801$, which is high and indicates that the respondents agreed with little variation on the influence of transport outsourcing on supply chain performance of the pharmaceutical industry in Mombasa County. There were indications that most firms have long term arrangements with third-party logistics firms for supply trucks for transportation of supplies to their premises from suppliers (mean = 3.88), and most firms leased supply trucks for their distribution needs to their clients (mean = 3.6). However, fewer respondents agreed that outsourcing supply trucks is more advantageous to us given their location and limited parking and storage of trucks (mean = 3.38).

V. REGRESSION ANALYSIS

Linear regression analysis was used to determine the multiple regression model hypothesized in chapter three held. It was also used to determine how the independent variables influenced the dependent variable. The results are summarized in Table 2.

Table 2: Summary of ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	287.736	4	71.934	8.16597	.000 ^b
Residual	845.664	96	8.809		

Total	1133.4	100			
a. Dependent Variable: supply chain performance					
b. Predictors: (Constant), transport outsourcing, warehousing outsourcing, value-added outsourcing, inventory outsourcing					

Table 2 indicates that the ANOVA (the F-Statistics) measures the overall significance of the model. It provides information levels of variability within the regression model and hence forms a basis for tests of significance. The results confirm that the regression model is significant for the data as captured by the ANOVA (F-statistic) value of 8.16597 and is associated probability value of 0.000 ($F = 8.16597, p < 0.05$) that was found to be significant at 5% significant level.

Table 3: Linear Regression Analysis Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.811 ^a	0.6577	0.600085	2.449197

a. Predictors: (Constant), transport outsourcing, warehousing outsourcing, value-added outsourcing, inventory outsourcing

Table 3 shows that the R^2 value of 0.6577, which implies that 65.6% of changes in performance are explained by the independent variable, transport outsourcing, while 34.4% is explained by the error term. The adjusted R^2 value of 0.600085 shows that 60.0% changes in performance in is explained by the transport outsourcing while the difference, 40.0% is captured by the error term hence showing a model with a good fit at 65.6%. as shown in Table 4.

Table 4: Coefficients regression results

	Unstandardized		Standardized Coefficients	t	Sig.
	Coefficients				
	B	Std. Error	Beta		
(Constant)	14.21	3.759		3.780261	0.0001
Transport Outsourcing	0.563	0.108	0.455	5.213963	0.0000

Table 4 represents the coefficient of regression where interpretation is made at the unassimilated coefficients that depicts the estimated coefficients which show the size or the magnitude of the change and the t-statistics which tests the statistical significance of the individual regression coefficient as compared to the p-value. Therefore, the study reveals that the transport outsourcing Pearson regression coefficient value was found to be 0.563 which shows that a unit increase transport outsourcing on average, increases performance by 0.563 units hence a direct positive correlation between transport outsourcing performance.

The study also observed that the calculated t-value for the relationship transport outsourcing and performance was 5.213963 with an associated p-value of 0.000. since the p-value <0.05 at 5% level of significance, the study concludes that transport outsourcing has a significant positive effect on performance. Hence, the null hypothesis, there is no significant effect between the transport outsourcing and performance, was rejected since $p < 0.05$ and adopted the alternative hypothesis, transport outsourcing has a significant effect on performance in pharmaceutical firms in Mombasa County.

The regression equation for predicting performance from transport outsourcing was $Y = 14.21 + 0.563X$ implying that transport outsourcing has significant negative effect on organisational performance in pharmaceutical firms in Mombasa County ($B = 0.563, p < 0.05$).

CONCLUSION

Based on the results of the study, it can be concluded that that transport outsourcing has a significant association with the improvement of the supply chain performance of the pharmaceutical industry. Supply transport, distribution transport, and specialized transport were all important constructs in the development of transport outsourcing. Developing transport outsourcing along these constructs would lead to higher supply chain performance of the pharmaceutical industry.

RECOMMENDATION

The pharmaceutical firms need to do more outsourcing of their transport logistics to specialized firms which have better route planning and management systems. The firms should partner with transport logistics firms which have multi-modal transportation capabilities

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