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Influence of Inventory Control Techniques on Service Delivery in Parastatals in Kenya: A Case Study of Kenya Medical Supplies Authority

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Abstract: ***The purpose of this project was to establish the influence of inventory control techniques on service delivery in parastatals in Kenya. Particularly Kenya Medical Supplies Authority It was purposively selected due to the fact that the company purchases high volume of expensive goods from the international market which amounts to 44.9% but gains excessive losses due to poor inventory control leading to less than expected performance and service delivery. The broad objective of the study was to establish the influence of inventory control techniques on service delivery in parastatals in Kenya and the specific objectives of the study were: To find out how economic order quantity influence service delivery in parastatals. To examine how period review systems influences service delivery in parastatals. To establish how fixed order systems on influences service delivery in parastatals. To access how material requirement planning influences service delivery in parastatals.In gathering out the data the researcher used a descriptive case study design. This entails the use of structured questionnaire, personal interviews which entailed the aspect of asking questions in a prescribed form and order. The study conducted a multiple regression analysis to determine the relationship between service delivery and the variables of the study. Multiple regression analysis was used to make a prediction of a dependent variable in relation to the independentvariables. The results also indicated that there was a positive and significant correlation between inventory control techniques and service delivery in parastatals. Furthermore, the study indicated that economic order quantity influences service delivery positively. The study recommends mismanaged inventory can lead to an unnecessary increase in the working capital. Effective inventory control techniques would lead to low storage costs, reduction of wastage and obsolescence which will in turn lead to an increase in the company's profits. Hence help satisfy customers by providing them with the products they need in the swiftest manner***

Keywords: Inventory, customers, parastatals, quantity, order.

1. Introduction

1.1 Background of the study

Kenya has only just recently started to embrace inventory control in a serious manner with universities having a an influx of students taking the supply chain management course as this sectoris gaining more and more importance in the market. Inventory control techniques are carried out by people who have specialized in other areas showing that it is taken as a peripheral function. Kenyan firms are facing stiff competition from international firms in the current markets which has led to the need to come up with better methods of managing resources and reducing wastage Ntayi et al., (2009). The main method of doing this is ensuring firms have effective inventory control techniques. A number of companies are now using software that enables them to effectively manage stock; examples include supermarkets such as Nakumatt and Tuskys and uchumi which are at the front line.

In the current scenario when customer satisfaction and service delivery have become a prime reason for a business to stand apart from its completion, the need for effective inventory management is largely seen as more of a necessity than a trend (Laran, 2014). Today, the cost of holding inventory, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets, make the expense of holding large inventories of finished goods excessive (Scott, 2013). The high demand items naturally have safety stock assigned to them, but in many organizations there are so many very-low-demand items that keeping any stock of these items is unreasonably expensive, so they argue that companies must now provide good service while maintaining minimal inventories. Therefore, inventory control approaches are essential aspects of any organization.

1.2 General Objective

The General objective of this study was to find out influence of inventory control techniques on service delivery in parastatals in Kenya.

1.3 Specific Objectives

The specific objectives of the study were:

1) To find out how economic order quantity influence service delivery in parastatals.
2) To examine how periodic review systems influences service delivery in parastatals.
3) To establish how fixed order systems on influences service delivery in parastatals.
4) To access how material requirement planning influences service delivery in parastatals.

2. Materials and Methods

2.1 Research Design

The study adopted a descriptive case study design to justify the relationship between the independent and dependent variables. Kothari (2008) defined a case study as a method used to narrow down a very broad field of research into one easily researchable topic. The design was to help the researcher to obtain information concerning the current status of the problem under study and describe it with respect to the dependent and independent variables. A research design is therefore the strategy for a study and the plan by which the strategy is to be carried out. It specifies

the methods and procedures for the collection, measurement, and analysis of data.

2.2Target Population

According to Allan, (2009) population is a complete set of individuals' cases of objects with some common observable characteristics from whom the researcher gets information. The study targeted one listed firm, Kenya Medical Supplies Authority. The study focused on managerial personnel.

Target population

Level	Population Size	Percentage
Top Management	20	9.1
Middle Level Managers	60	27.3
Lower level Managers	140	63.6
Total	220	100

Source: KEMSA (2017)

2.3 Sampling Frame

According to Mugenda and Mugenda (2008) a sample frame is a set of information used to identify a sample population for statistical treatment. The study will use Mugenda and Mugenda formula to calculate the sample size in each stratum where: n is the sample size nf is the computed sample size for the study. A sample of 140

2.4 Data Collection

The main instrument for data collection was questionnaires. According to Kothari (2014), a questionnaire is a schedule containing various items on which information is sought from respondents. The use of questionnaires was make it easier to approach the respondents since they do not have any distribution bias as they do not show any particular preference or dislike for a certain individual.

According to Kowalczyk (2015), Questionnaires are also free from any interviewer's bias and errors, which may undermine reliability and validity of the results emerging from the survey. The questionnaires also help avoid bias arising from any inhibition in answering questions of personal nature and questions that the respondent may hesitate to answer in the presence of the researcher. The method is also economical and questionnaire helps reduce biasing errors that might have resulted from personal characteristics of the interviewer.

2.5 Data Analysis and Presentation

Questionnaires were checked for completeness and consistency of information at the end of every field, data collection day and before storage. Information from questionnaires were coded and related information grouped together. The coding took into account all the sections of the questionnaire. The data from the completed questionnaires was cleaned, re-coded, and entered into the computer using SPSS for Windows version 20.0 for analysis. Data is presented in percentages, means, standard deviations, and frequencies.

The researcher also conducted a multiple regression analysis to determine the relationship between inventory control techniques and the variables of the study. Multiple regression analysis is used to make a prediction of a dependent variable in relation to the independent variables, and determine the relationship between one dependent variable and one or more independent variables (Hair, 2010).

3. Results and Discussions

3.1 Regression Analysis of economic order quantity on service delivery

Objective 1: To find out how economic quantity influence service delivery in parastatals

H_{01}: Economic order quantity has significant effect on service delivery

To determine the relationship, the model $Y= \beta_0 + \beta_1 EOQ + \varepsilon$ was fitted. The regressionresults were as shown in table 4.12.1.

Table 4.12.1: Regression Results of EOQ on Service Delivery.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.678[a]	0.46	0.455	0.582

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	37.203	1	37.203	109.672	.000[b]
Residual	43.759	129	0.339		
Total	80.962	130			

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.309	0.222		5.887	0
EOQ	0.64	0.061	0.678	10.472	0

The regression results in table 4.12.1 show that the effect of EOQ on service delivery was significant ($F_{(1, 129)} = 109.672$, $p=0.000<0.05$). With $R = 0.678$ and $R^2 = 0.460$, the model implies that about 67.8% of service delivery changes were accounted for by EOQ, while a variation of 46% in service delivery was brought about by EOQ.

The F test was significant with a p value =0.000 which was less than the standard p value of 0.05 and this meant that the model was significant. From ANOVA, since p value p=0.000 and was lower than p=0.05 (p value 0.000<0.05), then the contribution of EOQ to service delivery was significant, and the conclusion is that EOQ has caused service delivery to increase. The equation that was fitted for the model was

$$SD = 1.309 + 0.64EOQ$$

The coefficient for EOQ (β) was also significant (β = 0.64, t = 10.472, p = 0.000<0.05) indicating that EOQ increased service delivery by about 0.64 units. Since p-value =0.000< 0.05, the null hypothesis was rejected and concluded that

there was a statistically significant relationship between EOQ and service delivery.

3.2 Regression Analysis of periodic review systems on service delivery

The study sought to establish the magnitude and direction of how periodic review system influence service delivery in parastatals using the following objective 2 and hypothesis that is stated below.

Objective 2: To examine how periodic review system influence service delivery in parastatals
H_{02}: Periodic review system influences service delivery in parastatals

To determine the relationship, the model $Y= \beta_0 + \beta_2 PRS+ \varepsilon$ was fitted. The regression results were as shown in table 4.12.2.

Table 4.12.2: Regression Results of periodic review system on Service Delivery

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.695[a]	0.483	0.479	0.570

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	39.098	1	39.098	120.480	.000[b]
Residual	41.863	129	0.325		
Total	80.962	130			

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.959	.243		3.941	.000
Periodic review system	0.737	.067	0.695	10.976	.000

The regression results in table 4.12.2 show that the effect of periodic review system on service delivery was significant (F (1, 129) =120.48, p=0.000<0.05). With R =0.695 and R^2 = 0.483, the model implies that about 69.5% of service delivery changes were accounted for by periodic review system, while a variation of 48.3% in service delivery was brought about by periodic review system.

The F test was significant with a p value =0.000 which was less than the standard p value of 0.05 and this meant that the model was significant. From ANOVA, since p value p=0.000 and was lower than p=0.05 (p value 0.000<0.05), then the contribution of periodic review system to service delivery was significant, and the conclusion is that periodic review system has caused service delivery to increase. The equation that was fitted for the model was

$$SD = 0.959 + 0.737PRS$$

The coefficient for periodic review system (β) was also significant (β = 0.737, t = 10.976, p = 0.000<0.05) indicating that periodic review system increased service delivery by about 0.737 units. Since p-value =0.000< 0.05, the null hypothesis was rejected and concluded that there was a statistically significant relationship between periodic review system and service delivery.

3.3 Regression of fixed order system on service delivery

The study sought to establish the magnitude and direction of the fixed order systems influence on service delivery using the following objective 3 and hypothesis that is stated below.

Objective 3: To establish how fixed order systems influences service delivery in parastatals
H_{03}: fixed order system influences service delivery in parastatals

To determine the relationship, the model $Y= \beta_0 + \beta_3 FS+ \varepsilon$ was fitted. The regression results were as shown in table 4.12.3

Table 4.12.1: Regression Results of fixed order system on Service Delivery.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.529[a]	0.280	0.275	0.672

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	22.682	1	22.682	50.206	.000[b]
Residual	58.280	129	0.452		
Total	80.962	130			

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.632	.280		5.820	.000
Fixed order systems	0.536	.076	0.529	7.086	.000

The regression results in table 4.12.3 show that the effect of fixed order systems on service delivery was significant (F (1, 129) =50.206, p=0.000<0.05). With R =0.529 and R^2 = 0.280, the model implies that about 52.9% of service delivery changes were accounted for by fixed order systems, while a variation of 28% in service delivery was brought about by fixed order systems.

The F test was significant with a p value =0.000 which was less than the standard p value of 0.05 and this meant that the model was significant. From ANOVA, since p value p=0.000 and was lower than p=0.05 (p value 0.000<0.05), then the contribution of fixed order systems to service delivery was significant, and the conclusion is that fixed order systems has caused service delivery to increase. The equation that was fitted for the model was

$$SD = 1.632 + 0.536FS$$

The coefficient for fixed order systems (β) was also significant (β = 0.536, t = 7.086, p = 0.000<0.05) indicating that fixed order systems increased service delivery by about 0.536 units. Since p-value =0.000< 0.05, the null hypothesis was rejected and concluded that there was a statistically

significant relationship between fixed order systems and service delivery.

3.4 Regression of material requirement planning on service delivery

The study sought to establish the magnitude and direction of the effect of material requirements planning on service delivery using the following objective 4 and hypothesis that is stated below.

Objective 4: To access how material requirement planning influence service delivery

H_{04}: material requirement planning influences service delivery in parastatals

To determine the relationship, the model $Y= \beta_0 + \beta_4 MRP+ \varepsilon$ was fitted. The regression results were as shown in table 4.12.4.

Table 4.12.4: Regression Results of material requirement planning on Service Delivery.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.604[a]	.365	0.360	0.631

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.523	1	29.523	74.038	.000[b]
Residual	51.439	129	0.399		
Total	80.962	130			

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.696	.225		7.528	.000
Fixed order systems	0.543	.063	0.604	8.605	.000

The regression results in table 4.12.4 show that the effect of material requirements planning on service delivery was significant (F (1, 129) =74.038, p=0.000<0.05). With R =0.604 and R^2 = 0.365, the model implies that about 60.4% of service delivery changes were accounted for by material requirements planning , while a variation of 36.5% in service delivery was brought about by material requirements planning.

The F test was significant with a p value =0.000 which was less than the standard p value of 0.05 and this meant that the model was significant. From ANOVA, since p value p=0.000 and was lower than p=0.05 (p value 0.000<0.05), then the contribution of material requirements planning to service delivery was significant, and the conclusion is that material requirements planning has caused service delivery to increase. The equation that was fitted for the model was

$$SD = 1.696 + 0.543MRP$$

The coefficient for material requirements planning (β) was also significant (β = 0.543, t = 8.605, p = 0.000<0.05) indicating that material requirements planning increased service delivery by about 0.543 units. Since p-value =0.000< 0.05, the null hypothesis was rejected and concluded that there was a statistically significant relationship between material requirements planning and service delivery.

3.5 Results of multivariate regression

The study sought to establish the magnitude and direction of the effect of EOQ, periodic review system, fixed order system and material requirements planning on service delivery using the following objective 5 and hypothesis that is stated below.

Objective 5: To examine the joint effect of EOQ, periodic review system, fixed order system and material requirements planning on service delivery.

H_{05}: EOQ, periodic review system, fixed order system and material requirements planning do not have significant effect on financial performance

To determine the relationship, the model $Y= \beta_0 + \beta_1 EOQ+ \beta_2 PRS+ \beta_3 FS+\beta_4 MRP+ \varepsilon$ was fitted. The regression results were as shown in table 4.12.5.

Table 4.12.1: Regression Results of independent variables on Service Delivery

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.766[a]	.587	.574	.515

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	47.508	4	11.877	44.734	.000[b]
Residual	33.454	126	.266		
Total	80.962	130			

Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.535	.247		2.167	.032
EOQ	.313	.076	0.332	4.098	.000
Periodic review system	.42	.087	.379	4.612	.000
Fixed order systems	.004	.090	-.004	-.044	.965
Material requirements planning	.150	.085	.167	1.765	.080

The regression results in table 4.12.5 show that the effect of EOQ, periodic review system, fixed order system and material requirements planning on service delivery was significant (F (4, 126) = 44.734, p=0.000<0.05). With R =0.766 and R^2= 0.587, the model implies that about 76.6% of service delivery were contributed by EOQ, periodic review system, fixed order system and material requirements planning while a variation of 58.7% in service delivery were brought about by EOQ, periodic review system, fixed order system and material requirements planning. The F test was significant with a p value =0.000 which was less than the standard p value of 0.05 and this meant that the model was

significant. From ANOVA, since p value p=0.000 and was lower than p=0.05 (p value 0.00<0.05), then the contribution of EOQ, periodic review system, fixed order system and material requirements planning on service delivery was significant. The equation that was fitted for the model was

$$SD = 0.535 + 0.313EOQ + 0.402PRS + 0.0.004FS + 0.150MRP$$

4. Conclusions

From the researcher objectives and the research questions the underlying objectives of the study were achieved. The researcher would be wrong to portray KEMSA as an organization that has completely failed in inventory control therefore leading to low turnover hence poor service delivery. The organization has managed to stay afloat for many years due to efforts in control their inventory efficiently but has lacked to embrace changes in the way it controls its inventory. Even though a lot has been done to ensure organizational service delivery improves in the organization, inventory control still remains an area of concern due to high losses in terms of obsolescence and wastage, under or even over stocking, due poor embrace of technology and staff incompetency. From the data collected 80% of the respondents indicated there is room improve the Inventory control techniques and therefore enhance better organizational service delivery. It is right to conclude that Inventory control techniques does indeed directly affect an organization's service delivery. This can be supported by Dimitrios (2008) who found that the higher a firms level of inventory the lower its rates of return.

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