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Original Research Article

Examining the Influence of Physical Material Distribution on Service Delivery at the British Army Training Unit, Nanyuki, Kenya

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Abstract

The purpose of this study was to examine the influence of physical material distribution on service delivery at the British Army Training Unit, Nanyuki, Kenya. This study was pegged on the human systems dynamics and the institutional theory. A descriptive research design was adopted to analyze the effect of materials management on service delivery. The target population was 535, from which a sample of 229 respondents was used to obtain information. A stratified random sampling technique was used to ensure that there are no biases in the selection of the respondents. The respondents were divided into two strata; the industrial and non-industrial employees. Data was collected using a questionnaire, which contained open and closed-ended questions. The validity and reliability of the questionnaire was tested using content validity and Cronbach's Alpha, respectively. A pilot study was undertaken at the Kahawa Barracks. The data collected was analyzed using SPSS software. Descriptive statistics enabled the researcher to present data in a meaningful way, while inferential statistics helped to deduce meaning to the findings. A regression analysis was conducted to test the hypothesis presented in the study. Presentation of the findings was done with tables and graphs. On the effect of physical material distribution, the study found out that there is a strong transportation system in the organization, however; no regulations had been put in place to select the transportation modes also the study uncovered that the organization had made sufficient investments for warehousing infrastructure. In addition, physical material distribution was found to have a positive correlation with service delivery (r= 0.319; p= 0.000). There was a demonstration that a statistically significant relationship exists between physical material distribution and service delivery at BATUK. The study recommended that a similar study should be conducted in other organizations in the public and private sectors in Kenya.

Keywords: Materials management, purchasing, materials distribution, service delivery.

INTRODUCTION

The British Army Training Unit Kenya (BATUK), is a permanent military training support unit based mainly in Nanyuki – Laikipia County Kenya which is approximately 200 km north of Nairobi and with a small element in Kahawa Barracks. The organisation's mission is to deliver training combined arms light roles and forces in order to support the preparation for readiness and commitment [1]. It consists of 100 permanent staff and another 280 reinforcing short tour personnel. The Kenya-Britain relations dates back to the British –colonial control 1876 during the scramble for Africa. Under the current Defence Cooperation Agreement signed by the two countries in 2017, the Kenyan Government has permitted the British Army to use its land for training. Up to six infantry, battalions per year carry out exercises in Kenya [1].

There are also other units, which carry out civil engineering projects, and medical deployments, which provide primary health care assistance to the civilian community. Laikipia and Samburu Counties are the ideal places where the British Military conduct their training as these locations offer suitable climate conditions and the terrain best for military exercises. The cooperation has necessitated the British Army to offer Kenyan soldiers more training opportunities, both in Britain and with UK forces stationed in BATUK Nanyuki. They also participate in joint exercises with the British Army, who support the country's fight against Al Shabaab, including the deployment of British personnel to Somalia, and are involved in anti-terrorism training for Kenyan police and border guards. British Army troops also help prevent poaching of endangered species such as rhinos and elephants and are said to contribute £58 million to the Kenyan economy each

year more so through the employment of locals in both short and long term contracts [1].

According to Todaro and Smith [2], development is improving the quality of human lives in all aspects affecting individuals, organizations, communities and societies as a whole. Organizational development, as presented by Odor [3], is a planned process which focuses on improving and maintaining the health of an organization as a total system through activities performed by managers, employees and helpers of the organization. These activities include materials management, among others. Jeruto and Richu [4] assert that all organizations require materials in order to operate. Veritably, they point out that materials are the heart and lifeblood of any system in an organization, which ensures that the organization operates well in delivering its services. This is because materials are among the four basic resources of any business or industrial activity. The other three resources are manpower, equipment, and capital.

Sustainable Development Goal 12 focuses on sustained production and consumption, which emphasizes on minimized wastage in industries and organizations. When the right proportions of materials and manpower are available in the organization, then the production activity of goods and services becomes efficient. Meeting the needs of the customer while at the same time achieving the organization's objectives requires a continuous production schedule; which is made possible through having the correct material and human resource inventory [5].

Materials management, according to Nkechi [6], is a scientific technique which deals with the flow of materials from the initial purchase point to their destination. This is very useful in management as it helps to get the right supply quality and quantity at the right time and at the right cost. This ensures that organizations achieve and improve efficiency. In this manner, organizational development is achieved. Vrat [7] insists that materials management is an encompassing philosophy, which maximizes the material productivity that is used in a system to ensure that goods and services are delivered as they should.

Materials management involves the planning, organization and control of material flow from their initial purchase to the point of service through distribution [8]. According to Vrat [7], materials constitute a high proportion of the total goods and services which can be more than half of the cost of conducting business. This is as a result of its scope, which includes purchasing of materials, bought-out components, indirect materials, work in progress and the finished services and goods.

Materials management is a function that is found in different organizations. At the British Army Training Unit in Kenya (BATUK), materials management is a function that is found in the organization's system. At the British Army Training Unit in Kenya (BATUK), the materials management function is seen as a formality in the organizational system and cannot be compared to other functions such as the financial function, which is applied strictly. The organization presupposes materials management to be a function of the purchasing department, which is routine in nature. The materials management function is interconnected to the various departments of the organization, which warrants smooth operations of the entire organization. However, the materials management function is bottom-rung, which means that there are hurdles in achieving the service delivery function, and ultimately, organizational development is altered. Moreover, the materials management process at BATUK is set by the United Kingdom's Ministry of Defense (UK MOD). UK MOD is quite bureaucratic, making the nature of the materials management system to be inflexible with a red-tape approach to the materials management process. This study, therefore, sought to fill in the identified existing knowledge gap through establishing the effects of materials management on service delivery at the British Army Training Unit in Kenya (BATUK).

LITERATURE REVIEW

Physical Material Distribution

Physical material distribution refers to the management of the factors that affect how materials flow from the perspective of customers so as to achieve high delivery reliability, completeness and short delivery time [7]. This includes movement that surrounds the planning, implementation, and controlling the flow and storage of goods as finished goods so as to meet the requirements of customers [9].

Under physical distribution, there is need to understand the channels of distribution. Arnold *et al*., [8] contend that the transaction and distribution channels are the two main related channels in physical distribution. Transaction channel involves negotiation, selling and contracting, which mainly occurs in offices such as the sales offices or with the retailers. The distribution channel involves delivering services and goods to the end-users, which includes warehousing and local deliveries. Mukolwe and Wanyoike [10] opine that physical material distribution is a whole process that is concerned with materials management through an intense process until goods and services are delivered to the ultimate consumer. The goals of physical material distribution include customer satisfaction, ensuring cost efficiency and enhanced output levels. The goals lead to improved service delivery.

System dynamics are often applied to physical material distribution, which supports management throughout the life of a system to ensure efficient

utilization of resources. Physical material distribution ensures that materials are planned for, implemented and controlled so as to achieve efficient material flow so as to meet required service delivery [11]. In the distribution of materials, transportation is important to ensure goods move from one origin to the desired destination. The system in the physical material distribution is made possible when goods are transported, creating time and place utilities [8].

The flow of materials involves transportation, whereby goods are moved from one place to another. Inventory has to be stored, which mostly happens in warehouses. Warehouse management decides on how materials will be received, stored and retrieved. Warehouses help to improve service delivery as they provide place utility which places goods close to end-users [8]. In the warehouses, the organization has to decide how materials are handled in their movement. Materials should be handled with care to ensure that they preserve the quantity that should be delivered to the end-users.

Service Delivery

The main aim of service delivery is to meet the expectations of customers. A company will endeavour to satisfy customers with the goods and services it provides. Services to the organization should be delivered at the required speed, which determines if service delivery is good or bad [12]. When delivery is delayed, the service delivery is also poor; and when the delivery of services is fast, then service delivery is satisfactory. Effective delivery focuses on control and management of uncertainty that may occur in the flow of materials. It is, therefore, necessary for managers to develop the best strategy to ensure that services are delivered in a manner that results in customer satisfaction.

Customer satisfaction measures the extent to which customer expectations have been met in terms of goods and service provision [13]. As an abstract concept, customer satisfaction centres on the quality and price of goods and services, which leads to desired service delivery? In order to improve service delivery, it is important for the service providers to ensure that they have capacity, skills and knowledge to achieve set objectives [11]. This is supported by Ghoumrassi and Țigu [13] who cite that skills and knowledge are probably the most important aspects in ensuring that efficient and effective service delivery.

RESULTS

Effect of physical material distribution on service delivery at BATUK

As indicated by the third research objective, this study sought to examine the influence of physical material distribution on service delivery at BATUK. Physical material distribution was assessed in terms of transportations, warehousing and material handling. The responses were recorded as shown in Table-1.

Table-1: Physical Material Distribution

Question	Yes	No	N
In your opinion, is the material transportation system in the organization strong?	58.8%	41.2%	100%
Are there regulations put in place to select the transportation modes?	47.1%	52.9%	100%
Have sufficient investments been made for warehousing infrastructure in the organization?	53.5%	46.5%	100%
Does effective logistics management reduce the cost of material handling?	43.9%	56.1%	100%
Are storage areas far from working area?	32.1%	67.9%	100%

The results indicate that the respondents were asked whether the material transportation system in the organization is strong; 58.8 % of the respondents said yes, while 41.2% said no. On whether there are regulations that have been put in place to select the transportation modes, 52.9% of the respondents said no, while 47.1% of the respondents said yes. As opined by Arnold *et al.*, [8] there have to be clear channels of transportation which ensure that goods and services are delivered just in time as and when they are needed.

In addition, the respondents were asked if there have been sufficient investments made for warehousing infrastructure in the organization, 53.5% of the respondents agreed that the investments on warehousing infrastructure are sufficient while 46.5% did not agree. As implied by Mukolwe and Wanyoike [10], warehousing and transport management improve the efficiency of operations, which also improves the organization's service delivery.

On whether effective logistics management reduces the cost of material handling, 56.1% of the respondents disagreed. There was a feeling that there was ineffectiveness in the way materials are handled. As indicated by a respondent;

> *'The logistics management process at BATUK is not as effective as I would like it to be, and this leads to losses of materials and generally, poor performance in some sectors of the organization. This ineffectiveness in logistics management does not reduce the cost of handling materials; in fact, it increases the costs due to the losses experienced'* (Research data, Respondent 9, 2019).

Backing this finding is the study by Zaha [9], which found out that theft of materials occurs during

the process of delivery to production and this can affect the delivery of services. The loss of materials can be due to reasons such as poor supervision. On the other hand, 43.9% of the respondents agreed that effective logistics management reduces the cost of material handling since a few people are used for deliveries and this helps to increase organizational performance and furthers the development of the organization. Finally, the respondents were asked whether the storage areas are far from the working area, and 32.1% said yes, while 67.9% said no.

Service Delivery

For this study, the dependent variable was service delivery, and the respondents were presented with questions on the same. The responses are recorded in Table-2.

Table-2: Service Delivery

Question	Yes	No	N
Does loss of materials affect service delivery?	82.4%	17.6%	100%
Does automation of materials management systems improve the levels of service delivery?	90.9%	9.1%	100%
Do materials delivered as per schedule affect service delivery?	40.1%	59.9%	100%
Does clear communication help to achieve proper service delivery?	93.6%	6.4%	100%
Do skills in material management help to enhance service delivery?	90.9%	9.1%	100%

The results show that when the respondents were asked whether the loss of materials affects service delivery, 82.4% said yes and the reason for this was that the respondents believed that when there are no materials, then service delivery is poor. The output of the organization is affected, and this affects the overall functioning of the organization. On the other hand, 17.6% of the respondents said that loss of materials does not affect service delivery.

The study also sought to find out if automation of materials management systems improves the levels of service delivery and a majority of the respondents with 90.9% said that it did since automation makes work faster, more accurate and reduces material loss. Additionally, the respondents indicated that automation helped to reduce paperwork, which also saves resources for the organization; as indicated by one of the respondents;

> *'The use of technology and automation of services helps in service delivery since the delivery is faster, more accurate and also reduces paperwork. In my thinking, it is quite important for the organization as time and cost resources are saved making work more effective and efficient.'* (Research data, Respondent 86, 2019)

For those who disagreed that automation of materials management systems improves the levels of service delivery (9.1%) said their disagreement was from a sceptic point as the organization had tried the automation process before and it failed. Therefore, they did not see the need of automation that also, in the end, renders some employees redundant and they eventually get fired; thereby increasing the pool of unemployment in the country. According to PWC [12], automation of operations in the organization affects the performance as it enhances the service delivery levels while at the same time, reducing operational costs. There also minimizes inventory wastage.

Asked whether the materials delivered as per schedule affect service delivery, 40.1% of the respondents said yes, and 59.9% of the respondents said no. According to Ibegbulem and Okorie [5], organizations can meet the needs of the customers and improve service delivery when there is a continuous production schedule. This schedule has to be followed, and material delivery should continuously follow the delivery plan. The respondents were also asked whether clear communication help to achieve proper service delivery and 93.6% said that it did, while 6.4% said that communication did not help to achieve proper service delivery. Finally, the respondents were asked whether skills in material management help to enhance service delivery; 90.9 % of the respondents indicated yes, while 9.1% indicated no. Similar findings are presented by Ghoumrassi and Țigu [13], who found out that skills are knowledge of employees is important in ensuring the management of materials, which leads to better and improved service delivery.

Diagnostic Tests for Regression Model

The assumptions tests for models of multiple-regression, which include normality and multicollinearity tests, were conducted and presented as follows;

Normality Test

The normality test was conducted so as to ensure normal distribution of service delivery (dependent variable) in the population of study and also to ensure that the mean scores of the independent variables are normally distributed [14]. Figure-2 shows the fitting of a histogram and normal curve therein. A normally distributed data has a mean and standard deviation of 0 and 1, respectively [15]. Based on this, then the data for this study is normally distributed.

Dependent variable: Service Delivery

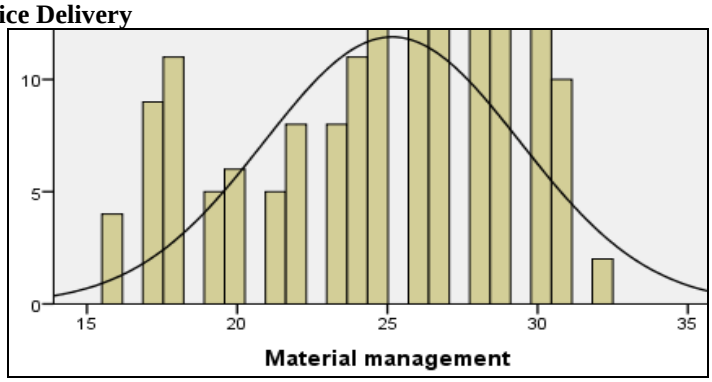

Fig-2: Normality Distribution Histogram

Multicollinearity Test

After the data normality in the regression model was met, the study sought to determine if a similarity exists between the study's independent variable, which can result in a very strong correlation, which can affect the decision-making process on the effects of material management on service delivery. The results of the multicollinearity test are shown in Table-3.

Table-3: Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	Material Requirement Planning	.732	1.367
	Inventory Control	.518	1.929
	Physical Material Distribution	.622	1.607
a. Dependent Variable: Service Delivery			

Table-3 shows that the multicollinearity test was conducted using the tolerance and Variance Inflation Factor (VIF). As indicated, the tolerance values range from between 0.6 to 0.7, while the VIF values range from between 1.3 and 1.9. According to Fox [15], a model shows the absence of multicollinearity when the tolerance value is less than 1, and the VIF value is between 1-10. In that case, then the linear model for this study does not have multicollinearity; therefore, the independent variables are not highly correlated.

Correlation Analysis

The inferential analysis that was conducted for this study focused on correlation analysis to establish the relationship between materials management and service delivery. The correlation results are indicated in Table-4.

Table-4: Correlation Table

		Material Requirement Planning	**Inventory control**	**Physical material distribution**	**Service delivery**
Material Requirement Planning	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	187			
Inventory control	Pearson Correlation	.517**	1		
	Sig. (2-tailed)	.000			
	N	187	187		
Physical material distribution	Pearson Correlation	.346**	.614**	1	
	Sig. (2-tailed)	.000	.000		
	N	187	187	187	
Service delivery	Pearson Correlation	.062	.270**	.319**	1
	Sig. (2-tailed)	.396	.000	.000	
	N	187	187	187	187
**. Correlation is significant at the 0.01 level (2-tailed).					

As indicated in Table-4, this study adopted the Pearson correlation coefficient analysis to establish the relationship between the independent and the dependent variables. According toYockey [14], the Pearson correlation measures the linear relationship between two or more study variables in terms of their degree of linear relationship. The established relationship degree can be positive or negative. From Table-4, the study found out that physical material distribution is positively correlated with service delivery (r= 0.319; p= 0.000). Potocan [16] also asserts that there is a positive relationship that exists between physical material distribution and service delivery.

Regression Analysis

This study also used inferential statistics for regression analysis to establish the effect of materials management on service delivery at BATUK. The results of the regression analysis helped to make deductions on the model and the relationship between the study variables.

To understand, the effect of material management on service delivery, a regression model was fitted to make inferences. In this study, the model used was $Y= \beta_0 +\beta_1x_1+ \beta_2x_2 + \beta_3x_3+ \varepsilon$. The model summary results are shown in Table-5.

Table-5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.346[a]	.120	.106	.94817
a. Predictors: (Constant), Physical material distribution, Material Requirement Planning, Inventory control				

The model summary shown in Table-5, shows that 12% of service delivery was predicted by material requirement planning, inventory control and physical material distribution. This did not in any way; provide a formal test of hypothesis to understand the relationship between the independent and dependent variables of the study.

Therefore, an Analysis of Variance (ANOVA) was tested, and the results recorded in Table-6.

Table-6: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.432	3	7.477	8.317	.000[b]
	Residual	164.520	183	.899		
	Total	186.952	186			
a. Dependent Variable: Service delivery						
b. Predictors: (Constant), Physical material distribution, Material Requirement Planning, Inventory control						

The ANOVA test was mainly conducted to establish the significance of the overall regression. In other words, the ANOVA tested whether the regression model, while including all predictors, significantly predicts service delivery. As shown in Table 6, the p-value was less than 0.05, which implies that with the inclusion of all predictors, the regression model significantly predicts service delivery. Therefore, the relationship between service delivery and materials management is significant. Having established the significance of the regression model, the study sought to test the individual predictors for significance. The results were recorded in Table-7.

Table-7: Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.583	.438		10.456	.000
	Material Req. Planning	-.052	.037	-.115	-1.418	.158
	Inventory control	.112	.062	.175	1.818	.071
	Physical material distribution	.170	.059	.251	2.854	.005

Table-7 shows that a unit change in physical material distribution increases service delivery (β=0.170, p=0.005) when all factors are held constant. The P-value ($p<0.05$) indicates that there is a statistically significant relationship between physical material distribution and service delivery at BATUK. Based on this study's hypothesis (H_{01}) that there is no significant relationship between physical material distribution and service delivery at BATUK, this study, therefore, rejects the null hypothesis. This finding agrees with Tshamaano [11] who purports that physical material distribution ensures that materials are planned for, implemented and controlled so as to achieve efficient material flow so as to meet required service delivery. Therefore, there is a relationship between physical material distribution and service delivery.

CONCLUSION AND RECOMMENDATIONS

This study found that physical material distribution has a positive correlation with service delivery (r= 0.319; p= 0.000). There was a demonstration that a statistically significant relationship exists between physical material distribution and service delivery at BATUK.

This study found out that automation of materials management systems improves the levels of service delivery. It also reduces paperwork, which in turn saves resources for the organization. This study also found out that materials are not delivered as per the schedule, and it affects service delivery. This schedule has to be followed, and material delivery should continuously follow the delivery plan. This study demonstrated that communication and skills in material management help to enhance service delivery. This study recommends that forecasting in the organization should focus on inventory control to ensure that there is improvement of service delivery. The inventory cost management process should be streamlined to ensure cost efficiencies in the organization. The organization should provide training, skills and knowledge on materials management in the organization; specifically, on material requirement planning, tracking inventory control, and logistics management. On physical material distribution, this study also recommends that BATUK should consider ways of reducing loss of materials, which affects service delivery. This calls for effective logistics management to be put in place.

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