FACTORS INFLUENCING PERFORMANCE OF HUMANITARIAN LOGISTICS IN LAMU COUNTY: A CASE STUDY OF THE KENYA RED CROSS

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ABSTRACT

The main objective of this study was to investigate the factors influencing humanitarian logistics performance in Lamu County. The geographical scope of the study was Kenya Red Cross Society in Lamu County. The study employed descriptive research design and it was quantitative in nature. The target population was derived from the entire staff of Kenya Red Cross Society and volunteers which were 57 respondents. Both primary and secondary data was collected where primary data was collected by use of semi-structured questionnaires and secondary data collected from already existing materials. The data collected was analysed, summarized and tabulated by use of SPSS Version 25 statistical tool. Descriptive statistics and inferential statistics were used to summarize the results for each of the main objective of the study. The study results established that the red cross staff were well trained to handle logistic issues and the society engages only those staffs who possess required skills to handle logistic function. The study results showed that the warehouse handling equipment were adequate and that the layout of the humanitarian warehouse was well designed. The study concluded that the humanitarian organization conducts budgeting for the humanitarian relief needed in a given period of time. The budgeting is made possible by demand forecasting which in most cases is uncertain. The study concluded that the humanitarian organization coordinates with other stakeholders while planning for humanitarian logistics and this planning is addressed by the available budget and resources. The study concluded that the humanitarian organizations receive and sends timely information which is of high quality to assist in humanitarian decision making. The warehouses should be manned by experienced logistics staff who would optimize storage capacity of the warehouse. The handling equipment should be tailor made for the warehouses to ensure swift response to humanitarian disasters. The humanitarian organizations should establish a framework to enable coordination with the stakeholders during humanitarian response planning. The researcher recommended that the humanitarian organizations should have an information systems to integrate interfunctional information flow. These information systems should have the capability to communite with external entities in real time and should be effective and reliable.

Key Words: Warehousing Capacity, Planning, Logistics Personnel Competence, Logistics Information Systems

INTRODUCTION

Globally, nearly 207 million people had been affected by a natural disaster in 2013, and 296,800 of them have lost their lives and about $109 billion destruction in assets was registered worldwide (Sahay, Gupta, & Menon, 2016). Further, over the past two years, 700 natural disasters were registered worldwide affecting more than 450 million people, according to a new IMF study. During the 2000s, the number of people affected was nearly three times higher than during the 1990s (Lehrer, 2015). This is due to both population growth and the rise in the number of disasters. The World Bank reports that the risk of death, destruction, and suffering has increased due to accelerated changes in demographic and economic trends (Kreimer & Munasinghe, 2016). The vast majority of those affected by emergencies and natural disasters live in developing countries. This severity of the problem caused by both natural and man-made disaster seems call for sustainable humanitarian aid services and relief operations.

The constant increase of natural disasters is putting pressure on the governments and humanitarian aid organizations to develop adequate tools that ensure an efficient disaster response (Lehrer, 2015). In the beginning of the third millennium, catastrophes like the Indian Ocean tsunami or the Sichuan earthquake in China drew attention to the world's changing environment. In 2010, an earthquake destroyed large parts of Haiti, leaving behind devastation and chaos. Only a few months later, Pakistan faced a disastrous flood (Beamon, 2016). A major challenge for the humanitarian organizations is to establish a supply chain within the shortest time possible. Logistics therefore is a key success factor for the disaster response. It serves as a link between disaster preparedness and immediate response and it is central for the effectiveness of major humanitarian programs such as food, water, health and sanitation (Lehrer, 2015).

Even though Africa has food deficit it has several characteristics which constrain the delivery of food relief. Distances are long, roads and railways are of poor quality and of insufficient length to reach the desired areas. In such instances the WFP has made special provisions to pay for up to half the cost of internal transport, storage and handling of food aid in the least developed countries (WFP in Africa, 2016). Despite such commitments governments of some recipient countries still find it difficult to meet the remainder of the costs, bringing the financial burden back to WFP. Since 2008, Namibia has experienced recurrent floods and droughts that have affected 60% of the population in seven northern regions

In Kenya there are several humanitarian organizations that currently operate in the country. According to Barcelo, Massaud and Davies (2016), there are many situations that warrant humanitarian response. There are basically four types of humanitarian organizations operating in Kenya. The first category includes government sponsored humanitarian organizations such as the Kenya Red Cross Society (KRCS). The second category of humanitarian organizations is those that are privately sponsored and are registered as NGOs with the NGO council like Oxfam, Save the Children, MSF et cetera. The third category of humanitarian organizations are those run and funded by religious groups
such as churches and mosques and the last category of humanitarian organizations is the ones affiliated with the UNO such as UNICEF, UNDP, WHO and UNHCR (Coipuram, 2015).

In Lamu County conflict between herders and farmers is often experienced in many parts of the county (Kazungu, 2017). This is a threat to peaceful coexistence among communities in the region. The situation escalates when there is drought and when it starts raining. Earlier this year, floods swept away homes for more than 50 families as heavy rains pounded the region. Ishakani village was the worst affected because 36 houses were destroyed. The Kenya Red Cross helped families relocate to other parts of Lamu, such as Kiunga (Praxides, 2019). It provided assistance after conducting an assessment of the situation. The affected families lost their food

and property to the floods. Displacements of families often happen whenever there are rains (Praxides, 2019). As a result, the government encouraged people living in areas prone to floods to move to safer areas to avert a disaster.

According to the Ministry of Health Disease Outbreak situation report published in March 2018, Lamu County reported cases of a measles outbreak. The onset of rainfall also results in flash floods in the county. The increased flash flooding often renders the road network impassable. The heavy rains destroy infrastructure, thus affecting many households. This delays movement and transportation of essential supplies since transporters must look for alternative means of transport, thus taking longer to reach their destination (UNICEF Kenya, 2018). Dispatch of emergency supplies to the affected areas may be derailed. Therefore, there are several factors that affect transportation in Lamu County. Terrorist organizations such as Al Shabaab have also perpetrated attacks in the county. There were a series of tourist kidnappings in the coastal town of Lamu between 2010 and 2011, prompting the government of Kenya to deploy security forces into Somalia. However, the number and scale of insecurity incidents in the County were on the rise after the Kenyan government deployed military forces in Somalia (Human Rights Watch, 2015).

Kenya Red Cross Society (KRCS) was established through an act of parliament in 1965. It operated as the BRCS between 1939 and 1965. The organization has been recognized by ICRC and other international bodies since 1966 (www. Krcs.co.ke). The Kenya Red Cross has a support supply chain management unit whose main function is to manage the procurement functions of the agency. Its role is to offer quality services to customers by facilitating the delivery of various goods, works, and essential services for the agency's operations. This role is critical in emergency situations where lives may be at risk. The transportation of KRCS staff and relief goods to various parts of the country is centrally coordinated by using KRCS vehicles. The logistics and warehousing unit is managed at both headquarters and across the eight regions across the country (Kenya Red Cross Cooperation Agreement Strategy 2018). These are used for the storage of KRCS goods from development partners. The warehouses store relief supplies from government and donor agencies.

Logistics at the Kenya Red Cross Society (KRCS) includes procurement, warehousing, and delivery of relief foods, medical supplies, and water. Distribution of supplies is by land, sea, and air. Sometimes, the railway is used to transport supplies from the port of Mombasa. There are challenges associated with this kind of work. For instance, the infrastructure can slow the logistical operations of the Red Cross (ICRC, 2018). The distances involved are enormous, and trucks may take days before reaching their intended destination. Sometimes a bridge may be washed away, thus preventing access to a region. Additionally, the loading of relief supplies on trucks is done manually. Some of the supplies include foodstuffs, beddings, water equipment, and agricultural tools (ICRC, 2018). The supplies are bulky and difficult to load on trucks. Despite various challenges, the KRCS is committed to working with communities and intervening in health and social services.

Statement of the Problem

The ultimate goal of humanitarian relief logistics is to deliver the right supplies in the right quantities to the right locations at the right time, so save lives and reduce human suffering within given financial constraints (Beamon & Balcik, 2016). There has been pressure on humanitarian organizations to respond to emergencies in organized, timely, effective and appropriate manner. A large body of research evidence has revealed that the humanitarian logistics has faced certain challenges which may need serious attention of stakeholders. In Lamu County, slow offloading of supplies and limited availability of trucks hinder timely dispatch of newly arrived humanitarian supplies which in turn affects humanitarian logistics performance

(KRCS, 2018). Poor road networks and distance have reduced food and medicine trucking access to some drought- stricken areas in Lamu (KRCS, 2018), as a result locals in much of remote areas of Lamu has continued to experience humanitarian crisis that result from severe food insecurity and sporadic attacks from al-shabaab militia.

Global studies have been done on humanitarian logistics. For instance, Kovacs and Spens (2017) did a study on the challenges in humanitarian logistics of Ghana and established that lack of transport infrastructure and warehouse affect the performance of humanitarian logistics. Similarly, a study by Kunz and Reiner (2016) identified four external factors affecting the performance of humanitarian logistics, namely, environmental situational factors, governmental situational factors, socio-economic situational factors, and infrastructural situational factors. However, the authors did not study the predictive effect of those factors on the performance of humanitarian logistics.

Locally, Anyadike (2016) carried out a study on supply chain management practices and its impact on performance among humanitarian organizations in Kenya and concluded that maintaining good supplier relation, effective and efficient internal operations and use of technology to speed up humanitarian work affects performance of humanitarian organizations in Kenya. Nyamu (2017) carried out a study on impact of supply chain management challenges on humanitarian organizations in Kenya and found out that poor information integration and uncertainty in demand affects performance of humanitarian organizations in Kenya. Nonetheless, very few studies have been conducted on the state of humanitarian logistics in Lamu County. Despite various studies having been carried out on humanitarian logistics, there is no fairly recent and sufficient study that examined the factors which significantly influence performance of humanitarian logistics in Lamu County. Therefore, this study investigated the factors influencing humanitarian logistics performance in Lamu County.

Objectives of the Study

The general objective of the study was to examine factors influencing humanitarian logistics performance in Lamu County. The study's specific objectives were;

- To determine the influence of warehousing capacity on humanitarian logistics performance in Lamu County.
- To establish the influence of logistics planning on humanitarian logistics performance in Lamu County.
- To determine the influence of logistics personnel competence on humanitarian logistics performance in Lamu County.
- To establish the influence of information systems on humanitarian logistics performance in Lamu county.

The study was guided by the following research hypotheses;

- H_01: There is no significant influence of warehousing capacity on humanitarian logistics performance in Lamu County.
- H_02: There is no significant influence of logistics planning on humanitarian logistics performance in Lamu County.
- H_03: There is no significant influence of logistics personnel competence on humanitarian logistics performance in Lamu County.
- H_04: There is no significant influence of information systems on humanitarian logistics performance in Lamu County.

LITERATURE REVIEW

The DeLone and McLean Models: The proponents of the models are William Delone and Ephraim McLean in 1992. The information systems success model (alternatively IS success model or Delone and McLean IS success model) is an information systems (IS) theory which seeks to provide a comprehensive understanding of IS success by identifying, describing, and explaining the relationships among six of the most critical dimensions of success along which information systems are commonly evaluated. The IS success model has been cited in thousands of scientific

papers, and is considered to be one of the most influential theories in contemporary information systems research.

Resource Dependency Theory: The proponent of the resource dependence theory is Pfeffer and Salancik in 1978. They engineered this theory with the purpose of expounding exactly how resources in the periphery could deliver merchandise in areas that are operationalized affected. The theory assumption is that there is a connection between those who are buying and those who are selling which largely improves the interrelationship that have been stimulated by exchange of puffed resources as well as having difficult opportunities come up (Sandebon, 2015). The main discussion is that organizations and companies relied on merchandise that have to be brought upon from different organizational environment.

Relational Exchange Theory: The proponent of the theory is Morgan and Hunt in the early 90s. The theory explains the competitive advantage as well as enhanced performances as it focuses on dyads and networks of organizations as its unit of analysis. According to this theory, sharing of knowledge is critical for the success of an organization. Dunn and Craighead (2015) noted that relational competencies could boost supply chain resilience. In essence, this goes a long way into boosting the performance of the logistics of any organization. This theory's focus on the dyads and networks of organizations is critical as it compares with a focus on the organizational variables that have to work to enhance the organization's competitive advantage. Logistics is closely linked to supply chain operations. In the supply chain, there are various elements that have to be linked, and thus the system can be understood better using the relational exchange theory. This theory relates well to the humanitarian personnel competence and how it is critical to the delivery of humanitarian aid. The theory supports logistics personnel competence variable.

Warehousing capacity
- Warehouse size
- Staffing at the warehouse
- Warehouse layout

Logistics planning
- Budgeting
- Forecasting
- Coordination

Logistics personnel competence
- Experience
- Skills
- Training

Information Systems
- Information quality
- Real time response
- Information integration

Logistics performance
- Responsive
- Reliable
- Timely
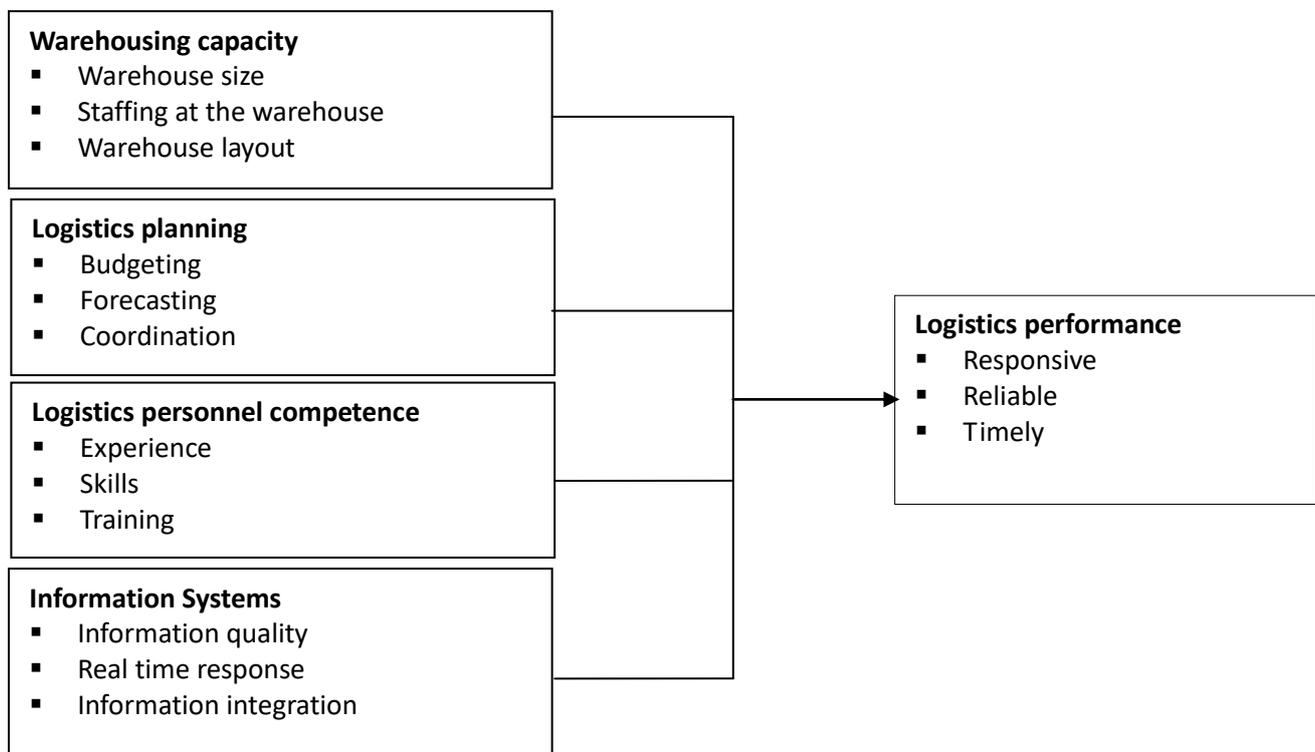
Independent Variables   **Dependent Variable**

Figure 1: The Conceptual Framework

Review of Literature

Warehousing Capacity: Warehousing is a critical element when it comes to the performance of the logistics department in any organization. A warehouse can be defined as a facility within the supply chain that is critical in product consolidation, and it is aimed at lowering transportation costs. It also aims to realize the economies of scale in manufacturing or purchasing processes (Bartholdi & Hackman, 2014). Warehousing can also be described as those activities that ensure that the systematic storage of goods for easy retrieval (Mukolwe & Wanyoike, 2015). Warehouses can be regarded as distribution or production centers. They play a critical role in logistics as they enhance various functionalities such as receiving, accumulating and sorting, order picking, replenishment, and shipping, among others. In warehousing, the size of the warehouses, the layout of the warehouses, and the staffing at the warehouse are critical elements that will determine the performance of the logistics in humanitarian delivery.

Logistics Planning: The supply network is huge and complicated with numerous players (donors, NGOs, government, military, and suppliers), and it is hard to coordinate all of them along with all the items that need to be delivered. Disasters place extraordinary stress on the logistics of responding organizations (Lehrer, 2015). Coordination can reduce and manage the stress. The systematic use of policy instruments to deliver humanitarian assistance in a cohesive and effective manner. Such instruments include: strategic planning, gathering data and managing information, mobilizing resources and assuring accountability, orchestrating a functional division of labor in the field; negotiating and maintaining a serviceable framework with host political authorities; and providing leadership (Minear, 2016).

Logistics Personnel Competence: Competences of staff and staff skills have been found to influence the efficiency of logistics performance in different industries. Christopher, Peck and Towill (2016) found that organization that had their employees trained on logistic and supply chain management were found to be efficient in management of their supply chain and had competitive advantage over their rival in the industry. Logistics has become more prominent and is recognized as a critical factor in competitive advantage for any organization. Lack of readily trained and experienced field logisticians has a harmful impact on the delivery of relief support.

Information Systems: Information systems play a significant role in managing complex processes (LeBlanc, 2014). During a disaster, communication is as important as food and water. A disaster can damage telecommunication infrastructure. If an event happens in a densely populated area, thousands of people can try to make calls at the same time overloading the system. Humanitarian supplies need robust equipment that can be set up and dismantled quickly enabling them to be extremely adaptable and prepared for the unexpected as circumstance scan change very quickly from one moment to the next. Unfortunately, logisticians in this sector often have to work with fragmented technology and poorly defined manual processes (Lehrer, 2015). There are greater issues of safety as they may be operating in a politically volatile climate

Humanitarian Logistics Performance: Humanitarian logisticians use more indicators that may not necessarily apply to commercial and military logistics operations. Examples are given as follows: Appeal Coverage: This indicator is comprised of two specific metrics: percent of appeal coverage and percent of items delivered. The first metric is the quantity of items that have been pledged by donors out of the total number of items requested for the operation (Barselo, Mssaud, & Davies, 2016). This indicates how well and how quickly the organization is finding pledges for the requested items. The second metric is the percentage of items that have actually been delivered on-site out of the total number of items requested for the operation. Together, these two metrics indicate how well the

organization is meeting its appeal for an operation in terms of both finding donors and delivering items.

Empirical Review

Tayyab and Norma (2016) conducted a study on a model for sustainable warehousing in Sydney. The study objective was to investigate the green gas emissions in warehouse operations. The study concluded that initiatives to achieve objectives of sustainable development are not in conflict with economic benefits. As such, societal and ecological improvements can be seen to result in both short-term and long-term profitability.

Leiras (2015) focused on the trends and challenges in reviewing the literature on humanitarian logistics. They used both qualitative and quantitative content analysis in their study. In this method, they reviewed past literature related to humanitarian logistics and detailed and updated it. Thereafter, they developed seven classification criteria that were added to the previous ones to enhance the literature analysis. The researchers found the existence of literature gaps and the need for further research.

Apte, Gonçalves, and Yoho (2016) explored the capabilities of the military as well as non-military organizations that are engaged in humanitarian operations. The researchers aimed to build on the existing literature with regard to the core competencies of the corporation. The concept of ability was expanded to identify, cultivate, and exploit the core capabilities of humanitarian organizations that yearned to be efficient and effective in their response to disasters. The study established the competencies and capabilities that are critical to the United States military and non-military organizations engaging in humanitarian assistance.

Kunz and Reiner (2016) focused on identifying factors affecting humanitarian logistics. The two researchers used the content analysis method, whereby they analyzed different published studies to make conclusions for their study. They found that

there was very little research on humanitarian logistics, especially focusing on the reconstruction phase after a disaster. The researchers advocated for future studies to be conducted where the case study and survey methodologies should be employed to give an empirical knowledge on factors affecting humanitarian logistics.

A study Shafiq and Soratana (2018) aimed at establishing areas that needed enhancements in Humanitarian Organizations Logistics and Supply Chain Management systems. They used content analysis where they categorized various literatures on the topic of interest and noted the gaps in the existing studies. They found that most of the existing studies focused on the effectiveness while overlooking the efficiency in Humanitarian Organizations Logistics and Supply Chain Management systems. Most of the studies reviewed, established as (94%), were based on qualitative research and came up with unproven theoretical frameworks (Shafiq & Soratana, 2018).

In his study on the use of case studies in humanitarian logistics research, Vega (2018) was eager to establish the best framework in conducting research in humanitarian logistics. In his study, he classified and drew a comparison of the use of case studies in researches on humanitarian logistics. He also considered criteria developed from the methodology literature, where he considered aspects such as purpose, type, and volume of data, as well as the type of analysis. He concluded that the case study methodologies lacked the rigor in the analysis as would be demanded in humanitarian logistics studies.

Mohamed (2015) also investigated the subject of humanitarian logistics in Kenya and identified some of the challenges as a lack of financial resources, disaster uncertainty, and transport of bulky material. He demonstrated that transportation and communication infrastructure could impede the delivery of relief aid. For instance, a disaster may damage the infrastructure of a locality to the extent that the delivery of aid is severely hampered. Furthermore, the communication infrastructure of

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the affected areas cannot handle the sudden increases of refugees, aid workers, and security personnel. The distribution channels may also suffer due to a lack of warehouses, equipment, and communication facilities.

METHODOLOGY

The study used a descriptive research design. The target population in this study included Kenya Red Cross staff and Volunteers in Lamu County. According to Kenya Red Cross HR report (2019) there were 57 staff and volunteers. The study targeted all employees and volunteers working with Kenya Red Cross in Lamu County. The sampling frame for this study consisted of all employees and volunteers working with Kenya Red Cross in Lamu County. Stratified random sampling was used to select the study sample size. Primary data was collected using structured questionnaire. The researcher collected secondary data from Kenya Red Cross logistics reports, past empirical studies and journals. The data collected was coded and analyzed using the Statistical Package for Social Sciences (SPSS version 25) tool. Both descriptive analysis and inferential analysis were generated. The regression analysis was guided by the following model:

$$Y = \beta_\Theta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Humanitarian logistics performance

$B\Theta$ = constant term

$\beta_1, \beta_2, \beta_3$ and β_4 are the coefficient function of the independent variables,

X_1 = Warehousing capacity

X_2 = Logistics planning

X_3 = Logistics personnel competence

X_4 = Information Systems

ε is the error term

FINDINGS

Descriptive Analysis

This study carried out the following descriptive statistics; mean, standard deviation of all the study variables.

Warehousing Capacity

The first objective of the study was to establish the extent to which warehousing capacity influences humanitarian logistics. The respondents were required to do this on a 5 point Likert scale where 1 represented strongly disagree while 5 represented strongly agree. The respondents were required to indicate the extent to which they agree or disagree with the statements. The results are displayed in Table 1.

Table 1: Warehouse Capacity

	N	Mean	Std. Deviation
The current warehouse capacity size is sufficient	50	4.65	.817
The warehouse has adequate warehouse staffing	50	3.77	.469
The warehouse handling equipment are adequate	50	4.82	.710
The layout of the warehouse is well designed	50	4.88	.635
Overall Mean	**50**	**4.53**	**.658**

From Table 1 it was observed that respondents agreed to the statement that the current warehouse capacity size is sufficient for storing humanitarian supplies as shown by a mean of 4.65 and standard deviation of 0.817. The respondents agreed to the statement that the warehouse has adequate warehouse staffing as shown by a mean of 3.77 and a standard deviation of 0.469. Also the respondents agreed to the statement that the warehouse

handling equipment is adequate as indicated by a Mean of 4.82 and Std. deviation of 710. The respondents agreed to the statement that the layout of the warehouse is well designed as indicated by a mean of 4.88 with a standard deviation of 0.635. The overall mean for warehouse capacity was mean=4.53 and standard deviation of 0.658 implying that the warehouse capacity had an effect on humanitarian logistics to a large extent.

The findings agree with Said and El-Rayes, (2016) who observed that the available sufficient warehouse space enables the storage of large inventory deliveries which results in lower ordering costs, effective utilization of delivery trucks and minimize stock-out risks.

Logistics Planning

Table 2: Logistics Planning

	N	Mean	Std. Deviation
The red cross society budgets for the needed humanitarian relief	50	4.16	.719
The red cross society forecasts the demand for humanitarian relief	50	4.58	.806
The agency coordinates with other stakeholders while planning for logistics	50	4.87	.611
The red cross society planning is influenced by the budget available	50	4.29	.328
Overall Mean	**50**	**4.48**	**.616**

From the findings in Table 2, respondents agreed to the statement that the Red Cross society budgets for the needed humanitarian relief as indicated by a mean of 4.16 and standard deviation of 0.719. The respondents agreed to the statement that the Red Cross society forecasts the demand for humanitarian relief as shown by a mean of 4.58 and a standard deviation of 0.806. Further, the respondents agreed to the statement that the agency coordinates with other stakeholders while planning for logistics as indicated by a mean of 4.87 with a standard deviation of 0.611. Finally, respondents agreed to the statement that the Red Cross society planning is influenced by the budget available as indicated by a mean of 4.29 and standard deviation of 0.328. The overall mean for

The second objective of the study sought to establish the influence of logistics planning on logistics performance. Data was collected through the Likert-scale measuring the level of agreement of the respondents with respect to the given aspects of logistics planning. The results were as presented in Table 2.

logistics planning was mean=4.48 and standard deviation of 0.616 implying that the logistics planning had a large effect on humanitarian logistics. The study findings contradicted an observation by Pettit and Beresford, (2016) that disasters are unique even if they occur in the exact same location, since other factors such as population structure or economic conditions could have changed since the previous occurrence. Hence, historical data is not always very useful for predicting future demand.

Logistics Personnel Competence

The third objective of the study sought to determine the influence of logistics personnel competence on logistics performance. The results are presented in Table 3.

Table 3: Logistics Personnel Competence

	N	Mean	Std. Deviation
The red cross staff are well trained to handle logistic issues	50	4.98	.856
The society engages those staff who have required skills to handle logistic function	50	4.10	.678
The logistics personnel in red cross society are well experienced	50	4.21	.665
The society offer in-house training to its staff	50	4.88	.332
Overall Mean	**50**	**4.54**	**.633**

The results in Table 3 showed that respondents agreed to the statement that the red cross staff are

well trained to handle logistic issues as indicated by a mean of 4.98 with a standard deviation of 0.856.

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Further respondents agreed to the statement that the Red Cross society engages those staff who have required skills to handle logistic function as indicated by a mean of 4.10 with a standard deviation of 0.678. Respondents agreed to the statement that the logistics personnel in the Red Cross society are well experienced as indicated by a mean of 4.21 and standard deviation of 0.665. Finally, respondents agreed to the statement that the Red Cross society offer in-house training to its staff as shown by a mean of 4.88 and standard deviation 0.332. The overall mean for logistics personnel competence was mean=4.54 and standard deviation of 0.633 implying that the logistics personnel competence had a large effect on humanitarian logistics. The findings corroborate results of a study by Christopher, Peck and Towill (2016) who found that organization that had their employees trained on logistic and supply chain management were found to be efficient in management of their supply chain and had competitive advantage over their rival in the industry.

Information Systems

The fourth objective sought to investigate the influence of information systems on logistics performance. The results are on means and standard deviation presenting the level of agreement of the respondents on the given aspects of information systems. The results are as presented in Table 4.

Table 4: Information Systems

	N	Mean	Std. Deviation
The society integrated all the information flow to improve efficiency	50	4.63	.517
The society gets and sends quality information for decision making	50	4.64	.895
Information systems used by the society provide real time responses	50	3.88	1.008
The society has implemented logistics information systems	50	4.68	.484
Overall Mean	**50**	**4.46**	**0.726**

Results in Table 4 showed that respondents agreed to the statement that the red cross society has integrated all the information flow to improve efficiency as indicated by a mean of 4.63 and standard deviation of 0.517. The findings also showed that respondents agreed to the statement that the society gets and sends quality information for decision making as shown by a mean of 4.64 and std. deviation of 0.895. Also respondents agreed to the statement that the information systems used by the society provide real time responses (Mean = 3.88 and std. dev. = 1.008). Finally respondents agreed to the statement that the Red Cross society has implemented logistics information systems (Mean = 4.68; std. dev. = .484). The overall mean for logistics information systems was mean=4.46 and standard deviation of 0.726 implying that logistics information systems had an effect on humanitarian logistics to a large extent. The results agree with Lehrer (2015) who posits that humanitarian supplies need robust equipment that can be set up and dismantled quickly enabling them to be extremely adaptable and prepared for the unexpected as circumstance scan change very quickly from one moment to the next.

Humanitarian Logistics Performance

The descriptive results on logistics performance are as presented in Table 5.

Table 5: Logistics performance

	N	Mean	Std. Deviation
Humanitarian logistics is responsive	50	4.63	.817
There is timely delivery of humanitarian assistance	50	3.58	.895
The humanitarian logistics is reliable	50	3.06	.707
Overall Mean	**50**	**3.756**	**0.806**

Results in Table 5 showed that respondents agreed to the statement that humanitarian logistics is responsive as indicated by a mean of 4.63 and standard deviation of 0.817. The findings also showed that respondents agreed to the statement that there is timely delivery of humanitarian assistance (Mean = 3.58; std. dev. = .895). Finally, respondents were indifferent to the statement that the humanitarian logistics is reliable (Mean = 3.06; std. dev. = .707). The overall mean for humanitarian logistics performance was mean=3.756 and standard deviation of 0.806 implying that the respondents agreed to the statements to the moderate extent.

Correlation Analysis

The researcher further sought to establish the bivariate correlation between the variables, that is, between the study variables. The results are shown in Table 6.

Table 6: Correlation coefficient

		Warehousing capacity	Logistics planning	Personnel competence	Information systems	Logistics performance
Warehousing capacity	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	50				
Logistics planning	Pearson Correlation	.361**	1			
	Sig. (2-tailed)	.000				
	N	50	50			
Personnel competence	Pearson Correlation	.205**	.519**	1		
	Sig. (2-tailed)	.000	.000			
	N	50	50	50		
Information systems	Pearson Correlation	.409**	.627**	.325**	1	
	Sig. (2-tailed)	.078	.000	.021		
	N	50	50	50	50	
Logistics performance	Pearson Correlation	.417**	.572**	.459**	.517	1
	Sig. (2-tailed)	.020	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation results in Table 6 indicated that the correlation between warehousing capacity and performance of humanitarian logistics was positive and significant as shown by r=0.417, P=0.020). Also the correlation results showed a moderate, positive correlation between logistics planning and performance of humanitarian logistics (r=0.572, P=0.000). The correlation results between logistics personnel competence and performance of humanitarian logistics was positive and significant (r=0.459, P=0.000). Finally, the correlation results between information systems and performance of humanitarian logistics established a positive and significant relationship (r=0.517, P=0.000).

Regression Analysis

Regression analysis is a statistical tool for the investigation of the relationship between variables.

Usually, researcher seeks to maintain the causal effect of one variable upon another. The regression results were shown in the following subsections.

Model Summary

Model summary results are presented in Table 7.

Table 7: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.723a	.523	.512	1.093

a. Predictors: (Constant), Warehousing capacity, Logistics planning, Logistics personnel competence, Information systems

The model summary results in Table 7 showed a moderate regression between the factors influencing logistics performance. In the model summary, the R^2 is 0.523 indicates that independent variables (warehousing capacity, logistics planning, logistics personnel competence and information systems) explain 52.3 per cent variation in logistics performance of humanitarian logistics, while the remaining 47.7% are un-modelled determinants.

Analysis of Variance

Analysis of variance was employed to test the overall significance of the regression model. The results are presented in Table 8.

Table 8: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	629.061	4	157.265	12.360	.000b
	Residual	572.539	45	12.723		
	Total	1201.600	49			

a. Dependent Variable: Humanitarian logistics performance
b. Predictors: (Constant), Warehousing capacity, Logistics planning, logistics personnel competence, information systems

Table 8 provided the results on the analysis of the variance (ANOVA). The results indicated that the overall model was statistically significant as supported by a p value of 0.000 which is lesser than the critical p value of 0.05. Further, the results imply that the independent variables are good predictors of performance of humanitarian logistics. This was supported by an F statistic of 12.360 and the reported p value 0.000 which was less than the conventional probability of 0.05 significance level.

Multiple Regression Coefficients

The multiple regression coefficients results are provided in the Table 9.

Table 9: Regression Coefficients

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	8.950	2.717		3.294	.000
Warehousing capacity	.401	.186	.269	2.155	.042
Logistics planning	.549	.265	.314	2.072	.000
Personnel competence	.437	.199	.278	2.195	.021
Information systems	.496	.201	.297	2.467	.016

a. Dependent Variable: Humanitarian logistics performance

$Y = 8.950 + 0.401X_1 + 0.549X_2 + 0.437X_3 + 0.496X_4$

The regression equation has shown that taking all factors constant at zero, logistics performance of factors constant at zero, logistics performance of humanitarian logistics would be 8.950. From the regression coefficients results it can be noted that the independent variables have a probability of 0.05

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and below which implies that the coefficients are statistically significant.

Regression analysis conducted proved that there was a positively significant influence of warehousing capacity on the performance of humanitarian logistics as indicated by the values $\beta_1 = 0.401$, t = 2.155, p<0.05. The study concludes that an increase in warehousing capacity by one unit would lead to an increase in performance of humanitarian logistics by 0.401 units. Regression analysis result showed a positively significant influence of logistics planning and performance of humanitarian logistics as indicated by the values $\beta_2 = 0.549$, t = 2.072, p<0.05. The study concludes that an increase in logistics planning by one unit would lead to increase in humanitarian logistics performance by 0.549 units.

On logistics personnel competence, regression analysis conducted showed that there was positive significant influence of logistics personnel competence on the dependent variable as indicated by the values $\beta_3 = 0.437$, t = 2.195, p<0.05. The study concludes that an increase in logistics personnel competence by one unit would lead to increase in performance of humanitarian logistics by 0.437 units. Regression analysis conducted showed that there was positive significant influence of information systems on performance of humanitarian logistics as indicated by the values $\beta_4 = 0.496$, t = 2.467, p<0.05. The study concludes that an increase in information systems by one unit would lead to increase in performance of humanitarian logistics by 0.496 units. The results agree with Lehrer (2015) who posits that humanitarian supplies need robust equipment that can be set up and dismantled quickly enabling them to be extremely adaptable and prepared for the unexpected as circumstance scan change very quickly from one moment to the next.

Hypotheses Testing

From the regression model computed, the research hypotheses were tested using the significance level of the coefficients. The research aimed to test the hypothesis with an aim of failing to reject or rejecting the relationship between independent and the dependent variables. The research hypothesis for the study included;

H$_0$1: Warehousing capacity has no significant influence on performance of humanitarian logistics.

The warehousing capacity was shown to have a positive and significant influence on logistics performance as indicated by t-value of 2.155 and a p-value of 0.042 at 95% level of significance which is less than 0.05. The significance level was used as a benchmark to accept or fail to accept null hypothesis. From the regression results on warehousing capacity, the p-value is 0.042 which is less than 0.05, hence the null hypothesis that warehousing capacity has no significant influence on performance of humanitarian logistics was rejected.

H$_0$2: Logistics planning has no significant influence on performance of humanitarian logistics.

The logistics planning variable indicated a positive and significant influence on logistics performance as shown by t-value of 2.072 and a p-value of 0.000 at 95% level of significance which is less than 0.05. The significance level was used as a benchmark to accept or fail to accept null hypothesis. From the regression results on logistics planning, the p-value is 0.000 which is less than 0.05, hence the null hypothesis that logistics planning has no significant influence on performance of humanitarian logistics was rejected.

H$_0$3: Logistics personnel competence has no significant influence on performance of humanitarian logistics.

The logistics personnel competence had a positive and significant influence on logistics performance as indicated by t-value of 2.195 and a p-value of 0.021 at 95% level of significance which is less than 0.05. The significance level was used as a benchmark to accept or fail to accept null hypothesis. From the regression results on logistics personnel competence, the p-value is 0.021 which is less than 0.05, hence the null hypothesis that logistics

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personnel competence has no significant influence on logistics performance was rejected.

H₀4: Information system has no significant influence on performance of humanitarian logistics.

The variable, information systems had a positive and significant influence on logistics performance as indicated by t-value of 2.467 and a p-value of 0.016 at 95% level of significance which is less than 0.05. The significance level was used as a benchmark to accept or fail to accept null hypothesis. From the regression results on information systems, the p-value is 0.016 which is less than 0.05, hence the null hypothesis that information system has no significant influence on logistics performance was rejected.

Discussion of Major Findings

Regression analysis formed a basis for answering research questions adopted in this study. This was done by considering the p values corresponding to each variable of interest. The first objective of the study sought to investigate the influence of warehousing capacity on performance of humanitarian logistics. Regression analysis conducted proved that there was a positively significant influence of warehousing capacity on the performance of humanitarian logistics as indicated by the values $\beta_1 = 0.401$, t = 2.155, p<0.05. The study concludes that an increase in warehousing capacity by one unit would lead to an increase in performance of humanitarian logistics by 0.401 units. The findings agree with Said and El-Rayes, (2016) who observed that the available sufficient warehouse space enables the storage of large inventory deliveries which results in lower ordering costs, effective utilization of delivery trucks and minimize stock-out risks.

The second objective was to establish the influence of logistics planning on performance of humanitarian logistics. Regression analysis result showed a positively significant influence of logistics planning and performance of humanitarian logistics as indicated by the values $\beta_2 = 0.549$, t = 2.072, p<0.05. The study concludes that an increase in

logistics planning by one unit would lead to increase in humanitarian logistics performance by 0.549 units. The study findings contradicted an observation by Pettit and Beresford, (2016) that disasters are unique even if they occur in the exact same location, since other factors such as population structure or economic conditions could have changed since the previous occurrence. Hence, historical data is not always very useful for predicting future demand.

The study sought to establish the influence of logistics personnel competence on performance of humanitarian logistics. Regression analysis conducted showed that there was positive significant influence of logistics personnel competence on the dependent variable as indicated by the values $\beta_3 = 0.437$, t = 2.195, p<0.05. The study concludes that an increase in logistics personnel competence by one unit would lead to increase in performance of humanitarian logistics by 0.437 units. The findings corroborate results of a study by Christopher, Peck and Towill (2016) who found that organization that had their employees trained on logistic and supply chain management were found to be efficient in management of their supply chain and had competitive advantage over their rival in the industry.

Finally, the study sought to investigate the influence of information system on performance of humanitarian logistics. Regression analysis conducted showed that there was positive significant influence of information systems on performance of humanitarian logistics as indicated by the values $\beta_4 = 0.496$, t = 2.467, p<0.05. The study concludes that an increase in information systems by one unit would lead to increase in performance of humanitarian logistics by 0.496 units. The results agree with Lehrer (2015) who posits that humanitarian supplies need robust equipment that can be set up and dismantled quickly enabling them to be extremely adaptable and prepared for the unexpected as circumstance scan change very quickly from one moment to the next.

Table 10: Hypotheses test results

Hypotheses	Standardized beta	t-test	P-value	Decision
Warehouse capacity has no significant influence on humanitarian logistics performance	0.401	2.155	0.042	Reject H_01
Logistics planning has no significant influence on humanitarian logistics performance	0.549	2.072	0.000	Reject H_02
Logistics personnel competence has no significant influence on humanitarian logistics performance	0.437	2.195	0.021	Reject H_03
Information system has no significant influence on humanitarian logistics performance	0.496	2.467	0.016	Reject H_04

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that the humanitarian warehouse capacity size is sufficient for storing humanitarian supplies for a given period of time. The study concludes that the warehouse staffing is adequate for a given need and the warehouse handling equipment are adequate and reliable. The study concludes that the layout of humanitarian warehouses is well designed factoring all the weather conditions of the area.

The study concluded that the humanitarian organization conducts budgeting for the humanitarian relief needed in a given period of time. The budgeting is made possible by demand forecasting which in most cases is uncertain. The study concludes that the humanitarian organization coordinates with other stakeholders while planning for humanitarian logistics and this planning is addressed by the available budget and resources.

The study concluded that the humanitarian organization boasts of well trained personnel to handle logistic issues. The humanitarian organization engages those individuals with required skills and experience to handle logistics function. The study concludes that many employees handling logistics in the organization have considerable experience in humanitarian logistics and to ensure consistency the organization carried out in-house trainings on its staff.

The study concluded that the humanitarian organizations have integrated information flow with all functions and stations to ensure efficiency in humanitarian logistics. The study concludes that the humanitarian organizations receive and sends timely information which is of high quality to assist in humanitarian decision making. The humanitarian organizations have invested in reliable and quality information systems which are used to provide real time responses to humanitarian needs.

The researcher recommended that the humanitarian organizations and specifically Kenya Red Cross management should build temporary warehouses in areas which are prone to humanitarian disasters to ensure swift response to humanitarian crises. The warehouses should be manned by experienced logistics staff who would optimize storage capacity of the warehouse. The handling equipment should be tailor made for the warehouses to ensure swift response to humanitarian disasters.

The researcher recommended that the humanitarian organizations management should budget for the human relief expected to be needed in the next six months. This would ensure adequate planning for the uncertainties since humanitarian disasters cannot be forecast with certainty. However, in coming up with the budget a bit of forecasting based on the historical data is

paramount to ensure the society is not caught off-guard. The humanitarian organizations should establish a framework to enable coordination with the stakeholders during humanitarian response planning.

The researcher recommended that the humanitarian organizations should employ staff with adequate training in disaster response and logistics handling. Since these organizations operate in uncertain environment the experience of the staff on these dynamics will determine the success of the disaster response. The humanitarian organization should design effective training programs and ensure periodic in-house training on its employees regardless of their prior experience and skills. This would educate and develop employees in contemporary issues in humanitarian logistics.

The researcher recommended that the humanitarian organizations should have information systems to integrate interfunctional information flow. These information systems should have the capability to communite with external entities in real time and should be effective and reliable. The information systems should have the capability to

withstand huge traffic flow and should be able to predict trends using historical data. This would improve decision making by the management of the humanitarian organizations.

Areas of Further Study

This study was limited to factors that influence performance of humanitarian logistics. However, since only 52.3% of results were explained by the independent variables in this study, the researcher recommends that a study be carried out on other factors that may influence performance of humanitarian logistics.

Secondly, the study focused on humanitarian organizations in Lamu County hence other studies should be carried out in other areas of the country which are frequented by humanitarian organizations like North Eastern and Turkana to compare the study findings. The future researchers should also investigate how these factors used in the current study would influence government disaster response in Kenya.

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