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LOGISTICAL FACTORS INFLUENCING DISASTER RESPONSIVENESS OF HUMANITARIAN ORGANIZATIONS IN KENYA (CASE OF KENYA RED CROSS SOCIETY)

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Abstract

Purpose: The purpose of this study was to explore the logistical factors that influence the responsiveness of humanitarian organizations in Kenya. The specific objective was to determine how infrastructure, funding, warehousing and coordination influenced the responsiveness of humanitarian organization in Kenya.

Methodology: The researcher selected case study approach with a focus on Kenya Red Cross Society (KRCS). KRCS was selected because it is the largest humanitarian organization in Kenya and has presence across the country. The target population was 329 employees of the Kenya Red Cross Society based in Nairobi and who ware directly connected to logistics. Stratified random sampling technique was used to select a sample of 60 respondents. The study used descriptive research design and chose questionnaire as the tool for data collection. The study was based on a conceptual framework hence descriptive statistical data analysis was ideal. Collected data was analyzed using descriptive and inferential statistics.

Results: The study found that KRCS depended on donor funding and delay in funding impacted on disaster responsiveness. Road infrastructure affected logistics but this was beyond the control of humanitarian organizations. Another key finding of this study demonstrated that many organizations in disaster area worked independently without coordinating with each. Owing to the fact that humanitarian organizations have no control on infrastructure the study recommended that these organizations invest in equipment that will help them perform even with poor road infrastructure. Concerning reliance on donor funding the study found that KRCS was investing in commercial ventures that would guarantee a steady revenue stream. The researcher contents with this thinking and encourages more such investment.

Unique contribution to theory, practice and policy: The study recommends that there should be better coordination among the various stakeholders to improve humanitarian effort.

Keywords: *Disaster responsiveness, Humanitarian logistics, Humanitarian disaster*

1.0 INTRODUCTION OF THE STUDY

The Global Humanitarian Assistance (GHA) report (2016) gives a gloomy outlook of human suffering. As wars in countries like Yemen, Syria and South Sudan continue, natural disasters like earth quakes in Mongolia continue to cause human suffering. Weather changes caused by the el Nino phenomena caused flooding while la Nina caused drought affecting millions of people across the world. The number affected was over 164 million spread in 47 countries. Disasters triggered by sudden onset hazard events continue to bring about the highest numbers of new displacements each year. A majority of these occur in developing countries and middle income countries (GHA, 2016).

In Africa, slow-onset disasters, existing vulnerabilities and conflicts continue to create an unpredictably volatile humanitarian environment. Most conflicts displacements occurred in sub-Saharan Africa, with the Democratic Republic of the Congo (DRC) recording the highest increase. In South Sudan's civil war that erupted in mid-December 2013, many thousands have been killed and an estimated 1.5 million people have had to flee their homes (Human Rights Watch, 2015). Without a stable government in Somalia it is difficult to quantify the magnitude of human loss as a result of the civil war, Al-Shabab militia activities as well as drought, malnutrition and diseases. In 2016, the International Federation of Red Cross Society raised 24 international appeals for countries that faced disaster related emergencies. These countries were found to have below average capacity to cope with disasters and included South Sudan, Democratic Republic of Congo and Somalia (WDR, 2016).

To serve the seven countries within East Africa namely Kenya, Uganda, Rwanda, Burundi, DR Congo, South Sudan, Ethiopia and Somalia three large humanitarian organizations established warehouses in both Mombasa and Nairobi. They are the UNHCR, Red Cross and World Vision (Kinyua, 2013). These countries are under developed with very poor infrastructure even without disasters. Delivering relief aid is expensive because of the need to employ military grade trucks that are rugged enough to cope with the poor roads (Kamau, 2013). The worst humanitarian disaster in Kenya was the post-election violence that took place in January and February, 2008. The disturbance lead to 1,133 deaths and an estimated 350,000 people were internally displaced mainly in Western, Nyanza, Rift Valley, Central, Nairobi and Coast Provinces. Thousands more suffered varied injuries including arrow wounds, burns and sexual violence.

The violence also resulted in the destruction of 117,216 private properties and 491 government properties including offices, vehicles, health centers and schools. Many victims were unable to access timely medical care owing to the risk of venturing out, physical destruction of the facilities and the freeing of medical workers. The void created by the lack of official response was partly filled by a number of NGOs, including the Kenya Red Cross Society (KRCS). Kenya has been a target of terrorist attacks including the 1998 United States embassy bombing in Nairobi leading to the death of 247 people and nearly 5,000 others injured, some maimed for life.

Flooding is almost a perennial occurrence in the county of Tana River and Bundalangi in Busia County. Rains also cause landslides in Mount Kenya region especially in the hilly slopes of Murang'a County. While the flooding in Tana River can accurately be predicted very little is done to avert destruction of property, livestock death and the resultant displacements of residents

triggering a humanitarian crisis. Drought is the most prevalent natural hazard in Kenya affecting mainly Eastern, North Eastern, parts of Rift Valley and coast Provinces. Kenya's disaster profile is dominated by droughts, fires, floods, technological accidents, diseases and epidemics that disrupt people's livelihoods, destroy the infrastructure, divert planned use of resources, interrupt economic activities and retard development. It is for this reasons that the National Disaster Management Unit (NDMU) was established as an effective and competent disaster management unit with an established command structure, budget and Standard Operating Procedures based on best practices. While the role of NDMU is policy formulation and coordination, The Kenya Red Cross Society responds to humanitarian needs.

Statement of the Problem

Implementing a cost effective and efficient logistic operation in humanitarian relief situation comes with immense challenges. On one side humanitarian organizations have internal rules and procedures that guide their logistics units while on the other satisfying donors' wishes which may not be aligned to the organization. Donors may dictate how, where and to whom the aid they give is used. This brings a conflict which curtails the freedom of humanitarian organization in choosing the disasters to respond to and how they plan the logistics. Another challenge is coordinating the operation of the disaster zone. The media, humanitarian organizations, government agencies and the curious public jam the disaster zone making it difficult for logistics units to reach disaster victims.

Often, relief operations do not meet the expectations of the various stake holders. Aid not only arrives late and in meager quantities but also wrong specifications of goods is sometimes delivered. Managers coordinating logistics are often overwhelmed by the magnitude of the task and having to work in broken infrastructure compounds the challenges. Logistics managers are expected to deliver goods and services needed at the shortest time possible. This forces them to disregard the laid down procedures and adapt methods that are most convenient to the situation. Tendering procedures are discarded in favor of single sourcing thus losing the objective of ensuring value for money and fair competition among suppliers, and ensuring accountability, transparency and ethics. This leads to protests from deserving suppliers who do not get selected. The public has come to expect a fast and effective response to disaster from humanitarian organizations as a matter of right.

The advancement of digital social medial has made it possible for disasters to be reported in real time as they happen. The downside is that any delay or weakness in humanitarian logistics is reported and results in severe criticism from the public and the media. It has been established that the speed of response after a disaster strikes is of the utmost importance, especially since the first 72 hours can save a maximum number of lives (Tomasini & Van Wassenhove, 2009). In their study on use of IT in humanitarian logistics, (Aini & Hasmiah, 2011) established that some organizations had a very high integration of IT in their supply chain management. These systems enable the organizations to track the movement of goods at every stage until it reached the disaster victims. This study only looked at tracking of goods but did not indicate how or if use of IT improved disaster responsiveness in the humanitarian organizations.

Kinyua (2008) explored the challenges of transporting humanitarian goods in poor road infrastructure. The challenges included slow pace, trucks breakdown downs, lack of refueling points and high costs of hireling trucks. The costs of logistics are quite high that it impacts negatively on supply chain performance in various ways. The researcher did not indicate whether humanitarian organizations had adequate funds to fund logistics and also how costs of logistics affected the responsiveness of humanitarian organizations. In his study, Wassenhove (2012) observed that it was only in recent years that humanitarian organizations such as the World Food Program (WFP) had identified logistics and Supply Chain Management as a strategic contributor to disaster responsiveness.

Commercial enterprises realized this many years ago and have elevated supply chain management to a strategic level. Many studies have been done and a wealth of knowledge exists for commercial enterprises however, few studies have been done on humanitarian organizations logistics, but even these are concentrated in Asian countries which are often hit by natural disasters. Disaster responsiveness is hardly done in African countries and in particular Kenya. This study therefore seeks to fill that gap.

Research Objectives

The general objective his of the study was to explore the logistical factors that influence the responsiveness of humanitarian organizations in Kenya while the specific objectives were:

i. To determine how infrastructure influence the responsiveness of humanitarian organisations in Kenya.
ii. To find out how warehousing influence the responsiveness of humanitarian organisations in Kenya.
iii. To establish how funding influence the responsiveness of humanitarian organisations in Kenya.
iv. To investigate how coordination influence the responsiveness of humanitarian organisations in Kenya.

2.0 LITERATURE REVIEW

Theoretical Review

The study is based on three theories namely grey systems theory, systems theory and goal setting theory. A brief discussion of each theory follows below.

Grey System Theory

Grey system theory was developed by Julong Deng in 1982. It is an important methodology for solving problems which involve uncertainties and aims at handling systems with unknown or incomplete information. Here, on the grounds of grey relations “grey” means poor, incomplete or uncertain information. Thus, the systems which lack information are referred to as Grey Systems (Deng, 1989). A grey system is a system which contains both known and uncertain unknowns (Zheng & Lewis, 1993). According to the theory, the information is classified into three categories. It is said to be white when it is completely certain; black when it is totally unknown and grey when it is insufficient (Yang et al., 2014). The grey theory is a new and different

approach which handles the uncertainty of a system. In humanitarian logistics, the organizations do not know when the next disaster will happen, how it will happen, nature of disaster and magnitude. The only known element is that there will be a disaster somewhere in the world that will require humanitarian response. Planning for humanitarian logistics therefore falls under the grey system. The importance of the attributes and the ratings of attributes can be expressed in grey numbers which gives the flexibility to express decisions more easily. The theory of Grey System considers the following factors in deciding on the best logistics outcomes; nature of disaster and its magnitude, extent of damage to infrastructure, location, available resources and number of victims. At the onset of the operation, all these elements are gray areas and only become clear as time in due course. This theory is important to my study since the criteria of evaluating the effectiveness of humanitarian response is very critical in saving human life. And this theory gives grounding that is used in this study.

Systems Theory

Early systems theorists like Bertalanffy, (1951) aimed at finding a general systems theory that could explain all systems in all fields of science. Systems theory explores the interdependencies of relationships. A system is composed of frequently interrelating groups of activities and parts that form the subsequent whole. Usually in a system theoretical study the relations are complex, reasons and influences are proportional and the amount of parts or variables is too large to be automatically structured. Therefore the systems theory is suitable for managing complex entities. It has been applied to the fields of electronics, information systems, control engineering, missile technology, biology, psychology, economics and organization theory. In the field of logistics, systems are usually complex and include many cause and effect relationships. Therefore systems thinking are suitable for managing logistics systems. Complex problems do not necessarily need complex solutions. The general concept of systems theory is that the whole is more than the sum of its parts. Supply chain management is a demanding task, the aim of which is to meet customer demand with high quality, low costs and minimum lead-time. Logistic systems are usually complex and include many cause-effect relationships. Therefore, system theoretical approach is adequate for modeling supply chains. When using control methods, it is conceivable to see dependencies of variables. Dynamic modeling is applicable to complex supply chains that include lot of uncertainties and many changes throughout the supply chain.

Goal Setting Theory

Goal setting theory refers to goals being set up for the future for subsequent performances of an individual or organization. The theory was developed in 1979 by Edwin Locke after studying the psychology of organizations and industries over the years. Goals refer to future valued outcomes. The setting of goals is first and foremost a discretionary creating process (Lock & Latham, 2013). Goal setting theory encompasses all aspects of building organizations with efficiency (Koppes, 2014). According to Lock, there are five basic principles that allow goal setting to perform better. These include clarity-clear and measurable goals that can be achieved within specific timelines; Challenge-goals being able to achieve decent level of difficulty motivating the individual and organization to strive for positive goal achievement; Commitment-makes individuals and organizations put on deliberate efforts in meeting goals; Feedback-provides information on the progress towards achieving goals; Task complexity-makes the achieving of

goals easier by laying down processes and steps. Goal setting is often used by individuals for their personal goals and in groups at work places and social gatherings. In humanitarian organizations, the goal is to respond to human suffering by delivering humanitarian assistance effectively within set timelines. The logistical divisions of humanitarian organizations are expected to respond as soon as a disaster happens and are evaluated by public opinion based on how effective the response is.

Empirical Literature Review

Infrastructure

The World Risk Report (2016) analyzed the role that infrastructure plays in shaping a country's disaster risk. When an extreme environmental hazard strikes, infrastructure can be a deciding factor in whether or not the situation becomes a disaster. Roads, for example, can provide access to quickly supply relief aid to affected communities; but if roads are destroyed, entire regions can be cut off from support. Huxel & Gelashvili (2014) observed that sufficient and well-built infrastructure such as high quality power and transportation networks, can limit the impacts that natural hazards can cause both in terms of loss of life and economic damage. At the same time, the breakdown of nodal points in infrastructure, such as airports or power plants, can also cause impacts that reach far beyond the actual extent of the hazard.

When looked in a broader perspective, transport infrastructure involve global sourcing, shipment, military transport, commercial transport, non-commercial transport, third-party logistics firms, freight forwarders, charter aircraft, or even local transportation in form of planes, trucks, cars, boats, and even animals if necessary (Huxel & Gelashvili, 2014)). Yet, transportation is dependent on road conditions, fuel availability, airports and ports capacity after disasters. These compounds the problem as makeshift facilities will have to be put up to facilitate movement of supplies while at the same time dropping supplies from aircraft using parachutes. Transportation is a major component of disaster relief operations and hence the existence of transport infrastructure such as roads and airports and the availability of vehicles and fuel are just a few challenges that humanitarian organizations face when disaster strikes.

In humanitarian relief operations, Infrastructure does not refer to transport alone. Another key infrastructure component is communication. The presence of mobile telephony and ICT facilities simplify easy information flow. Where communication infrastructure is destroyed by disaster most large relief organizations set up their own radio communication equipment to ease communication. As Balcik & Beamon (2008) observe, it is always assumed that communication infrastructure is destroyed in large disasters and hence relief organizations always come with their own equipment. Moreover, the military may set up their equipment and allocate some frequency channels to relief organizations.

The other component of infrastructure is hospitals and evacuation centers. People who have lost homes need to be evacuated to safe areas usually sports stadium, social hall or schools. The injured and sick need to be hospitalized, therefore temporally hospitals may be set if the local hospital is un-functional. Sanitation facilities should be set up to avoid spread of diseases. Where water treatment facility is damaged, clean drinking water must be provided promptly. This is usually the first consignment of goods to arrive. The damaged water treatment is repaired as soon

as possible and where this is not possible temporally water treatment facility is set up usually by the military.

Warehousing

Pache (2010) emphasizes that the location of warehouses needs to be evaluated due to changes in demand, product mix, sourcing strategies and costs. In a humanitarian context emergency response to sudden on-set disasters makes decision support tools for humanitarian facility location especially important. Facility location models calculate the optimal warehouse locations in a location mathematically. However, lessons learned from previous disasters have taught humanitarian organizations to position warehouses in disaster prone regions which may not necessarily agree with the mathematical warehouse location models (Balcik & Beamon, 2008).

Prepositioning means to keep emergency stock ready in strategic warehouses before a disaster strikes to be able to send it immediately when needed (Khaki & Boufaim, 2010).

Besides a speedy delivery, a main benefit of stock piling is that the goods are already quality controlled and appropriately packed (Mason, et al., 2007). On the other hand, pre-stocking is very costly. But it helps the humanitarian organizations to gain a flexible relief supply chain, which is a key issue for disaster response logistics. One of the humanitarian organizations which use prepositioning is the UNHCR, the United Nations High Commissioner for Refugees. They have identified a great need to keep relevant stock available close to potential disaster areas to ensure the ability to fulfill their mandate (Ginnetti, 2015). To make the most of the prepositioning, the warehouses of UNHCR must be put in strategic locations. To ensure the optimal location of their global warehouses a strategic facility location model for the humanitarian context was created by Jahre, et al. (2015).

Soon after a disaster strikes, relief organizations conduct an initial assessment, usually within one day after occurrence to determine the expected quantity of supplies required to meet the relief needs of the affected population as well as pre-positioned supplies, already available at the organizations warehouses. Supplies are mainly ‘pushed’ to the disaster area in the response phase, whereas during the reconstruction phase the principle of ‘pull’ in sourcing is predominately applied (Kovacs & Spens, 2007). As emergencies cannot be planned properly in advance, an immediate response is required. Therefore, emergency stock piles of frequently needed goods like blankets, plastic sheets, food and vehicles shorten delivery times tremendously. Supply chain teams of relief organizations are responsible of transporting, warehousing and storage, order fulfillment, demand forecast, inventory control, customer service, material handling, production planning and schedule, procurement (Sandwell, 2011).

Funding

In every relief activities, donors play a fundamental role in providing funds for humanitarian actions (UNHCR, 2008). Donations come from general public as well as from private organizations. Governments, international organizations, religious associations, count as well as donors. The bulk of humanitarian financing comes from a set of wealthy industrialized countries (Dahl and Linden, 2016). Worldwide donations support cannot yet be predicted in exact numbers. Therefore, delivery of goods cannot be scrupulously estimated, since the disaster zone’s remaining transport infrastructure varies from case to case. Consequently, ports of

entrance to the disaster zones are key factors for the success of the relief of aid to end beneficiaries.

Emergency supplies enter the relief chain through different sources, forms, and locations. They can be given as donations, grants, or gifts-in-kind (Kamau, 2013). To mitigate the negative impacts, human prepare counter measures by creating infrastructure and planning relief operations in advance (Mohamed & Afua, 2011). In particular, governmental as well as non-governmental organizations (humanitarian organizations) all over the world put a lot of effort into helping nations and people to recover from disasters (Gode, 2014).

One of the biggest hurdles to overcome in humanitarian relief supply chains is the huge uncertainty in demand, supplies and assessment accompanied by high time pressure. Hence, humanitarian logistics is determined by a high level of complexity, which makes this field the most expensive part during disaster relief which is about 80 % of total expenditures, (Van Wassenhove, 2006). Furthermore, humanitarian organizations have to face increasing pressure from donors to prove that the money provided for aid is reaching those in need. Hence, the organizations' outcomes need to be transparent and operations result-oriented (Van Wassenhove, 2006), which pressures them to use their resources more efficiently.

The United Nation established Central Emergency Response Fund (CERF) as a central pool of funds for emergency funding (UNHCR, 2008). In contrast to the current system in which governments can take months to commit funds in response to UN appeals, the CERF would provide a permanent central pot of funds that can be drawn upon in under 72 hours by UN humanitarian agencies (Willner & Zafeiridis, 2013). And because the Fund could make resources available for neglected emergencies, as well as rapid response, it could also help ensure that funds are allocated according to humanitarian need, rather than political or media profile. The challenge is not just to provide funds but also to ensure that the CERF performs well (Ginnetti, 2015). Increased and timely humanitarian assistance is vital, but if the CERF is to achieve its potential, it will need to be well-governed, transparent, and accountable.

Coordination

Since humanitarian relief organizations must cope with a numerous number of actors that have to be coordinated and managed, the view is not anymore about having a logistic approach only, but rather about a supply chain management approach (Oloruntoba & Gray, 2006). Therefore, the specificities that humanitarian relief organizations present regarding their supply chains must be highlighted. Firstly, objectives are most of the time ambiguous and unclear. Secondly, resources are scarce and uneasy to gather, both in terms of human capital, financial resources and adequate infrastructures. Thirdly, they evolve in an environment that is particularly uncertain. Fourthly, urgencies are actually part of their daily job. Fifthly, they focus on acting as fast as possible, therefore side-lining any profit oriented vision. Finally, they evolve in an environment that is particularly sensitive to political concerns (Tomasini & Van Wassenhove, 2009).

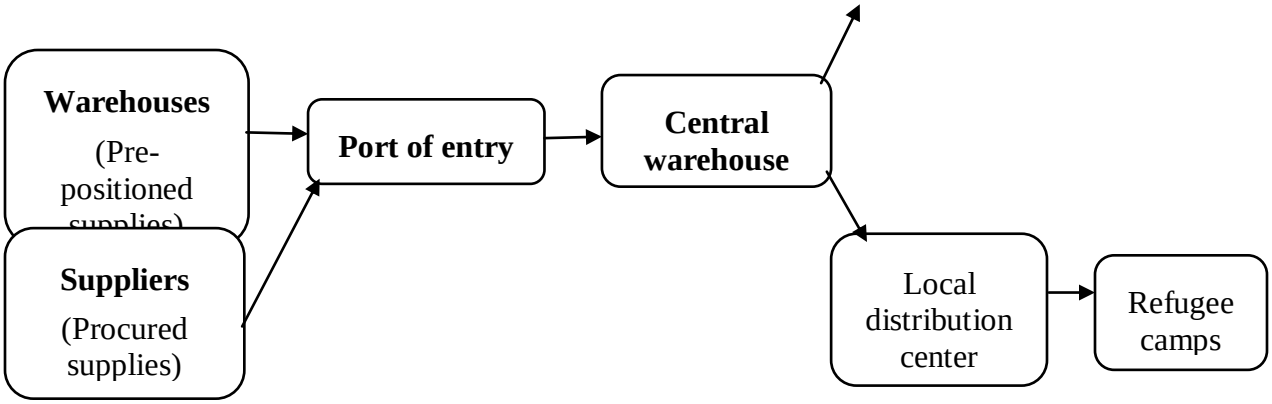

Figure 1 Logistical Arrangements in Humanitarian management.

Source: Adopted from UNDP (2008)

A humanitarian relief supply chain typically consists of government and donors providing financial or material donations on the supplier's side. On the other end are aid organizations, logistics teams and the beneficiaries who are victims of disasters (Beamon & Balcik, 2008). The wider supply chain has several participants including local governments, the military, and the mass media as information bearers all competing for scarce donations and media attention. The growing numbers of participants often with diverse goals worsens the coordination effort (Huxel & Gelashvili, 2014) although an effective coordination highly influences the results of relief operations.

However, the literature lacks particular attention concerning the coordination roles and objectives between humanitarian relief organizations and logistic service providers during disaster relief operations. Taylor & Pettit (2009) emphasize the lack of inter-organizational cooperation and coordination within humanitarian relief supply chains. In order to improve or even maintain the level of assistance to those victims affected by disaster, efficiency and effectiveness of the response must be improved in terms of cost, time and quality. The logistics function can constitute a main improvement lever in this regard because it accounts for up to eighty percent of the entire funds spent in disaster response (Ugochukwu P., Engstrom J., & Langstrand J., 2010). Close collaborations with suppliers facilitate inventory management which in turn can speed up the processes in the supply chain (Tomasini & Van Wassenhove, 2009).

Conceptual Framework

A conceptual framework represents the perceived relationship between study variables. Independent variables (the predictor variables) were Infrastructure, Ware housing, Funding and coordination. Effectiveness of humanitarian organizations was the dependent variable.

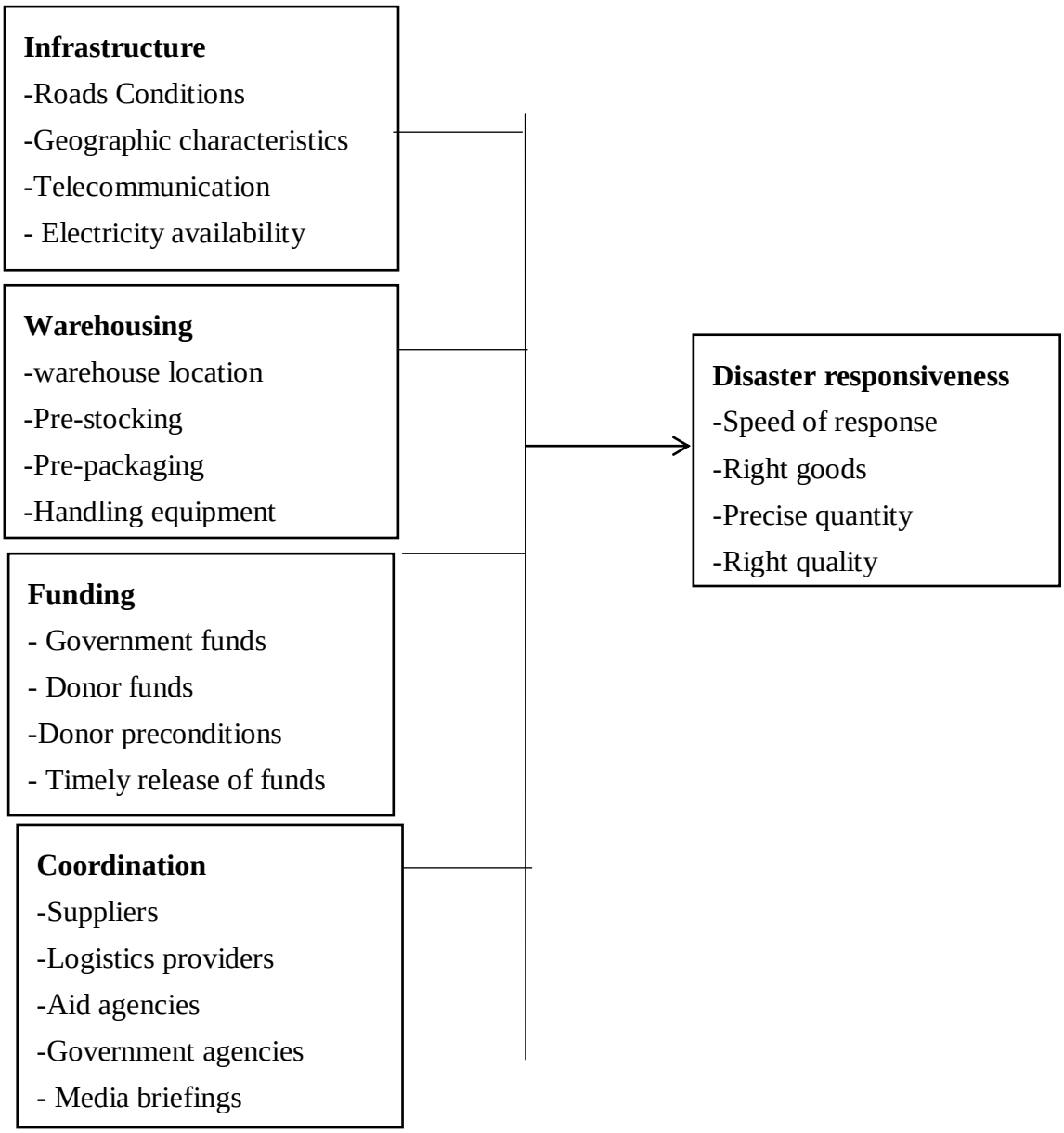

Figure 2 Conceptual framework

3.0 RESEARCH METHODOLOGY

The study adopted descriptive research design in an effort to generate appropriate information about factors that influence the responsiveness of logistics in humanitarian organizations in Kenya. The study targeted the 329 employees of Kenya Red Cross Society based in Nairobi and their selection was motivated by the fact that they were directly involved with the logistics of procurement, managing inventory and delivering the goods to disaster victim. The researcher used stratified random sampling technique to arrive at the sample of 60 respondents and used

questionnaires as key data collection instrument. A descriptive statistical data analysis method was used and the data presentation done by use of frequency tables and charts.

4.0 RESULTS

4.1 Inferential Statistics and Analysis

Inferential analysis focuses on the strength and direction of relationship between variables and inferring the findings from the sample to the population. This section presents the findings of the inferential analysis and appropriate discussions. The researcher undertook a Spearman's correlation to explain the relationship between the independent variables and the dependent variable.

4.1.1 Relationship between Insufficient Funding and Disaster Responsiveness

Table 1 sought to establish whether there was a relationship between funding and disaster responsiveness.

Table 1 Relationship between Insufficient Funding and Disaster responsiveness

		Insufficient Funding
Spearman's rho	Correlation Coefficient	- .416*
	Sig. (2-tailed)	.003
Disaster Responsiveness	N	49

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

The data shows a negative and statistically significant relationship (r =.-416, p = .003) between insufficient funding and disaster responsiveness. The finding indicates that insufficient funding affected disaster responsiveness negatively. It also implies that increasing funding would significantly improve logistics and hence increase disaster responsiveness in KRCS.

Table 2 Summary Model of Funding

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.505[a]	.255	.239	.97875

a. Predictors: (Constant),Funding

Table 2 shows the results of regressing funding against disaster responsiveness. The results illustrated by the coefficient of determination (R^2 = 0.255) means that 25.5% of disaster responsiveness can be attributed to insufficient funding of KRCS. The finding is that if funding was met according to requirements of humanitarian organizations responsiveness would increase by 25.5%. This is a very significant margin.

Table 3 ANOVA for funding

Model		Sum of Squares	df	Mean square	F	Sig
1	Regression	15.385	1	15.385	16.060	.000[b]
	Residual	45.024	47	.958		
	Total	60.408	48			

a. Dependent Variable: Funding
b. Predictors: (Constant), Disaster responsiveness

The ANOVA was used to determine whether the simple linear regression with disaster responsiveness as the dependent variable and funding as the independent variable was reliable. As shown in Table 3 above, the correlation between funding and disaster responsiveness in KRCS was found to be statistically significant ($F = 16.060$; $p < 0.05$). This was supported by a significant value of 0.00 which is less than the convection P value of 0.05.The findings implied that the studied elements of funding were important to KRCS response to disasters.

4.1.2 Relationship between Infrastructure and Disaster Responsiveness

Table 4 below shows the results of relationship between infrastructure and disaster responsiveness. Unfortunately logistic teams in humanitarian organizations have no control over condition of infrastructure.

Table 4 Relationship between Infrastructure and Disaster responsiveness

		Infrastructure
Spearman's rho	Correlation Coefficient	- .716*
	Sig. (2-tailed)	.000
Disaster Responsiveness	N	49

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

A strong negative correlation between poor infrastructure and disaster responsiveness ($r = -.716$ and $p = .000$) is seen. This implies that as infrastructure gets worse disaster responsiveness worsens. The opposite is also true; with every increase in improvement of infrastructure there is 0.7 unit increase in disaster responsiveness. Whereas natural disasters can destroy the infrastructure in a disaster zone, any efforts to repair or mitigate the damage will have an effect on the disaster response.

Table 5 Summary model on Infrastructure

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688[a]	.473	.462	.98741

a. Predictors: (Constant), Infrastructure

There was positive correlation between infrastructure and disaster responsiveness in KRCS as the correlation coefficient R was 0.688. The coefficient of determination R^2 gave a value of

0.473 which implies that 47.3% of the variance in disaster responsiveness was as a result of the state of infrastructure in the disaster area.

Table 6 ANOVA for Infrastructure

Model		Sum of Squares	df	Mean square	F	Sig
1	Regression	41.156	1	41.156	42.212	.000[b]
	Residual	45.824	47	.975		
	Total	86.980	48			

a. Dependent Variable: Infrastructure

b. Predictors: (Constant), Disaster responsiveness

Table 6 illustrates the correlation between infrastructure and disaster responsiveness in KRCS. The table shows it to be statistically significant ($F = 42.212$; $p < 0.05$). The finding signifies the importance of infrastructure in disaster responsiveness. This further proves that infrastructure is the single most important variable in disaster responsiveness of humanitarian organizations in Kenya.

4.1.3 Relationship between Warehousing and Disaster Responsiveness

Table 7 shows the results when warehousing was regressed against disaster responsiveness. The aim was to establish the strength of the relationship.

Table 7 Relationship between Warehousing and Disaster responsiveness

		Warehousing
Spearman's rho	Correlation Coefficient	- .178*
	Sig. (2-tailed)	.220
Disaster Responsiveness	N	49

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

There is a weak negative correlation between warehousing and disaster responsiveness ($r = -.178$ and $p = .220$). It can be deduced that warehousing does not significantly influence the responsiveness of humanitarian relief. However, improving warehousing will marginally give a positive performance.

Table 8 Summary model on Warehousing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.208[a]	.043	.023	1.29847

a. Predictors: (Constant), Warehousing

There was a weak correlation between warehousing and disaster responsiveness in KRCS as the correlation coefficient R was 0.208. The coefficient of determination R^2 gave a value of 0.043

which implies that 4.3% of the variance in disaster responsiveness was as a result of the performance of the warehousing function. However, this does not explain the remaining 95.7%.

Table 9 ANOVA for Warehousing

Model		Sum of Squares	df	Mean square	F	Sig
1	Regression	3.574	1	3.574	2.120	.152[b]
	Residual	79.242	47	1.686		
	Total	82.816	48			

a. Dependent Variable: Warehousing
b. Predictors: (Constant), Disaster responsiveness

The ANOVA was used to determine whether the simple linear regression with warehousing as the independent variable and disaster responsiveness as the independent variable was reliable. The p-value was used to determine this with the minimum requirement for reliability of the model being a p-value less than 0.05 ($p<0.05$). The results are presented in Table 4.19 which shows that $p>0.05$ meaning that the result is not significant.

4.1.4 Relationship between Coordination and Disaster Responsiveness

Table 10 shows the results of regressing coordination against disaster responsiveness. The aim was to demonstrate the strength of relationship between the two variables.

Table 10 Relationship between Coordination and Disaster responsiveness

		Coordination
Spearman's rho	Correlation Coefficient	- .701*
	Sig. (2-tailed)	.000
Disaster Responsiveness	N	49

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

As demonstrated by table 10, there is a strong correlation between coordination and disaster responsiveness ($r = .701$and $p = .000$). The data proves that coordinating relief effort with other stakeholders is the way to go. This implies an increase in coordinating activities will result in almost equal measure of increase in disaster responsiveness.

Table 11 Summary model on coordination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.729[a]	.532	.522	.60932

a. Predictors: (Constant), Coordination.

Table 11 shows that there was correlation between coordination among humanitarian organizations and disaster responsiveness in KRCS as the correlation coefficient R were 0.729. The coefficient of determination R^2 gave a value of 0.532 which implies that 53.2% of the variance in disaster responsiveness was as a result of coordination.

Table 12 ANOVA for Coordination

Model		Sum of Squares	df	Mean square	F	Sig
1	Regression	19.816	1	19.816	53.373	.000[b]
	Residual	17.450	47	.371		
	Total	37.265	48			

a. Dependent Variable: Coordination
b. Predictors: (Constant), Disaster responsiveness

The ANOVA test result shows calculated F value was 53.373, p=0.000 as shown in Table 4.22. The P-value is less than the conventional 0.05 implying that the model had a good fit. The finding further implies statistically significant relationship between the independent and dependent variables. This implies that disaster responsiveness of KRCS is influenced by coordination among stakeholders.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study found that lack of coordination among the various stakeholders was the leading contributing factor (53.2%) that affected disaster responsiveness. Coordination among the many humanitarian organizations was not there as each organization worked independently. If they were to coordinate their efforts they would make a bigger impact and improve their responsiveness. The study also found that KRCS assumed the leading role in many disasters in the country. The National Disaster Management Unit (NDMU) was found to be ineffective in coordinating relief operations. It was also found that although KRCS held briefings with the press to update the public of disaster status, the communications were not effective enough.

The study found out that conditions of the roads had a big impact on disaster responsiveness in KRCS. It was established that 47.3% of humanitarian responsiveness could be attributed to the condition of infrastructure in the disaster area. It was also revealed that telecommunication infrastructure was essential in coordination of the fleet. The disaster victims required hospital facilities and clean drinking water so this was also important. Other factors like topography of the land distance to disaster area and availability of support infrastructure all had varied degrees of importance. However, the availability of grid electricity was not given any significant importance by the respondents.

The main finding was that insufficient funding of humanitarian organizations affected their logistics funding by 25.5% and thus reduced disaster responsiveness by the same margin. The

study established that Kenya Red Cross Society received part of its funding from budgetary allocation from the Government while the rest of funds came from donors. It was also established that some donors put preconditions to the funds they give thus restricting them to specific projects. This restriction did not however have significant impact of disaster responsiveness. It was established that delay in releasing funds either from donors or the Government affected KRCS ability to respond to humanitarian disasters. Notwithstanding funds delay, KRCS had the capacity to mobilize and raise funds at short notice to deal with emergencies. The overall finding was that KRCS was well funded and had adequate capacity to deal with disasters.

Warehouse operations contributed a mere 4.3% to disaster responsiveness of KRCS, which is a very low score. This was a surprise finding as one would have expected the warehouse to contribute more to disaster responsiveness. It was established the warehouses of KRCS were well equipped with handling equipment and had adequate storage space. A computerized warehouse management system (ERP) was also in place. While goods arrived in bulk the warehouse pre-packed them into smaller units comprising of items that were essential in the first phase of emergency response because it eases in distributing. One of the challenges encountered was in-kind donations. These were found to be difficult to deal with as it comprised some unwanted items.

Conclusion

Kenya Red Cross Society depends on the goodwill of the Government and other donors to fund its activities. This state of affairs makes it impossible to plan accurately because often the funds are delayed. It is also true that some donations come with preconditions attached making it impossible to prioritize funds to the most urgent emergencies. However, the ability of KRCS to mobilize resources at short notice during an emergency mitigated this challenge.

With regards to infrastructure, KRCS and other humanitarian have no control over it. Natural disasters often damage infrastructure and humanitarian organizations are used to this and are often equipped to deal with the situation. Although they would prefer working in good infrastructure, broken infrastructure only slows them down but does not hinder their work. In terms of logistics, humanitarian KRCS always assumes they it will work in such an environment and prepares accordingly.

As to warehousing, this was found to be fully automated, with enough handling equipment and enough storage space. In terms of helping in disaster responsiveness, the warehousing function was found to be the least important. However, KRCS was able to break bulk by repacking goods into small packets that contains the basic requirements of a single household. This was found to ease the process of goods distribution to disaster victims.

Coordination among the various humanitarian organizations and stake holders was found to be lacking. This greatly affected the responsiveness of KRCS as the many organizations working in disaster areas worked independently. This made some organizations to stand on the way of others, duplication of roles and wastage. However, KRCS was able to coordinate well with suppliers ensuring goods could be delivered in short notice.

Recommendations

The study found that humanitarian organization relied exclusively on funds donated by governments, corporations and individual donors. Whenever the donors delayed in releasing funds the humanitarian organizations ability to respond to disasters was affected. In the literature review it was established that KRCS had started investing in income generating ventures in hospitality industry. This was the right way to go as it will eventually bring a steady revenue stream and thus reduce over-reliance on donors. On the issue of infrastructure, humanitarian organizations have no control over it. It is therefore recommended that they invest in hardware and equipment that will make their work easier in such environments.

Investing in hardy four wheel drive vehicles, generators, portable water treatment machines and portable field hospitals is recommended. The warehouse was found to be very functional and supported operations as required. The only addition recommendation is establishment of small field warehouses in disaster prone regions in Kenya. These can be located in drought prone northern Kenya and flood prone Nyanza. Currently the warehouses are located in Mombasa and Nairobi from where all goods are dispatched to various locations in the country. The long distances involved cause delays and to the cost of logistics. As for coordination, it is recommended that the National Disaster Management Unit revamps itself and takes the responsibility it was established for. A closer look on this organization should point out its weaknesses with a view to fixing them to making it strong. A way should be found to coordinate the efforts of the many organizations who respond to disasters to minimize duplication of roles.

Suggestions for Further Studies

This study looked at humanitarian responses that were caused by natural disasters that were slow onset such as flooding and drought. It would be interesting to look at disasters that are manmade and sudden onset like industrial accidents, road and air accidents and structural failures. In Kenya, instance of buildings collapsing is fairly common although the lives lost are few. The humanitarian responses and supporting logistics in these cases may be different to what was observed in this study. Another area of interest would be looking at disasters that are caused by political conflicts. This would include wars both civil and among nations. Some disasters caused by acts of terrorism would also fit in this category.

Humanitarian organizations working in such operations face serious challenges including risk to their lives. The logistics teams in such operations would have to device ways of delivering goods. The same challenges would befall the researcher who opts to collect primary data from the field. There is need to undertake a comparative study on factors affecting supply chain in both development projects and humanitarian operations so as to draw similarities and parallels and build synergies so as to generate evidence for planning and decision making. This is also important to inform donors on sub-granting processes. Such a study may also extend to corporate organizations as they may learn to minimize costs and get other perspective on effectiveness from the private sector.

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