

**LOGISTICS INFORMATION SYSTEMS AND PERFORMANCE  
OF INTERNATIONAL HUMANITARIAN ORGANIZATIONS IN  
KENYA**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILMENT OF THE REQUIREMENTS OF THE AWARD OF  
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION  
(MBA), SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI**

**2014**

## DECLARATION

This research is my original work and has not been presented for a degree in any other university.

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This research project has been submitted for examination with my approval as University Supervisor.

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## **DEDICATION**

This project is dedicated to my mum, Millah Ndeda. For all those times you kept pushing me towards my goals and telling me I could do it. For the never ending love and support. I could never thank you enough.

## **ACKNOWLEDGEMENTS**

First, I would like to thank God for the strength and will he gave me to do this project.

My special thanks go to my supervisor, Mr. Ernest Akelo for his enormous patience, guidance and constant advice to make this work a success. I am also grateful to Mr. Joash Mageto for the support he provided to me.

I am equally grateful to my brothers Brian and Kevin, sister Cynthia and cousin Brenda, for their support, encouragement and patience. To my friends Faith Gathua, Rose Nyarangi, David Ochieng, Hassan Kidzuga and Ted Akama who all rallied behind me and gave me that extra motivation when I needed it, I am indebted to you. Thank you so much for your support and encouragement.

Special thanks to my parents for all the sacrifices they made for me to come this far. I thank them for putting me through school, making sure I lacked for nothing, counseling and mentoring me and molding me into what I am today. I am grateful to everyone else who made this project a success in one way or another, God bless you so much.

## **ABSTRACT**

Humanitarian organizations play a large role in providing aid to people affected by disasters all over the world. Their operations largely rely on the logistics function to enable them deliver the goods, services and works required within a reasonable time in response to the disasters in order to maximize on the number of lives saved and the impact of their programs. Logistics Information Systems are widely used by international humanitarian organizations to manage the logistics process.

The purpose of this study was to establish the impact of logistics information systems on the performance of international humanitarian organizations in Kenya and the challenges of implementing these systems in these organizations. To satisfy the study objectives, data was collected from international humanitarian organizations in Kenya. The data was collected using structured questionnaires which had open and closed ended questions. The data collected was analyzed using descriptive statistics and presented in tables and graphs. Multivariate Analysis of variance was used to establish the impact of logistics information systems on performance of IHOs.

The study established that logistics information system play an important role in the performance of IHOs in Kenya by boosting cost effectiveness, timely delivery, accurate and timely reporting as well as supply chain visibility. The prohibitive cost of implementing logistics information systems, lack of adequate management support and data security risks are some of the challenges facing the implementation of logistics information systems. The recommendation is for management of IHOs to maximize the value the organizations can obtain through the logistics information systems by providing adequate support and backing their implementation.

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## **LIST OF ABBREVIATIONS**

ECHO	European Community Humanitarian Office
ICT	Information Communication Technology
IHO	International Humanitarian Organizations
IT	Information Technology
LSS	Logistics Support System
MANOVA	Multivariate Analysis of Variance
NGOs	Non-Governmental Organizations
ROI	Return On Investment
SCM	Supply Chain Management
SUMA	Supply Management System
UN	United Nations

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the Study**

Billions of people, the world over, are affected by either natural or manmade disasters. According to the International Federation of Red Cross and Red Crescent Societies World Disasters Report (2012), over 72 million people, more than one in every hundred of the world's citizens, are now forcibly displaced. The Report notes that growing numbers of people are forced into migration by a range of what it calls "increasingly complex 'drivers'" including conflict and violence, disasters, political upheaval and even by large-scale development projects. Of these, an estimated 20 million are living in a state of prolonged displacement. Humanitarian organizations' operations revolve around disaster preparedness and stepping in to minimize loss of lives and alleviate suffering of people affected by disasters. In these operations, logistics is the most fundamental tool since it involves the procurement, storage, transportation and delivery of the supplies to the affected areas within the period that they are required.

Performance of International Humanitarian Organizations is critical since it is often a matter of life and death for the affected people. The speed and efficiency with which an IHO reacts to a disaster or crisis will determine the level of impact it will have, how many lives it will save and how successful the mission will be. Information systems come in handy to aid in the planning, organizing and executing of the logistical activities in an organization to enable it achieve its objectives in a more effective and efficient manner.

### **1.1.1 Logistics Information Systems**

Information technology has largely revolutionized logistics operations in humanitarian organizations. Information technology components encompass computer hardware, software, electronics, internet and other telecommunication equipment which enable storage, retrieval, transmission and manipulation of data. The software component of information technology includes information systems. Information systems are a key enabler for humanitarian logistics since the flow of information in humanitarian operations is highly critical. Information systems gather, process, store and distribute information for use by the various players using the systems. Information systems for logistics automate the logistics function allowing companies to standardize, share and update data as well as plan and forecast information in the entire supply chain.

Logistics Management is that part the supply chain which plans, implements and controls effective forward and reverse flow and storage of goods, services and related information between the point of origin to the point of consumption in order to meet customer's requirements. Logistics Information Systems are information systems which are involved in managing these processes. While other information systems focus on internal operations of an organization, Logistics information systems capture, process and transmit data across the entire supply chain which starts from the donor and moves to the organization, the supplier and finally to the beneficiaries. The relevance, accuracy, timeliness and reliability of the information will determine the success of the logistics activities.

Humanitarian logistics is unique and different from corporate logistics hence the software required to meet the needs of humanitarian organizations in terms of logistics management is be different from what is required for the corporate organizations. According to Beamon (2004), there are several differentiating factors between the two supply chains. The strategic goals in the commercial supply chain are to maximize profitability and achieve high customer satisfaction whereas in the humanitarian relief chain, they are to minimize loss of life and alleviate suffering. The demand pattern in the commercial supply chain is also relatively stable and mostly predictable while that of the humanitarian supply chain is highly variable and unpredictable in terms of timing, location, type and size.

Beamon (2004) further points out that in the commercial supply chain, the distribution networks are well defined since the number and location of distribution centres are determined while those in the humanitarian supply chain are challenging due to the nature of the unknowns (locations, type, and size of events, politics, and culture). While performance in the commercial supply chains is measured by using performance measures such as Return on Investment and turnover rates, performance in the humanitarian supply chain is focused on output performance measures, such as time required to respond to a disaster or ability to meet the needs of the disaster. For a humanitarian supply chain therefore, it is imperative that information be transmitted as quickly and accurately as possible and that the action required be prompt enough to avert loss of human life.

The humanitarian logistics function involves components such as procurement, transportation, custom clearance warehousing, inventory management, trace and tracking and reporting. A Humanitarian Logistics Information System therefore needs to have some specific functionality for it to achieve maximum results. The documentation functionality is to enable the users to key in important data and to be able to quickly and easily retrieve it when required. The reporting functionality is necessary so that various reports can be generated to be shared with the various players involved in humanitarian operations. This increases accountability and transparency in operations. The planning functionality is required to be able to plan on why, when and where resources will be required and how they will be availed where they will be required. The cross-linking of systems functionality is necessary to interlink the various functions of the organization as well as the various regions that the organization is operating in. If, for instance, there is a regional office in charge of programs in several countries then the systems should be linked so that there is visibility between the regional office and the countries. The software should also be able to provide linkage to supplier, donors and other players in the logistics function. Finally, the tracking and tracing functionality enables prediction and timely adaptation of arrival time for orders, (Blecken *et al.*, 2008).

### **1.1.2 Organizational Performance**

Organizational Performance refers to the extent to which an organization achieves a set of pre-defined targets that are unique to its mission. These targets will include both objective (numerical) and subjective (judgmental) indicators. (Albrecht, 2011) Organizational performance can be measured in terms of relevance, effectiveness, efficiency and financial viability. Relevance will look at the degree to which the organization's stakeholders think the company is relevant to their needs. Effectiveness is the degree to

which the organization is successful in achieving its strategy, mission and vision. Efficiency is how well the organization uses its resources and financial viability is how viable the organization is both in the short and long term, (Mitchell, 2002).

Humanitarian organizations' activities are mostly centered on saving lives and averting further loss of life during crises hence their operations will be deemed successful if they are able to respond to the affected population's needs on time while efficiently utilizing the available resources. These organizations primarily rely on donors for funding, hence responsibility and accountability to these donors plays a crucial role in the organizations performance. The organizations must ensure that there is visibility in their operations; their presence is felt by the communities they are aiding and that they continuously report to the donor on the progress of the projects and how the funds have been utilized.

### **1.1.3 International Humanitarian Organizations in Kenya**

Humanitarian Organizations are organizations whose activities are focussed on humanitarian relief operations. Humanitarian relief operations can be divided into two; disaster relief which involved reaction to disasters and calamities and continuous aid work which involves ongoing programs by humanitarian organizations in cases of crises, calamities and also providing basic needs in areas where the population may not have access to it. There are several international humanitarian organizations running various programs in Kenya. There are five core sectors within which humanitarian organizations operate: health services; water, sanitation and hygiene promotion; food security and nutrition; aid items (food and non-food), and shelter and settlement. Many of these humanitarian organizations also run other programs in areas such as protection, gender,

education, agriculture, psycho-social/mental health support, capacity strengthening, income generation, infrastructure rehabilitation/reconstruction, human rights approaches. Organizations such as Action Against Hunger, Emergency Nutrition Network, Food for The Hungry International and Hunger Plus Inc have various programs including providing food and related supplies for emergency use as well as improving food security. Doctors without Borders delivers medical help to populations endangered by war, civil strife, epidemics or natural disasters. Organizations like CARE and Oxfam work to eradicate poverty and find lasting solutions to poverty and injustice. Save the Children and United Nations Children's Fund work to create lasting change for children and ensure their survival, protection and development. While some of these organizations run programs in one sector, others are multi-sectoral, with programs cutting across various sectors.

According to the European Community Humanitarian Office (ECHO) Factsheet (2013), Kenya is prone to recurrent droughts; particularly affected are the arid and semi-arid lands in the northern part of the country. Structural underdevelopment and chronic poverty put 5.5 million people living in Northern Kenya, mainly pastoralists, in a vulnerable position. People have little or no time to recover from one drought to the next and millions who depend on livestock continue to live precarious lives. The worst drought in 60 years hit Kenya in 2011. Over 3.75 million people needed urgent food assistance, water, medication, sanitation, shelter and protection simply to survive. Humanitarian Agencies quickly stepped in to provide the much needed supplies and avert loss of more lives and aid in recovery.



In cases of emergencies, coordination and communication are vital. The humanitarian organizations need to not only ensure that there is adequate and timely communication, their activities must also be well coordinated to ensure that they respond to the emergency in good time and with the appropriate supplies and personnel to remedy the situation and ensuring maximum impact of their activities.

## **1.2 Statement of the Problem**

Logistics forms a huge part of humanitarian relief operations. Beamon (2004) described the unique characteristics of the disaster relief environment in comparison with commercial supply chains. Unlike commercial supply chains where demand can be predicted and therefore supply be planned, considering the lead times and have the demand met in time, In the humanitarian supply chain, demand is unpredictable since the events leading up to the need for supplies cannot be foreseen. The lead times are much shorter and at times even zero due to the emergency situation. It is also hard to control inventory since the demand, locations and lead times for the various operations vary for instance stock could be kept for a certain location but due to an emergency be required to be transported to a different location. It is therefore imperative that adequate planning and monitoring be done in order to ensure that humanitarian operations are successful.

Information plays a significant role in humanitarian supply chains. The key decision makers within the humanitarian supply chain are the donors who are funding the operation and many NGOs regard the donor as the customer in humanitarian supply chain (Beamon and Balcik, 2006). In the logistics supply chain, information flows from the program managers who communicate the need for supplies based on assessment done on

the ground, then on to the Logistics function which undertakes the sourcing, transportation, custom clearance and distribution to the location where the suppliers are required. Throughout the process the program managers are updated on the progress and the logistics team keeps track of the goods from when they source them through until they are received. In instances where there are programs running, supplies are stored in warehouses and issued as and when required. Therefore there has to be constant supply of information to keep all these activities coordinated and running smoothly.

For humanitarian organizations, performance is pegged on how quickly they respond to emergencies and humanitarian situations and the effectiveness and efficiency of both their response and use of resources. Howden (2009), states that in order to function effectively, humanitarian logistics must coordinate with other actors and be considered throughout the lifespan of humanitarian operations. He further says that logistics information systems enhance logistics activities and provide continuous support across the disaster management cycle phases which are preparedness, response, transition, recovery and mitigation. This optimizes the efficiency and effectiveness and therefore the performance of humanitarian organizations. Logistics Information Systems automate logistics activities to synchronize and coordinate information and data. The need for sharing information and the unity of purpose has driven humanitarian organizations to collaborate and design logistics information systems with the humanitarian operations as a backdrop in order to meet the specific requirements of humanitarian logistics.

A study carried out by Mohammed (2012) across International Humanitarian Organizations in Kenya revealed that all these organizations have implemented

technology solutions to speed up their operations. The researcher asserts that there is a strong relationship between the use of information technology and performance of International Humanitarian Organizations. He identifies use of Information Technology as one of the drivers of performance of the humanitarian supply chain, enhancing cost reduction, timeliness, faster response, continuous improvement and improved collaboration. Nyamu, (2012) argues that lack of proper information affects delivery among humanitarian organizations in Kenya and that technological challenges are among the challenges that can adversely affect the performance of a humanitarian organization. A study done by Kinuthia (2012) reiterates that through investing in Information Technology, NGOs in Kenya attract donor funding, collaborate with other partners, implement target schedules on time, achieve stakeholder objectives and reduce costs. Abdel-Kader and Wadongo (2001) contend that technology (ICT) is one of the key organizational factors that influence the performance of NGOs in Kenya.

These studies have looked at internal information technology solutions implemented to function within the organization. Logistics Information Systems integrate the organization's internal operations with external stakeholders and allow the organization to interact with stakeholders such as suppliers, donors, beneficiaries and other organizations. They transmit and process data across the entire supply chain. It is necessary to assess how these systems which provide for integration of the operations in both the internal and external environment of the organization impact on its performance. Logistics is a major component of humanitarian operations and performance of humanitarian organizations heavily relies on the logistics function. While research has been done to show the need for humanitarian logistics information systems and how humanitarian organizations can

benefit from them, it is important to evaluate the impact of these systems on the performance of organizations which have implemented them. This study therefore sought to answer the following research questions:-

- i. What is the impact of Logistics Information Systems on the performance of International Humanitarian Organizations in Kenya?
- ii. What are the challenges experienced in implementation of Logistics Information Systems in International Humanitarian Organizations in Kenya?

### **1.3 Research Objectives**

- i. To establish the impact of logistics information systems on performance of International Humanitarian Organizations in Kenya
- ii. To find out challenges on the implementation of logistics Information system in International Humanitarian Organizations in Kenya

### **1.4 Value of the Study**

The findings of the study will be of value to management in humanitarian organizations since it will highlight the impact of implementing humanitarian logistics information systems hence the organizations will be able to determine whether it is a worthwhile investment and how they can optimize the system for better results.

The study will also be useful to donors who play a leading role in humanitarian organizations and will guide their decision making in terms of investment in humanitarian logistics information systems in the organizations which they are supporting. The findings of the study will also be useful to students, researchers and other scholars since it will provide additional literature for referencing in this area.

## **CHAPTER TWO: LITERATURE REVIEW**

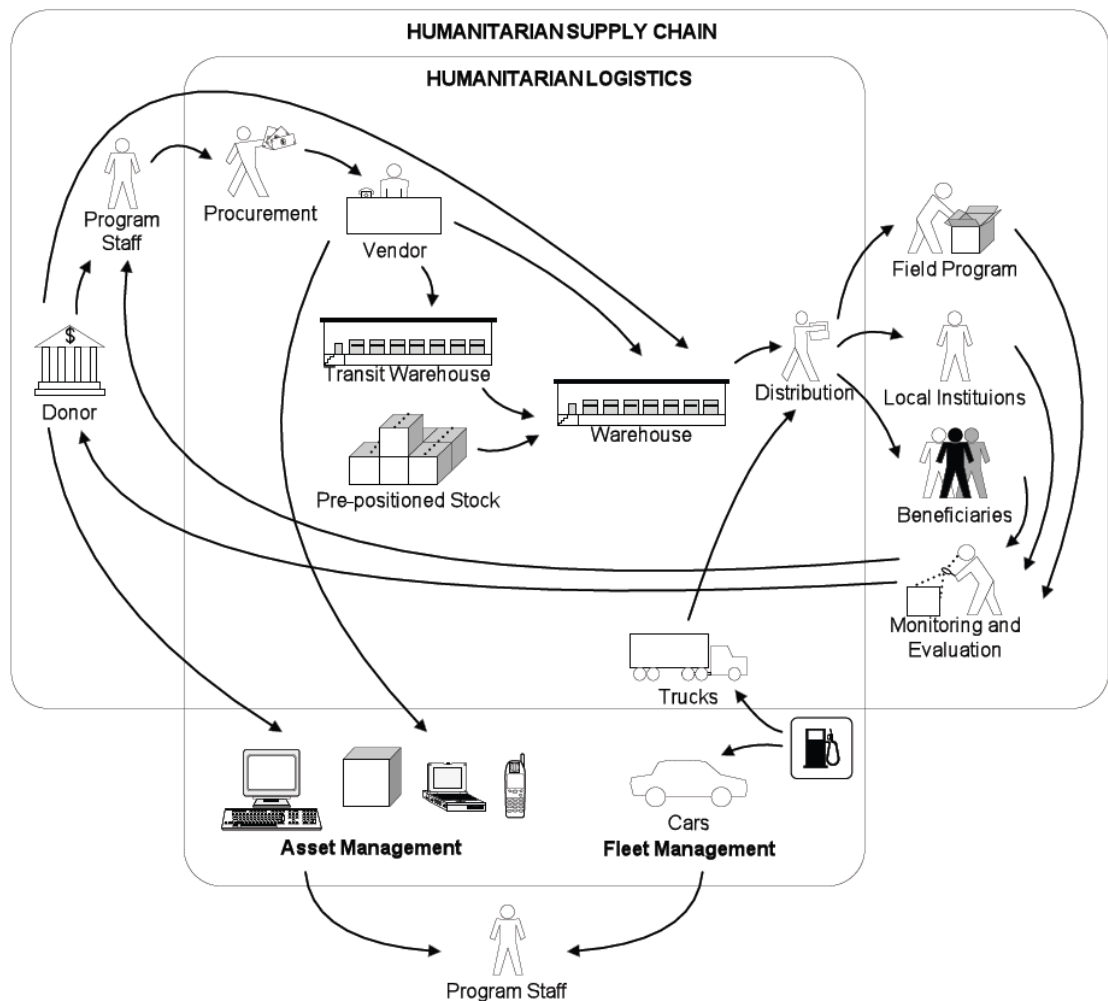
### **2.1 Introduction**

This chapter will review various literature relating to logistics information systems in humanitarian organizations and performance of humanitarian organizations. It will include review of studies done on the humanitarian supply chain, logistics information systems, logistics information systems for humanitarian organizations, value of information systems to humanitarian organizations, challenges in implementing logistics information systems in humanitarian organizations and performance of humanitarian organizations. It will also explain the research gap and the conceptual framework.

### **2.2 The Humanitarian Supply Chain**

A humanitarian supply chain is a network created through the flow of supplies, services, finances and information between donors, beneficiaries, suppliers and different units of humanitarian organizations for the purpose of providing physical aid to beneficiaries (Mentzer et al. 2001). The Humanitarian Supply Chain flows from the donors who fund the humanitarian organizations based on proposals submitted detailing the needs of the beneficiaries based on a needs assessment. The supplies are then procured and either stored in the transition warehouse or taken directly to the main warehouse from where they are distributed to the local institutions and beneficiaries. The programs and projects are monitored and evaluated and a report submitted to the donors. Assets and cars purchased using donors funds are also managed and a report on the assets position, depreciation and disposal if carried out, is submitted to the donors in intervals agreed in the project deliverables.

**Figure 2.1 : The Humanitarian Supply Chain**



**Source: Howden (2010)**

Humanitarian organizations usually include logistic units which can have different functions depending on the organizations or even the disaster and can include Procurement, Warehousing, Fleet Management, Transportation (of both supplies and people), Asset Management, Building Management, Security, Information Technology (IT) and Radio Communications (Howden, 2010)

Thomas and Kopezak (2005) define Humanitarian Logistics as ‘The process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and

materials as well as related information, from the point of origin to the point of consumption for the purposes of alleviating suffering of vulnerable people.

Thomas and Kopezak (2005) further assert that Humanitarian Logistics is central to disaster relief for several reasons. First, it is crucial to the effectiveness and speed of response for major humanitarian programs, such as health, food, shelter, water, and sanitation. Second, with procurement and transportation included in the function, it can be one of the most expensive parts of a relief effort. Third, since the logistics department handles tracking of goods through the supply chain, it is often the repository of data that can be analyzed to provide post-event learning. Logistics data reflects all aspects of execution, from the effectiveness of suppliers and transportation providers, to the cost and timeliness of response, to the appropriateness of donated goods and the management of information. Thus, it is critical to the performance of both current and future operations and programs.

### **2.3 Logistics Information Systems**

There are three flows in the logistics function: material flow, information flow and financial flow. Logistics is as much about the management and movement of information as it is about the management and movement of the physical goods. Information is the lifeblood of a logistics and distribution system. The effectiveness and accuracy of distribution systems depend on the transfer of information, (Farahani et al., 2011). An information system is a mainframe system linking a number of computers together. A logistics information system links up the logistical activities. It integrates a number of information sources, including the order information, purchasing information, production

information schedule, the packaging information schedule, the transport and warehousing information, the distribution information, the payment information and the delivery information. It serves to enable logisticians retrieve data as and when it is required, process data through the system and analyse data (Voortman, 2004).

Logistical information has two major components; planning and coordination and operations. Planning and coordination include the activities necessary to schedule procurement, production and logistics resource allocation throughout the enterprise. Specific components include definition of strategic objectives, rationalization of capacity constraints and determination of logistics, manufacturing and procurement requirements. Operations include the activities necessary manage and process orders, operate distribution facilities, schedule transportation and integrate procurement resources. A logistics information system incorporates modules which enable the operations to be carried out efficiently as well as provide data to facilitate the planning and coordination (Ismail, 2008).

The Logistics information system provides and integrates information needed at the various levels of logistics management. At the Operating level, it supports and enables efficiency of functionalities such as order registration, order processing, inventory planning, warehousing and distribution and transportation and delivery. At the tactical level it supports inventory management, facility planning, vehicle route planning and scheduling and outsourcing. At the Control Level it supports customer service, cost control and asset utilization. At the strategic level it enables activities such as capacity planning and alliances and partnership (Sople, 2007).



## **2.4 Logistics Information Systems for Humanitarian Organizations**

Humanitarian logistics faces a number of challenges. Thomas and Kopezak (2005) state that inadequate use of technology, lack of professional staff and limited collaboration between humanitarian organizations are among the main challenges that need to be tackled. Information flow is the most crucial factor in humanitarian logistics. Logistics information systems serve to improve the flow of information between the players in the supply chain system hence enhance effectiveness and efficiency of logistics in humanitarian operations. Over the years software for use in humanitarian logistics management has been designed and continuously improved to fit into their requirements. Some of the software developed include; The Supply Management System (SUMA), The Logistics Support System (LSS), Helios and Sahana.

The Supply Management System (SUMA) was one of the first SCM tools specifically designed for humanitarian logistics operations in 1992 by the Pan American Health Organization with the aim of improving management when supplying goods to beneficiaries. SUMA helps to manage donated supplies by classifying them from the moment they arrive at their point of entry, and by establishing a prioritization system for the distribution of the supplies to the community, according to the needs of the affected people. The SUMA system also provides information of the flow of donations and their characteristics, allowing production of reports for donors, national authorities, humanitarian agencies and the media about the received supplies and their distribution to the affected areas. This is crucial to guarantee a transparency and accountability in the management of the relief supplies (Blecken, 2010).

SUMA uses inventory management software that consolidates information from the various and independent supply chains that form during a relief operation. Initially intended for the management of medicines during a humanitarian organization, the system was further developed to include all types of donations. The software enables managers gather information and get a more accurate assessment of what needs remain unaddressed, the amount of incoming goods and how they should be managed. However, this system is not compatible with other systems hence the cross-linking function was not available. This software was therefore replaced by SCM tools with more capabilities and functionalities (Tomasini & Wassenhoeve, 2003).

The Logistics Support System (LSS) is a direct successor of SUMA and was developed inputting the recommendations of various countries, NGOs and UN entities after using SUMA. Its main objectives are to use available stock and transport capacities more efficiently. According to the assessment by Blecken (2010) LSS has the advantage of synchronizing and networking information, hence improving transparency in the system. There is also flexibility in import and export of data even within different systems. However, tracking is not possible with this software. Helios was developed by the Fritz Institute, a non-profit organization that works in partnerships with governments, NGOs and corporations to innovate solutions and facilitate the adoption of best known practises for rapid and effective disaster response and recovery. Helios is currently piloted in several humanitarian organizations such as Oxfam, World Vision International and International Medical Corps (Blecken, 2010).

The initiative for development of Helios software was to provide an off the shelf system in the market to meet the requirements of humanitarian agencies. Helios consists of five modules; The Project Management module administrates the open projects, estimating the main needs and managing requests. This is the main module, coordinating the execution of the others when needed. The Request Processing module manages the information concerning issued requests, such as the issuer data, required goods, pickup and delivery locations, etc. The Warehouse module deals with the management of stocks and it can be activated when an issue is received or a delivery is performed. The Mobilization module is focused on donation management, from cash to in-kind goods and services. It is used by organizations to monitor and report on donations, highly improving the information provided to donors concerning the use of their donations. The Procurement module is used to administrate and purchase goods, managing the corresponding quotation requests and executing orders (Christopher & Tatham, 2010).

Sahana is a disaster management project that was created by the Sri Lankan IT Community after the 2004 Indian Ocean earthquake and tsunami. It is a web based automated system mainly focussed on coordination and planning of humanitarian operations Sahana has several modules; those which are relevant to logistics are request aid management, inventory management and the reporting system. The inventory module offers warehouse management features, including registration of incoming goods. The reporting system provides analysis of data in form of reports (Vittoriano et al, 2013).

## **2.5 Value of Humanitarian Logistics Information Systems to Humanitarian Organizations**

Humanitarian logistics involves a wide range of activities taking place in a humanitarian organization. Humanitarian logistics information systems can improve flow of information with other units, in a mutually constructive manner, improving the effectiveness of the humanitarian supply chain. The systems can enhance needs assessment by ensuring that the field staff knows what supplies are available in stock, share lists of supplies including prices and lead times to enable program staff to plan their procurement activities better, keep staff informed of procurement activities hence develop a better understanding of the procedures and creating trust as well as provide more accurate information to the budget holders hence preventing under or overspending of budgets. Further, the systems can provide warehouse inventory reports to program supplies to ensure that the supplies are utilized effectively and enable division of logistics overheads more accurately between the various programs as well as aiding in accurately dividing logistics over head costs into program budgets (Howden, 2009).

According to Thomas and Kopczak (2005), Humanitarian organizations have a common need for integrated information technology solutions that support procurement, distribution through a pipeline, tracking and tracing of goods and funds, flexible and robust reporting and connectivity in the field. Developing flexible technology solutions creates visibility of the processes and increases effectiveness. Further, information systems provide better communication avenues with suppliers and other partners hence increasing effectiveness and efficiency.

Tatham and Christopher, (2014) state that logistics information systems enable supply chain transparency and improved planning. Planning greatly enhances efficiency of humanitarian supply chain operations. The systems support the organization in making decisions on what to store and transport, communication, order tracking and tracing, forecasting, inventory monitoring and cost reduction. They improve responsiveness in the supply chain and enable humanitarian organizations to have the maximum impact on the population through its activities and programs.

Logistics information systems enable better logistics decision making, provide information on costs, lead to more control over the physical distribution and supply of goods and services, make accounting more accurate, help link data and systems with the systems of supplier and assist in accessing the performance of key logistics functions like the number of on time deliveries from suppliers, the number of outstanding payments, the cost of running warehouses or the total inventory value of distribution centres (Voortman, 2004).

According to Thomas (2005), developing flexible technology solutions improves responsiveness by creating visibility of the materials pipeline and increasing the effectiveness of people and processes. Furthermore, advanced information systems create the infrastructure for knowledge management, performance measurement and learning. According to the Fritz Institute, who pioneered the development of Helios Software, the software can provide a number of benefits. It maximizes the impact of humanitarian relief efforts by providing tactical supply chain visibility, from mobilization to warehouse. It also improves efficiency of humanitarian supply chain operations by providing views to a common source of data hence improving coordination across all operating units of the

organization. It automates logistics processes at both the headquarters and field levels and provides tactical visibility from each of these perspectives. The software also enhances the relationship between humanitarian organization and donors by providing users with the ability to trace donations as they move through the entire supply chain. Organizations obtain accurate information about all of their donations, from cash to in-kind goods and services. It enables supply chain visibility from the donor perspective, enabling organizations to monitor and report on donations, improve donor communications, and engage donors more deeply in the work of the organization.

## **2.6 Challenges in Implementing Logistics Information Systems in Humanitarian Organizations**

Jennex, (2011) asserts that the humanitarian community has been slow to adopt new technology for three reasons. First technology is not the main focus for most organizations thus there are limited resources for exploring and exploiting new developments, secondly, they have not been traditionally used to return on investment (ROI) as a basis for making decisions hence communities have failed to identify where and how new technology can save their resources. Third, the decentralized nature of many organizations means that innovation in one location is not easily transferred to other locations. These obstacles mean that humanitarian organizations are often overtaken by technology hence they don't keep track of advances of logistic information systems.

According to Maiers, Reynolds and Haselkorn (2005), humanitarian relief organizations generally view Information Systems as overhead rather than as a fundamental activity. Donors generally view overhead costs as detrimental to a proposed project, so overhead costs are kept to a minimum. Most funding is program based hence program resources are

hardly used to address longer term organization-wide infrastructure needs like logistics information systems.

Lawry, (2009) states that very few NGOs are in position to procure, implement and sustain advanced systems on an organization-wide basis. This is in part because NGOs do not receive grants for infrastructure investment. Donors would rather see funding spent on direct aid to victims. Therefore, NGOs are under constant pressure to keep overhead costs down and generally spend less than 1% to 3% of operating revenues on ICT. Underinvestment in ICT is also the result of decentralization, whereby NGOs often implement only what is necessary to keep field programs running.

Lawry further asserts that most humanitarian organizations usually have operations in remote areas where there is poor or no internet connectivity and little or limited power supply. This poses a challenge to the Information Technology systems which rely on the internet as well as power for their operations. Blecken, (2010) asserts that humanitarian organizations often have to cope with the problem that their funding is earmarked for direct project support and therefore not eligible for long-term investments. The costs of implementing the systems therefore need to be limited. Further, he states that lack of professional staff and high staff turnover are a major challenge in implementing logistics information systems since new personnel have to be trained every so often.

## **2.7 Performance of Humanitarian Organizations**

The ultimate goal of any supply chain is to deliver the right supplies in the right quantities to the right locations at the right time. In the humanitarian relief sector, effective performance means undertaking work in ways that are consistent with humanitarian

principles, mobilising and deploying sufficient financial, material and human resources in ways that are relevant, well-managed, accountable, impartial, durable and ensure good quality Performance measurement for the relief chain is critical, in terms of securing donor funding (accountability) and improving the relief mission (saving lives and reducing human suffering).

There are three broad characteristics that affect performance in the relief environment; these are strategic goals, demand characteristics and customer characteristics. Strategic goals define the objectives of the organization that contribute to the overall performance of the organization. The main objectives for the relief chain are mission effectiveness and financial sustainability. Demand requirements for humanitarian organizations are not predicted but are estimated after the needs assessment is done in the affected area. The lead time is usually zero hence the onus is on the organization to ensure the supplies are availed to the area where they are needed as soon as possible. The customers in a relief chain are the aid recipients. Donors also play a large role in the humanitarian relief sectors and are also regarded as customers. In the humanitarian supply chain, provision of supplies to the aid recipients is often a matter of life and death hence relief organizations performance will be gauged by how many recipients they were able to reach. Donor reporting is also a big part of performance evaluation since it will determine whether the donors will continue funding the organization's programs or not, (Beamon and Balcik, 2008).

Performance indicators used in not for profit sectors are commonly framed in terms of economy of operations, efficiency of management, and effectiveness of strategy.



Economy of operations entails procurement and delivery of outputs, quantity and quality, cost element and timeliness. Efficiency of management necessitates rational use of resources, least costs for maximum results, work planning and timeliness. Effectiveness of strategy entails the extent to which a programme or project achieves its immediate objectives, changes in the lives of target groups, beneficiaries or clients. This looks at the medium and long term perspective, (Ramalingam et al., 2009).

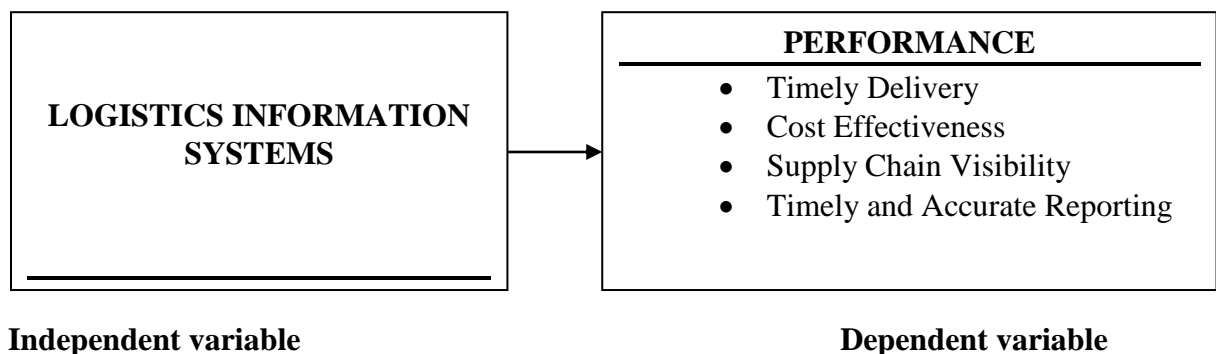
Humanitarian organizations must ensure that they evaluate their performance and keep improving to continue surviving. Beamon, (2004) says that “As resources become tighter, NGOs face new pressures for greater accountability for program impact and quality. Today, contributors, donor agencies, scholars, and relief and development practitioners are all asking: do NGOs practice what they preach? How do we know? How effective are their programs and projects?” The increased frequency and scale of disasters, scarce resources, funding competition, and the need for accountability require more efficient, effective and transparent relief operations. Since logistics is central to relief operations and the most expensive part of any relief operation (Van Wassenhove, 2006), measuring the performance of relief chains has become vital for all organizations involved in disaster management.

Going by these studies, it is evident that logistics is the central focus of humanitarian operations, without which all the efforts would be futile. To ensure success in operations, humanitarian organizations must ensure that their logistics function are operating with a high level of efficiency since the performance of the logistics function will affect the organization’s output in terms of the success of the humanitarian operations.

## 2.8 Research Gap and Conceptual Framework

It is imperative that humanitarian organizations adopt logistics information systems to enhance their operations and ensure they are able to meet the needs of the beneficiaries in a timely manner. While studies conducted in this area have focussed on the need for investment in information technology and potential benefits of information systems in the humanitarian community, there is need to look at the logistics information systems in particular, given their interactions across the entire organization's supply chain the value that they add to the humanitarian organizations. This study explores the impact that logistics information systems has had on the humanitarian organizations in Kenya which have invested in them with a view to shed light on how the information systems have influenced the humanitarian supply chain and organization as a whole as well as the challenges experienced in implementing these systems as shown in Figure 2.1.

**Figure 2.2 : Conceptual Framework of the variables**



**Source: Researcher (2014)**

From figure 2.1, it is clear that Logistics information systems impact on performance variables in international humanitarian logistics, which are timely delivery, cost effectiveness, supply chain visibility and timely and accurate reporting.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter describes the methodology that was used by the researcher in carrying out the study. It included the research design, target population, data collection instruments and the technique for data analysis

### **3.2 Research Design**

The researcher adopted a survey research design in order to gain an understanding of how Logistics Information Systems have impacted on humanitarian organizations. Creswell (2003) states that a survey design provides a quantitative or numeric description of trends, attitudes or opinions of a population by studying a sample of that population. From the sample results, the researcher generalizes about the population.

### **3.3 Study Population**

The study targeted international humanitarian organizations in Kenya. According to the UNOCHA report (2011), there are sixty (60) international humanitarian organizations running various programs in Kenya. All the 60 organizations were selected for the study.

### **3.4 Data Collection**

The researcher used primary data obtained through self administered questionnaires with both open and closed ended questions. The questionnaires were administered through drop and pick later method to the respondents. According to Sproul (2000), a self administered questionnaire is the best way to elicit a report on people's opinion, attitudes, beliefs and values. The respondents targeted were Procurement and Logistics Officers

and Managers since they had adequate knowledge of the procurement and logistics operations of the organizations.

### **3.5 Data Analysis**

The data collected was thoroughly examined and checked for completeness and comprehensibility. Frequency distribution was used to analyse the data. The data was entered into SPSS for analysis. Data presentation was done by use of pie charts, graphs, percentages and frequency tables. The impact of implementation of logistics information systems on performance was analyzed using multivariate analysis of variance (MANOVA)

## **CHAPTER FOUR: DATA ANALYSIS, INTERPRETATIONS AND PRESENTATIONS**

### **4.1 Introduction**

This chapter discusses the interpretation and presentation of the findings obtained from the field. The chapter presents the findings and analysis based on the objectives of the study. The study targeted 60 IHOs. Data was collected from 30 respondents which constitutes a response rate of 50% from four different sectors which was adequately representative of the target population.

### **4.2 General Description of the respondents and sectors**

This survey collected information on 30 organizations in four sectors namely Health services, Food security and nutrition, Aid items (food and non-food) and Shelter and settlement. The composition of the organizations in the four sectors is shown in Table 4.1.

**Table 4.1: Organizations per sector**

<b>Sectors</b>	<b>Frequency</b>	<b>%</b>
Health services	8	27%
Water	0	0%
Sanitation and hygiene promotion	0	0%
Food security and nutrition	8	27%
Aid items (food and non-food)	8	27%
Shelter and settlement	6	20%

**Source: Research data (2014)**

### **4.2 Operation Duration**

The study set out to establish the period which the organizations have been in operation and the findings were as shown in Table 4.2.

**Table 4.2 Operation duration by sector**

	<b>Duration of Operation</b>	<b>%</b>
<b>Less than 5 years</b>	5	17%
<b>6-15 years</b>	20	67%
<b>26-30 years</b>	5	17%
<b>Over 30 years</b>	0	0%

**Source: Research data (2014)**

The data in Table 4.2 shows that majority of the organizations have been in operation for between 6 to 30 years with 67% having been in operation for between 6-30 years and 17% being in operation for 26-30 years. 17% of the organizations surveyed have been in operation for less than 5 years.

#### **4.3 Logistics Information System usage duration**

The study sought to establish how long the organizations have used the software. The results were as shown in Table 4.3.

**Table 4.3 Logistics Information software usage duration**

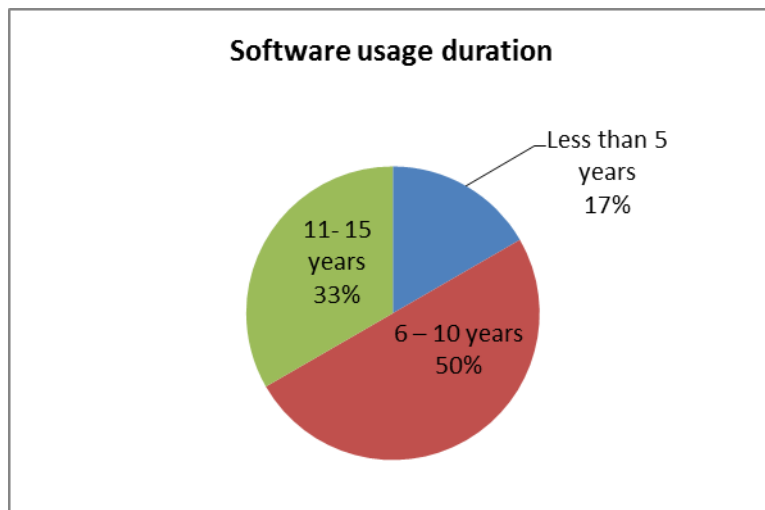
<b>Logistics Information software usage duration</b>	<b>Frequency</b>	<b>%</b>
Less than 5 years	5	17%
6 – 10 years	15	50%
11- 15 years	10	33%
16- 20 years	0	0%
Over 20 years	0	0%

**Source: Research data (2014)**

The organizations which have used the logistics information software between 6 to 10 years were the majority with 50% of the total sample followed by the ones which have used it for 11 to 15 years. There was no organization which has used the software for more than 16 years. With most organizations having used the system for between 6 to 15 years, this was a reasonable period for the respondents to be able to provide information about the impact of the systems on the organization's operations.

A graphical representation of the same can be shown in Figure 4.1

**Figure 4.1 Software usage duration**



**Source: Research data (2014)**

#### **4.4 Functionalities of the System**

The study sought to find out which functionalities the systems being used by the organization had. The findings were as per table 4.4.

**Table 4.4: Functionalities of the system**

Functionality	Organizations		Organizations	
	Frequency	%	Frequency	%
Order processing	28	93%	2	7%
Inventory management	23	77%	7	23%
Transport management	16	53%	12	47%
Supplier management	23	77%	7	23%
Asset management	17	57%	13	43%

**Source: Research data (2014)**

Almost all the organizations use the software for order processing this constitutes to 93% of all the organizations. 77% of the organizations use the systems for inventory management and asset management while 88% use them for supplier management. Slightly more than half of the organizations use the systems for transport management and asset management.

#### **4.5 Agreement level to Timely Delivery**

In order to assess the impact of logistics information systems on timely delivery, the respondents were requested to indicate their level of agreement on various statements on the perceived bearing of logistics information systems on delivery lead times. The responses were rated on a 5 point Likert scale where 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree. The findings were as shown in Table 4.5.



**Table 4.5 Agreement Level to Timely delivery**

	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Logistics Information systems has improved planning for delivery of goods	9	30%	12	40%	6	20%	3	10%	0	0%
Logistics Information systems has improved delivery lead times from suppliers to the organization	12	40%	12	40%	6	20%	0	0%	0	0%
Logistics Information systems improved delivery lead times from the organization to the end user	6	20%	9	30%	9	30%	6	20%	0	0%
Logistics information systems have shortened order processing period	18	60%	12	40%	0	0%	0	0%	0	0%

**Source: Research data (2014)**

From the findings, 70% of the respondents agreed that Logistics Information systems have improved planning for delivery of goods. This is mainly because they systems are used to best monitor the flow of goods in the warehouse hence they can be aware of the current stock and re-order levels and be able to plan for acquisition of additional stock as and when required. 80% of the respondents agreed that Logistics Information systems have improved delivery lead times from suppliers to the organization; this is mainly because the systems are used to as means of communication between the organization and the suppliers hence the organization can easily track the suppliers’ progress in delivery and earmark challenges then address them. The systems also send automated reminders of deliveries that are due and status updates of deliveries hence enabling follow up.

20% of the respondents were not sure. They were of the opinion that the challenge was that the systems notifications and tracking were not enough to guarantee delivery from the supplier since the suppliers' operations and process of acquisition of goods were not encompassed by the system and were out of the organization's control. More than half the respondents were of the positive opinion that Logistics Information systems improved delivery lead times from the organization to the end user since the improved processes and elimination of delays results in shorter lead times. More than half the respondents agreed that Logistics information systems have shortened order processing period which they interrelate with the fact that the orders are done online. This reduces time wastage in protocol and signatures. These findings are synonymous with those of Blecken (2010) who stated that information systems facilitate order tracking and tracing as well as improving planning in the supply chain.

#### **4.6 Agreement level to Cost Effectiveness**

In order to further assess the impact of logistics information systems on cost effectiveness, the respondents were requested to indicate their level of agreement on various statements on the bearing of logistics information systems on cost effectiveness.

The responses were rated on a 5 point Likert scale where 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree. The findings were as shown in Table 4.6.

**Table 4.6 Agreement Level to Cost Effectiveness**

Cost Effectiveness Indicators	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Logistics Information systems has improved consolidating of procurement	12	40%	18	60%	0	0%	0	0%	0	0%
Through use of logistics information systems, it has been possible to achieve economies	6	20%	6	20%	12	40%	6	20%	0	0%
Logistics information system has enhanced competition hence enhanced value for	3	10%	3	10%	15	50%	9	30%	0	0%
Logistics information system has reduced transactional costs	21	70%	9	30%	0	0%	0	0%	0	0%
Logistics information system has enabled easier access to price information and tracking of expenditure hence identifying cost saving	18	60%	6	20%	6	20%	0	0%	0	0%

**Source: Research data (2014)**

In terms of cost effectiveness, the respondents were of positive opinion that logistical information systems have improved consolidation of procurement since all the requirements can be projected and lumped together for ease of procurement and transport. The systems have also reduced transaction costs and enabled tracking of expenditures. This is because the systems maintain records of purchases made and costs hence enabling comparison of the costs and use of the cost information for future purchases. Payment is also transmitted electronically hence reducing the transaction costs. Majority of the respondents were not sure if the logistics information systems have enabled their organizations to achieve economies of scale. As for enhancing competition majority of the respondents were of the idea that the systems only promoted transparency but did not enhance the bargaining power of the organization. Howden, 2009 pointed out that some

of the possible value adds that can be achieved from information systems is provision of accurate information to budget holders and making price information available to field staff. These findings establish this to be the case.

#### 4.7 Agreement level to Supply Chain Visibility

The respondents were asked to respond various indicate their level of agreement on various statements on the bearing of logistics information systems on supply chain visibility. The responses were rated on a 5 point Likert scale where 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree. The findings were as shown in Table 4.7.

**Table 4.7: Agreement level to supply chain visibility**

Supply Chain Visibility Indicators	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Logistics Information systems has enabled donors to get status updates on the procurement process	21	70%	9	30%	0	0%	0	0%	0	0%
Logistics Information systems has enabled the program manager and user departments to track the status of their procurement requests	15	50%	12	40%	3	10%	0	0%	0	0%
Logistics Information systems has enabled sharing of information with suppliers	12	40%	12	40%	6	20%	0	0%	0	0%
Logistics Information system has provided an audit trail for transactions and enhanced	21	70%	9	30%	0	0%	0	0%	0	0%
Logistics information system has enhanced the feedback mechanism across the supply chain.	6	20%	6	20%	12	40%	6	20%	0	0%

**Source: Research data (2014)**

70% respondents strongly agreed while 30% agreed that the systems have enabled donors to get status update on the procurement process. This is because most of systems are automated to give a portal login for the donors to trace the organizations spending. This is seen as promoting transparency to the donors. The systems also enhance and ease audit and traceability of records, providing an accurate audit trail. 50% of the respondents strongly agreed while 40% agreed that the logistics information systems have enabled the program managers and user departments be able to track the status of their procurement requests. Majority of the respondents agreed that sharing of information with suppliers has been enabled through use of logistics information systems. Many respondents were not positive to the systems enhancing feedback mechanism across the supply chain. This was because of security threats of information mostly sensitive being shared across many systems. These findings corroborate those of Thomas and Kopczak (2005) who intimated the need for humanitarian organizations to have integrated information technology solutions since they create visibility of processes and increase effectiveness.

#### **4.8 Agreement level to Timely and accurate reporting**

The respondents were asked to respond various indicate their level of agreement on various statements on the bearing of logistics information systems on timely and accurate reporting. The responses were rated on a 5 point Likert scale where 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree. The findings were as shown in table 4.6.

**Table 4.8: Agreement level to Timely and accurate reporting**

	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Logistics Information system has enabled processing of accurate reports to donors	12	40%	12	40%	6	20%	0	0%	0	0%
Logistics Information system has enabled presentation of reports to donors in a timely	18	60%	6	20%	6	20%	0	0%	0	0%
Logistics information has enabled easy retrieval of data and information	21	70%	6	20%	3	10%	0	0%	0	0%

**Source: Research data (2014)**

40% of the respondent strongly agreed and 40% agreed that Logistics information systems have enabled processing of accurate reports to donors. 60% strongly agreed and 20% agreed that the systems have enabled timely presentation of reports to donors as the reports could be run in real time, as and when required. 70% of the respondents strongly agreed that the systems have enabled easy retrieval of data and information.

#### **4.9 Challenges of Implementing Logistics Information system.**

In order to assess the challenges of implementing logistics information systems, the respondents were requested to indicate their level of agreement on various statements on the challenges of implementing the systems. The responses were rated on a 5 point Likert scale where 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree. The findings were as shown in Table 4.6 .

**Table 4.9 Challenges of Implementing Logistics Information Systems**

	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
<b>Timely and accurate reporting</b>										
There is limited funding for development and upgrading of the logistic information system	21	70%	9	30%	0	0%	0	0%	0	0%
The logistic information system cannot be used in remote areas that the organization is operating in due to poor internet connectivity	24	80%	6	20%	0	0%	0	0%	0	0%
The logistic information system has not been embraced by all the employees in the organization	0	0%	6	20%	6	20%	12	40%	6	20%
There is little support from top management towards supporting the logistic information system	3	10%	6	20%	0	0%	12	40%	9	30%
The costs of implementing, maintaining and upgrading the logistics information software are very high	21	70%	9	30%	0	0%	0	0%	0	0%
The logistics information system is not user friendly	6	20%	12	40%	0	0%	6	20%	6	20%
There is a high turnover of staff who are qualified in the operations of the system	6	20%	6	20%	9	30%	6	20%	3	10%
Downtime in the system results in delays of operations	9	30%	15	50%	0	0%	6	20%	0	0%
The logistics information system is incompatible with systems used by suppliers	0	0%	6	20%	15	50%	9	30%	0	0%
Errors in transactions carried out the system result to losses and costly business inefficiencies	0	0%	6	20%	6	20%	12	40%	6	20%
There is a risk of the system being hacked into and data being corrupted	9	30%	12	40%	0	0%	9	30%	0	0%
The data can be used by unscrupulous people who have access to it to commit fraud	6	20%	6	20%	9	30%	9	30%	0	0%

**Source: Research data (2014)**

The biggest challenge identified by the respondents is in the usage of the system in remote areas. This is widely affected by access of internet and power in remote areas in which most of the organizations have operations. The cost of setting up and maintaining the system was also seen to be a challenge by most of the respondents. The logistics information software are expensive to set up and maintain, posing a challenge to organizations especially since information technology is quite dynamic. The other concern is about the downtime of the system which results in delays in operations. Most of the respondent felt that the support they received from the management was average but some felt that the management did not give enough support. Most of the respondents were of the opinion that the systems were not adapted well by all the employees within the organization and since most of the employees were only concentrating on learning their own departmental systems and not knowing the operations of the entire system. More than half of the respondents felt that there was risk of the systems being hacked and hence resulting in the data being corrupt or sensitive information leaking and used by unscrupulous people. A small amount of respondents thought that the system could have errors in transaction and hence loss of business because the systems are able to detect errors.

#### **4.10 MANOVA analysis to test for relationship significance**

The extension of univariate analysis of variance to the case of multiple dependent variables is known as Multivariate Analysis of Variance (MANOVA). MANOVA allows for a direct test of the null hypothesis with respect to all the dependent variables in an experiment. In MANOVA, a linear function ( $y$ ) of the dependent variables in the analysis is constructed, so that inter-group difference on  $y$  are maximized. The composite variable



y is then treated in a manner somewhat similar to the dependent variable in a univariate ANOVA, with the null hypothesis being accepted or rejected accordingly. Our hypothesis will be given as ‘Is logistics information systems giving a positive indicator to the Performance of International Humanitarian Organizations in Kenya?’ Table 4.10 shows the results of the multivariate tests

**Table 4.10: Multivariate Tests<sup>a</sup>**

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.986	326.658 <sup>b</sup>	3.000	14.000	.000
	Wilks' Lambda	.014	326.658 <sup>b</sup>	3.000	14.000	.000
	Hotelling's Trace	69.998	326.658 <sup>b</sup>	3.000	14.000	.000
	Roy's Largest Root	69.998	326.658 <sup>b</sup>	3.000	14.000	.000
Logistics Information systems	Pillai's Trace	.258	1.623 <sup>b</sup>	3.000	14.000	.001
	Wilks' Lambda	.742	1.623 <sup>b</sup>	3.000	14.000	.001
	Hotelling's Trace	.348	1.623 <sup>b</sup>	3.000	14.000	.001
	Roy's Largest Root	.348	1.623 <sup>b</sup>	3.000	14.000	.001

a. Design: Intercept + Logistics Information systems

b. Exact statistic

**Source: Research data (2014)**

All four tests explore whether the means for each of the groups are the same. The first column contains the values of the parameters (S, M, N) used to discover significant levels in tables of the exact distributions of the statistics. For the first three tests, the value of the test statistic is given, followed by its transformation to a statistic that has approximately an F distribution. The next two columns contain the numerator (hypothesis) and denominator (Error) degrees of freedom for the F statistic. The next column gives us the observed significance levels which are translated as the probability of observing a difference at least as large as the one found in the sample when there is no difference in the populations. In this case, due to the significance values of .000 (sig column) it can be

concluded that the null hypothesis that there is no difference is rejected. These results tell if there is a significant effect of the four on all of the dependent variables, considered as a group. The four different multivariate tests are all significant since their significant variable is less ( $p < .05$ ), so the study concluded that Logistics Information systems did have a significant effect on the four different variable groups. The second part of the test gives univariate tests for the effects of Logistics Information systems on each of the different dependent variables. The results of the tests of between-subjects effects is shown in table 4.11.

**Table 4.11: Tests of Between-Subjects Effects**

Tests of Between-Subjects Effects						
Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Timely Delivery	28.800 <sup>a</sup>	1	28.800	2.404	.141
	Cost Effectiveness	3.200 <sup>b</sup>	1	3.200	.145	.708
	Supply Chain Visibility	.800 <sup>c</sup>	1	.800	.087	.772
	Accurate and Timely Reporting	.000 <sup>d</sup>	1	0.000		
Intercept	Timely Delivery	96.543	1	96.543	8.058	.012
	Cost Effectiveness	94.511	1	94.511	4.280	.055
	Supply Chain Visibility	3.124	1	3.124	.340	.568
	Accurate and Timely Reporting	0.000	1	0.000		
Logistics Information systems	Timely Delivery	28.800	1	28.800	2.404	.001
	Cost Effectiveness	3.200	1	3.200	.145	.008
	Supply Chain Visibility	.800	1	.800	.087	.002
	Accurate and Timely Reporting	0.000	1	0.000		
Error	Timely Delivery	191.700	16	11.981		
	Cost Effectiveness	353.300	16	22.081		
	Supply Chain Visibility	147.200	16	9.200		
	Accurate and Timely Reporting	0.000	16	0.000		
Total	Timely Delivery	1845.000	18			
	Cost Effectiveness	837.000	18			
	Supply Chain Visibility	198.000	18			
	Accurate and Timely Reporting	0.000	18			
Corrected Total	Timely Delivery	220.500	17			
	Cost Effectiveness	356.500	17			
	Supply Chain Visibility	148.000	17			
	Accurate and Timely Reporting	0.000	17			
a. R Squared = .033 (Adjusted R Squared = -.027)						
b. R Squared = .131 (Adjusted R Squared = .076)						
c. R Squared = .009 (Adjusted R Squared = -.053)						
d. R Squared = .005 (Adjusted R Squared = -.057)						

The table above shows that Logistics Information systems had a significant effect on the results of the Timely Delivery ( $p = .001$ ), the results of the Cost Effectiveness ( $p = .008$ ), and the results of Supply Chain Visibility ( $p = .002$ ). We can see from this table that Logistics Information systems has a statistically significant effect on Timely Delivery ( $F(1, 16) = 2.404; p < .005$ ) and Cost Effectiveness ( $F(1, 16) = 3.200; p < .005$ ) and Supply Chain Visibility ( $F(1, 16) = 0.800; p < .005$ ). As such, in this case, we accept statistical significance at  $p < .005$ . Timely delivery, cost effectiveness and supply chain visibility are indicators of performance in humanitarian organizations. The analysis therefore shows that Logistics Information System, having significant effects on timely delivery, cost effectiveness and supply chain visibility, contributes positively to the performance on IHOs.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter gives a summary of the findings of the study on the impact of logistics information systems on performance of IHOs and the challenges faced when implementing the systems. The conclusions of the findings of this study are also highlighted in this chapter. The study presented some notable limitations which have been discussed. Recommendations from the study have been made for policy and practice and this will be an important basis for IHOs to consider and make them more appealing to donors and more effective in their missions. There are areas of interest that came up during the study that unfortunately were not within the scope of the study, these have been highlighted and recommended for further studies and research

### **5.2 Summary of the findings**

There has been Increasing exigency for efficiency and effectiveness among IHOs. Donors are increasingly pressuring the IHOs for accountability and effective use of the funds allocated to them. Beneficiaries are also relying on timely and effective reaction by the NGO to the adversities affecting them. IHO program managers and end users also rely heavily on the supply chain efficiency for them to be able to achieve their planned activities within the stipulated time period. There has been need to integrate all the stakeholders in the supply chain in order to maximize on efficiencies across the system and identify any weak areas in the chain in order for them to be tackled. This has necessitated IHOs to adopt logistics information systems to enhance performance of the supply chain and the organization as a whole. For IHOs, the main indicators of performance in their logistical activities are delivering the goods, services and works

required to the people who require it at the right time and the right place and achieving the best value for money in terms of cost effectiveness. Donor reporting also comes into play since the donors keep a keen eye on the going on of the organizations and their continued funding is determined by the effectiveness and efficiency of the organizations' operations.

This study looks at the role of logistics information systems in the performance of IHOs and highlights the challenges of implementing these systems. Based on the findings of this study, general trends on use of logistics information systems show that a majority of IHOs have implemented logistic information systems, with many of them having multiple functionalities. The most common usage of the systems is in order processing, inventory management and supplier management. Slightly over half of the organizations use the systems for transport management and asset management. In terms of timeliness, the study found out that majority of the respondent agreed that the systems had improved delivery planning and delivery lead times both from the supplier to the organization and from the organization to the end user.

The systems have also resulted in shorter order processing time with the automation of processes and approvals. In terms of supply chain visibility, majority of the respondents agreed that the logistics information systems have improved the visibility of the supply chain process. The stakeholders are able to get a step by step status update on the processes and information is shared across the supply chain making it easy to follow up on deliverables and ensure that bottlenecks are identified and addressed. As far as cost effectiveness is concerned, the study shows that the logistics information systems have enabled consolidation of procurement requirements hence making the procurement,

storage and transportation of goods and reducing the costs. Further, transactional costs have been largely reduced owing to the fact that the entire purchase to pay process is done online, starting from the needs assessment and requisitioning, to the sourcing of the goods and finally to payment of the suppliers. This reduces paperwork and also costs associated with manual transactions. The study also established that logistics information systems have enhanced accurate and timely reporting to donors. With easy retrieval of data and manipulation of data being possible, IHOs are able to run reports in real time and avail these reports as and when they are required by the donors.

As far as challenges in implementing the logistics information systems are concerned, the study established that the cost of implementing, maintaining and upgrading the logistics information software was prohibitive and therefore adversely impacting on the implementation of the systems. Downtime in the systems resulting into delays in operations was also identified as a challenge as was usage of the systems in remote areas due to poor internet connectivity. High turnover of staff knowledgeable in operations of the systems also posed a challenge and so did lack of adequate support from the management. The study also noted that some of the employees did not embrace the systems and were more concerned about their departmental systems and not the entire logistics information system. Data security was also identified as one of the areas that posed a challenge in the implementation of logistics information systems with the respondents agreeing that there was risk of the systems being hacked and data manipulated as well as data being used to commit fraudulent activities by people who had access to it.

### **5.3 Conclusions**

The study concludes that logistics information systems positively impact on the performance of the performance of IHOs, considerably improving efficiency and effectiveness. Most of the organizations studied have used the system for between 6 to 15 years and have been able to identify the positive impact on performance that the systems have had over the period that they have been in use. The systems enable the IHOs to better achieve cost effectiveness hence leading to cost optimization and cost saving. In addition the systems largely improve visibility of the supply chain which is key in ensuring that the supply chain processes run smoothly. Delivery lead times are also improved which means that the organization will avail assistance faster to the affected population, and this means saving more lives and averting suffering for more people within reasonable time. Having implemented the systems, the organizations also find reporting to donors easier and more accurate since the reports are system generated and can be run and retrieved as and when required.

The study further concludes that implementation of the logistics information systems is not without challenges. The costs of purchasing, implementing and upgrading the systems was prohibitive and was not a priority when allocating funds for utilization by the organization. The organizations are also losing employees who have already been trained and have knowledge on how to operate the systems. The study also concludes that logistics information systems are also generally not user friendly and there is resistance by employees to adapt to them upon implementation.

#### **5.4 Recommendations for policy and practice**

From the findings, the study recommends that IHOs in Kenya to seek ways of addressing the challenges facing the implementation of Logistics Information Systems as it was revealed that implementation of logistics information systems positively impact on the performance of IHOs in Kenya. There is need for the management of IHOs in Kenya to fully support implementation and adoption of Logistics Information Systems and increase funding towards them since they have been seen to improve effectiveness and efficiency of the logistics function and hence the performance of the organization as a whole. The study recommends that IHOs should ensure that they put in place measures to address employee turnover and strive to retain employees already qualified in operations of the logistics information systems.

A lot of sensitization and training should be carried out to ensure that all employees are aware of the benefits of the system and make maximum use of it. IHOs also need to put in place suitable measures to ensure access to the system and data is protected and there is no unauthorized access or tampering of the data. In as much as IHOs are not in the business of making profits, they seek to make the impact of their operations felt to the maximum since this will highly determine whether or not donors will continue funding their operations. Since the majority of IHOs rely almost entirely on donor funding, it is in their best interest to ensure that the logistics information systems are working optimally and the most is achieved out of the systems.

#### **5.5 Limitations of the study**

Time and financial constraints meant that it was not possible to carry out an in-depth study on each of the individual information systems and all the other possible



performance indicators of the organizations. The researcher was also unable to administer the questionnaire to all employees of the organizations concerned due to time constraints. Some of the respondents were not willing to complete the questionnaire since they were too busy hence limiting the number of respondents.

### **5.6 Suggestions for further research**

Further research on more comprehensive and comparative case studies of successful implementation and the role played by logistics information systems would be helpful to those organizations which are yet to implement the systems or are in the initial stages of implementation. Future studies could also look at how organizations actually deal with the challenges of implementing the information systems. This would also be useful to those organizations which are dealing with teething problems of the logistics information systems. The study also focused on the IHOs. However, the supply chain includes external parties to the organization, including donors, suppliers and beneficiaries. To further knowledge on the impact of logistics information system, it is necessary to collect data from these stakeholders as well in order to have an overview of the effect of the systems across the entire humanitarian supply chain from different point of view.

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## APPENDICES

### Appendix 1: Questionnaire

1. Name of Organization.....
  
2. What is your designation / title? .....
  
3. How long has the organization been in operation (Tick as applicable)
  - a. Less than 5 years
  - b. 6-15 years
  - c. 16- 25 years
  - d. 26- 30 years
  - e. Over 30 years
  
4. Which Logistics Information Software is in use by the organization? .....  
.....  
.....
  
5. How long has the system been in use by the organization?
  - a. Less than 5 years
  - b. 6 – 10 years
  - c. 11- 15 years
  - d. 16- 20 years
  - e. Over 20 years

6. Which functionalities does the system have?

- a. Order processing
- b. Inventory management
- c. Transport management
- d. Supplier management
- e. Asset management

7. On a Scale of 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree, please indicate your level of agreement with the following statements relating to the impact of logistics information systems on performance of your organization

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Reason
		5	4	3	2	1	
	<b>Timely Delivery</b>						
i.	Logistics Information systems has improved planning for delivery of goods						
ii.	Logistics Information systems has improved delivery lead times from suppliers to the organization						
iii.	Logistics Information systems improved delivery lead times from the organization to the end user						
iv.	Logistics information systems have shortened order processing period						

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Reason
	<b>Cost Effectiveness</b>						
v.	Logistics Information systems has improved consolidating of procurement						
vi	Through use of logistics information systems, it has been possible to achieve economies of scale						
vi	Logistics information system has enhanced competition hence enhanced value for money						
vi	Logistics information system has reduced						
ix	Logistics information system has enabled easier						
	<b>Supply Chain Visibility</b>						
x.	Logistics Information systems has enabled donors to get status updates on the procurement process						
xi	Logistics Information systems has enabled the program manager and user departments to track the status of their procurement requests						
xi	Logistics Information systems has enabled sharing of information with suppliers						
xi	Logistics Information system has provided an audit trail for transactions and enhanced traceability of information						
xi	Logistics information system has enhanced the feedback mechanism across the supply chain.						
	<b>Accurate and Timely Reporting</b>						
xv	Logistics Information system has enabled processing of accurate reports to donors						
xv	Logistics Information system has enabled presentation of reports to donors in a timely manner						
xv	Logistics information has enabled easy retrieval of data and information						

## CHALLENGES

8. On a Scale of 1-5 where 5= Strongly Agree, 4 = Agree, 3 = Not Sure, 2 = Disagree and 1 = Strongly Disagree, please indicate your level of agreement with the following statements relating to the challenges of implementing logistics information systems in your organization.

		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Reason
i.	There is limited funding for development and upgrading of the logistic information system						
ii.	The logistic information system cannot be used in remote areas that the organization is operating in due to poor internet connectivity						
iii.	The logistic information system has not been embraced by all the employees in the organization						
iv.	There is little support from top management towards supporting the logistic information system						
v.	The costs of implementing, maintaining and upgrading the logistics information software are very high						
vi.	The logistics information system is not user friendly						
vii.	There is a high turnover of staff who are qualified in the operations of the system						
viii.	Downtime in the system results in delays of operations						
ix.	The logistics information system is incompatible with systems used by suppliers						
x.	Errors in transactions carried out the system result to losses and costly business inefficiencies						
xi.	There is a risk of the system being hacked into and data being corrupted						
xii.	The data can be used by unscrupulous people who have access to it to commit fraud						

9. What are other challenges, not mentioned above, facing implementation of logistical information system in your organization?.....  
 .....

**THE END**