SUPPLY CHAIN LEAGILITY, ORGANIZATIONAL CHARACTERISTICS AND PERFORMANCE OF HUMANITARIAN AID ORGANIZATIONS IN KENYA

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Supply Chain Leagility, Organizational Characteristics and Performance of Humanitarian Aid Organizations in Kenya

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DECLARATION

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

Signature.....Date.....

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This thesis has been submitted for examination with our approval as University supervisors.

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DEDICATION

This thesis is affectionately dedicated to my family for the support accorded throughout my academic life. They are the love of my life, the reason of my being and the very essence of my existence. It is from their care that my life is pompously outstanding. They are an immense source of encouragement and may God recompense them abundantly.

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LIST OF ABBREVIATIONS AND ACRONYMS

AARP : American Association of Retired Persons

ASALs : Arid and Semi-Arid Lands

BCP : Business Continuity Plans

CAS : Complex Adaptive System

CM : Crisis Management

DF : Degrees of Freedom

ECHO : European Commission Humanitarian Aid Department

ERP : Enterprise Resource Planning

GRA : Grey Relational Analysis

HA : Humanitarian Aid

HAOs : Humanitarian Aid Organizations

IDP : Information Decoupling Point

ISO : International Organization of Standards

JIT : Just in Time

KMO : Kaiser-Meyer-Olkin

MMR : Moderated Multiple Regression

NACOSTI : National Commission for Science, Technology and Innovation

NGO : Non-Governmental Organizations

OC **:** Organizational Characteristics

OCHA **:** Office of the Coordination of Humanitarian Affairs

ODP **:** Order Decoupling Point

PCA **:** Principal Components Analysis

PEV **:** Post-Election Violence

SC **:** Supply Chain

SCE **:** Supply Chain Efficiency

SCI **:** Supply Chain Integration

SCM **:** Supply Chain Management

SCR **:** Supply Chain Responsiveness

SCREL **:** Supply Chain Resilience

SPSS **:** Statistical Package for Social Sciences

UN **:** United Nations

UNEP **:** United Nations Environmental Programme

UN-HABITAT: United Nations Human Settlements Programme

UNISDR **:** United Nations International Strategy for Disaster Reduction

VIF **:** Variance Inflation Factor

WHO **:** World Health Organization

DEFINITION OF TERMS

Humanitarian Aid Organizations **:** These are non-profit making firms entrusted with the responsibility of saving lives, lessening suffering, maintenance of human dignity as well as strengthening preparedness of communities during and in aftermaths of crises and calamities (Heyse, 2016).

Humanitarian Supply Chain **:** The planning, implementing and controlling the efficient cost effective flow in addition to storage of goods, materials and related information from point of origin to the consumption point in mitigating the misery of the vulnerable (Apte, Goncalves & Yoho, 2016).

Supply Chain Efficiency **:** is a measure of how an organization's supply chain harness resources in the best way possible, saving on costs and reducing waste in the process thus enabling humanitarian organizations to achieve its purpose of "serving the maximum lives", and to deliver the best value for money still commensurate with satisfactory quality (Shafiq, Akhtar, Tahir, Akhtar & Kashif ,2021)

Supply Chain Integration **:** Is the degree to which all the supply chain activities within an organization are unified involving effective communication and relationships among all supply chain

members (Pati, Sundram, Chandran & Bhatti, 2016).

Supply Chain Leagility **:** This denotes a hybrid combination of lean and agile supply chain paradigms in the humanitarian setting thus responding to the needs of vulnerable people in a quick, effective, well-coordinated and informed way, while on the other side minimizing on wastes and costs, with the chain able to withstand turbulences and disruptions (Galankashi & Helmi, 2016).

Supply Chain Resilience **:** Denotes the supply chain ability of preparing for unexpected risk events, quick response and recovery to probable disruptions and returning to the original status or grow by moving to a new and more desirable state (Ribeiro & Barbosa-Povoa, 2018).

Supply Chain Responsiveness **:** Is the ability of the supply chain to evaluate and consider needs quickly and the ability to respond to such needs in a timely manner in order to alleviate the suffering of vulnerable people (Christopher, 2016).

Supply Chain Vulnerability **:** It is the susceptibility of the supply chain to the probability and significances of disruptions either within or external to the supply chain (Christopher, 2016).

ABSTRACT

In today's volatile, uncertain, complex and ambigous humanitarian environment, adopting a purely lean or a purely agile supply chain is not effective. Humanitarian organizations are struggling to obtain the highest possible performance from their supply chains by utilizing and adopting various supply chain designs. This is upon realization that despite the huge chunks of money pumped into humanitarian sector, stringent oversight by donors and expectations from vulnerable populations, humanitarian supply chains still respond in a sluggish, inefficient and poorly coordinated manner to emergencies. The purpose of this study was to determine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya. Specifically, the study sought to establish the influence of supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and the moderating effect of organizational characteristics on the performance of humanitarian aid organizations in Kenya. The underpinning theories and models in this study included; Decoupling Point theory; Complex Adaptive Systems Theory, Theory of Constraints, Relational View Theory, Theory of Performance and Grey Incidence Analysis Model. Survey research design was employed for this study as it enabled the combination of both qualitative and quantitative research approaches. The positivist philosophy was used in this study. The study entailed a census of all the 330 humanitarian aid organizations carrying out their operations in Kenya with supply chain managers as the unit of observation. Objectively developed questionnaires were used to collect primary data. The pilot study was conducted from 10% of the entire population. Descriptive statistics and inferential statistics was used aided by SPSS version 24 to facilitate data analysis. Inferential data analysis was done using Pearson Correlation Coefficient and multiple regression analysis through stepwise method. The data was presented using a combination of statistical and graphical techniques. Trend analysis was used to spot a pattern on the sub-constructs of performance of humanitarian aid organizations for five years. The study findings revealed that supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration jointly are positively associated with performance of humanitarian aid organizations. Organizational characteristics was found to have a moderating effect on the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. The findings of this study established that most humanitarian aid organizations had knowingly or unknowingly partially implemented leagility design in their supply chains. The findings further showed the essence of the country to be prepared to reduce the effect of disasters on people and livelihoods. While the study found that resource allocation for disaster preparedness was on the rise, the culture of preparedness was still lacking in the country. Based on these findings and conclusions, the study recommended that in order to achieve and sustain a supply chain that is responsive to the changing needs of vulnerable people, humanitarian aid organizations should design, implement and fully adopt leagility design in humanitarian supply chains. Humanitarian aid organizations are recommended to explore and embrace advanced and emerging technologies to improve their supply chain leagility. The study further recommended for a creation of a common disaster preparedness plan amongst humanitarian actors and formulation of backup and continuity plans to ensure minimal supply chain disruptions. Donors on the other

hand were encouraged to strengthen local capacity of affected communities in preventing, preparing for, mitigating as well as responding to crises and increase their funding on humanitarian aid operations. This research was based on humanitarian aid organizations in Kenya and there is need to undertake similar studies in public or commercial sector to uncover the underlying relationships between supply chain leagility and performance as the findings may identify interesting comparisons.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Supply chain management has come out as a common art with which organizations outflank each other competition wise (Jackson, 2018). Effectual supply chain management is a puzzling and complex role, because currently diverse brands are on rise, products' life cycle is reducing, outsourcing strategy is now being adopted by most of the companies, globalization of business are on rise and advancement of information technology is becoming tremendous (Holweg, 2018). Additionally, the composition of the supply chain impacts the utility and price of a commodity all through its existence in the market. Organizations are making all efforts to obtain the highest possible performance from their supply chains by utilizing varied assorted means in the contemporary period (Chan, Ngai & Moon, 2017). Competitive edge can be achieved with no doubt when a company has adopted an efficacious supply chain strategy and design by utilizing its capabilities on supply chain to realize flexibility, rapid response and efficient cost. In relation to the rising relevance of supply chain management, the competitive focus deviates from rivalry among organizations/firms to contest in supply chain supremacy in the 21st century. Korpela, Hallikas and Dahlberg (2017) emphasized that an effective and efficient supply chain design could guarantee a secure spot in competition.

An organization has the ability to consolidate all its resources to enhance the movement of the products over stream value to achieve needs of consumers if at all its supply chain design is appropriate (Hugos, 2018). Several studies have come up with various supply chain designs, which are mutually exclusive or even collectively exhaustive such as the efficient versus responsive (Manning & Soon, 2016); risk hedging, and agile (Chen & Kitsis, 2017) and market of one versus mass market. There is evidence of movement from independent supply chain patterns to hybrid models such as ambidextrous and leagile supply chains as proposed by Nakandala & Lau (2019). This backs the argument that in the current inconsistent and wavering environment, relying entirely on a purely lean or a purely agile supply chain is not

guaranteed to pay off. According to Korpela, Hallikas and Dahlberg (2017), leagile supply chain outperforms the traditional mutually exclusive designs of a supply chain.

Conversely, natural and manmade catastrophes and crises have substantially increased in magnitude as well as frequency in recent years. According to the United Nations, natural calamities in the coming years will increase in severity, frequency as well as damaging effect (Montz, Tobin & Hagelman, 2017). Humanitarian supply chains are responsible for provision of services in emergencies during disasters by availing food, shelter, medicine, water and sanitation (Montz, Tobin & Hagelman, 2017). When disaster containment is involved, time is an important factor as time saved means lives saved (Apte, Goncalves & Yoho, 2016). Since 80% of disaster and relief operations involve supply chains, proper chain management concepts offer possibilities to increase efficiency and effectiveness of humanitarian operations (Papadopoulos *et al*., 2017). Thus, lean and agile aggregated to leagile supply chain principles are adopted following a disaster to quickly and efficiently respond to it (Apte, Goncalves & Yoho, 2016). Failure to achieve effectiveness and efficiency after the strike of a disaster can lead to lose of lives, undesirable media coverage as well as loss of important donor funding required for future operations (Adem *et al.*, 2018).

Humanitarian organizations are wide and varied, each with its own organizational structure, ways of operating, communicating and making decisions. Offering a rapid and appropriate response during humanitarian disasters can be a herculean task requiring complex coordination. Challenges to humanitarian logistics include physical destruction, which limits logistical pathways; constrained resources, which limit funding during the disaster; federated organizational structures, which result in autonomous, under-defined, and non-unified operations. To save lives and alleviate suffering, the response to emergencies must be timely, effective, appropriate, and well organized. This is where supply chain managers play a key role. Supply chain is central to humanitarian relief. The speed and efficacy of relief programs depends on the ability of supply chain managers to procure, transport, receive and distribute supplies to the site of relief efforts (Rashid, 2018).

1.1.1 Global Perspective of Supply Chain Leagility

Humanitarian supply chain professionals all over the world are faced with the challenge of designing proper supply chains that meet the objective of delivering value and aid to vulnerable people at the same time satisfying donors and funders expectations. This is because of the increase in humanitarian disasters worldwide. The exercise of planning, implementation and controlling of the systematic, feasible movement and storage of goods, materials and associated information from the original point to consumption point with the goal of mitigating the suffering of the vulnerable people is termed as humanitarian supply chain. This form of supply chain encompasses various events that necessitate alertness, strategy, acquisition, transportation, warehousing, inquiry and analysis, custom requirements and clearance among others (Khan, Yong & Han, 2019).

Olaogbebikan and Oloruntoba (2017) identified resemblances between commercial supply chains and humanitarian supply chains. In contrast, Dubey and Gunasekaran (2016) described emphasis on life and death in place of profit and loss, unpredictability and the necessity to hastily change preference and a high number of players in the field as unique characteristics of humanitarian supply chains. Humanitarian supply chains involve flow of aid from donors to the beneficiaries. Additionally, humanitarian supply chains focus on vulnerable populations and their needs unlike commercial supply chains that deal with customer predictable demands and marketplace structures (Khan, Yong & Han, 2019). Predominantly, these commercial supply chains are focused on financial savings, not saving human lives; assume highly controlled communication networks and predictable demand, not the chaos of disasters; and are oriented to serving customers who are both decision-makers and recipients, versus the highly complex relations of response experienced in humanitarian supply chains.

There is need to manage and oversee calamity supply chains to guarantee humanitarian aid organizations benefit from having a supply chain framework set up. Humanitarian supply chain is designed to see to it that the humanitarian aid organizations are not exploited even when acquiring goods and services in times of

emergencies. Worldwide, supply chain experts are in persistent quest for new and inventive methods for building productive and successful supply chains designs that will adjust to quick changes in catastrophic situations. One such design commonly adopted by humanitarian supply chains, all-inclusive is the use of leagile principles in supply chains (Datta, 2017).

The leagile supply chain is a hybrid of lean concept and agile paradigm to form a common supply chain design arrived at by positioning the decoupling point to effectively withstand the inconsistent downstream demand while on the other hand creating a level scheduling upstream from the marketplace (Nayak & Choudhary, 2020). The development of lean concept is credited to Toyota Company and largely the Toyota Production Systems. Lean aims at doing more with less (Mostafa & Dumrak, 2017).The lean concept is essentially a combination of administrative operations with emphasis on eradication of waste in the supply chain, inside and beyond organizations (Bortolotti *et al.,* 2016). Biazzo, Panizzolo and Crescenzo (2016) were of the view that basic principles of lean entails identifying, creating value as well as alleviating waste and generating flow. Consequently, the starting point towards developing leanness is identification of value and definition of value proposition for the customer or consumption points (York, 2018). Mourtzis, Papathanasiou and Fotia (2016) classified the processes within a supply chain into value adding, non-value adding and necessary but not value adding. According to Mostafa and Dumrak (2017), excessive production, waiting, transportation, unneeded movement, unneeded processing, superfluous inventory and damaged goods are the commonly accepted types of wastes.

The agility paradigm, which evolved from flexible manufacturing systems, focuses on the integration of the organization's suppliers, business procedures, buyers and commodity consumption and disposition (Abdi, Labib, Edalat & Abdi, 2018). At first, agility majored on obtaining a zero time wastage establishment and proficiency to changes in product mix and volume and with time reached out to the vast business background (Mangan, Lalwani & Lalwani, 2016). An agile supply chain (Um, 2017) due to its ability to dependably meet market demands, at the same time minimize expenditure, and lowering security risks better suits a changing and unpredictable

business environment. This integrates flexibility as pertains to both resources and coordination of activities (Gligor *et al.,* 2019). Attainment of resource and coordination flexibility make it possible for organizations to address the increasing environmental and operational unpredictability (Teece, Peteraf & Leih, 2016). Thus, when talking of agility, the focus is on responding to unexpected changes in a volatile marketplace within a useful timeframe, denoting flexibility, speed, responsiveness and quality as elements of agility.

Though lean and agile principles have been used within supply chains for some time, in practice leanness does not imply agility. When markets are volatile or uncertain like in the humanitarian context, leanness should be blended with agility into a hybrid leagile strategy to create a more responsive supply chain that will deliver aid in an effective and efficient manner. The literary expression of leagility was presented in design of supply chain to limit resoluteness and overage in supply chain procedures by making it lean and agile. Its beginnings are implicit, yet various papers tending to supply chain management embraced the term. Leagility is the capacity to keep a balance in agile and lean processes of supply chain management and managing the trade-offs between the two points of effectiveness and efficiency. The associated management triggers the efficacy, compound of effectiveness and efficiency, through composition of agility and leanness at distinguishable de-coupling point. This point is the conceptual demarcation where the strategic overlapping of agility and leanness is operationally inevitable as per the customer orientation. At different operational phases of supply chain management, lean and agility play their obvious and required role in the field, so application of one does not mean exclusion of the other (Shafiq, Akhtar, Tahir, Akhtar & Kashif, 2021).

The lean-agile concept has been implemented and researched in different countries globally. In Ireland, the adoption of supply chain leagility practices by humanitarian bodies is a result of donor demand for accountability and resource pressure (Bendul, Rosca & Pivovarova, 2017). This is in line with the advice of Tatham and Christopher (2018) that failure of international humanitarian organizations to achieve efficiency in their operations lead to preventable life loss and certain loss of donor funds. Lodge and Wilson (2016) established that the pressure on humanitarian

organizations to handle their roles skillfully during disasters have been braced in the recent times. The ambiguousness humanitarian organizations have to cope with and high expectation of their performance is what necessitated that they quickly and reliably respond to temporary changes. Therefore, leagility is seen as a better approach by the private sector in the country. The need to be leagile according to Lodge and Wilson (2016) is also been pushed by donors who are pledging millions in donations for the humanitarian organizations and thus pushing for rationalization.

In the United Kingdom, Singh and Pandey (2015), using a case of the United Nations World Food Programme assessed the implementation of leagile system. The study established that due to high increase in both natural and manmade disasters, humanitarian activities have gained attention from both logistics academics and practitioners. There should be a set of principles over which logistics strategies of humanitarian organizations faced with events of disaster are to be developed to stimulate effective response since time saved culminate to saving lives. Supply chain leagility therefore is evolving to be a vital focus of research mainly in humanitarian logistics in disaster containment operations (Tatham & Christopher, 2018).

Companies are trying to reduce inefficiencies in their supply chain to achieve competitive advantages. Lean thinking and agile supply chain are the two common paradigms that the companies are considering in achieving this. Cost reduction and low wastage are the focus of lean supply chain management. Moreover, the organizations with low varieties but high volume purchase stand high chance of benefiting from utilization of lean supply chain practices. Lean supply chain management is not limited to manufacturing companies but can also be adopted by organizations with the motive of streamlining their processes to reduce wastage and activities that add no value. There are several areas in the supply chain where waste in terms of time, cost and inventory can be singled out. On the other side, agile emphasis mostly on the high flexibility and ability cope up with varied situations. This practice is viewed as significant to organizations, which want to adapt to unforeseen changes, like economic swings, technological changes and unpredictable customer demands. Implementation of agile supply chain, offers a firm an

opportunity to do quick adjustment in the sourcing, logistics as well as distribution (Christopher, 2016).

Lean paradigm function optimally in a predictable demand, where accurate forecast can be made. Through elimination of all forms of waste, lean system have high competitive edge base on quality and cost. Humanitarian supply chains characteristically hold a variety of items needed by aid recipients and usually experience loss of products due to theft, misappropriation, poor tracking and control as well as product deterioration (Mohammed, 2018). The agility is a much diverse concept, which needs participation of the whole organization, logistics processes and information systems (Christopher, 2016). The agile supply chain makes an organization to respond effectively in situations where there is unstable customers demand and a highly volatile market. Resilience, integration and flexibility are key features of leagile supply chains. Abdelilah *et al.* (2018) delineates flexibility as the adaptability and versatility where else agility emphasize on the speed that a system needs to adapt making flexibility be a necessary precondition and component for agility. Supply chains play an imperative role in mitigating destruction caused by disasters by delivering items to those in need and ensuring that recovery operations are carried out smoothly (Banikoi *et al.*, 2018).

1.1.2 Regional Perspective of Supply Chain Leagility

The concept of leagile supply chain in the context of humanitarian aid organizations has been researched in the region although only few studies have been published so far. According to Nkwunonwo, Whitworth and Baily (2016), supply chain management is critical to humanitarian organizations operating in Nigeria. According to the study, there has been constant flooding in Lagos due to low coastal location leading to increased number of humanitarian organizations. Neighbors, religious homes and relatives offer aid directly to the victims. This is evidence of a miserable inference on sustainability of disaster management, humanitarian service and supply chains. Application of leagile supply chain help in enhancing the performance of humanitarian supply chains.

Owusu-Kwateng, Hamid and Debrah (2017) reviewed disaster relief logistics in Ghana and how lean and agile practices can be used. The study established that coordination of logistics during relief operations is always an overwhelming task and can endanger lives and properties if quick and practicable actions are not taken. The research demonstrated an effective assessment time but there was delay in delivery of relief commodities. Further, there was revelation on issues relating to availability of resources, coordination of relief actors as well as inventory management, that led to sluggish response to the impacted populous. This ineffective response can be addressed by utilizing leagile supply chain practices.

According to Dufour *et al.* (2018), there are several complex humanitarian challenges facing East Saharan Africa arising from famines, civil wars as well as natural disasters. The population is highly prone to humanitarian calamities in comparison with the rest of the world. It also suffers from lack of national resources available to support people in times of humanitarian crisis, commonly known as coping capacity. In such circumstances, the international communities chip in to support, manage, procure and distribute most important aids (Twikirize, 2017). Nonetheless, since many humanitarian aid organizations are always deployed during the crisis phenomenon, challenges of coordination of the efforts become a big issue. Poor coordination of relief efforts amounts to network congestion and the aftermath could pose a risk to the victims. Hence, the adoption of leagile systems helps solve such challenges in the supply chain (Dufour *et al.*, 2018).

According to Cockton, Lárusdóttir, Gregory and Cajander (2016), the lean approach offer opportunity to accomplish more with less while heading closely to customer/user satisfaction. Christopher (2016) highlight the importance of this philosophy in which he indicate that the firm's viability largely relies on how well it can respond to the needs of customers and still remain lean. Previously, supply chains were designed to achieve service optimization and minimize costs. This is different today as more emphasis is put on supply chain resilience described as the capability of the supply chain to adapt to abrupt occurrences in order to proficiently counter the unfavorable impacts of the occurrence (Dufour *et al.*, 2018).

Lean and agile paradigms have attracted substantial interests currently forcing industries globally to upgrade their systems to the paradigms for purposes of fostering their performance (Christopher, 2016). The contemporary market trends calls for a more practical proposition that assimilate the promising facets of both lean and agile structures. Through this inspiration, leagility paradigm has developed as features of the two paradigms have been combined for a robust strategy. Dufour *et al.*, (2018) noted that when agility first became known, leanness and agility were essentially considered different in composition and structure and agility was considered a new paradigm, which would replace leanness. In this regard, Christopher (2016) accentuated that despite the fact that both paradigms could be effective, organizations need to be particular with the time and place to apply them. Additionally, agility and leanness could be combined sufficiently to form a common supply chain, which offers customers/beneficiaries more relief.

1.1.3 Local Perspective of Supply Chain Leagility

In Kenya, leagile supply chain design have been implemented by numerous humanitarian organizations and researched by different scholars. According to Koori and Chirchir (2017), NGOs are important in Kenya as they have the ability to achieve impacts faster as compared to the government. The development of these organizations have helped and relieved the government of its pressure of delivering aid to the citizens. As supply chain operations increase, leagile management needs to be handled with utmost professionalism since humanitarian organizations receive funding from donor institutions who expect accountability of the organizations by following laid down supply chain procedures as set in the grant agreements. Leagile practices adoption within the humanitarian sector are highly desirable and this ensures that supply chain non-critical activities and operational costs are reduced to ensure higher efficiencies.

Kuria and Chirchir (2014) examined the extent of implementation of supply chain leagility in humanitarian organizations in Kenya and how it improved their performance. The study noted the numerous humanitarian catastrophes experienced in Kenya substantiating the intensity and significance of humanitarian activities in

the country. Muthee and Thogori (2021) on the other side found out the challenges faced by humanitarian supply chains in Kenya as failed comprehension of the important role of supply chains in humanitarian operations, delays in humanitarian tasks, request vulnerability and high expenses. Muthee and Thogori (2021) further established that half of humanitarian organizations have non-performing supply chains resulting to movement towards leagile supply chain by humanitarian organizations operating in Kenya.

The leagile supply chain by virtue of being lean and agile, is a more superior supply chain thus enhancing performance of humanitarian organizations. Leagility ensures efficiency and effectiveness along humanitarian supply chains resulting to more efficient resource utilization, reduction in response time, improved impact of activities and guarantees meeting time and expenditure targets (Mundia, Nyaoga, Ngacho & Auka, 2021). Supply chain leagility facilitates reliable and resilient supply chains to boost performance of humanitarian organizations. Reliable humanitarian supply chains ensure that inventory is delivered on time and in sufficient amounts, while resilient supply chains are adaptable to different desired states depending on the type and magnitude of the disaster (Gitonga, 2021). Collaboration with other humanitarian partners and organizations, robust information technology infrastructure and staff with the required expertise are key. All this is to meet the primarily objective of the humanitarian aid organizations, which is to save lives, mitigate affliction and maintaining human decency in times of and after crisis while at the same time formulate proficiency in case of similar occurrences (Mokua & Kimutai, 2019).

1.1.4 Humanitarian Aid Organizations in Kenya

International humanitarian entities are collaborating in provision of relief aid to numerous people suffering globally (Weiss, 2018). World Health Organization (WHO) and UN (FAO) make sure that food is availed to those at risk of starving. In the same way, UNHCR and IOM set up camps in addition to other facilities for people forced to vacate their homes. In the event of disasters, WHO further offers protection to the affected people against ensuing diseases, UNICEF on the other hand

collaborate with other NGOs including Save the Children to provide education to children affected by calamity.

As explained by Maria, Githii and Ombati (2018), categorization of humanitarian entities is manifold; government-sponsored humanitarian entities, privately sponsored and registered as NGO's, faith-based humanitarian organizations established by churches and mosques and organizations affiliated to the United Nations Organization (UNO). According to Behl and Dutta (2019), there are many humanitarian organization operations in developing world and every humanitarian organization has the supply chain included. These organizations can be broadly divided into those that are purely originated and are managed by Kenyans and those that are foreign in origin and control. According to Wanjiru (2018), these humanitarian supply chains avail support to fasten readjustment and adaptation, to help create viable living conditions and create the possibility of development. A practical example on the important role played by humanitarian organization in Kenya was the assistance of the 2008 Post-Election Violence (PEV) victims.

Kenya has had its fair share of natural disasters and manmade disasters, particularly with the increase of terrorist activities in the country. A comprehensive humanitarian relief establishment has been growing since the Second World War (Puchner, Karamagioli, Pikouli, Tsiamis, Kalogeropoulos, Kakalou & Pikoulis, 2018). This includes multilateral agencies like the United Nations, World Food Programme, Oxfam, Care International, Medicins sans Frontieres and The International Committee of the Red Cross. Governments, multinational organizations, NGOs, corporates and individuals, support these international humanitarian organizations heavily. Humanitarian organizations in Kenya have been the first line of response when Kenyans are faced by various humanitarian challenges. They play a significant role when the country faces natural and manmade humanitarian crises. This is evident from the work they do in arid areas, during floods, disease outbreaks and conflict and terrorist activities in the country (Mutindi, 2019).

According to Namagembe (2020), humanitarian entities participate majorly in two forms of activities; disaster relief and development activities. The relief activities

encompass the provision of relief for victims of major disasters and temporary mechanism seeking to provide goods and services for lessening risk to human. Development activities on the other hand are aimed at long-term measures focusing on community self-sufficiency and sustainability. The activities entails creation of immutable and stable infrastructure, healthcare, housing and food. A number of humanitarian enterprises merely participates in relief activities and others get involved in developmental activities and others in both (Too, 2020).

The environment in which humanitarian aid organizations operates in Kenya is highly unstable, with high probability of effect from political and military influences. The operation is further inefficient due to absence of joint planning and inter-organizational collaboration (Kenyanya, 2022). The entities handles insufficient logistics infrastructure in addition to shifting origins and destinations for relief supplies devoid of warning. Complications further results when disasters are experienced in remote areas as it happens in most cases. Whichever the case, emergencies demand clear coordination and communication. Humanitarian entities have to ensure there is adequate and timely communication and response to emergencies as well as required supplies and personnel for remedying the situation and making sure of maximum impact of their operations to vulnerable populations (Muthee &Thogori, 2021).

1.1.5 Performance of Humanitarian Aid Organizations

Weiss (2018) described a humanitarian as one who is sternly involved in advocating for the well-being of all humankind without biasness on grounds of gender, ethnicity, sexual orientation, religion or race. The goal of a humanitarian is to salvage lives, alleviate affliction and uphold human decency (Weiss, 2018) achieved by liberation and protection of refugees, housing and feeding the homeless, or promoting recovery from the after effects of natural disasters and civil disorder. Humanitarians combat disease, famine and unrest even if it means taking risks in unfriendly localities and weather and persisting even when the risks of abduction, death threats, loss of lives and other forms of abuse from some unfriendly societies. Humanitarians uphold the wellbeing and opinions of all people, facilitate change in human behavior, and offer

assistance in form of money and other necessities to those in need. The necessities can be in terms of food, clothing, housing as well as equipment and medical supplies with the ability to calm the victims in distressful and miserable situations (Collier & Betts, 2017).

Humanitarian organizations that have effective SCM system gain from precise, accountable, fair and accurately documented procurement process. Generally, the performance of not-for-profit entities is dependent on their capability of raising funds with a view to fulfilling their goals and objectives (Mangan & Lalwani, 2016). As per the findings of Clarke (2018), humanitarian organizations need to focus solely on presently required monetary resources and have an exclusive concentration on fundraising as well as financial indicators as this has the ability of shifting the attention from other facets of performance associated with output, effectiveness, quality in addition to client satisfaction. The authors make the observation that measures often are concerned with the outcome of organization activities, measured through assessment of the general impact of the activities carried out in addition to efficiency and efficacy as pertains to resources expended.

Variety of researchers have come up with metrics that can be utilized in the assessment of humanitarian performance. According to Maghsoudi and Pazirandeh (2016), resources, output and flexibility metrics can be utilized to assess the efficiency, effectiveness as well as ability for responding to a varying environment. Conversely, Wei (2019) developed a framework for examining the financial performance of humanitarian entities. The framework is composed of fundraising efficiency, public support and expenses as well as cost efficiency. In the same way, standards for Charity Accountability of the Better Business Bureau came up with a framework to measure performance of NGOs. In their framework, performance is assessed on aspects such as financial, effectiveness as well as governance. In the model, financial aspect is not exclusively represented by fundraising efficiency but in addition entails management and production of concise and accurate financial statements in addition to budgets. American Association of Retired Persons (AARP) as cited by Ramadan and Borgonovi (2015) also came up with an NGO performance

measurement model, consisting of organizational leadership and integration, resources and stewardship, as well as social impact value.

In Kenya, humanitarian entities have huge reliance on donor funding to roll out their operations, leading to responsibility to be accountable (Pocock & Whitman, 2016). The procurement processes for such entities is subject to periodic audits as they aim at obtaining internal and external assurance of observance of value for money and accountability principles (Pocock & Whitman, 2016). Consequently, with increased funding attribute to rising number of disasters, accountability, transparency and value for money are becoming critical principles to donors. The primary role of humanitarian supply chain encompass getting value for money, attainment of competence and potency, fostering fair competition among the vendors, as well as enhancement of answerability, openness and ethics. This differs from the private sector entities whose major objective is profit maximization. Over the past decade, the humanitarian entities have experienced increased pressure from donors who requires them to provide proof of meeting their objectives in both efficient and effective manner. As donors develop more increased involvement with regard to expenses, humanitarian organizations find themselves in increased scrutiny with regard to monitoring impact of aid, not merely the input and output but the entire operation (Gorman, 2019). Consequently, the organizations have to develop a more result orientation, accountability and transparency in their operations.

1.2 Statement of the Problem

The preparedness and the capability of humanitarian aid organizations to act in the face of disasters and have proper supply chain coordination is moot (Shareef, Dwivedi, Mahmud, Wright, Rahman, Kizgin & Rana, 2019). This concern arises due the increasing number of emergencies putting pressure on humanitarian aid organizations to deliver aid in an appropriate way (Olaogbebikan & Oloruntoba, 2017). The ASALs (vulnerable to hazards) of Kenya make up more than 80% of Kenya's landmass supporting nearly 30% of the total human population (Njoka *et al.*, 2016). About 70% of the disasters in Kenya are hydro-meteorological in nature particularly droughts, floods and disease outbreaks among others. This calls for

responsive and robust humanitarian supply chains to deliver aid when needed, in a timely manner to vulnerable populations upon colossal donor funding (Njoka *et al*., 2016).

Despite the huge chunks of money pumped into the humanitarian sector, stringent oversight by donors and expectations from vulnerable populations, humanitarian supply chains still respond in a sluggish, inefficient and poorly coordinated manner to emergencies (Paul, 2019). Mark you, about 80% of disaster and relief operations are related to supply chains (Maghsoudi, Zailani, Ramayah & Pazirandeh, 2018). Therefore, the poor performance of humanitarian aid organizations is attributed to poor management of their supply chain operations (Bealt *et al.*, 2016). Thus, the inference that humanitarian aid organizations are performing way below the expected levels. Sinha (2019) supports this by concluding that 50% of humanitarian aid organizations have non-performing supply chains. Jahre (2017) described humanitarian supply chains as multiple, global, dynamic and temporary. This is because these supply chains face unpredictability and intricacy same as if not greater than that faced by commercial-world supply chains and involve a wide-range set of collaborators from both private and public sectors, with little systemization. This makes them lesser active than their commercial cousins do. Le Pennec and Raufflet (2018) added that the environment in which humanitarian aid organizations operates in is highly unstable, with high chances of disruptions. The humanitarian operation is further bungling due to the absence of joint planning and inter-organizational collaborations. Moreover, little is known about the moderating effect of organizational characteristics. Investing in better performance of humanitarian supply chains could have profound and lasting impact on society (Wagner & Thakur-Weigold, 2018).

This study aimed at bringing efficacy into humanitarian sector by looking into the concept of supply chain leagility. Predominantly, the concept was discussed in the context of commercial supply chains (Fadaki, Rahman & Chan, 2019) and only a few number of academicians and practitioners linked supply chain leagility to humanitarian operations (Kuria and Chirchir, 2014; Purvis *et al.*, 2016; Koori and Chirchir, 2017). Qamar and Hall (2018) found that the two paradigms of lean and

agility could not co-exist (mutually exclusive) where else Purvis *et al*. (2016) described them as complementary concepts that need to be in balance as both concepts strive for an effective organization, creating maximum value for its clients. The concept of supply chain leagility has been globally accepted (Galankashi & Helmi, 2016). A number of humanitarian aid organizations have adopted leagility design, despite its poor documentation limiting its full adoption, to increase efficacy in their supply chains (Ponnusamy, 2019). Concisely, the employment of the leagility concept is still immature and a comprehensive overview of the concept barely exists. Previously, the lean and agile paradigms have been studied separately with dominance on the agile side (rapid response) of humanitarian operations. This inclination towards agile process and effectiveness procedures negated the need of lean processes and efficiency procedures and made leagility (efficacy) an observable gap, creating the need to study lean and agile paradigms as hybrid, supportive of each other. This therefore creates a gap for a specific study that focuses exclusively on supply chain leagility. This study sought to fill this gap in literature by carrying out a research on supply chain leagility and performance of humanitarian aid organizations in Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of this study was to determine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya.

1.3.2 Specific Objectives

The specific objectives for this study were:

i. To examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya.
ii. To establish the influence of supply chain resilience on performance of humanitarian aid organizations in Kenya.

iii. To determine the influence of supply chain efficiency on performance of humanitarian aid organizations in Kenya.

iv. To examine the influence of supply chain integration on performance of humanitarian aid organizations in Kenya.

v. To determine the moderating effect of organizational characteristics on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya.

1.4 Research Hypotheses

$H_0$1: Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya.

$H_0$2: Supply chain resilience does not significantly influence the performance of humanitarian aid organizations in Kenya.

$H_0$3: Supply chain efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya.

$H_0$4: Supply chain integration does not significantly influence the performance of humanitarian aid organizations in Kenya.

$H_0$5: Organizational characteristics does not have a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya.

1.5 Significance of the Study

The study was essential as it sought to shed light on supply chain leagility and performance of humanitarian aid organizations, with the understanding that performance is very critical in the functioning of humanitarian aid organizations. This is because ultimate beneficiaries rely on the humanitarian supply chains to provide emergency assistance in times of disasters. The significance of this study is manifold as the study findings would be beneficial to various stakeholders as follows:

1.5.1 Humanitarian Aid Organizations

The findings of this study would be useful to humanitarian aid organizations, as it would enable them to get insights and understand the relationship between leagile supply chain and humanitarian organizational performance. This would enable managers and other decision makers in humanitarian aid organizations to implement supply chain leagility to enable their organizations to operate more effective and efficient supply chains, which enhance cost savings and are resilient and responsive to unpredictable demands of unstable environments as is the case of humanitarian sector.

1.5.2 Researchers

Researchers would benefit from the findings of this study as it would provide them with more information for future research and pave way for more humanitarian research. The study findings would assist scholars and researchers in gaining new knowledge that goes a long way by adding its contribution to the knowledge domain. This study avails crucial data for administrators and researchers to be able to decide whether employing one of the mutually exclusive designs or a hybrid supply chain designs would help achieve the desired performance.

1.5. 3 Supply Chain Managers

Supply chain managers would use the findings of this study in their endeavor to design more leagile supply chains. This study would help and advice on the reduction of the over reliance on commercial supply chain management principles in humanitarian supply chain management. The outcome of this study would create a standard procedure for supply chain managers to employ both lean and agile techniques optimally in their supply chains to maximize organizational performance. The study would as well guide humanitarian supply chain practitioners in setting up their objectives, suppositions and resolutions, aimed at enhancing the effectiveness and efficiency of relief operations.

1.5.4 Donors and Well-wishers

Donors and funders pressure humanitarian entities, requiring them to provide proof of meeting their objectives in both an efficient and effective manner. This study gives donors an overview of the humanitarian operations and proposes possible supply chain designs that bring about accountability, transparency and value for money. This study also displays resource mobilization and utilization as useful elements to donors as they favor funding humanitarians with demands of knowing how their funds are utilized expecting to see tangible and measurable results.

1.5.5 Humanitarian Supply Chain Actors

The research focus of this study is expected to be significant as it relates to humanity and societal welfare. Since, the study aimed at establishing the influence of supply chain integration covering coordination, collaboration and information sharing among actors, the results of the study would benefit the entire humanitarian community to have a more precise comprehension about the coordination mechanisms during emergency assistance in the event of a disaster. The study would boost the responsive ability and inseparability of humanitarians in disaster containment. The concept of supply chain leagility would help humanitarians learn to respond to disasters and in quick reconfiguration of their supply chains in difficult conditions. This would potentially save many lives.

1.5.6 Government and Policy Makers

The findings provide policy makers with viable opportunities to revise the existing policies related to humanitarian operations. The study also provides a breakthrough to policy makers and government to draft more laws and regulations to legislate humanitarian sector striking the delicate balance between protecting public interests and providing an enabling environment for humanitarians to pursue their charitable purposes. International, national and subnational actors would be required to come together with humanitarian supply chain actors to endorse the culture of preparedness that is needed in Kenya.

1.6 Scope of the Study

This study was carried out on humanitarian aid organizations operating in Kenya. As derived from the NGO Coordination Board of Kenya, there are 330 humanitarian aid organizations with established supply chains that are actively involved in humanitarian work in Kenya. The study purposefully focused on the supply chain managers (unit of observation) of the aforementioned humanitarian aid organizations. The study was a census of all humanitarian aid organizations (unit of analysis) in Kenya. Data was collected through the administration of questionnaires to supply chain managers. The choice of humanitarian aid organizations was due to the nature of operations of these organizations, which strive with very particular factors in a volatile, unpredictable, complex and ambigous environment, which necessitate rapid and efficient response. The study was established on the following independent variables; supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration and their influence on the performance of humanitarian aid organizations in Kenya with organizational characteristics as the moderating variable.

1.7 Limitations of the Study

The study faced a challenge of resistance by respondents to answer questions relating to performance of humanitarian aid organizations, occasioned by the confidentiality policy of most entities in the humanitarian sector. This was however alleviated by the introduction letter provided by the university that indicated that the data sought in the survey was for academic purposes only, and would be treated with utmost confidentiality. This enabled respondents to freely avail the requested information towards the success of this study. Additionally, there was a limitation of lack of information coming from the humanitarian aid organizations' supply chain managers for fear of information confidentiality not being honored by the researcher as well as victimization. The researcher delimited this by obtaining permission from the management of the firms and from the NGO coordination board of Kenya before proceeding to collect data as well as assuring the respondents of their anonymity by asking them not to indicate their names on the questionnaires. The limitation of the

respondents not giving accurate information due to respondents' divided attention to questionnaires, and the desire to safeguard the reputation of the humanitarian aid organizations was delimited by informing the respondents of the magnitude and importance of the data to be collected as well as the ethical requirements expected of them upon consenting to participate in the study.

Securing the valuable time of supply chain managers to respond to the questionnaires was a big challenge, therefore, the researcher allowed the respondents adequate time to respond to the questionnaires, sensitized the supply chain managers on the benefits and significance of the study and ensured that follow ups were made. The study examined the influence of four supply chain leagility components; supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration on the performance of humanitarian aid organizations in Kenya with organizational characteristics as the moderating variable. Inter alia, these supply chain leagility components may influence the performance of humanitarian aid organizations in Kenya. Thus, this study was not able to wholesomely consider other leagility components, among them, demand management, Just in Time, Total Quality Management and Six sigma, as they were deemed not sufficiently applicable in the milieu of humanitarian aid organizations. This provides an opportunity for other researchers and scholars to explore the relationship between these supply chain leagility components and performance of other sectors of the economy in Kenya. Further, the study assumed that all the humanitarian aid organizations have well established and structured supply chains that enable them respond to the needs of vulnerable people. Additionally, the study assumed homogeinity in the operations of humanitarian aid organizations in pursuant of their objectives, as they are entrusted with the responsibility of saving lives, lessening suffering and maintenance of human dignity and are guided by humanitarianism principles.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical framework for which different theories and models relevant to the study are reviewed, conceptual framework and the discussion of study variables, empirical review and critique of the existing literature relevant to the study, summary of literature reviewed and research gap.

2.2 Theoretical Framework

A theory can be explained as a set of interlinked concepts, definitions as well as prepositions presenting a systematic view of a phenomenon through specifications of interactions among variables for purposes of explanation and prediction of phenomena (Creswell & Creswell, 2017). The underpinning theories and model in this study included; Decoupling Point Theory; Complex Adaptive Systems Theory, Theory of Constraints, Relational View Theory, Theory of Performance and Grey Incidence Analysis Model.

2.2.1 Decoupling Point Theory

The Decoupling Point Theory is credited to Romme and Hoekstra (1992) who intended to furnish a concept for integral control. It has since become the most common used theory in literature for supply chain responsiveness as used by Cristopher et al. (2001), Mason-Jones et al. (2000) and Naylor et al. (1999). This point is the conceptual demarcation where the strategic overlapping of agility and leanness is operationally inevitable as per the customer orientation. The traditional decoupling point theory centers on a point in the supply chain where distinction is clarified among push and pull point in the pipeline. At the point, the Order Decoupling Point (ODP) is sporadically used as a critical stock point, with the supplies of the final product being held up to the time the end clients need them. Thus, the ODP give assurance to upstream players against fluctuating demand enabling them to accomplish smooth system dynamics. This implies they distinguish

forecast driven (upstream) from demand driven (downstream) pull part (Mason-Jones et al., 1999).

Leagility on the other hand need both side of the ODP to utilize pull scheduling and thus create conflict. According to Mason-Jones *et al*. (1999) the solution to the push-pull challenge, requires consideration of an informative supply chain, where the demand data is utilized to a given upstream point in the pipeline. Consequently, market sensitivity is arrived at in significant part of the supply chain, which allows for enhanced responsiveness. Their argument is that for purposes of attaining the information-augmented chain, firms need to separate the ODP in a physical and an information decoupling point.

The physical Decoupling Point can additionally be used following a postponement strategy, which enables organizations to produce in advance while simultaneously deferring the last get together up to the point customized end customer demand is established. In doing this, organizations create capacity of delivering the various modules ahead of time, making of framework elements just as economies of scale. At the point when one fuse the information decoupling point (IDP), entities that are further upstream can utilize real-time demand information in their ordering and creation tasks, permitting them to accomplish more market-affectability. Such firms create client responsiveness. Taking into account that supply chain is seen as agile as the responsiveness of the least responsive player, this cultivates the responsiveness of the whole chain. Thus, lead times and inventories are limited, accelerating measures and improving the efficiency of the chain.

According to this theory, the supply chain responsiveness can be increased by relocating the decoupling points in the supply chain. Hence, the theory aid the present study by highlighting how the supply chain responsiveness objective can be attained. One factor that affect the responsiveness of the supply chain is having long lead-time. With the rapidly changing requirements, there has been a need for shorter lead-time and increased responsiveness. Humanitarian organizations have reacted to this by shifting the decoupling point upstream in the supply chain. In order to remain responsive, humanitarian organizations have focused on the internet advancement to

establish high-speed information exchange and enable access to first-hand information, product standardization and modularization, associating with suppliers that deliver the ordered amounts at the agreed place in the right time and fast transportation structures. All these are the premise of the Decoupling Point theory and they assist in increasing the supply chain responsiveness.

2.2.2 Complex Adaptive System Theory

Complex Adaptive System (CAS) entails an interconnected network of numerous agents who respond adaptively to variations in environment in addition to the system of agents in it. For example, humanitarian entities in Kenya have their operations in a volatile environment, which varies occasionally because of disruptions and they have the necessity to cope and survive in the same environment. Consequently, their operating environment is composed of a fair share of chaos and disorder, complex non-linear systems struggles to be neither overly stable nor unstable (Wycisk, McKelvey & Hulsmann, 2008). Holland (1995); Choi, Dooley and Rungtusanatham (2001) perceived CAS as a type of framework that over time forms reasonable structures as far as effectively expressed properties of adaptation and self-reorganization are concerned. In a CAS, adaptation implies that the system's agents or components have responsiveness, flexibility, reactivity and occasionally proactive in handling inputs of other agents, or components influencing them. Thus, humanitarians must be proactive, adaptable, notwithstanding re-planning their structures and settling on key decisions. The agents constituting a CAS are steered by order generating principles, known as schemas (McCarthy 2003; Pathak *et al.*, 2007; Hasgall, 2013), determining CAS response in the course of adaptation. The CAS environment is both rugged and dynamic, with CAS agents having to adapt in order to maintain fit with the environment. Over the span of adaptation, new changes in the CAS just as its current circumstances may arise in a process of coevolution, making it important to learn and make applicable variations to schemas for upgrade of wellness.

Conversely, CAS is impacted upon by inconsistent association between the cause and effect of CAS events. In the event of happening of a disruption, it may contribute

to disproportionately negative or positive outcomes. According to Urry (2005), inconsistencies in the association between the cause and effect of CAS events can be termed as non-linearity. An example of this is the number of type of connections as well as association among CAS agents having the ability of influencing the degree by which CAS agents functions autonomously in a way that higher connectivity is attributable to lower agent's autonomy and the other way round (Pathak *et al*., 2007). Non-linearity in a CAS further contributes to self-reorganization as well as emergence. Self-organization and emergence in a CAS can lead to changes that encompass developing new structures, patterns as well as properties. The feature of scalability implying that varied entities at various levels of CAS contain similar concerns, may further foster such variation, for instance, reduction of costs, fostering delivery speed in addition to adaptation (Surana *et al*., 2005). Consequently, individual agents aim at attainment of their goals through addressing their concerns, but lead to similar collective patterns emerging at the extended wider system level.

Supply chain looks like a CAS, as it mirrors the primary features of a CAS. For instance, a system is robust and resilient provided it is able to adapt to environmental threats and avoid violating its integrity as a system. In most cases, this entails modification of its environment, thus it essentially encompass co-evolution. It is further probable to be highly non-linear, for instance, that seemingly negligible variation in supply chain controls enables disastrous events to have probability of occurring (Choi, Dooley & Rungtusanatham, 2001; Surana *et al*., 2005; Pathak *et al*., 2007; Hearnshaw & Wilson, 2013). Supply chain resilience is depicted in the process of self-organization, another form of a CAS. Managers in the Kenya humanitarian entities need to have awareness that supply chain resilience is exhibited utilizing the process of self-reorganization as opposed to outcome of deliberately controlled by one entity. This in part is due to the fact that supply chain is complex to the degree that majority of what occurs therein is beyond the visibility and reach of a principal firm. Consequently, managers need to be prepared to be flexible for purposes of collaborating with more humanitarian entities as well as other stakeholders who include suppliers as well as the state for purposes of enhancing the ability to create resilience in their entities.

In general, supply networks can be perceived from CAS viewpoint differently. The components composing CAS are agents, autonomous actions, interaction as well as learning. Such components can be found in the supply network. In the present study, the Complex Adaptive System theory aids in explanation of the supply chain resilience variable. According to the theory, humanitarian supply chains need to be able to adapt to complex environments. To be able to adapt, humanitarian organizations must become resilient in all aspects including in the supply chain.

2.2.3 Theory of Constraints

The theory of constraints whose proponent is Eliyahu Goldratt is a methodology used in the identification of the most critical limiting factor or constraint hindering the attainment of a goal through systematic advancement of constraint until it is no longer a limiting factor (Goldratt, 1990). The theory construes that managers need to focus primarily on efficient management of capacity and capability of the limited number of constraints contained in the organization where the performance of the organization is fostered. The key notion of the theory is that constraints limit the performance for any system within the organization. This theory assumes a scientific viewpoint to advancement and that all complex systems encompasses numerous linked activities, among them constraints to the entire system. To assist in the attainment of system goals, the theory advances a methodology for identification and elimination of constraints, tools for analysis and resolution of problems and a method of performance measurement and guidance of management decisions (Goldratt, 1990).

This theory treats the supply chain as a system, which is a group of connected components that operate together to convert investment to value in accordance with the expectations. The theory focuses on comprehension and handling of constraints that stand between an organization and the attainment of its goals. Therefore, it avails the necessary resources, which can be effectively used by humanitarian supply chains to increase their productivity and reliability (Rudnicki, 2011). Leagility paradigm upholds convergence of accessible resources, which is the basic notion of exploiting constraints in a supply chain. Leagile principles can be applied to

maximum advantage in humanitarian supply chains to eliminate waste, trim costs, compress lead times, boost the amplitude, foster adaptability and improve flexibility amounting to supply chain efficiency. This without a doubt fosters humanitarian performance through ensuring optimum resource utilization, increase saved lives, meeting time, expenditure targets and needs of aid recipients and enhanced impact of activities and projects.

The theory of constraints in this study help in understanding the objective of supply chain efficiency. According to the theory, organizations need to identify the most limiting factor or constraint standing in the way of realizing an objective and then analytically refining the constraint until it is no longer a limiting factor. The theory views waste and inefficiencies as the largest constraints on opportunity and thus the need to be managed and eliminated for performance of humanitarian aid organizations.

2.2.4 Relational View Theory

Relational view theory is considered relevant in understanding the influence of supply chain integration on performance of humanitarian aid organizations in Kenya and hence provides the theoretical background for this study. Dyer and Singh (1998) advocating for development of transaction exchange relationships into collaborative integrations advanced the relational view theory. The main assumption of this theory is that, a relational rent and competitive advantage can be generated through value-adding initiatives enabled by inter-firm resources and routine. A relational rent is described as a superior profit mutually generated in an exchange relationship that otherwise cannot be obtained by a firm who operates in isolation, but could only be obtained through the mutual contributions of collaborative partners (Dyer & Singh, 1998). Simply put, it is when the sum of a relationship's parts create something much greater and more valuable than what individual organizations can achieve on their own. The relational view, introduced by Dyer and Singh (1998) explain that a firm cannot only achieve competitive advantage through its internal resources and the structure of the industry in which it operates but equally could be based on the network and dyads of relationship within the industry in which the firm operates. The

authors argued that relational rents are realizable when collaborative collaborates exchange and combine idiosyncratic assets, complementary resource endowments, knowledge and competence through relation-defined investments, effective governance mechanisms and inter-firm knowledge-sharing routines (Richard & Devinney, 2005).

The relational view theory considers networks and dyads of firms as the unit of analysis to explain relational rents generated within that network/dyad. Drawing upon the work of Dyer, Schurr and Oh (1987) & Morgan and Hunt (2002) on collaborative inter-organizational relationships as well as the relational view of the firm, conceptualized how supply chain integration function to develop rents. Flow of strategic information between players means the exchange of critical resources and this exchange is defined by time compression diseconomies and made possible by asset partners and that these correlative vital resources bring about relational rents. Therefore, this theory advocates for collaborative integration within the supply chain brought about through exchange of strategic information that is important to all parties involved. This cooperation can lead to a more integrated supply chain within or outside the organizations.

In the humanitarian supply chain, there exists relations of different interactions between different humanitarian supply chain actors. Supply chain players need to interact simultaneously in order to achieve the general objective of the humanitarian aid organization, which is to save lives and rescue the suffering of vulnerable populations. Supply chains should be able to identify the scope of different players in the supply chain in order to allow for seamless interactions of the supply chain activities to have harmonized results due to the contribution of different players in the humanitarian supply chain. In addition, supply chain managers of the humanitarian associations ought to have the option to build up a decent association with service providers and relate well with other humanitarian actors. Supply chain integration entails linking of business operations and procedures within and across organizations to obtain a well-coordinated, cohesive and high performing business model. Hence, the relational view theory provides a comprehensive framework through which supply chain integration concept can be understood.

2.2.5 Theory of Performance

The Theory of Performance traces its origin in a variety of fields but Victor Turner (1988) and Richard Schechner (1985) are the theorists most associated with the theory. Turner (1988) and Schechner (1985) considered the performance nature of societies globally and linked events, rituals and daily life to the code of performance. With the application of ethnographic research in different societies and contexts, these theorists underscored the importance of performance on human understanding. The theory of performance is considered relevant in understanding the influence of supply chain leagility on performance of humanitarian aid organizations and consequently providing the theoretical background for this study. Elger (2015) argued that the Theory of Performance (ToP) makes and portrays six foundational approaches used to explain performance and performance improvements. To perform is to produce valued results. This theory anchor the performance of humanitarian aid organizations, which is the dependent variable in this study. Schrettle *et al.* (2013) observed that, as performance theory insists on alertness and consideration to formal elements of textual representation (structural concerns); it also recommends greater emphasis on context. Performance theory establishes stories to a particular scenario and rewards a narrator who claims the responsibility for the performance. Each performance relies on a player's claim of responsibility for the emergent event (Hou *et al.,* 2014).

The basic tenet of the theory of performance is that to perform, is to produce valued or desired results. Performance is perceived as a journey, with a specific point in time denoting the level of performance. The extent of performance is based on six factors: level of knowledge, context, levels of skills, level of identity, personal factors and fixed factors (Elger, 2015). Weiner and Mahoney (1981) further contributed to the theory of performance by linking it to organizational performance. The theory of performance can be applied to the performance of humanitarian aid organizations. As explained, the theory of performance perceives performance as the ability to produce the desired results. In the context of humanitarian aid organizations, the desired results can be measured with the use of different metrics. Generally, the performance of not-for-profit entities is dependent on their capability

of raising funds with a view to fulfilling their goals and objectives (Mangan & Lalwani, 2016). According to Dubey and Gunasekaran (2016), aid should be reasonable, considerate of human dignity, responsibly overseen and rationally obligated to avoid failure and abuse. The primary role of humanitarian supply chains is getting value for money, attainment of efficiency and effectiveness, fostering fair competition among the vendors, as well as enhancement of accountability, transparency and ethics (Pocock & Whitman, 2016). Donors who fund humanitarian aid organizations in Kenya demand accountability, transparency and value for money, and hence these can be considered as the desired results for humanitarian aid organizations.

2.2.6 Grey Incidence Analysis Model

Grey Relational Analysis (GRA) or the Deng's Grey Incidence Analysis model was developed by Julong Deng in 1982. It is among the most commonly practiced versions of grey system theory. It is a vital approach for solving problems, which involve uncertainties, and aims at handling systems whose information is unknown or incomplete. GRA utilizes a particular concept of information. It characterizes circumstances with no information as black, and those with perfect information as white. Nonetheless, circumstances that fall in the middle with scattered or partial information, are described as being grey, hazy or fuzzy (Yang *et al*., 2014). Thus, in the field of grey relation, "grey" refers to weak, insufficient, or ambiguous information making systems (Deng, 1982). A grey system is that which contains both known and uncertain unknowns (Zheng & Lewis, 1993). This GRA model views humanitarian sector as grey system because of the nature of operations of the humanitarian organizations, which strain with rare situations in an unpredictable environment where quick and effective response is paramount. A grey system is one, which has a missing and a known part of information. From this explanation, the quantity and quality of information creates a continuum from an absolute absence of information to full information: from black through grey to white. Since unpredictability is an aspect of disaster and relief operations, they are therefore classified somewhere in the middle, between the extremes and in a grey area.

In humanitarian supply chain, the organizations do not know when the next disaster will happen, how it will happen, nature of disaster and magnitude. Planning for humanitarian supply chains therefore falls under the grey system. The necessity of the aspects and the valuation of aspects can be characterized in grey numbers, which creates the flexibility to make judgment 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 grey areas and only become clear in due course. Grey analysis arrives at definitive theorems on system solutions. Toward one side, no arrangement can be characterized for a system with no information. At the other extreme, a system with perfect information has a unique solution. In the middle, grey systems will give a variety of available solutions. Grey analysis does not essentially seek to find the resolve, but avails ways in which a good solution can be found for a particular problem. The grey incidence analysis supports supply chain leagility as a solution to the problems faced by humanitarian aid organizations in their operations in the uncertain environment. This was supported by Bendul, Rosca and Pivovarova (2017), that when markets are volatile and uncertain like in the humanitarian context, leanness needs to be combined with agility into a hybrid leagile strategy to create a more responsive, resilient and integrated supply chain that will deliver aid in an effective and efficient manner. This model is important to this study since the criteria of evaluating the effectiveness and efficacy of humanitarian response is very critical in saving human life. In addition, this theory gives grounding that is used in this study. GRA has since become the most common used model in literature for humanitarian supply chains as used by Mwangi and Senelwa (2020) in their study entitled logistical factors influencing disaster responsiveness of humanitarian organizations in Kenya.

2.3 Conceptual Framework

A conceptual framework denotes a model of presentation in which the researcher conceptualizes or provides a presentation or association among variables in the research and depict this association graphically or figuratively (Merriam & Grenier, 2019). As espoused by Creswell and Poth (2017), a variable is a measurable feature,

which assumes varied values in the context of units of a given population. The primary variables in the present study are categorized as either independent or dependent variable. As explained by Creswell and Poth (2017), independent variables are also termed as predictor variables due to their prediction of the amount of variation occurring in another variable. Conversely, dependent variable, which is also known as criterion variables are those that are either influenced or changed by another variable. The dependent variable is the one that the researcher aims at explaining. Consequently, this study aimed to establish the influence of supply chain responsiveness, supply chain resilience, supply chain efficiency as well as supply chain integration on the performance of humanitarian aid organizations in Kenya with organizational characteristics as the moderating variable.

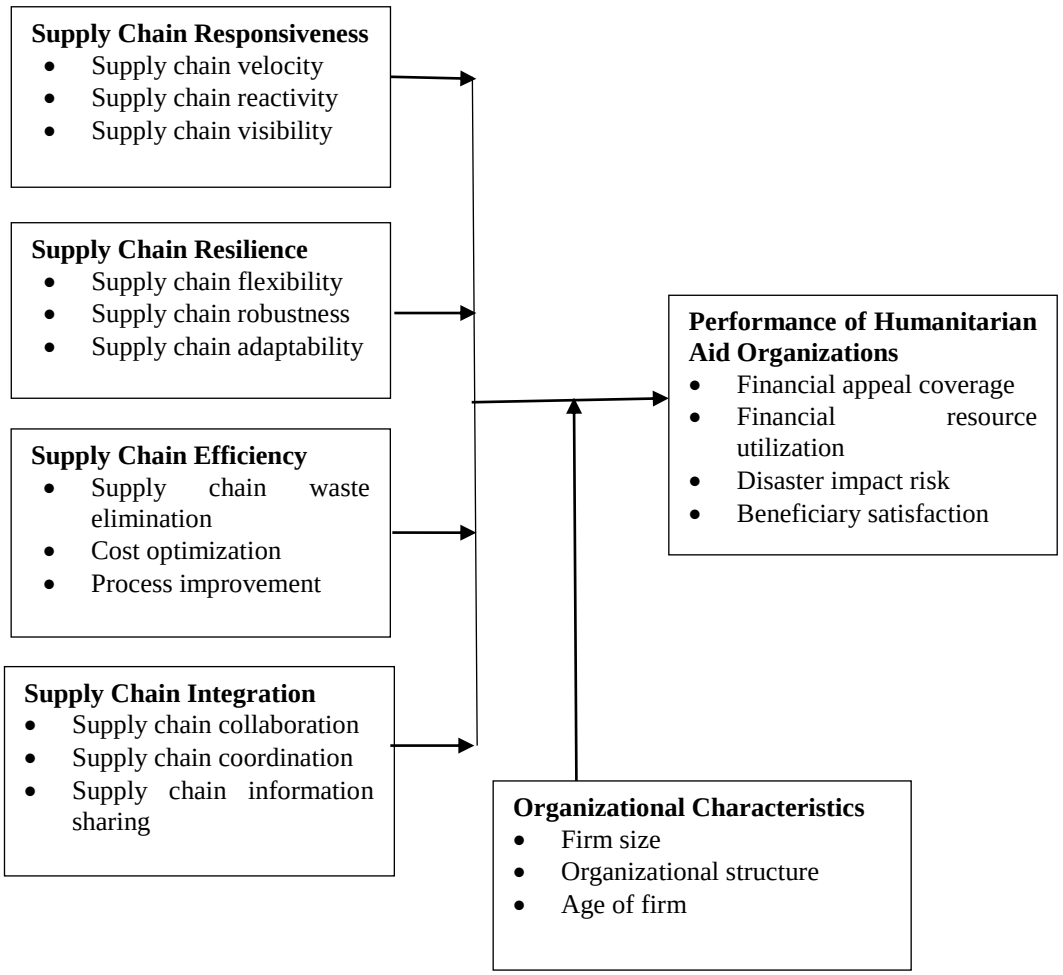

Figure 2.1: Conceptual Framework

2.3.1 Supply Chain Responsiveness

Brusset and Teller (2017) depicts responsiveness as separated into three capabilities; velocity, reactivity and visibility. Reactivity is the capacity to assess and consider quickly while velocity alludes to the capacity to cover needs rapidly (Brusset & Teller, 2017). Consequently, as indicated by Vernon (as referred to in (Brusset & Teller, 2017), visibility covers the capacity to see the developments down the supply chain, including identity, position and status of the shipment alongside the programmed and specific dates and times for the events. To conclude, adaptability, viability and responsiveness have been endorsed as proper ground for the agile

strategy by Brusset and Teller, (2017) and are portrayed previously. Additionally, agility is necessary when an organization needs a dynamic and adept supply chain structure; therefore, this approach is suitable for humanitarian associations. Be that as it may, this may be a challenge for humanitarian associations because of issues of assets and subsidizing, yet the ideas that have been embraced in business settings ought to be important in this setting as well. To concentrate on supply chain management appears important and prompting cost savings and expanded consumer loyalty (Chavez, Yu, Feng & Wiengarten, 2016). Consequently, improved effectiveness would interest humanitarian entities to participate in such ideas, despite the fact that the supply chains in alleviation tasks have brief span.

In early 1990s, agile manufacturing became a basis of reference by both researchers and practitioners. In the mid 1990s, supply chain management gained more popularity (Elbert et al., 2018). The two concepts are distinct on basis of philosophical insistence; agility manufacturing mainly stresses on strategic alliances and partnerships for realization of speed and flexibility (Elbert *et al.*, 2018), whereas supply chain management is hugely concerned with cost with focus on integration of suppliers and clients as it seek to attain an integrated value chain (Elbert *et al.*, 2018). In the contemporary world, firms are dealing with the problem of fulfilling the client's demand with provision of high level of quality of products and services at reasonable prices. Firms further have to be responsive to customers' unique as well as rapidly varying requirements. Consolidation of the positive aspects of agile manufacturing and supply chain management addresses a new strategy for handling challenges. The strategy is known as responsive supply chain (Elbert et al., 2018).

As espoused by Christopher (2016), a supply chain need to be responsive to the requirement of the enterprise as well as those of the clients. A critical aspect of this is order-fill accuracy. In contemporary market environment characterized by high level of competition, a guarantee of delivery is a real marketing strategy. When the customer order is fulfilled quickly but either lacks accuracy or is incomplete, then the firm ends up wasting time and money and could lose its clients as well. Another crucial concept pertaining to responsiveness is scalable fulfillment. Businesses of all form experience vicissitudes where sales have the potential of being impacted by the

environment and economy. A responsive supply chain is the one, which is able to adapt to variation of sales volumes. Responsiveness in the supply chain is further exemplified through satisfaction of clients.

Media coverage of natural and manmade disasters has increased both public and industry awareness of the importance of rapid response to disasters. Speed of aid to disaster victims is often vital to their survival. Clearly, the humanitarian community struggles against a host of challenges to offer rapid response. Value of speedy disaster relief operations intrinsically contain a need for speed. Language regarding the importance of speed abounds in leading emergency response guidelines with common terms like “immediate actions to save lives”, “rapid response” ,“time is more important than cost”, “victims cannot wait” and humanitarian actions should be carried out "rapidly" and “as soon as possible”. This emphasizes the urgency of an effective and immediate response to disasters.

2.3.2 Supply Chain Resilience

Resilience is a multi-faceted dynamic capability meaning that it functions as the dynamic ability for entities to integrate, build as well as reconfigure both internal and external competencies with ability to sustain performance of enterprises (Eltantawy, 2016). Following a disturbance, resilience enables a given system, whether it is a supply chain, to revert to its original state or to advance to another desirable state (Adobor & McMullen, 2018). Resilience in an organizational sense is viewed as the ability to withstand and flourish in crises and disturbances (Fisher, 2017). Kamalahmadi and Parast (2016) established that supply chain resilience is connected to existing activities such as crisis management and business continuity plans.

The interest of researchers and policy makers concerning resilience is hugely motivated by deteriorating business vulnerabilities and disruptions by both external factors including legislative and environmental vulnerabilities and internal ones including monetary standing as well as internal business-process vulnerabilities (Krishnan & Pertheban, 2017). Point to note therefore is that the key motivation force of resilience is disruption. The disturbances in a supply chain are either internal to the firm (process and control risks), external to the firm but internal to the supply

chain network (demand and supply chain risks) and external to the supply chain network (environmental risks) (Abdel-Basset, Gunasekaran, Mohamed & Chilamkurti, 2019). Organizations cope with disruptions either reactively or proactively. Supply chains that adjust ex-post to changes are known to be reactive and are usually referred to as agile supply chains (Gichuki, 2017). Alternatively, supply chains can implement ex-ante measures to cope with turbulences hence referred to as robust supply chains (Cohen & Kouvelis, 2020). Supply chain resilience balances both reactive and proactive strategies such that a resilient supply chain is both adaptable and robust (El Baz & Ruel, 2020). Resilience and robustness are therefore dimensions of agility.

Flexibility as stated is among the primary features of a leagile supply chain (Fadaki, Rahman & Chan, 2020) and is consequently depicted on the agility basis by Chan, Ngai and Moon (2017) adding that is not the only needed capability. A way of defining flexibility capabilities as espoused by Srinivasan and Swink (2018) is by product, mix, volume as well as delivery. Product flexibility denotes the ability of modifying existing products as well as introducing others (Manning & Soon, 2016). Conversely, mix denotes the ability of alternating the diversity of produced or delivered products over a given time. Volume can be denoted as the level of varying the compiled output. Finally, when the delivery dates can be moved, delivery flexibility exists (Lyons, Um & Sharifi, 2020).

Despite lean and agile sharing similar aim of creating value and fostering performance, the emphasis is put in a different way. In specific terms, agile concepts emphasis is on improved flexibility level in adapting to dynamic environments as opposed to reduction of costs. According to Chan, Ngai and Moon (2017), flexibility denotes the adaptability as well as versatility while agility is focused on the system's speed needed. Consequently, flexibility appears as mandatory precondition for agility. In addition, the contingency theory is of the view of inexistence of no universal method for managing or organizing firms, thus, management style must be based on the situation constraints being experienced by the entity (Baker, 2017). The firm's flexibility in adapting to the environment dictates its success in a dynamic changing environment.

As per Sreedevi and Saranga (2017), flexibility is the ability of changing or reacting with minimal adverse repercussions for time, effort, cost as well as performance. Sreedevi and Saranga (2017), asserts that environmental unpredictability is among the primary reasons for a firm seeking flexibility. On this basis, it can be inferred that flexibility is closely associated with uncertainty and variability. The association is as illustrated by Lyons, Um and Sharifi (2020) who linked the three facets in the context of management of unplanned change and recommends flexibility as a better approach to counter the effects of unplanned change, while uncertainty and variability are elements of the inadvertent change.

2.3.3 Supply Chain Efficiency

Vaishnavi and Suresh (2020) outlines that one most important motive for adoption of agility and leanness is to increase efficiency through eradication of waste and process optimization (leanness), two components which are important to humanitarian and commercial organizations likewise. According to Shafiq and Soratana (2020), leanness is characterized by optimization of waste through adoption of more efficient processes. Lean strategies typically aim at minimizing cost by "doing more with less". This includes process optimization and value stream analysis techniques. Fatime and Odock (2019) who defines leagility as development of a value stream to eliminate all waste, including time, and to ensure a level schedule supports this. Volatile and unpredictable environments like humanitarian disasters demand supply chains that will minimize waste and ensure flexibility. Lean emphasizes on reduction of waste of resources by identifying non-value adding activities and eliminating them. According to Bag, Wood, Mangla and Luthra (2020), one major problem with procurement regarding business stock is the time spent on products with high demand and low profits. There is a high number of players involved, too many invoices, inability to regulate expenditure and minimal accountability. Lean procurement significantly streamlines the process. Both commercial and humanitarian supply chains have a goal of developing increased efficiency through elimination of waste in the unpredictable nature of humanitarian supply chain, which make it difficult to reduce waste completely along the supply chain. Through continuous improvement measures, however, humanitarian organizations can

continually improve the way they manage their waste (Olaogbebikan & Oloruntoba, 2017).

The lean concepts can be considered a set of managerial practices whose focus is on eliminating waste in the entire value chain, within and across firms (Muchiri, 2017). According to Osore, Ogola and Ogot (2020), the most basic principle of lean encompasses the identification and enhancement of value, the elimination of waste in addition to generating flow. Consequently, the first point in becoming lean is identification of value and definition of value preposition for the clients (Mwangi & Kamau, 2019). Provided the importance of discovery of values and wastes, it is critical to have an understanding of how it should be determined. Olaogbebikan and Oloruntoba (2017), classifies waste into value adding, non-value adding and necessary but not value adding. Keyte and Locher (2016), describes the value adding process as the process of converting raw materials or semi-finished products into products. On the other hand, the non-value adding processes are the unnecessary procedures and should be done away with. The necessary but not value adding processes are non-beneficial yet essential in the current design necessitating extensive changes in the process design to do away with them.

It has been established that waste does not add any value. Thus, when it occurs, the quality and reliability of the supply chain is threatened. Consequent to this hazard, a methodical detection of the gain as well as wastes need to be determined using techniques including value identification and stream mapping. Value stream mapping signifies a set of actions needed in bringing a product via the production processes, from raw materials to the final consumer (Keyte & Locher, 2016). Information as well as material flow in the context of supply chain are considered by value stream mapping for purposes of identifying all forms of wastes in the value stream and taking actions for elimination of such wastes (Keyte & Locher, 2016). Furthermore, value stream mapping foster the likelihood of working on a lasting resolution, as opposed to individual processes. Value stream mapping generates a sturdy groundwork for the primary processes thereby promoting more astute decisions for unending improvement of the value stream (Sweeney & Business, 2017).

In a commercial logistics context, the pursued objective is to minimize logistics costs; where else in a humanitarian logistics context the objective is to minimize human suffering (Tull, 2020). However, it is difficult to estimate the cost of ethical and computational suffering. A qualitative assessment of cost-effectiveness of humanitarian aid to Somalia concluded that the same results could not have been achieved for 'less effort and investment', stating that a lower financial cost would have come at the expense of lives. However, there is no quantitative data available to support this. There is little publicly available information on the required infrastructure and operational costs in humanitarian settings (Roblin, 2019). The recording of logistics costs in practice is still limited (Hein et al., 2020).

Supply chain and logistics accounts for between 60% and 80% of total expenditure of any humanitarian intervention. Therefore, the need for cost-effective humanitarian aid is greater than ever (Besiou & Van Wassenhove, 2020). Each time a crisis arises, a new logistics chain is set in motion. However, research shows that logistics operations in isolation e.g. where each non-government organization (NGO) has its own logistics operation, are no longer tenable (Radosta, 2019). Humanitarian logistics research states that in order to meet humanitarian outcomes cost-effectively, a change in operational strategy is needed, moving from a model of fundraising and using funds to a model of fundraising and optimizing these funds (Lacourt & Radosta, 2019). Supply chain must also become strategic in order to become part of the decision-making process, starting early, from the assessment and programming stages (Lewin et al., 2018; Lacourt & Radosta, 2019).

2.3.4 Supply Chain Integration

The degree to which a range of activities and parties of an entity are conjoined and unified together, including effective communication and information flow among all the actors in the supply chain is termed as supply chain integration (Olaogbebikan & Oloruntoba, 2017). Integration is the term used in describing the various associations existing among departments within a single firm or the association among different firms. For instance, internally and externally, firms are able to integrate varied actions as per their operations. Integration not only provides knowledge but further

lead to varied problems. Managers have the ability of designing the form of integration to be focused on and the actions to be taken, when different forms of overlapping of integration and procedures to be followed (Olaogbebikan & Oloruntoba, 2017). The level of supply chain integration have the ability of enhancing the performance of the entity (Christopher, 2016).

Supply chain integration is a combination of exercises responsible for the coordination of product movement among supply chain partners with respect to the elemental information flows (Vanpoucke, Vereecke & Muylle, 2017). Zhang, Donk and Vaart (2016) also defined supply chain integration as the strategic collaboration of both intra-organizational and inter-organizational processes. The significance of supply chain integration is evidently crucial (Khanuja & Jain, 2019). Supply chain integration involves laying out coordinated flows of information and materials that facilitate the assimilation of reliable processes across the extended supply chain. It entails exchange processes and coordination tactics between supply chain partners (Vanpoucke *et al.,* 2017). Reliable information and material flows eradicate boundaries between supply chain partners, and help reduce uncertainty in the supply chain hence improving supply chain performance (Shukor, Newaz, Rahman & Taha, 2020).

Supply chain integration is multidimensional, and a single construct might not represent all what it entails. While some researchers view it from the activity perspective as customer integration, supply integration and internal integration (Ayoub, Abdallah & Suifan, 2017) others view it from the behavioral and relational perspective of firms (Liu & Lee, 2018). Through information systems, business networks could be built to ensure the seamless flow of information, financial, and material resources for the delivery of value to stakeholders within supply chains. The inability of firms to integrate their supply chains could result in the missing out of benefits that emanates from the integration of supply chains.

Collaboration is an important concept in the supply chain integration, which implies working together during disasters. Collaborations or cohesiveness in humanitarian organizations is not an end by itself, rather it assist organizations in attaining tangible

benefits (Rodríguez-Espíndola *et al.,* 2018). For instance, through collaboration, increased coverage can be attained. In an atmosphere with demand for humanitarian work, analysis is important in determining humanitarian response performance. Majority of crisis experienced in the contemporary environment are too big to be handled by one organization, which creates the need for collaboration. Collaboration and cohesiveness also fosters the effectiveness of humanitarian logistics (Rodríguez-Espíndola *et al.,* 2018). Effectiveness denote the degree by which an activity attain what it aimed at achieving (Sabri *et al.,* 2019).

Coordination (operational integration) is another important component of the supply chain integration. Response to the humanitarian needs by humanitarian organizations need to be based on principles of humanity, neutrality as well as impartiality. The three factors forms the primary principles by which humanitarian entities need to be based on, with humanity implying that people need to be protected and their dignity preserved (Dubey & Altay, 2018). On the other hand, impartiality encompass the view that aid need to be provided to those requiring it without any discrimination. Conversely, neutrality entails provision of relief without any bias to all groups of people. The primary goals of coordination in the humanitarian relief content is therefore to react to disaster of manmade or natural kind in the most effective and efficient way. Coordination entails logistics and transportation, which are essential for humanitarian organizations as better coordination of these components reduce cost related to operations and foster services (Dubey & Altay, 2018). During disasters, numerous organizations come together to respond to disaster and without proper coordination, efforts cannot be effective. Therefore, coordination of organizations and agencies is critically important to respond better to the needs and wants of affected people.

Another critical facet of supply chain integration is information sharing which denotes the degree by which important and definitive information is passed in a particular supply chain. The nature of information could be strategic or tactic, about logistics activities, about affected populations, availability of products, levels of inventory and status of production requirements (Christopher, 2016). Extensive research shows that information exchange between supply chain partners has

considerable impact on organizational fulfillment and proficiency of the supply chains. Through information exchange, organizations are able to decide on placement of orders, capacity allocations, production and material planning due to better visibility of demand, supply and inventory. In particular, Ributhi (2020) indicated that information exchange between partners in a supply chain creates an advantage on the performance of an organization, due to the eradication of uncertainty of the obtained information thereby amounting to the achievement of a platform for sharing systemized information.

Today, firms that seek to streamline their operations across different actors rely on information systems to support their internal and external functions. Information systems utilization in supply chains enhances the exchange of information by connecting people, materials, and processes. Internal functions of a firm and its external relationship with partners is coordinated where information systems are used in a shared architecture. Information systems are the virtual ingredients that knit supply chain partners towards effective and efficient supply chain performance (Saberi, Kouhizadeh, Sarkis & Shen, 2019).

2.3.5 Organizational Characteristics

Organizational characteristics are the features originating both from the management model adopted by the organization, through its structure or strategy, and the organizational perception resulting from the complexion of its membership and external affiliations. Some of the important organizational factors that affect performance of humanitarian aid organizations include organizational size, organizational structure and age of the firm in that industry (Mutebi, Ntayi, Muhwezi & Munene, 2020). Olaogbebikan and Oloruntoba (2017) established a positive relationship between firm size and performance in their research using a simpler form of the model, but applied different measures of size (sales and total assets) and profitability (profit margin and profit on total assets). Isik, Unal and Unal (2017) gauged the impact of firm size on profitability using Turkish manufacturing sector as the sample. The study revealed an irrefutable relationship between the size and performance of the firm. Wayongah (2019) evaluated the relationship between size

and profit of firms operating in the financial services sector. The author uncovered unfavorable impact of firm size to the profit margin. Hence, when humanitarian organizations adopt leagile supply chain, the influence on performance is likely to be affected by the size of the firm.

Organizational structure is as well an element that affects the performance of humanitarian firms. Organizational structure refers to the supervision aspects, departmental make-up, and workflow inside an institution. Performance management is the systematic improvement of an individual or group productivity through setting of goals and conducting performance assessments. Performance management methods and policies can be substantially impacted by a firm's structure, and organizational performance targets should determine the company approach. Comprehension to these two conceptions can help establish the most effective performance management system for an organizational structure. Organizational structure focuses on the layout of units and functions in an organization in the frame of reporting relationships. The complexity of a company can be illustrated as a top-down flowchart, with each connected node epitomizing a separate position in the firm reporting to the post directly above and possibly administering the positions below it. Considering that, performance management majors on relationships between administrators and their juniors. Organizational structure can be used to determine which positions should be responsible for oversight and assessment of other positions.

2.3.6 Performance of Humanitarian Aid Organizations

Donors increasingly demand accountability, transparency and value for money in respect to the resources availed in exchange for their patronage of humanitarian aid agencies (Bhatta, 2019). They have great interest in knowing how successful an organization is in accomplishing its goals with the resources they have provided. According to Dubey and Gunasekaran (2016), aid should be relevant, of human standard, properly administered and consistent with components that discourage deficiency. It should provide lasting solutions and be sufficiently resourced. This explains why mechanisms for measuring performance of humanitarian organizations

are of paramount relevance. Multiple stakeholders' priorities differ therefore making it difficult to define humanitarian organizational performance (Khan, Yong & Han, 2019).

Moving the above idea to application in humanitarian supply chains, donor and beneficiary are two various types of clients. The donor is the upstream client and beneficiary is the downstream client as per the flow of resources. As per the monetary reliance of humanitarian organizations on its upstream clients (donors), they have comparably much right of decision power. Nevertheless, the humanitarian operational capability is defined by their ability to balance the needs of the downstream (beneficiaries) and demands of upstream (donors). Few studies address humanitarians' performance management. Empirically, there is dearth of tools available for measuring performance of humanitarians as per ISO and other standards. This means that the operational gap of integration of effectiveness and efficiency into efficacy has been reflected in management side in terms of agile to lean and then the case of leagility. This operational gap, management practices lapses and lack of integration of the two sides of the same coin is imperative for sustainable development in humanitarian organizations performance uplift globally, yet ignored until now (Shafiq, Akhtar, Tahir, Akhtar & Kashif, 2021).

The overall performance of a non-profitable organization relies solely on its capacity to raise funds to fulfill the organization's mission and goals (Şanal & Nsubuga, 2018). Osei (2017), argue that humanitarian organizations should not put too much attention on current financial resources and absolute attention to raising funds as this leads to misplacement of priorities, which include; output, effectiveness, quality and client satisfaction. He upholds that adjustments in most times focus on the outcome of organizational activities, which are determined by assessing the bearing of the activities performed along with their efficiency and efficacy in relation to resources spent. Different scholars have derived metrics to measure humanitarian performance. Kwena, Mukulu, Nzulwa and Odhiambo (2020) outlined a three-part performance measurement of resource, output and flexibility metrics, which measure efficiency, effectiveness and ability to respond to a changing environment respectively.

To improve humanitarian logistics operations, performance measurement is the first step. Moreover, despite its significance, performance measures and measurement systems have not been widely developed and systematically implemented in the relief chain. In addition to the common problems in the non-profit sector such as performance criteria ambiguity, the inherently unique characteristics of the disaster relief environment make relief chain performance measurement even more challenging (Frennesson, Kembro, de Vries, Van Wassenhove & Jahre, 2020). Performance measurement is crucial in the humanitarian sector as there are numerous agencies competing for donor funding and higher demands for accountability of donors, media and the public. According to Negi and Negi (2020), developing the right performance measurements can assist a humanitarian organization measure the impacts of disasters, enhance preparedness and as a result alleviate the impact of such disasters, and ultimately efficiently manage donor funds to maximize assistance to the beneficiaries.

While most performance measurement frameworks in humanitarian organization are borrowed from commercial world, many commercial performance metrics do not apply for humanitarian organizations (Patil, Shardeo & Madaan, 2020). In summary, performance measurement in humanitarian organizations is less established in comparison to the commercial world. While there are some well-known generic frameworks for commercial firms such as the SCOR model and the Balanced Scorecard, there is not any universally accepted performance measurement framework in humanitarian organizations and it is difficult to develop appropriate metrics (Anjomshoae, Hassan & Wong, 2019). Moreover, many humanitarian organizations do not have appropriate performance measurement metrics, and those that do, tend to make the mistake of employing too many metrics, which stretches their resources in data tracking and maintenance.

2.4 Empirical Review

2.4.1 Supply Chain Responsiveness

Srinivasan, Srivastava and Iyer (2020) studied the implementation of responsive supply chain strategy. The study conferred an analytical design that explains the

drivers, strategy and practices of a responsive supply chain and the impact it lays on performance. As per the study, the effective implementation of a responsive supply chain calls for a proper characterization of a responsive supply chain strategy in respect to product variety, uniformity and inventiveness. The research additionally proposed that the primary provisional components that influence the scope of implementation of a responsive supply chain strategy are basically the firm size, nature of the industry, and customer and supplier population, instead of location of humanitarian organizations.

Khan and Wisner (2019) further evaluated how an organization can achieve agility and leanness. The concept of supply chain responsiveness emerged with the study emphasizing the importance of responsiveness of the supply chain to achieve organizational performance. Abu-Radi and Al-Hawajreh (2013), studied the effect of supply chain responsiveness on the competitive edge of firms. The study acquired 269 responses using a questionnaire. Statistical techniques such as descriptive statistics, correlation and multiple regressions were employed. The aftermath revealed positive influence of advanced operation systems on competitive advantage on basis of affordable price, competent delivery, advanced product modification, and low marketing time. It was also discovered that advanced supplier network responsiveness elevates the level of competitive advantage, affordable price range and product performance reliability.

Datta (2017) additionally assessed responsiveness in the supply chain and the role it plays in competitive advantage. Leagility was pointed out as a solution for volume responsiveness; agility was accredited with product proportion, while leanness was associated with process responsiveness. However, when applying leagility, humanitarian organizations ought to include two order-decoupling points, a downstream physical decoupling point, differentiating the lean from the agile part; and an upstream information decoupling point, updating current market information across the entire chain. For the realization of product responsiveness, the agile strategies of postponement and modular product designs are necessary. For process responsiveness, the lean principles of modular process design and JIT were portrayed.

Mwangi and Anaya (2020) examined the logistical factors influencing disaster responsiveness among humanitarian organizations. The researchers adopted a case study approach with a sample of 60 Kenya Red Cross Society employees. The findings of the study revealed 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 the humanitarian organizations. 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.

Lean and agile paradigms in humanitarian organizations' logistics and supply chain management was examined by Shafiq and Soratana (2019) by interviewing seven humanitarian logistics and supply chain management professionals. The study uncovered that Lean and Agile Decoupling Point (LADP) model avail essential basis that can renew and reinforce humanitarians' activities. This results in reliability from which donors, beneficiaries and other stakeholders gain confidence. Ahimbisibwe, Ssebulime, Tumuhairwe and Tusiime (2016) explored supply chain visibility, supply chain velocity, supply chain alignment and humanitarian supply chain relief agility. The study was carried out using a sample of sixteen (16) humanitarian agencies that participated in responding to landslide disasters in Bududa district, eastern Uganda region producing 135 usable questionnaires, which were used to analyze data. The outcomes showed a significant positive relationship between supply chain visibility, supply chain velocity, supply chain alignment and supply chain relief agility.

2.4.2 Supply Chain Resilience

The role of supply chain resilience on humanitarian organizational performance has been researched severally. A study by Kuria and Chirchir (2014) on supply chain leagility among humanitarian organizations in Kenya explored the concept of resilience with findings that supply chain resilience enhances resource utilization, helps in meeting needs and saving lives, and ensuring time targets are met. Singh, Gupta & Gunasekaran (2018) conducted a study on management of relief supply chain and humanitarian aids logistics through supply chain resilience. The study

established that humanitarian organizations supply chain are affected especially during relief operations in disasters due to lack of coordination approaches and less joint and holistic supply chain strategies between operation management and humanitarian actors that are performing in the scene. Through resiliency, these organizations are able to cope after such disasters.

Nemuel, Mukulu and Waiganjo (2017) studied enhancers for supply chain resilience and found out that strategic sourcing, supply chain re-engineering, operational flexibility and risk awareness were significant predictors of supply chain resilience. Altay, Gunasekaran, Dubey and Childe (2018) suggests four main principles, which must be followed while making a resilient supply chain. The principles range from merging of supply chain features, need for collaborative efforts, agility and to the risk management culture. There are plenty of features that require merging in the supply chain bringing about build-in features that make the supply chain more capable of recovering in case any unpleasant event. The purpose of cooperative strategies is to determine the source of hazards. The high the prospects of adaptability to abrupt occurrences defines the resilience of the organization. It is also crucial to focus on external factors that can affect the supply chain. Success and potency of other supply chains can pose a performance risk to the organization's performance.

Gunessee and Subramanian (2020) conducted research on resilient supply chains for extreme situations. The study established that having a resilient supply chain in the face of disasters help the humanitarian organization to forge ahead and improve their performance. Kariuki, Ngugi and Odhiambo (2018) examining the influence of supply chain resilience on organizational performance established that supply chain resilience is related to organizational performance. The use of outsourcing strategy, spare capacity and local suppliers was recommended by the study to mitigate against operational risks.

Altay, Gunasekaran, Dubey and Childe (2018) conducted a study on agility and resilience as antecedents of supply chain performance under moderating effects of organizational culture within the humanitarian framework. The study used partial

least squares to evaluate the prospective research suppositions based on 335 responses obtained from Indian institutions through questionnaires designed for individual respondents. The results suggested that supply chain agility and resilience are both significant pillars of supply chain with weighty impact on pre-disaster performance. Singh, Gupta and Gunasekaran (2018) analyzed the interaction of factors for resilient humanitarian supply chain. Based on the literature review, 12 factors related to resilient humanitarian supply chain were identified. Some of these factors were process oriented while others were result oriented. Government support, strategy and capacity planning and continuous assessment of project progress emerged as the major drivers for the development of resilient humanitarian supply chain. By managing these driving factors, humanitarian aid programmes can be made resilient and agile.

2.4.3 Supply Chain Efficiency

Supply chain efficiency as established by Helmold and Terry (2021) is a continuous improvement process that is needed to eliminate wastes from all the elements of a supply chain. This process calls for backing from dropping set-up periods to enable an organization scale down production thereby attaining cost efficiencies, flexibility and achieving external agility by meeting consumer expectations. Nath and Agrawal (2020) examined the influence of lean, resilient and green practices on supply chain sustainability capitalizing on waste elimination. The study established that waste management along the supply chain resulted in enhanced social status of the firm. Non value-adding activities consume resources and hence end up economically unsustainable with time, hence the need to eliminate them.

Eltawy and Gallear (2017) carried a study on leanness and agility and their connection and contradiction. The study indicated that lean thinking emphasizes the importance of identifying value and eliminating waste. Kuria and Chirchir (2014) on the other hand in the study of supply chain leagility among humanitarian organizations in Kenya found that the volatile and unpredictable environments demand supply chains that will minimize waste and ensure flexibility. Such supply chains should meet market demand, minimize costs and reduce supply chain risks.

The lean and agile paradigms have been researched, developed and applied in supply chain management in an endeavor to make supply chains more efficient and effective. Loss of products, which is waste, is eminent between donors and recipients due to theft, misappropriation, poor tracking and control as well as product deterioration as experienced by humanitarian supply chains (Charles *et al*., 2010). This can be averted by supply chain leagility by using systems as well as reduction of transportation costs by increasing minimum quantities and establishing a less dense network of facilities to minimize theft.

Marwa (2016) studied the determinants of effective implementation of supply chain management practices. The study adopted descriptive statistics with a sample size of 127 management staff drawn from humanitarian organizations in Nairobi. The researcher observed that human capital efficiency and proper inventory management determines effective implementation of supply chain management practices in international humanitarian organization in Kenya. Victoria, Nyamwange and Harley (2017) explored the sustainable supply chain management practices and how they influence the performance of United Nations Agencies in Kenya. The study adopted a correlation cross-sectional research design in collecting data from the respondents. The study involved a census of the UN Agencies in Nairobi. The primary tool for collecting data was questionnaires, which were administered by the researcher to allow for further probing on issues that were not clear to the respondents. The data was analyzed using descriptive statistics, regression analysis, correlation analysis and factor analysis. The findings showed that stakeholder engagement, having a diverse supplier network, ensuring suppliers have a sustainable policy, good working conditions for employees, employee health and safety and ethical sourcing, production and distribution were highly adopted. The findings also showed that through adoption of sustainable supply chain practices practices, UN agencies were able to get new market opportunities, increased their operational and production efficiencies, reduced their costs and improved the organizations corporate image.

2.4.4 Supply Chain Integration

Various studies have been carried on supply chain information sharing, supply chain coordination and collaborations among supply chain members. A study by Ponnusamy (2019) indicated that upholding a good supplier relationship, effective and efficient internal operations, constant advancement, adoption of technology to hasten humanitarian activities, inter-organization integrations and simplicity in internal operations are among the practices rampant within the humanitarian circle. Chari, Ngcamu and Novukela (2020) established that the supply chain obstacles encountered by humanitarian organizations as delayed delivery of the needed products, faulty information integration, and unpredictability in demand among others. At the basic level, supply chain integration refers to companies and/or organizations operating together to find solutions to their problems and to accomplish common goals (Kembro, Näslund & Olhager, 2017). The difficulty in running supply chain integration sets in when deciding with whom and when to collaborate, why it is necessary and how to implement integration (Chaudhuri, Boer & Taran, 2018). It is hence important to comprehend the context and the type of collaborative relationship between partners in order to obtain suitable results. The success of integration in a way relies on cultural and strategic factors such as trust, corporate focus, intra-organizational support, communication.

Maghsoudi (2015) examined inter-organizational factors, coordination mechanism initiatives and performance. The study used a sample of 101 respondents from humanitarian organizations across six countries in Southeast Asia. The findings showed that supply chain visibility and complementarity are the main inter-organizational factors for effective coordination mechanism in a humanitarian set-up, while total perceived interdependence was disclosed to be insignificant pooling of effort among humanitarian organizations. Resource allocation and standardization reflects a great deal of impact on the performance of humanitarian supply chains on basis of resource, output, flexibility and accountability.

Karanja, Mairura and Ombui (2015) researched the determinants of effective logistics coordination among humanitarian organizations in Kenya. The study was

based on a sample of 92 logistics coordinators and heads of operations drawn from the Kenya Red Cross Society; Concern worldwide, Danish Refugee Council, Oxfam Kenya and world Vision-Kenya all identified as the major inter-related humanitarian actors with analogous obligations. The general results of the research showed that logistics coordination is poorly embraced among relief giving organizations in Nairobi.

Makepeace, Tatham and Wu (2017) probed the internal integration in humanitarian supply chain management. Underpinned by services supply chain management (SSCM) theory, a particular case study of a top global non-governmental organization was presented according to a web-based survey of the organization's global operations staff, reinforced by semi-structured interviews carried out within high-ranking personnel. The findings implied a significant divergence between the views of these two cohorts, along with a generalized absence of precision/clarity in the concept of SCM, its relationship with logistics and the cross-functional nature of SCM.

Qi, Huo, Wang and Yeung (2017) noted that an integrated supply chain help organizations to design the supply chains as either lean or agile supply chains. When a supply chain is designed towards the lean approach, the integration is geared towards achieving efficiency in the supply chain as opposed to quality, cost and reduced delivery time. However, the authors also asserted that agile supply chains help firms to maintain a flexible relationship with their supply chain partners. A study by Som, Cobblah and Anyigba (2019) on the effect of supply chain integration on supply chain performance suggest that the effectiveness of supply chains based on the extent of integration between the actors along a supply chain is predicted by the level of information and operational interaction between the various actors along the supply chain.

2.5 Critique of Empirical Literature

Duman, Topgul and Avni (2015) in their study titled lean, agile and leagile supply chain management established that lean management is a quite favorable technique when demand is stable, predictable and low variety of customer requirement for

reducing the cost. If volatile and high variety nature of demand is existent, agility management is necessary in such conditions for profit bearing prospects to compete in the market. The two can be adjoined to constitute leagility, which is vital for their survival and competitiveness. Despite the recognition of the leagility concept, the study researched the two concepts, lean and agile, separately and hence the need for a study that consider the concept of leagility holistically. Additionally, Duman, Topgul and Avni (2015) adopted a review design implying the existing findings from literature were reviewed. Contrariwise, this study used primary data for valid and reliable findings since supply chain leagility is a relatively recent concept.

Boschi, Borin and Batocchio (2018) studied leagility as the new framework for supply chain management. The results of the literature review and expert's view revealed that market qualifier and market winner features could be modified into practical activities that shape the profile of a leagile supply chain. The lean and agile models merged have brought rise to a new management model for leagile supply chains. The various actions acknowledged in the literature review and proposed in the study are the prime phase of an extensive research on the subject. Similarly to Duman, Topgul and Avni (2015) study, this study recognized the concept of leagility but went ahead to discuss agile and lean practices as separate concepts. Conversely, the benefits and otherwise of leagile were hugely ignored. Additionally, the study used existing literature for analysis and hence was limited since the leagile is a relatively new concept. The use of expert opinions sought to eliminate this limitation but a more holistic view can be established through organizational context.

In Kenya, Farah (2015) researched on the lean supply chain management and performance of organizations. The variables being studied were demand management practices, waste management practices, standardization practices and behavioral practices. The research embraced a descriptive survey research design and both qualitative and quantitative data were acquired for the sake of comparison. The study concluded that the lean supply chain practices used in Kenya were demand management practices, waste management practices, standardization practices, behavioral practices, inspection activities and assurance activities. The study concluded that the companies have been embracing lean supply chain management

strategies despite the challenges experienced form the internal and external environment. Lean supply chain management strategies have assisted the companies to enhance their performance. However, the study was only restricted to lean practices and thus hugely ignored the agility practices. In the contemporary business environment, both lean and agile practices are important and hence the need to combine them to leagility. Additionally, the study was conducted in public sector organization and therefore lacked insights from humanitarian entities.

Similarly, Yala (2016) in the study entitled lean supply chain and operational performance used demand management, waste management, cross enterprise collaboration, cultural practices and standardization as variables. The study adopting a survey method to collect data from manufacturing firms in Kenya by stratified sampling uncovered that lean supply chain management practices share a strong relationship with manufacturing corporations in Kenya with demand management possessing the highest level of effect. Again, this study only concentrated on lean practices as opposed to agile. Additionally concepts such as supply chain responsiveness, resilience and integration, which are important for leagility implementation, were not considered. The study further focused on commercial manufacturing sector ignoring humanitarian organizations where leagility is also very critical.

Koori and Chirchir (2017) recommended that leagile supply chain practices be embraced by NGOs due to their positive implication on supply chain performance. This was in the study on leagile supply chain practices and supply chain performance of non-governmental health organizations in Nairobi, Kenya where data was obtained through self-administered questionnaires and processed through descriptive statistics. The study did not narrow down to different components of leagility though it showed the relationship between leagility and supply chain performance. Therefore, a need to narrow down to concepts such as supply chain resilience, supply chain responsiveness, supply chain efficiency as well as supply chain integration arises.

In another study, Eltawy and Gallear (2017) explored leanness and agility and their connection and contradiction. The study implied that the leagile model could be suitable in a market situation where lean and agile, separately are limited. Additionally, the study separated the lean oriented leagility from agile oriented leagility to clarify that the leagile model does not necessarily accommodate both concepts equally. Despite its contribution in explaining the concepts of leanness and agility, the study explored these concepts separately rather than in unison. Further, the study did not give adequate emphasis on humanitarian aid organizations.

Kuria and Chirchir (2014) examined supply chain leagility and performance of humanitarian organizations. Despite the study treating lean and agile concepts separately, a direct relationship between supply chain leagility and performance of humanitarian organizations in Kenya was the ultimate result. The study recommended that humanitarian organizations invest in ICT, train their staff to manage leagile supply chains, share information internally and with external partners, collaborate with other humanitarian organizations and implement organizational structures that support leagility. The study also focused on implementation of supply chain leagility and the challenges faced but failed to consider important aspects of leagility paradigm such as supply chain responsiveness, integration, efficiency, resilience and completely overlooked the moderating effect of organizational characteristics. Further, Kuria and Chirchir (2014), using broad research objectives that lacked specificity and immesurable subconstructs of performance of humanitarians, adopted a different research methodology, model and data analysis method that varied and resulted to inconsistencies in the research findings. The study was conducted on seventy humanitarian organizations, as was the case then, prompting this study to holistically and in a wider way consider the multifaceted supply chain leagility in the humanitarian setting, with specific focus on relief organizations, years later, to make generalizations that could validate, support or contradict the findings of Kuria and Chirchir (2014) study.

Shafiq and Soratana (2019) examined lean and agile paradigms in humanitarian organizations' logistics and supply chain management and found the Lean & Agile

Decoupling Point (LADP) model as availing crucial foundation that can refresh and reinforce humanitarian activity, resulting in reliability in which donors, beneficiaries and other players get assurance. However, the study considered lean and agile as different components and hence examined them differently. The study therefore did not base its findings on the leagile concept, which combines lean and agile practices as opposed to studying them in isolation.

Karanja, Mairura and Ombui (2015), in their research on determinants of effective logistics coordination among humanitarian organizations in Kenya established that logistics coordination is faintly endorsed across relief organizations based in Nairobi. The study therefore focused majorly on level of adoption of logistics coordination among humanitarian organizations and did not consider whether leagile practices influence performance. Altay *et al*., (2018) study on agility and resilience as antecedents of supply chain performance found that supply chain agility and supply chain resilience are two important dynamic capabilities of supply chain and have significant effects on pre-disaster performance. While the study considered agility, it did not explore the lean concepts, which are increasingly being used together with agility. Further, the study was conducted in India where the operating environment may be different from Kenya, making it difficult to generalize.

Ahimbisibwe *et al.* (2016) researched on supply chain visibility, supply chain velocity, supply chain alignment, and humanitarian supply chain relief agility and found significant positive relationships between supply chain visibility, supply chain velocity, supply chain alignment and supply chain relief agility. The study however failed to link these variables with performance. Additionally, other variables such as supply chain responsiveness, integration, resilience and supply chain efficiency were not considered. Mwangi and Anaya (2020) examined the logistical factors influencing disaster responsiveness among humanitarian organizations and found that KRCS depended on donor funding and delay in funding impacted on disaster responsiveness. The study however did not link the logistical factors with the performance of humanitarian organizations.

Andrew (2020) examined the effect of leagile supply chain management on operational performance. The findings showed that 66.4% of variations in leagile supply chain management could be explained by variations in Just in Time, information flow, management of waste and continuous improvement. However, the study was based in Mombasa and did not examine some tenets of leagility such as supply chain integration and resilience. Bhamra, et al., (2020) sought to determine the relevance of leagility. Findings revealed that leagile is recognized as important for business excellence and for quality excellence in complex supply networks. The study was however based on review of existing literature and therefore did not provide new findings. The study was also not conducted in Kenya.

2.6 Summary of Literature

The chapter has reviewed existing literature on supply chain leagility, organizational characteristics and performance of humanitarian aid organizations. The concepts have been examined in the light of several existing theories and models including Decoupling Point theory; Complex Adaptive Systems Theory, Theory of Constraints, Relational View Theory, Theory of Performance and Grey Incidence Analysis Model. Using a conceptual framework, the researcher has demonstrated how different variables relate to each other. In sum, this research sought to establish whether supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration influence the performance of humanitarian aid organizations, and whether the relationship is moderated by organizational characteristics. Each of these variables have been discussed in detail in the chapter. Empirical review covering research done on the subject is also covered in this chapter. The critique of the previous studies has been conducted culminating into the research gap that the present study sought to fill.

2.7 Research Gap

A gap has emerged in the different studies conducted on leagility in supply chain and its impact on performance. The treatment of lean concept and the agility paradigm separately appears to be very common among various studies. One such is a study by Duman, Topgul and Avni (2015) on lean, agile and leagile supply chain where lean

management was found to be a quite good method where demand is stable and predictable. However, despite the mention of supply chain leagility, the study treated the agile and lean concepts separately. Additionally, Duman, Topgul and Avni (2015) adopted a review design implying the existing findings from literature were reviewed. Contrariwise, this study relied on primary data for valid and reliable findings since supply chain leagility is a relatively recent concept.

Similarly, Boschi, Borin and Batocchio (2018) recognized the concept of leagility but too discussed lean and agile paradigms separately. Farah (2015) study was restricted to lean and did not consider combination of lean and agile (leagility). The study was also conducted in the public sector and lacked viewpoint of humanitarian organizations. Koori and Chirchir (2017) on the study of leagile supply chain and supply chain performance of non-governmental health organizations in Nairobi, failed to narrow down to various facets of leagility such as supply chain resilience, supply chain responsiveness, supply chain efficiency as well as supply chain integration. Shafiq and Soratana (2019) left a gap by studying agile and lean paradigms separately. The present study adopted the term supply chain leagility to combine the two concepts. Karanja, Mairura and Ombui (2015) did not link supply chain leagility to performance, a gap that was filled in this study. Ahimbisibwe *et al.* (2016) study left a gap by not including supply chain responsiveness, integration, resilience and supply chain efficiency, which were considered in this study. On the other hand, Mwangi and Anaya (2020) did not link the logistical factors with the performance of humanitarian organizations, which is achieved in this study.

Despite its global acceptance (Galankashi & Helmi, 2016) and imperative role, supply chain leagility has not yet fused into the mainstream of supply chains research, as extant studies in the area of humanitarian supply chain leagility are limited (Kuria & Chirchir, 2014; Purvis *et al.*, 2016; Koori & Chirchir ,2017). Predominantly, the concept was discussed in the context of commercial supply chains (Fadaki, Rahman & Chan, 2019). This study therefore adds to the knowledge in the less explored field of supply chain leagility particularly in the humanitarian setting to increase efficacy in their supply chains.

Farahani, Lotfi, Baghaian, Ruiz and Rezapour (2020) found out that humanitarian organizations functioning in the emergency circle are often under constant pressure to deploy immediate resources without enough knowledge of the nature of resources required on ground and the amounts. More pressure on resource utilization and performance is a result of increased natural and conflict compelled disasters, which demand more simultaneous relief operations around the world. However, little is known about the moderating effect of organizational characteristics on the relationship between supply chain leagility and performance of humanitarian aid organizations. Humanitarian models may be incomplete if they fail to specify mediating and moderating variables. Therefore, they may be unable to give solution to actual societal problems (Swalehe, Odock & Wainaina, 2020). This study looked at the direct and indirect influence of supply chain leagility thus providing broader insights in the area of humanitarian sector.

Most of the reviewed studies are limited to other countries and developed economies. Supply chain leagility has evolved to be a vital focus of research mainly in humanitarian logistics in disaster containment operations (Tatham & Christopher, 2018) with extant studies in USA, Ireland, UK and India**.** African countries suffer several complex humanitarian challenges and the population is highly prone to humanitarian calamities in comparison with the rest of the world. African countries also suffer from lack of national resources available to support people in times of humanitarian crisis, commonly known as coping capacity (Dufour *et al.*, 2018). Thus, a clear understanding and sufficient knowledge on supply chain leagility will facilitate implementation and problem solving process. The context of this study is Kenya, which is in Africa. This study will serve as a reference point for African countries who wish to implement leagility in their humanitarian supply chains.

Further, Eltawy and Gallear (2017); Altay et al (2018) and Bharma et al (2020) studies presented both conceptual and contextual gaps thus the studies did not present the relationship between supply chain leagility and performance of humanitarians. Moreover, it was noted that some of the existing studies (Kuria and Chirchir, 2014; Datta, 2017; Makepeace, Tatham and Wu, 2017; Khan and Wisner, 2019; Mwangi and Anaya, 2020) adopted different research methodologies and data

analysis methods that varied and resulted to inconsistencies in the research findings. This study allowed more sophisticated and comprehensive analyses to avoid the shortcomings, exigencies and inconsistencies suffered in extant studies.

Further, extant studies have hardly emphasized on the influence of supply chain leagility on performance in the humanitarian setting. This study aimed at addressing these exigencies by focusing on supply chain leagility and performance of humanitarian aid organizations in Kenya. In conclusion, the existing studies on the area of study have left a gap that this study filled. Specifically, the past studies focused on other sectors ignoring the humanitarian sector. Additionally, majority of existing studies despite recognizing the concept of supply chain leagility treated the lean and agile concepts separately as others failed to review the different components of supply chain leagility including supply chain resilience, supply chain responsiveness, supply chain efficiency as well as supply chain integration.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodology employed to study supply chain leagility and performance of humanitarian aid organizations. It covers research design and philosophy, target population, sample and sampling techniques, research instruments, data collection procedure, pilot study, data analysis and presentation.

3.2 Research Design

According to Bazeley (2017), research design is the scheme, outline or plan that is used to answer research questions. It is the "glue" that holds all the elements in a research study together. The research design also constitutes the blue print for the collection, measurement and analysis of the data (Abulela & Harwell, 2019). A survey research design was employed for this study. This research design is appropriate where large population geographically spread is involved which was the case in this study. A survey design is appropriate for this study as it allows collection of data for dependent and independent variables by interviewing and use of questionnaire (Rahi, 2017). The design also enabled the study to apply both qualitative and quantitative research approaches as observed by Rahi (2017) that the two approaches reinforces each other. Qualitative approaches enables collection of data in the form of words rather than numbers. It presents verbal explanations instead of numerical and can help obtain more in-depth information that would be otherwise intricate to convey quantitatively (Smith & Thompson, 2017). On the other side, quantitative approach strives for precision by majoring on items that can be counted into predetermined categories and subjected to statistical analysis (Miksza & Elpus, 2018). The study used this approach because the data collected by means of questionnaire was quantitative and was analyzed using statistics. As noted in Sánchez Hernández (2017), the mixed research that combines both qualitative and quantitative research methods: enables mutual corroboration of each other,

contextualizes the analysis and initiates new lines of thinking through attention and surprises, turning ideas around and providing fresh insights.

3.2.1 Research Philosophy

Research philosophy outlines the way data of a certain phenomenon should be compiled and analyzed (Larkin, Shaw & Flowers, 2019). Research study philosophy is a comprehensive term that denotes the development of knowledge and the nature of that knowledge (Creswell & Poth, 2017). Research philosophy is made up of ontology and epistemology. Researchers who seek to understand the nature of the world in the most suitable manner are assisted by the theory of knowledge, which is the epistemology (Easterby-Smith *et al*., 2015). Epistemology consists of two main frameworks; positivism and constructionism (Easterby-Smith *et al*., 2015). Positivism indicates the independence of the researcher from the target of the research and that reality exists separate from the phenomenon or substance being researched (Smith *et al,* 2015). Moreover, constructionism establishes a relationship between the observer and the research and credits humanity for the drive of science (Easterby-Smith *et al*., 2015).

This study was guided by a positivism research philosophy, which is part of epistemological viewpoint. The positivist philosophy was used in this study because it puts emphasis on highly structured methodology to facilitate replication on quantifiable observations that can be analyzed statistically. In positivism research belief, the research is carried out in a value freeway. The researcher is an outward player in data collection in that there is little which can be done to alter the substance of the data collected. The researcher is independent of and not afflicted by the subject of the research. Positivism is directly associated with the concept of objectivism. In this nature of profound approach, scientists express their viewpoint to evaluate social world using objectivity in place of subjectivity (Langdridge, 2007). The philosophy presumes that the researcher is independent of and neither affects nor is affected by the subject of the research. With this approach, the convictions of the researcher do not influence the research study. Positivisms assert that there is no solitary objective reality that can be observed and tested without bias using standardized instruments.

In the positivist paradigm, the researchers see themselves as neutral recorders. Different researchers utilizing similar instruments should arrive at similar results. Positivism is characterized by a belief in theory before research and statistical justification of conclusions from empirically testable hypothesis, the core tenets of social science (Creswell & Poth, 2017).

3.3 Target Population

Etikan, Musa and Alkassim (2016) define population as a large collection of all subjects from where a sample is drawn. According to Susukida, Crum, Stuart, Ebnesajjad and Mojtabai (2016), the target population should have some observable characteristics, from which the researcher intends to generalize the results of the study. The target population of this study was humanitarian aid organizations carrying out their operations in Kenya. As derived from the NGO Coordination Board of Kenya (2019), there are 330 humanitarian aid organizations with established supply chains, which are actively involved in humanitarian work in Kenya.

3.4 Sample and Sampling Techniques

According to Kalton (2020), sample size refers to the selected number of cases, members or events from the accessible population and the aim of sampling is to obtain a comprehension of some features or attributes of the entire population in accordance with the characteristics of the sample. This study was a census. According to Lieberman and Singh (2017), census method is a complete enumeration of the entire population used when it is reasonable to include the entire population for some reasons, whereby one does not need to use a sample. According to Setia (2016), a 100 percent census responsive population is at an upper hand as the doubt of whether the people who take part represent the population is removed. However, the study employed purposive sampling technique in choosing the best-fit participants, supply chain managers in this case, that have a particular set of characteristics such as specific experience, knowledge, skills or exposure to an event. Purposive sampling relies entirely on the knowledge and discretion of the researcher (Manna & Mete, 2021). The researcher collected data from the supply chain

managers (unit of observation) working in the humanitarian aid organizations in Kenya. These target participants had adequate knowledge about the various supply chain designs and leagility practices considering their skills and experience.

3.5 Research Instruments

Several research instruments such as questionnaires, interviews, focus groups, observations, historical reviews and recordings are available to a researcher in the process of collecting data for a study (Moyo, 2017). The choice of method is in accordance with the kind of data the researcher needs, the design used, the simplicity of application, the researcher's preference and the nature of the intended questions (Bell, Bryman & Harley, 2018). Due to the necessity to gather information that assessed the influence of supply chain leagility on performance of humanitarian aid organizations, collecting precise and accurate data was of essence.

Questionnaires were used to obtain primary data for the study. The questionnaires contained structured and semi-structured questions that captured the various variables of the study. A questionnaire with closed and open-ended questions was administered to all supply chain managers of humanitarian aid organizations who participated in this study. This format was applied in all sections of the questionnaires. Robinson and Leonard (2018) observed that using a close-ended format limits the respondents by providing acceptable answers, limiting serious thinking on the part of the respondents. This makes respondents to choose the easiest alternative and as it provides fewer opportunities for self-expression. These reasons explain the drive to combine this format of items with open–ended response items to attract qualitative responses, which resulted in in-depth feelings and perceptions of the respondents. According to Wijngaarden, Leget and Goossensen (2018), open-ended items are applied due to their ability to let respondents exercise freedom to express their views or opinions and to make prudent decisions. The questionnaire explored the selected respondents' observations, views and opinions on the variables. The convenience of questionnaire over other instruments included; information could be obtained from a large sample, no opportunity for bias since it was presented in

paper form and confidentiality was upheld (Stedman, Connelly, Heberlein, Decker & Allred, 2019).

3.6 Data Collection Procedure

Data collection is the gathering of information to serve or prove some facts (Ignatow & Mihalcea, 2017). The researcher obtained a list of all humanitarian aid organizations from NGO Coordination Board of Kenya, an introduction letter from the university and a permit from National Commission for Science, Technology and Innovation (NACOSTI) to collect data from humanitarian aid organizations in Kenya. Research assistants were then recruited based on competence in data collection. The research assistants were trained extensively on the procedure of administration of questionnaires and in interpretations of responses from respondents. The research assistants also accompanied the researcher in piloting and modifying the research instruments in order to understand fully the purposes and methods of data collection. Regarding data collection procedure, the researcher came up with a program for data collection and scheduled appointments with respondents, particularizing the date, time and location where the data was collected. The unit of analysis in this study were humanitarian aid organizations. The target participants (unit of observation) were supply chain managers who filled in the questionnaires. These target participants had adequate knowledge about lean-agile practices adopted by humanitarian supply chains.

The questionnaires were hand delivered by research assistants to the respondents. The respondents were expected to answer the questions and return the questionnaires back to the researcher later (drop and pick questionnaire). Where the responses were not clear, the research assistants asked investigative and follow up questions for clarity. The responses were then inscribed on the questionnaire. The questions were both open and close ended where the respondents, using a five level semantic differential scale, chose a number of alternative answers. The respondents were required to give their independent view on influence of supply chain leagility on performance of humanitarian aid organizations. The respondents were given two weeks to fill the questionnaires, and then the filled questionnaires were collected.

Nonetheless, the duration was prolonged in instances where the respondents failed to return the filled questionnaire at the stipulated time. This method is convenient owing to the length of the questionnaire, the availability of the respondents and the geographical dispersion of the population (Farah, Munga & Mbebe, 2018).

3.7 Pilot Study

According to Ismail, Kinchin and Edwards (2018), a pilot study is always necessary to test the reliability and validity of the data collection instruments. The procedures that are used in pre-testing the questionnaire should be the same as those that are used in the actual. The pilot study was conducted from thirty-three selected humanitarian aid organizations in Nairobi City County. This is in line as the number in the pre-test should be about 1% to 10% of the target population. In this study, the questionnaire was tested on 10% of the entire population. The choice of Nairobi City County was informed by proximity and accessibility by researcher and the location of many humanitarians' headquarters in the County. The purpose of the pilot study was to check on the suitability and clarity of the design, relevance of the information being sought, the language used and the content validity of the instruments from the obtained responses and the reliability of the research instruments. The pilot study was additionally used to identify any item in the questionnaire that may be ambiguous or unclear for the respondents. Such items were changed thereby improving their validity.

3.7.1 Reliability of Research Instrument

Reliability is consistency of measurement or stability of measurement over a range of conditions in which the same result should be obtained. Mohajan (2017) states that reliability is the extent to which a given measuring instrument produces the same result each time it is used. The two commonly used indicators of a scale's reliability are test-retest reliability and internal consistency. The test-retest reliability of a scale is assessed by administering it to the same people twice on separate occasions, and computing the correlation between the two scores obtained. High test-retest correlations denote a more reliable scale. Internal consistency is the extent to which the items that constitute to the scale are all measuring the same underlying attribute

(Mohajan, 2017). This study adopted the internal consistency method to estimate test reliability. The internal consistency method was preferred because it is more stable than other methods (Viladrich, Angulo-Brunet & Doval, 2017). Further, the appeal of an internal consistency index of reliability is that it is estimated after only one test administration and therefore avoids the problems associated with testing over multiple times. Internal consistency is tested using the Cronbach's alpha and sometimes, Kuder-Richardson formula 20 (KR-20) index is used. The difference between the two is when they would be used to assess reliability. Specifically, coefficient alpha is typically used during scale development with items that have several response options (1 = Not at all to 5 = Very great extent) whereas KR-20 is used to estimate reliability for dichotomous (yes/no; true/false) response scales. This research used Cronbach's Alpha to test for internal consistency.

Cronbach's alpha measures consistency within the instrument and questions how well a set of items measures a particular behavior or characteristics within the test. Cronbach's alpha is a reliability coefficient that indicates how well items in a set are positively correlated to one another. The Cronbach's alpha coefficient should range between 0 and 1. Higher alpha coefficient values means that scales are more reliable. Acceptable alpha should be at-least 0.70 or above. Using the formulae below, which is Cronbach's alpha basic equation and an extension of the Kuder-Richardson formula 20 (KR-20), reliability coefficient of internal consistency was determined.

$$KR-20 = \frac{(K)\ (S2-\Sigma S2)}{(S2)\ (K-1)}$$

Where:

KR-20 =Reliability coefficient of internal consistency

K= Number of questions used to measure the reliability

ΣS2= Total variance of overall scores on the entire test

S2=Variance of scores on each question.

Interpretation of the Alpha coefficients was based on the following threshold as cited in Kimaku, Omwenga and Nzulwa (2021); that the reliability of the constructs was acceptable based on the rule that when Cronbach's alpha value is greater than 0.9, it is considered excellent; when value is between 0.8 – 0.9 is deemed very good and when it is between 0.7 – 0.8, it is rated as good, otherwise below 0.7 is poor. In social sciences researches, a reliability value of 0.7 or more is considered acceptable. Alpha Coefficients below 0.7 for a variable necessitated the need to drop the variable and second pilot test undertaken**.**

3.7.2 Validity of Research Instrument

Validity is the precision and meaningfulness of interference, which are based on the results of the study (Mohajan, 2017). The validity of the questionnaire was determined using various methods, to ensure that what is supposed to be measured and performed is achieved with minimal deviation. The validity tests that were conducted included: content validity, face validity and construct validity. In content validity, which is the extent to which a measuring instrument provides adequate coverage of the topic under study, the questionnaires were formulated and operationalized as per the study variables to warrant sufficiency and representativeness of the items in each variable in to the purpose and objectives of the study. Clark and Watson (2019) contented that an instrument can only achieve content validity if it goes through a rational analysis by raters (experts) who have familiarity with the academic scope of study. The researcher additionally asked the supervisors and supply chain experts to analytically scrutinize the items measuring specific constructs with a view of ascertaining whether the full content pertaining to any given construct was represented in the items and if such content was justified with evidence from literature. On scrutiny, various suggestions for correction were made and the ultimate research instrument was produced.

Face validity, which according to Almanasreh, Moles and Chen (2019) is the judgment made based on scientific approach on whether the indicators in use measure the required construct. Subsequently, the researcher sought the opinion and assistance of specialists in the circle of supply chain management and that of the

assigned supervisors on whether as per face value the questionnaire seemed appropriate in both design and structure and if it measured the required constructs. An evaluation of each item was done to determine if it corresponded with the given conceptual domain of supply chain leagility and performance. This was proved nonetheless with some modifications, which were implemented.

Construct validity is the degree to which, a test measure an intended hypothetical construct (Slaney, 2017). Construct validity was achieved through limiting the questions to conceptualization of variables and ensuring that the indicators of every variable fell within the same construct. The motive of this check is to ensure that each measure adequately assess the construct it is purported to assess. Using a panel of "experts" conversant with the construct is one way to assess this type of validity; the experts can examine the items and decide what that specific item is intended to measure (Cobern & AJ, 2020). The study dealt with different groups of experts in the field of supply chain management and issued them with the questionnaires. The experts were expected to assess if the questionnaires helps in determining the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya. The coefficient of the data gathered from the pilot study was computed using Statistical Package for Social Sciences (SPSS) version 24. A coefficient of above 0.5 was obtained and this upheld the validity of the data collection instrument (Mohajan, 2017). The recommendations from the supply chain management experts and the pilot study respondents were used to improve on data collection instruments.

Concerning the qualitative aspects of the study (open-ended questions), the authenticity of the findings was considered primal. This as noted by Barton (2020) relates to the fairness, balance and honesty exhibited by respondents on topical issues. The researcher hoped that respondents would be truthful by avoiding giving distorted accounts of events surrounding supply chain leagility and performance of humanitarian aid organizations in Kenya.

3.8 Data Analysis and Presentation

Data analysis is the use of reasoning to understand the data that has been gathered (Walliman, 2017) with the aim of determining consistent patterns and summarizing

the relevant details affirmed by the study. First, processing through editing, classification and tabulation of data obtained was done making the data amenable to analysis (Li, Higgins & Deeks, 2019). With the study being quantitative and qualitative in nature, both descriptive statistics and inferential statistics were employed. Descriptive data analysis is used in description of basic features of the data in a study. It avails simple summaries about the sample and the measures. Together with simple graphics analysis, they are the basis of virtually every quantitative analysis of data (Denis, 2020).

3.8.1 Inferential Statistics Analysis

Inferential or statistical induction refers to the use of statistics to make inferences concerning some unknown aspects of a population using a sample of the population. The purpose is to give estimation or determine the likelihood, after taking a sample of the needed population (Makar & Rubin, 2018).The study adopted inferential data analysis in order to enable it make suppositions that extend beyond the immediate data alone to infer from the sample data about the whole population. Inferential statistics facilitate inferences from sample data to population conditions (Trafimow, 2017). The study used SPSS version 24 to facilitate the analysis of data. Inferential data analysis was done using Pearson correlation coefficient, regression analysis through enter method and multiple regression analysis through stepwise method. This is in line with Kelter (2020) who observed that in several statistical approaches, particularly parametric measures; one presumes a normal distribution of variables. Therefore, for the purposes of using parametric statistics such as Pearson Correlation and regression analysis, normal distribution of variables is needed; hence, the variable was internally standardized. However, the regression analysis equation is given for standardized and unstandardized coefficients.

3.8.2 Correlation Analysis

In accordance with Bakdash and Marusich (2017), correlation technique is applied when analyzing the degree of relationship between two variables. The computation of a correlation coefficient produces a statistical that ranges between -1 to +1. This statistical is called correlation coefficient (r) which indicate the relationship between

the two variables being compared. This relationship is vital as +1 means that there is a positive relationship between two variables or when one variable increase the other also increases, while -1 implied that when one variable increase the other decrease. Without an existing relationship, the coefficient is equal to zero. Pearson's product moment correlation coefficient was used to establish the strength and the direction of the relationship between dependent and independent variables. The analysis using Pearson's product moment correlation was built on the assumptions that data was normally distributed (Schober, Boer& Schwarte, 2018).

3.8.3 Multiple Regressions Analysis

Multiple regression is an extension of simple linear regression. It is used in predetermination of the value of a variable based on the value of two or more other variables. According to Erdodi (2019), the variable to be predicted is referred to as the dependent variable (or rather, the outcome, target or criterion variable). The variables used to predict the value of the dependent variable are called the independent variables (or rather the predictor, explanatory or regress variables). According to Faraway (2016), multiple regressions lets one determine the overall fit such as the variance explained of the model and the relative contribution of each of the predictors to the total variance explained. Multiple regression analysis was used to test the relationship between the independent and the dependent variables of the study.

3.8.4 Statistical Measurement Model

In order to determine the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya, multiple regression model (1) was used. The regression model is illustrated below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \text{..... (1)}$$

Where: Y=Performance of Humanitarian Aid Organizations

B_0 = Y intercept

X_1 = Supply Chain Responsiveness

X_2 = Supply Chain Resilience

X_3 = Supply Chain Efficiency

X_4 = Supply Chain Integration

ε = Error term

β1, β2, β3 and β4 represent the coefficients of each independent variable.

3.8.5 Moderating Effect Analysis

A moderating variable affects the direction and strength of the relationship between an independent or predictor variables and a dependent or criterion variable. This variable may reduce or enhance the strength of the relationship between a predictor variable and a dependent variable, or alter the direction of the relationship between the dual to negative from positive and viceversa. A moderator is supported if the interaction of predictor and moderator on the outcome of the variable is significant (Darlington & Hayes, 2016). The moderating variable of this study was organizational characteristics. To determine the moderating effect of organizational characteristics on the relationship between supply chain leagility and the performance of humanitarian aid organizations in Kenya, Moderated Multiple Regression (MMR) analysis was followed. This model was used to test hypothesis 5. The moderating model tests whether the prediction of a dependent variable Y, from an independent variable X, varies across levels of a third variable Z. Moderator variables affect the strength and/or direction of the relationship between a predictor and an outcome: enhancing, reducing or altering the influence of the predictor (Darlington & Hayes, 2016). MMR technique is made up of two steps. In the first step, the main effects of the predictors and the hypothesized moderator (Z) were estimated using regression.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_Z Z + \varepsilon \quad \text{..... (2)}$$

Where:

β_0 = Y intercept

β_1, β_2, β_3 and β_4 represent the coefficients of each independent variable.

β_z = the estimate of the population regression coefficient for Z

Z= Organizational Characteristics.

Y=Performance of Humanitarian Aid Organizations

ε = a residual term.

The second step consisted of adding the interaction term to the equation (3) as:

$$Y=\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_z Z + \beta_{1z} X_1 * Z + \beta_{2z} X_2 * Z + \beta_{3z} X_3 * Z + \beta_{4z} X_4 * Z + \varepsilon$$

Where:

$\beta_{1Z}, \beta_{2Z}, \beta_{3Z}$ and β_{4Z} = are the estimates of the population regression coefficient for the product term (X*Z)

Qualitative Data: Data collected from open-ended questions was analyzed qualitatively. Data frequency distribution and cross tabulation was used in describing and explaining the situation as is in the humanitarian aid organizations. The data was coded and analyzed simultaneously as collected. Through thematic analysis, a list of key ideas and themes for each variable was generated and this guided the nature of integration needed for both qualitative and quantitative data collected. The data corpus for the qualitative analysis was the open-ended questions in the research instrument. The data obtained was first transcribed before generation of initial codes in a theory driven manner. The third step involved discovering of recurrent themes

amongst the codes and then a review of the themes was made to assess the evidence associated with respective themes. Views and ideas that recurred often were noted. The recurrent themes selected were finally defined and named in describing and explaining the situation as is in the humanitarian aid organizations; and ultimately reported in narration form.

Quantitative Data: Data was analyzed using descriptive statistics; measures of central tendency, measures of dispersion and measures of symmetry and inferential statistics. Scatter plots were used to establish whether the relationships were linear. SPSS software version 24 was used as a statistical tool for analysis. Linear regression analysis revealed the correlation and strength of the relationship between both independent and dependent variables and the effect of the moderating variable on each relationship. Multiple regression analysis was thereafter conducted to test the overall effect on the study model (Nitzl, Roldan & Cepeda, 2016). Analysis of Variance (ANOVA) also sought to test the goodness of fit of the regression models and finally to test the hypothesis of the multiple regression models.

Data Presentation: The information was presented using a combination of statistical techniques and graphical techniques. Statistical techniques comprised of; frequency distribution for grouped and ungrouped data, measures of central tendency such as mean to present characteristics that determine performance of humanitarian aid organizations and measures of dispersion such as variance, standard deviation and coefficient of variability. Graphical representations, the most common being histograms were used to present data diagrammatically. Upon a glimpse, one is able to make conclusions about the study (Dubey, Kothari & Awari, 2016). Trend analysis, a technique for extracting an underlying pattern was used to spot a pattern on the sub-constructs of performance of humanitarian aid organizations in the 2015-2019 period.

3.8.6 Hypothesis Testing

The hypothesis was tested by running an Ordinary Least Square regression model for the combined sub-constructs of each independent variable against the combined measures of the dependent variable. The acceptance/rejection criteria was that, if the

P-value is greater than 0.05, the study fails to reject the H_0 but if P-value is less than 0.05, the H_0 is rejected.

Table 3.1: Hypothesis Testing

Hypotheses	Hypotheses Test	Regression Model
Hypothesis 1: $H_0$1:Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya	$H_0: \beta_1 = 0$ Vs $H_1: \beta_1 \neq 0$ Reject H_0 if $p < 0.05$, otherwise fail to reject the H_0	$Y = \beta_0 + \beta_1 X_1 + \varepsilon$ Where: Y=Performance of Humanitarian Aid Organizations β_0=Constant (Coefficient of intercept) β_1=Regression coefficient of X_1 X_1=Supply Chain Responsiveness ε=Error Term
Hypothesis 2: $H_0$2: Supply Chain Resilience does not significantly influence the performance of humanitarian aid organizations in Kenya	$H_0: \beta_2 = 0$ Vs $H_1: \beta_2 \neq 0$ Reject H_0 if $p < 0.05$, otherwise fail to reject the H_0	$Y = \beta_0 + \beta_2 X_2 + \varepsilon$ Where: Y=Performance of Humanitarian aid Organizations β_0=Constant (Coefficient of intercept) β_2=Regression coefficient of X_2 X_2=Supply Chain Resilience ε=Error Term
Hypothesis 3: $H_0$3: Supply Chain Efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya	$H_0: \beta_3 = 0$ Vs $H_1: \beta_3 \neq 0$ Reject H_0 if $p < 0.05$, otherwise fail to reject the H_0	$Y = \beta_0 + \beta_3 X_3 + \varepsilon$ Where: Y=performance of humanitarian aid organizations β_0=Constant (Coefficient of intercept) β_3=Regression coefficient of X_3

		X_3= Supply Chain Efficiency ε=Error Term
Hypothesis 4: $H_0$4: Supply Chain Integration does not significantly influence the performance of humanitarian aid organizations in Kenya	$H_0: \beta_4 = 0$ Vs $H_1: \beta_4 \neq 0$ Reject H_0 if $p < 0.05$, otherwise fail to reject the H_0	$Y = \beta_0 + \beta_4 X_4 + \varepsilon$ Where: Y=Performance of Humanitarian aid Organizations β_0=Constant (Coefficient of intercept) β_4=Regression coefficient of X_4 X_4=Supply Chain Integration ε=Error Term

3.9 Diagnostic Tests

Zimmermann, Pauly and Bathke (2019), indicated that in order to have a regression model and estimates that mean something we should be sure that the assumptions are reasonable and that the sample data appear to be sampled from a population that meets the assumption. For this purpose, Srinivasan and Lohith (2017), recommended that normality, autocorrelation, heteroscedasticity, confirmatory factor analysis, linearity and Multicollinearity tests be conducted when checking for relationship between the independent and dependent variables.

3.9.1 Auto Correlation Test/Serial Correlation Test

Auto correlation test to investigate whether the predictor variables have serial correlation, which may affect the regression results by giving spurious results and incorrect estimates, was tested using Durbin Watson test. Durbin Watson statistics ranges in value from 0 to 4 (Chen, 2016). A value toward 0 indicates positive autocorrelation, a value near 2 indicates non-autocorrelation and a value toward 4 indicates negative autocorrelation.

3.9.2 Multicollinearity Test

Multicollinearity is a case of multiple regression whereby the predictor variables are highly correlated. Multicollinearity poses serious effects on the least squares estimates of the regression coefficients, the most significant of which is leading to the acceptance of the null hypothesis more readily (Raheem, Udoh & Gbolahan, 2019). Multicollinearity diagnostics was conducted using Variance Inflation Factor (VIF) and tolerance statistics. The VIF is the reciprocal of the tolerance statistics. The variance inflation factor (VIF) for each term in the model measures the combined effect of the dependences among the regressors on the variance of that term. One or more large VIF indicate Multicollinearity. Tolerance is inverse of the coefficient of determination (R^2). Tolerance is estimated by 1 - R^2. Other factors equal, researchers desire higher levels of tolerance, as low tolerance levels could severely affect results associated with a multiple regression analysis. A VIF of above 5 is usually regarded as evidence of Multicollinearity. While a tolerance statistics of less than 0.20 is also taken as a course for Multicollinearity concern. Multicollinearity was hence tested to establish the possibility of the predictor variables having some explanatory power over each other.

3.9.3 Normality Test

A test for outliers within the constructs was carried out and the ones identified were dropped. Outliers are cases or observations showing characteristics or values that are marked different from the majority of cases in a data set and should be dropped. This is because they distort the true relationship between variables, either by creating a correlation that should not exist or by suppressing a correlation that should exist (Domingues, Filippone, Michiardi & Zouaoui, 2018). To determine the presence of outliers, Mahalanobis d-squared was used for multivariate testing on the dependent and independent variables. After dropping the outliers, the normality of data distribution was assessed by examining its skewness and kurtosis (Soberón & Stute, 2017). A variable that has an absolute skew-index value greater than 3.0 is extremely skewed whereas a kurtosis index greater than 8.0 is an extreme kurtosis (Soberón & Stute, 2017). Further, Verma and Abdel-Salam (2019) stated that an index smaller

than an absolute value of 2.0, representing skewness and an absolute value of 7.0 is the least violation of the assumption of normality.

3.9.4 Heteroscedasticity Test

A common problem experienced in cross-sectional data is heteroscedasticity (unequal variance) in the error term. Heteroscedasticity is caused by many factors including the presence of outliers in the data, incorrect functional form of the regression model, incorrect transformation of data or mixing observations with different measures of scale. Heteroscedasticity was tested using Breush-Pagan test as recommended by Cao, Chen, Ren & Xu (2018).This tested the null hypothesis that the error term has constant variance against the alternative, that the error term variances are not constant. This means that the error terms are multiplicative function of one or more variables. P value ≤ 0.05 signifies the presence of heteroscedasticity (no constant variance in the error term) leading to rejection of the null hypothesis at a significance level of 5%. Large chi-square would indicate heteroscedasticity meaning the error term is not constant.

3.9.5 Confirmatory Factor Analysis

Factor analysis serves as a gauge of the substantive importance of a certain variable to the factor and it is used to identify and remove hidden constructs or variable items that do not meet the objectives of the study and which may not be apparent from direct analysis (Ragin, 2014). Factor analysis as a dimension reduction technique was conducted to retain the smallest number of factors that had the highest influence in terms of the total variance explained. Factor analysis was conducted using Principal Component method approach.

3.10 Operationalization of Study Variables

This study used the open-ended questions, which allowed the respondents to include information that was left out in the close-ended questions. Likert scale, developed by Rensis Likert was used to examine how strongly subjects agree or disagree with a statement (Willits, Theodori & Luloff, 2016). In this study, Likert scales dominated the questionnaire. Willits et al. (2016), revealed that Likert scale is used when the value sought is a belief, conviction, opinion or effect; or when the value sought cannot be asked or answered definitely and with precision; and when the value sought is seen to be of so profound a nature that respondents would not answer except categorically in large ranges. The nature of the collected data in this research displayed most of these features and hence the suitability of the Likert scale. All the hypotheses to test the relationship between supply chain leagility and performance of humanitarian aid organizations were measured by structural equation model.

Supply Chain Responsiveness is the ability of the supply chain to evaluate and consider needs of vulnerable people quickly and the ability to response to such needs in a timely manner in order to alleviate the suffering of vulnerable people (Christopher, 2016). In this study, supply chain responsiveness was measured objectively and subjectively by use of supply chain velocity, supply chain reactivity and supply chain visibility. These measurements were modified and adopted from Brusset and Teller (2017). The researcher used semi-structured questionnaire. This was measured in PART B of the questionnaire.

Supply Chain Resilience is the supply chains' capacity to be equipped for unforeseen hazardous events, quick response and adaptability to potential disturbances to return to its original state or advance by moving to a new, more desirable state (Ribeiro & Barbosa-Povoa, 2018). In this study, supply chain resilience was measured by the use of supply chain flexibility, supply chain robustness and supply chain adaptability adopted and modified from El Baz & Ruel (2020). The researcher used semi-structured questionnaire. This was measured in PART C of the questionnaire.

Supply Chain Efficiency is a measure of how an organization's supply chain harness resources in the best way possible, saving on costs and reducing waste in the process thus enabling humanitarian organizations to achieve its purpose of "serving the maximum lives", and to deliver the best value for money still commensurate with satisfactory quality (Shafiq, Akhtar, Tahir, Akhtar & Kashif ,2021). Supply chain efficiency, in this study is measured using: supply chain waste elimination, cost optimization and process improvement adopted and modified from Shafiq et al. (2021). The researcher used semi-structured questionnaire. This was measured in PART D of the questionnaire.

Supply Chain Integration is the degree to which all the supply chain activities within an organization are unified involving effective communication and relationships among all supply chain members (Pati et al., 2016). In this study, supply chain integration was measured objectively and subjectively by use of supply chain collaboration, supply chain coordination and supply chain information sharing. These measurements were modified and adopted from Dubey & Altay (2018) and Rodríguez-Espíndola *et al.* (2018). The researcher used semi-structured questionnaire. This was measured in PART E of the questionnaire.

Organizational Characteristics is the moderating variable in this study. The instrument used nine items to measure how organizational characteristics moderated the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. In this study, organizational characteristics was measured using firm size, organizational structure and age of firm. This was measured in PART F of the questionnaire.

Performance of Humanitarian Aid Organizations is the dependent variable in this study. This variable was measured using financial appeal coverage, financial resource utilization, disaster impact risk and beneficiary satisfaction, adopted and modified from Mangan & Lalwani (2016). This was measured in PART G of the questionnaire.

Table 3.2: Operationalization of Study Variables

Type of Variable	Variable	Indicators	Questionnaire Reference/ Measurement
Independent Variables	Supply Chain Responsiveness	Supply chain velocity Supply chain reactivity Supply chain visibility	Questions (a to i)
	Supply Chain Resilience	Supply chain flexibility Supply chain robustness Supply chain adaptability	Questions (a to i)
	Supply Chain Efficiency	Supply chain waste elimination Cost optimization Process improvement	Questions (a to i)
	Supply Chain Integration	Supply chain collaboration Supply chain coordination Supply chain information sharing	Questions (a to i)
Moderating Variable	Organizational Characteristics	Firm size Organizational structure Age of firm	Questions (a to i)
Dependent Variable	Performance of Humanitarian Aid Organizations	Financial appeal coverage Financial resource utilization Disaster impact risk Beneficiary Satisfaction	Questions (a to d)

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents analysis and findings of the study as set out in the research objectives and methodology. The study sought to determine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya. This chapter presents the analysis of the results, interpretation of the results and findings of the variables using survey research design. Data collected was mainly ordinal in nature, which took into account the perceptions of the respondents in a five level semantic differential questionnaire with 1- representing Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent. Data was analyzed and results interpreted based on the overall objectives of the study.

4.2. Response Rate

The target population in this study was 330 humanitarian aid organizations operating in Kenya as derived from the NGO Coordination Board of Kenya (2019). Hendra and Hill (2019) describes response rate as the degree at which the final data sets incorporates all sample members and is calculated as the number of respondents with whom questionnaires are completed divided by the total number of respondents in the entire sample including non-respondents. The researcher distributed 297 questionnaires (participants in the pilot test were not included in the actual study) to supply chain managers working in the humanitarian aid organizations from which, 290 were filled and returned, a 97.64% response rate as indicated on Table 4.1. This was a perfect representation and enough to make generalizations of the study findings. This response rate conforms to Ebert, Huibers, Christensen and Christensen (2018) affirmation that a 50% response rate is sufficient for analysis; a rate of 60% is good and that of above 70% is exceptional. The outstanding response rate was attributed to the method of data collection used, whereby the researcher, with assistance from research assistants administered questionnaires to the respondents

who filled them after which they were then collected. The rate of response rate demonstrated willingness to respond to the study. This praiseworthy degree of response was achieved with efforts by the researcher, who made constant visits and followed up to get the questionnaires filled. The unsuccessful response rate was 2.36%.

Table 4.1: Response Rate

Category	Frequency	Percentage
Response	290	97.64
Non response	7	2.36
Total	**297**	**100**

4.3 Pilot Study Results

The study carried out a pilot test to establish the instrument reliability and validity. The participants in the pilot test were not included in the actual study. The reliability of an instrument refers to its ability to produce consistent and steady measurements. Reliability of this instrument was assessed through Cronbach Alpha, which determines the internal consistency. The Cronbach's alpha coefficient is supposed to range between 0 and 1. The higher the alpha coefficient values, the more reliable the scales. Acceptable alpha should be at-least 0.70 or above though this is dependent on the number of items in the scale (Viladrich, Angulo-Brunet & Doval, 2017).

Table 4.2 shows the outcome of the reliability of the questionnaire as derived from the pilot study. The coefficients presented in Table 4.2 showed that supply chain responsiveness (0.729), supply chain resilience (0.725), supply chain efficiency (0.719), supply chain integration (0.729) and organizational characteristics (0.705) were reliable in all the measurement scales used having attained the recommended reliability level of 0.7. This indicates that the scales in question had a high degree of internal consistency among the measurement items. According to Taber (2018), Cronbach Alpha coefficients range between 0 and 1, where a high value indicates a high level of consistency among the items. Taber further argued that the value of alpha is influenced by the number of items in a scale; it increases as the number of items increases.

Table 4.2: Pilot Study Reliability Statistics

Variables	No of items	Cronbach Alpha	Comment
Supply Chain Responsiveness	9	0.729	Accepted
Supply Chain Resilience	9	0.725	Accepted
Supply Chain Efficiency	9	0.719	Accepted
Supply Chain Integration	9	0.729	Accepted
Organizational Characteristics	9	0.705	Accepted

4.4 Demographic Information

This analyses the background information of the respondents ranging from gender, level of education, duration/ experience in the industry, the age of the humanitarian aid organization to the nature of activities undertaken by the humanitarian aid organizations.

4.4.1 Respondents' Gender Distribution

The gender of the respondents was sought. A simple majority of 51.7% of the respondents were female whereas 48.3 % were male as shown in Table 4.3, an implication that humanitarian aid organizations in Kenya have more female staff than males working as supply chain managers. This distribution is a portrayal of fair gender balance. The fact that most responses for this study were based on the perceptions of individual respondents makes this gender distribution bound to represent the opinions and views from both genders. Nonetheless, the gender balance in the humanitarian sector may be proof of fruitful struggles of gender mainstreaming campaigns and inclusivity drives.

Table 4.3: Gender of Respondents

Gender	Frequency	Percent
Male	140	48.3
Female	150	51.7
Total	**290**	**100**

4.4.2 Level of Education

The results of Table 4.4 implies that majority of respondents (supply chain managers) are holders of undergraduate and masters degrees represented by 44.8% and 38.6% respectively. Thirteen point one (13.1%) of the respondents were post-graduate diploma holders, 2.1% hold PhDs, as 1.4% of the respondents are diploma holders. This shows that enlistment with the humanitarian aid organizations is based on academic meritocracy. Moreover, the well-educated respondents in this study signify that they were well informed with supply chain designs and furnished this study with better information of value addition.

Table 4.4: Education Level of Respondents

Education level	Frequency	Percent
Diploma	4	1.4
Undergraduate	130	44.8
Post Graduate Diploma	38	13.1
Masters	112	38.6
PhD	6	2.1
Total	**290**	**100**

4.4.3 Experience in the Humanitarian Industry

The study sought to establish the length of time each respondent had worked in the humanitarian industry. Majority (41.4%) of the respondents had a working experience of between 2-5 years, 37.9% between 5-10 years, 13.8% between 10-20 years and minority of 3.4% had a working experience of more than 20 years and less than 2 years as shown in the results of Table 4.5. This shows that the respondents had been in the industry long enough and they possessed the relevant supply chain leagility familiarity, experience and expertise in the humanitarian industry regarded as valuable in this study.

Table 4.5: Working Experience

Working experience	Frequency	Percent
Less than 2 Years	10	3.4
2-5 Years	120	41.4
5-10 Years	110	37.9
10-20 Years	40	13.8
Above 20 Years	10	3.4
Total	**290**	**100**

4.4.4 Age of Organization

Respondents were required to indicate the age of the humanitarian aid organization they were working with. From the findings of the study, 37.9 % of the organizations were aged between 5-10 years and 10-20 years. 6.9% were less than 2 years old while 6.9% were 2-5 years old in the industry. Some of the humanitarian aid organizations (10.3%) had longer existed in the industry for more than 20 years. The age of the organization played a key role in performance. This is attributed to the vast experience in use of various supply chain designs unilaterally or in a multifaceted approach. From the results in Table 4.6, all the categories/ages of humanitarian aid organizations are well represented enabling the researcher to determine the moderating effect of firm age, as an organizational characteristic, on the relationship between supply chain leagility and performance of humanitarian aid organizations.

Table 4.6: Age of Organization

Age of organization	Frequency	Percentage
Less than 2 Years	20	6.9
2-5 Years	20	6.9
5-10 Years	110	37.9
10-20 Years	110	37.9
Above 20 Years	30	10.3
Total	**290**	**100**

4.4.5 Nature of Humanitarian Activities

The study sought to establish the various activities humanitarian aid organizations specialize in (core competencies). The findings indicate that 41.38% purely specialize in disaster relief aid while 58.62% conduct an aggregated aid compounding both disaster & emergence response and developmental aid to communities. It is important to note that both developmental aid and disaster relief require efficiency, effectiveness and speed in response thus the need for lean and agile paradigms. This is because in the occurrence of disasters, the daily lives of various communities are disrupted and development prospects are halted. Inspired by this, Daly, Mahdi, McCaughey, Mundzir, Halim and Srimulyani (2020) asserts that the idea of humanitarian aid is to save lives and relieve people off suffering in times of and post emergencies. Elsewhere, development aid focuses on the affected structural aspects, particularly systemic poverty, that could slow down economic, institutional and social development in the society, and assists in building capacity to oversee strong communities and maintainable livings. Humanitarian and development aid share some similarities, and various forms of aid draw aspects from both humanitarian and development aspects thus commonly termed as aggregated aid. Sharing the same view is Nyandiko (2020) that disasters and relief aid responds to an occurrence that threatens human lives while development assistance is a long-term plan responding to systematic glitches and focused on economic, social and political advancement.

Table 4.7: Nature of Activities Undertaken by Organization

Nature of Organization	Frequency	Percentage
Disaster relief aid	120	41.38
Aggregated aid	170	58.62
Total	**290**	**100**

4.5 Descriptive Analysis of the Study Variables

Descriptive statistics is the examination of data to explain, illustrate or summarize data in a meaningful way. Descriptive analysis was used to describe the basic features of the data in the study providing a summary about the sample and the

measure thus helping in simplifying massive amounts of data in a sensible and convenient style. It expressed the variables in frequencies, percentages, means and standard deviation. The study analyzed descriptive statistics for all the study variables.

4.5.1 Supply Chain Responsiveness

The study sought to examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: supply chain velocity, supply chain reactivity and supply chain visibility in the opinion statements given. Respondents were asked to indicate the extent to which supply chain responsiveness influenced performance of humanitarian aid organizations in Kenya. This was based on a likert scale of not at all, small extent, moderate, large extent and very large extent. Therefore, in this study, a scale of not at all and small extent implied disagree while large and very large extent implied agreement. The results were expressed as frequencies, percentages, mean and standard deviation as indicated in Table 4.8 below.

Table 4.8: Descriptive Analysis of Supply Chain Responsiveness

Statements on Supply Chain Responsiveness	1 %	2 %	3 %	4 %	5 %	Mean	Std Dev
Organization's supply chain evaluates, considers and covers needs quickly by providing basic essentials to alleviate suffering people.	0(0)	0(0)	69(23.8)	150(51.7)	71(24.5)	3.70	0.696
The supply chain has an element of visibility enabling the view of the motion across the entire supply chain	0(0)	0(0)	60(20.7)	160(55.2)	70(24.1)	4.03	0.670
Leagility enables reliability of supply chains	0(0)	0(0)	58(20)	142(49.0)	90(31)	4.11	0.713
The ability of humanitarian organizations to respond quickly to emergencies might be challenging due to issues of resources, funding and lack of information	0(0)	0(0)	10(3.4)	150(51.7)	130(44.8)	4.41	0.559
A guarantee of the humanitarian supply chain to quickly deliver is a real selling point if that order arrives quickly, accurately and complete otherwise its termed as waste.	0(0)	0(0)	39(13.4)	150(51.7)	101(34.8)	4.21	0.664
Our organization has a close partnership with suppliers that enables speedy delivery especially when handling a disaster or an emergency	0(0)	0(0)	10(3.4)	120(41.4)	160(55.2)	4.52	0.565
Supply chain has high degree of flexibility in terms of assembling and transportation structure to meet the needs of suffering people	0(0)	0(0)	51(17.6)	129(44.5)	110(37.9)	4.20	0.715
Organization's supply chain undertakes activities before disasters occur that enhance the readiness of humanitarian organizations and the society to counter the emergencies.	0(0)	0(0)	20(6.9)	190(65.5)	80(27.6)	4.21	.551
Supply chain preparedness is crucial as it minimizes the time spent in undertaking the immediate response and increase the odds of quick recovery	0(0)	0(0)	31(10.7)	168(57.9)	91(31.2)	4.21	.610

Key: 1-Not at all; 2-Small Extent; 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent

Majority of the respondents (76.2%) agreed that humanitarian supply chains evaluate, consider and covers needs quickly by providing basic essentials to alleviate suffering of vulnerable people while 23.8% indicated moderate extent. Large number of respondents (79.3%) agreed that their supply chains have an element of visibility

enabling the view of the movements across the supply chain, including identity, position and state of transit alongside the arranged and actual dates and times for the events as 20.7% moderately agreed. Elsewhere, 80% of the respondents agreed that leagility enables reliability of humanitarian supply chains while 20% moderately agreed that reliability is enabled by leagility design of the supply chains. The ability of humanitarian aid organizations to respond quickly to emergencies might be challenging due to issues of resources, funding and lack of information as indicated by 96.5% of the respondents who agreed and 3.4% of the moderate responses. Majority of the respondents (86.5%) agreed that, a guarantee of the humanitarian supply chains to quickly deliver is a real selling point if that order arrives quickly, accurately and complete otherwise it is termed as waste while 13.4% moderately agreed.

Respondents were asked to indicate whether humanitarian aid organizations had a close partnership with suppliers that enables delivery of requested supplies within the requested time and place especially when handling a disaster or an emergency, 96.6% and 3.4% agreed and moderately agreed respectively to the statement. Further, majority of the respondents (82.4%) agreed that supply chain has high degree of flexibility in terms of assembling and transportation structure to meet the needs of suffering people as 17.6% indicated moderate. Respondents agreed that their supply chains undertake pre-disaster activities that enhance the readiness of humanitarian organizations and the society to counter the emergencies. This was important for supply chain preparedness which respondents termed as crucial as it minimizes the time spent in undertaking the immediate response and increase the odds of quick recovery.

In general, the findings in Table 4.8 found out that humanitarian aid organizations in Kenya have supply chains that are designed to be responsive to the needs of vulnerable populations. The humanitarian supply chains are designed to evaluate, consider and cover needs quickly while enabling a view of the movements along the supply chain. Further, to increase the element of supply chain velocity and reactivity, humanitarian aid organizations have established close relationships with suppliers in the effort to improve responsiveness. The humanitarian supply chains are also

designed to be flexible to meet the needs of vulnerable people in aspects of transportation, assembling and dispatch.

However, the ability of humanitarian aid organizations to respond quickly to emergencies and disasters is a challenging task influenced by the various challenges facing humanitarian supply chains such as lack of information, insufficient resources and poor funding. This means that despite the supply chains being designed to be responsive to emergencies, there is an element of sluggishness in most humanitarian supply chains in Kenya resultant from the challenges faced. This shows lack of preparedness by humanitarian aid organizations in responding to emergencies and disasters. Preparedness entails all the activities undertaken before a disaster occurs that enhance the readiness of humanitarian organizations and the society to counter the emergencies. Gikonyo (2017) asserted that preparedness measures are crucial as they minimize the time spent in undertaking the immediate response and increase the odds of quick recovery. During the preparation phase, hazards/risks are acknowledged and strategies designated to address response and recovery necessities. The findings of this study concurred with Rodríguez-Espíndola, Chowdhury, Beltagui and Albores (2020) study that identified the humanitarian supply chain management challenges as delayed delivery of the appropriate products, lack of disaster preparedness, faulty information integration and uncertainty in demand among others.

4.5.2 Supply Chain Resilience

The respondents were probed on various indicators of supply chain resilience and performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: supply chain flexibility, supply chain robustness and supply chain adaptability in the opinion statements given. The responses were rated on a 5-point likert scale where respondents either indicated not at all, small extent, moderate extent, large extent and very large extent. In this study the scale of not at all and small extent indicated disagree whereas large and very large extent meant agreed. The results were expressed as frequencies, percentages, mean and standard deviation as shown in Table 4.9 below.

Table 4.9: Descriptive Analysis of Supply Chain Resilience

Statements on Supply Chain Resilience	1 %	2 %	3 %	4 %	5 %	Mean	Std Dev
Leagility enables the supply chain to become resilient after disruptions	0(0)	0(0)	50(17.2)	200(69)	40(13.8)	3.97	.557
Out of adoption of leagility, supply chain flexibility has been achieved	0(0)	0(0)	41(14.1)	179(61.7)	70(24.1)	4.07	.608
Supply chain alignment has been made possible by leagility	0(0)	0(0)	40(13.8)	170(58.60	80(27.6)	4.14	.629
Leagility reduces supply chain vulnerability and improved adaptability	0(0)	0(0)	32(11.0)	150(51.7)	108(37.2)	4.26	.639
Our supply chain is prone to vulnerabilities and disruptions from both external factors and internal factors ranging from financial to internal business-process susceptibilities.	0(0)	0(0)	10(3.4)	160(55.2)	120(41.4)	4.38	.553
The humanitarian organizations cope with disruptions and vulnerabilities either reactively or proactively	0(0)	0(0)	20(6.9)	191(65.9)	79(27.2)	4.20	.551
Supply chain flexibility enables humanitarian organizations to handle the effects of unforeseen changes, ambiguity and volatile environment in which these organizations operate in	0(0)	0(0)	30(10.3)	170(58.6)	90(31.0)	4.21	.610
Leagility practices give humanitarian aid organizations the aptitude to survive, adjust and keep their operations running in times of turbulent change	0(0)	0(0)	50(17.2)	190(65.5)	50(17.2)	4.00	.588
Through leagility practices our supply chains have apparent ability to recover from inevitable risk events more effectively than others	0(0)	0(0)	40(13.8)	189(65.2)	61(21)	4.07	.584

Key: 1-Not at all; 2-Small Extent; 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent

The respondents were asked to indicate the extent to which leagility enables the supply chains to become resilient upon disruptions. Majority of the respondents (82.8%) agreed that leagility contributes to resilience of supply chains as 17.2% moderately agreed. By humanitarian aid organizations adopting leagility design in their supply chains, flexibility has been achieved as indicated by 85.8% and 14.1% of the responses who agreed and moderately agreed respectively. Adoption of supply

chain leagility by humanitarian aid organizations has also made possible supply chain alignment. Leagility is indicated by 88.9% of the respondents to improve supply chain adaptability and reduces supply chain vulnerability defined as the susceptibility of the supply chain to the probability and significances of disruptions.

Respondents (96.6%) agreed that humanitarian supply chains are prone to vulnerabilities and disruptions from both external factors and internal factors such as financial and internal business-process vulnerabilities as 3.4% moderately agreed. In response to this, the humanitarian aid organizations cope with disruptions and vulnerabilities either reactively or proactively as 93.1% of the respondents agreed while 6.9% moderately agreed to the statement. A large number of the respondents (89.6%) agreed and 10.3% moderately agreed that supply chain flexibility enables humanitarian organizations to deal with the effects of unplanned changes, uncertainty and volatile environment in which these organizations operate. Furthermore, 82.8% of the respondents indicated that leagility practices give humanitarian aid organizations the capacity to survive, adapt and sustain their operations in the face of turbulent changes while 17.2% moderately alluded to that. By humanitarian aid organizations adopting leagility design in their supply chains they have apparent ability to recover from inevitable risk events more effectively than others as indicated in 86.2% and 13.8% of the responses agreeing and moderately agreeing to the statement. In general, resilience is typically focused on bringing supply chain operations back to their previous condition following a crisis, and some humanitarian supply chains have painfully proven to not be resilient. Nevertheless, many humanitarian supply chains in Kenya have emerged stronger than they were prior to crises and disruptions, learning valuable lessons and rapidly reconfiguring to meet emergent needs, suggesting that the concept of resilience needs to be reimagined.

In general, the findings as in Table 4.9 indicate that leagility design of supply chains enables humanitarian supply chains to be resilient by achieving the elements of flexibility, alignment and reduction in supply chain vulnerability. Humanitarian supply chains are prone to vulnerabilities and disruptions emanating internally or externally to the organizations. The adoption of leagility design in supply chains give humanitarian aid organizations the capacity to survive, adapt and sustain in the event

of turbulences. Leagility design enables humanitarian supply chains to recover from inevitable risky events in an effective way. The findings of this study corroborate with Mutebi, Ntayi, Muhwezi and Munene (2020) study on self-organization, adaptability, organizational networks and inter-organizational coordination, with an empirical evidence from humanitarian organizations in Uganda, that supply chain resilience enhances resource utilization, helps in meeting needs and saving lives and ensuring time targets are met. Further, Nemuel, Mukulu and Waiganjo (2017) established that supply chain re-engineering and risk awareness were significant predictors of supply chain resilience in organizations.

4.5.3 Supply Chain Efficiency

The study sought to determine the influence of supply chain efficiency on performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: supply chain waste elimination, cost optimization and process improvement in the opinion statements given. Respondents were required to indicate the extent to which supply chain efficiency influenced performance of humanitarian aid organizations in Kenya. This was on a likert scale of not at all, small extent, moderate extent, large extent and very large extent. Therefore, in this study the scale of not at all and small extent meant disagree while large and very large extent meant agreed. The results were expressed as frequencies, percentages, mean and standard deviation as shown in Table 4.10 below.

Table 4.10: Descriptive Analysis of Supply Chain Efficiency

Statements on Supply Chain Efficiency	1 %	2 %	3 %	4 %	5 %	Mean	Std Dev
Supply chain emphasizes on reduction of waste of resources by identifying non-value adding activities and eliminating them.	0 (0)	11(3.8)	40(13.8)	160(55.2)	79(27.2)	4.06	.741
Minimization of waste enhances resource utilization and is continually improved amounting to increased supply chain efficiency	0 (0)	10(3.4)	80(27.6)	90(31)	110(37.9)	4.03	.891
The organization has managed to eliminate non-value adding operations in their supply chain	10(3.4)	10(3.4)	50(17.2)	140(48.3)	80(27.6)	3.93	0.946
Supply chain leagility creates checks, balances and system use that improves waste mitigation process.	0 (0)	0 (0)	99(34.1)	151(52.1)	40(13.8)	3.79	.664
Organization has eliminated cumbersome planning processes to create an enhanced supply chain with an improved inventory and standard operating procedures.	0 (0)	10(3.4)	60(20.7)	110(37.9)	110(37.9)	4.10	.846
Through waste elimination practices, the organization have a better value proposition	0 (0)	10(3.4)	40(13.8)	90(31)	150(51.7)	4.31	.836
Supply chain has a systematic approach designed to create robust, effective processes and improve existing processes to meet organizational performance goals now and into the future.	0 (0)	10(3.4)	60(20.7)	100(34.5)	120(41.4)	4.14	.861
Supply chain uncover the best solutions for creating and storing inventory to deliver products and services to vulnerable populations at minimal operating costs.	0 (0)	0 (0)	39(13.4)	150(51.7)	101(34.8)	4.21	.664
Supply chain employs strategic network analysis to look at a wide range of metrics including physical facilities and inventories, costs for warehousing, transportation, labor and distribution networks.	0 (0)	0 (0)	39(13.4)	149(51.4)	102(35.2)	4.21	.664

Majority of the respondents (82.4%) agreed that humanitarian supply chains emphasize on reduction of wastage of resources by identifying non-value adding activities and eliminating them. 13.8% moderately responded while 3.8% disagreed on the emphasize. A large number of respondents (68.9%) also agreed that minimization of wastes enhances resource utilization and the practice of waste mitigation in humanitarian aid organizations is continuously improved amounting to increased supply chain efficiency. Most humanitarian aid organizations (75.9%) had managed to eliminate non-value adding operations in their supply chains as indicated in the findings as 17.2% moderately responded. Still 6.8% of the organizations were yet to eliminate non-value adding operations in their humanitarian supply chains. Generally, waste mitigation in the humanitarian supply chains had improved with the onset of supply chain leagility practices.

Majority of the respondents (65.9%) agreed that leagility creates checks, balances and allows for system use that improves waste mitigation process in humanitarian supply chains as 34.1% moderately agreed that leagility design of supply chains provides for checks and balances. Respondents agreed (82.7%) that through waste elimination practices humanitarian aid organizations have better value propositions. 3.4% of the respondents disagreed as 13.8% moderately alluded to the statement.

Majority of the respondents (75.8%) agreed that humanitarian organizations had eliminated cumbersome planning processes to create an enhanced supply chain with an improved inventory and standard operating procedures. Further, 75.9% of the respondents consented that humanitarian supply chains has a systematic approach designed to create robust, effective processes and improve existing processes to meet organizational performance goals now and into the future. The humanitarian supply chains uncover the best solutions for creating and storing inventory to deliver products and services to vulnerable populations at minimal operating costs as indicated by 86.5% of the respondents who agreed to the statement. Lastly, 86.6% of the respondents agreed that the humanitarian supply chains employ strategic network analysis to look at a wide range of metrics including physical facilities and inventories, costs for warehousing, transportation, labour and distribution networks.

Based on the study findings in Table 4.10, leagility is an essential design of supply chain efficiency in humanitarian supply chains. Supply chain leagility design creates checks & balances and enables systems use improving waste mitigation. Waste elimination is a continuous exercise in humanitarian aid organizations involving identification of non-value adding activities in the supply chains and eliminating them. Majority of the humanitarian aid organizations had managed to eliminate the non-value adding operations in their supply chains but still some humanitarian aid organizations were yet to. Minimization of such wastages enhances resource utilizations in the organizations. The humanitarian supply chains uncover the best solutions for creating and storing inventory to deliver products and services to vulnerable populations at minimal operating costs. Ozen (2018) alluded that most humanitarian supplies fall into the category of relief items and face specific challenges related to in-kind donations ranging from storage and transportation bottlenecks that bring about inefficiency.

The findings of this study agree with Iyengar and Bharathi (2018) study on analysis of lean, agile, and leagile supply chains that efficiency and waste management are important aspects of leagile supply chain. Munyalo (2020) further confirms that elimination of waste from all the elements of supply chain calls for continuous improvement processes. Hassani, Ceauşu and Iordache (2020) on the other hand in their study on lean and agile model implementation for managing the supply chain found that volatile and unpredictable environments demand supply chains that minimize waste to boost efficiency, as was the case in the findings of this study.

4.5.4 Supply Chain Integration

The study sought to examine the influence of supply chain integration on performance of humanitarian aid organizations in Kenya. This objective was measured using the following indicators: supply chain collaboration, supply chain coordination and supply chain information sharing in the opinion statements given. Respondents were required to indicate the extent to which supply chain integration influenced performance of humanitarian aid organizations in Kenya. This was on a likert scale of not at all, small extent, moderate, large extent and very large extent.

Therefore, in this study the scale of not at all and small extent meant disagree while large and very large extent meant agreed. The results were expressed as frequencies, percentages, mean and standard deviation as shown in Table 4.11 below.

Table 4.11: Descriptive Analysis of Supply Chain Integration

Statement of Supply Chain Integration	1 %	2 %	3 %	4 %	5 %	Mean	Std Dev
Leagility fostered various forms of integration including virtual integration, process integration, collaborative planning and information sharing	0(0)	10(3.4)	90(31)	130(44.8)	60(20.7)	3.83	.792
Supply chain has effective communication among all supply chain members enhancing the various relationships that exist between departments within one organization or the relationship between various organizations.	0(0)	10(3.4)	40(13.8)	160(55.2)	80(27.6)	4.07	.741
Shipments of the items needed by the firm can be simply organized through the internet or a networked computer system.	0(0)	0(0)	59(20.3)	111(38.3)	120(41.4)	4.21	.762
Information exchange between partners in the humanitarian supply chain has definitive impact on organization performance and efficiency of their supply chains.	0(0)	0(0)	0(0)	162(55.9)	128(44.1)	4.44	.498
Sharing of information makes it possible for humanitarian organizations to make better-informed decisions on basis of making orders, capacity allocations, and material planning.	0(0)	0(0)	20(6.9)	151(52.1)	119(41.0)	4.34	.604
Humanitarian organizations have strategic suppliers for various critical products and services especially for catering for emergencies	0(0)	0(0)	80(27.6)	150(51.7)	60(20.7)	3.93	.693
Leagility has enabled partners' input to be considered as pertains to product or services attributes considered during emergencies	0(0)	0(0)	20(6.9)	150(51.7)	120(41.4)	4.34	.604
Humanitarian actions involve large numbers of domestic and global actors working in the same topographical settings targeting the same objectives thus coordination is needed for smooth flow of operations	0(0)	10(3.4)	40(13.8)	90(31.0)	150(51.7)	4.31	.836
Coordination and information sharing among the humanitarian actors during inter-agency disaster response influences collective decision-making and humanitarian actions.	0(0)	0(0)	99(33.9)	150(51.7)	41(14.1)	3.8	.664

Majority of the respondents (65.5%) agreed that leagility design fostered various forms of integration ranging from virtual integration, process integration, collaborative planning and information sharing. On the contrary, 31% indicated moderate as 3.4% disagreed that leagility fosters integration. A large number of respondents (82.8%) agreed that their humanitarian supply chains had effective communication among all supply chain members enhancing the various relationships that existed between departments within one organization or the relationship between various organizations involved in humanitarian operations. Of the respondents, 13.8% indicated moderate while 3.4% disagreed that there was effective communications among humanitarian supply chain members. Shipments of the components that humanitarian aid organizations needed could be easily arranged through the internet or a networked computer system as indicated by 79.7% of the respondents while 20.3% indicated moderate. Indeed, Wagner and Thakur-Weigold (2018) agrees that substantial developments have been made to the information technology and communication infrastructure to foster enhanced coordination and cooperation between humanitarian actors. All the same, gaps remain concerning the generation, analysis and transmission of proper information before, during and after disasters accredited to the nature of humanitarian response, which can be ideally conceptualized as a complex system.

Respondents (100%) upheld that the exchange of information among actors in the humanitarian supply chain has a huge impact on organizational performance and efficiency of their supply chains. Informational exchange by humanitarian organizations facilitates informed decision making in respect to ordering, capacity allocations and material planning, due to better visibility of demand, supply and inventory as indicated by 93.1% of the respondents. From the response, 6.9% indicated moderate indicating the role of information sharing in humanitarian supply chains. Majority of the respondents (72.4%) indicated that humanitarian aid organizations have strategic suppliers for various critical products and services especially for catering for emergencies. 27.6% moderately agreed to this idea of framework contracting. Further, majority of the humanitarian aid organizations (93.1%) enabled partners' input to be considered as pertains to product or services attributes considered during emergencies courtesy of supply chain leagility. Of the

respondents, 6.9% indicated moderate. Respondents (82.7%) indicated that humanitarian actions involve large numbers of domestic and global actors working in the same topographical settings targeting the same objectives raising the need for supply chain coordination for smooth flow of operations. The findings revealed that poor coordination and information sharing, among the humanitarian actors during inter-agency disaster response, negatively influences collective decision-making and humanitarian actions.

In general, supply chain leagility is fostered in various forms in humanitarian aid organizations ranging from virtual integration, process integration, collaborative planning and information sharing. The findings of this study indicate that humanitarian aid organizations have effective communication among all the supply chain partners. Sharing of information among supply chain members has a significant impact on the performance of humanitarian aid organizations and amounts to efficiency of supply chains. This is because sharing information allows humanitarian aid organizations to make informed decisions in the event of emergencies or disasters. The findings confirm Zhu, Krikke and Caniels (2018) argument that sharing information among supply chain partners has a leveraging power on organizational performance. This results from elimination of possible inconsistencies arising from the exchanged information ultimately leading to the attainment of a standardized platform for information sharing. Maria and Ellen (2017) arrived at a similar conclusion that information is one of the elements that connect all humanitarian supply chain actors. In addition, having quality information by supply chain actors amounts to better planning and judgment thereby enhancing the response to beneficiaries.

The findings also indicate that humanitarian organizations embrace framework contracting where they have standby strategic suppliers for various critical products and services to cater for emergencies. Embracing leagility design enables humanitarian aid organizations to consider the partners' input as pertains to the attributes of products and services needed in case of emergencies. This aligns with the findings of Victoria, Nyamwange and Harley (2017) that preserving a good liaison with suppliers, practical and competent internal affairs, constant progress and

keeping up with technology to facilitate swiftness in executing humanitarian duties, inter-organizational integrations and effortlessness in internal processes are some of the practices rampant among humanitarian organizations in Kenya. Further, Naburuk (2018) identified poor information integration as one of the supply chain management challenges encountered by relief organizations in Kenya.

4.6 Qualitative Analysis

Thematically, recurrent themes were drawn from qualitative responses received from the supply chain managers. As many potential themes as possible were manually coded for purposes of establishing patterns.

4.6.1 Supply Chain Responsiveness

Exploration of the views of supply chain managers on supply chain responsiveness was conducted using three items on research instrument. First, the various disasters that disrupt communities/societies triggering the need for supply chain responsiveness. Secondly, the strategies humanitarian aid organizations adopt to make their supply chains more responsive. Lastly, respondents were asked to identify the driving forces making humanitarian aid organizations design their supply chains to be responsive to societal needs.

The study sought to determine the various disasters and situations triggering the need for supply chains to be responsive by disrupting communities at large in Kenya. The findings indicated that Kenya has been subjected to various disasters, which are classified on basis of origin and cause as either manmade (anthropogenic) or natural in nature. Commonly identified natural disasters included disease outbreaks, plagues/invasions, floods, landslides/mudslides, droughts and famine. Additionally, though utterly devastating but occurring less frequently in Kenya, other natural disasters (geographic in nature) included earthquakes and volcanic eruptions. Common manmade disasters identified included structural/buildings collapse, chemical leaks, spillovers, manmade fires, terrorist activities, human conflicts, traffic accidents and politically instigated violence. The findings fit with Bamgbose (2017) proposal that manmade disasters, commonly known as anthropogenic disasters

because they occur from human activities, can be categorized into technological, sociological and transportation disasters. From the views of the respondents, the diversity, frequency of occurrence and magnitude of the disasters has dramatically increased in the recent times leading to the upsurge in number of victims. In some cases, though unintentional, manmade disasters are caused by intentional human activities. Except for some, which are intentional such as terrorism, most are a result of accidents, which could have been avoided with appropriate timely precaution.

Four themes commonly emerged from the participating supply chain managers concerning the strategies adopted in increasing supply chain responsiveness. Modularity emerged as a strategy to increase supply chain responsiveness in humanitarian aid organizations. Modularization in supply chain management refers to division of a greater whole to substitutable parts that fit together flawlessly and together in many different combinations and permutations make many unlike wholes. The findings concur with Wang and Zhang (2020) study, which concluded that humanitarian supply chains utilize modular solutions through pre-packaged units, which can be readily shipped to any location at any time for apt disaster response. There is increasing push for modularity in the humanitarian sector. This is principally a result of the rising need for responsiveness in form of flexibility and favorable costs. This aspiration champions for standardized solutions creating modules that can be pooled in diverse variations and assembled/disassembled according to needs (Mwangangi & Achuora, 2019). Micheli, Trucco, Sabri and Mancini (2019) further supported this by emphasizing that all humanitarian actors are struggling with responsiveness on basis of consistent pressure of charging less while providing better service to beneficiaries and donors.

Another strategy commonly identified from the views of supply chain managers to increase responsiveness in humanitarian supply chains is shortened lead-times. Charles, Lauras, Van Wassenhove and Dupont (2016) asserted that analyzing lead times is of high significance especially in supply of critical items as time values are more vital in humanitarian relief. The sensitiveness of the time factor is the need to deliver goods in time so they can be availed to the victims at the right time in the

perfect condition. This could be achieved by utilization of local sources of supply or through having strategic suppliers ready to deliver when need arises.

Transport and capacity planning emerged as a strategy used by humanitarian aid organizations to respond quickly to disasters. Unidentified circumstances, and at times, ruined infrastructure, make it challenging to plan for transportation and volume capability. Allaoui, Guo and Sarkis (2019) arrived at a similar conclusion terming transportation as a significant link between agencies as it facilitates the flow of goods among them. Organizations can take advantage of transport to earn competitive advantage through supply chain in terms of efficiency. Transportation in addition entails modes of transportation, routing/scheduling, maintenance, shipping and consolidation. The main sectors that are responsible for capacity planning on matters pertaining to humanitarian logistics are warehousing, transport, material handling devices and human resources.

The postponement strategy decrees that the organizations should postpone the creation or delivery of the product for as long as they possibly can. Nyang'au (2017) agreed that postponement strategy aims at reducing inventory obsolescence and eliminates the risks and uncertainty costs that may arise from having unwanted products. It however requires an integrated and agile supply chain to effectively generate and develop the most recent demand prognoses along the supply chain to produce or allocate the suitable products for individual clients. The conditions where postponement becomes the only option are scarce, but may occur for particular classes of products or channels in an organization. The driving forces making humanitarian aid organizations to design responsive supply chains emerged as the need to rescue lives, pressure from donors and the increased number of disasters and emergencies in the contemporary period.

4.6.2 Supply Chain Resilience

Examination of supply chain managers views on supply chain resilience were examined using two open-ended questions. The first question sought to identify the challenges faced by humanitarian supply chains in implementing leagility design.

Secondly, supply chain managers opinions was sought on how humanitarian supply chains can be designed to be resilient to overcome vulnerabilities and disruptions.

From the examination of the views of supply chain managers, insufficient resources emerged as a major challenge in implementation of supply chain leagility by humanitarian organizations in Kenya. Humanitarian aid organizations disclosed struggle in accessing enough, appropriate and continuous funding for their humanitarian work. Reaching out to donors is as difficult as handling funding conditions. Humanitarian aid organizations have inadequate resource mobilization skills thus no funds are collected on local capacity as they wait for international donors to approach them. Sewordor, Esnard, Sapat and Schwartz (2019) alluded that humanitarian aid organizations have high reliance on donors and often deviate from their focus to act in compliance with donors. This leaves humanitarian organizations exposed to donors' manipulation making it hard to measure their impact over time.

Demand uncertainty was identified as a challenge too in implementation of leagility design in humanitarian aid organizations in Kenya. The uncertainty and unpredictability of events, which is especially common in sudden-onset disasters in regard to their timing, location, nature and magnitude, interfere with the prediction of supply and demand. The probability of disturbance therefore increases greatly, which makes response and preparation equally important. The degree to which demand can be projected or forecasted is crucial for making supply chain decisions. The needs for vulnerable populations vary significantly according to the nature of the disaster and phases in the disaster timeline. The findings confirm Rahman, Majchrzak and Comes (2019) argument that humanitarian supply chain managers are in constant pressure from unpredictable possibilities of when, where, what, how much, where from and how frequent; to be precise, the rudimentary components necessary for an efficient supply chain structure are extremely ambiguous. Feng and Cui (2020) added that disaster demand forecasting is challenging, as there is no historic reference although the data may still be useless if available, as it is not guaranteed to predict the future disaster demand due to the unique nature of disasters, in that, there will be statistical variations every time a disaster strikes.

Poor coordination within the humanitarian supply chains was identified as a challenge to leagility design. In complex emergencies, the sturdier the coordination, the better the quality of services delivered. In absence of coordination, humanitarian aid organizations end up duplicating projects in one place or concentrate attention where it is not needed. Comes, Van de Walle and Wassenhove (2020) supported this by emphasizing that in several occurrences, lack of strong central coordinating mechanism make the work of humanitarian aid organizations look haphazard. Host governments prioritizing bilateral and multilaterals while ignoring humanitarian aid organizations especially in making decisions was a challenge to supply chain leagility. This is because reports or concerns from humanitarian aid organizations are regarded as non-technical thus not taken into account. This is despite humanitarian aid organizations (especially local ones) being in a better position to understand the needs of the disturbed populations due to their familiarity and interactions with the affected populations.

Respondents identified indifference in development approaches as a disruption to humanitarian supply chain leagility. Many humanitarian organizations are still focusing on 'hardware' approach to development such as development of infrastructure and delivery of services in place of the 'software' approach of empowering people and local institutions so they have the capacity to handle what comes their way. The rates of poverty and illiteracy remain substantial. Humanitarian organizations are deeply cognizant of the growing and massive needs of vulnerable people and face difficulty in responding to all these needs. There is a lack of sustainability and ownership of development interventions by communities. Bonga (2020) in the study, poverty and pandemic response, concur that the society and communities are spoiled by methods that encourage reliance and the drive to take responsibility individually is diminished.

For humanitarian aid organizations to overcome the vulnerabilities and disruptions affecting their supply chains and be resilient, utilization of locally available resources is necessary as money can be raised from businesses, individuals, government and investments. For this to be achieved, humanitarian aid organizations ought to possess capable management and corruption free policies, properly planned approaches and

domestic integrity. The findings mirror Love, Allison, Asche, Belton, Cottrell, Froelich and Pinto da Silva (2020) on emerging Covid-19 impacts, responses and lessons for building resilience that relief activities ought to be able to effectively gather resources, contain the disaster and alleviate any possible repercussions. This indicates how important it is to be swift in resource mobilization during emergency action and how quick reaction can limit the overall severity of a disaster in terms of loss of life. Proper coordination of humanitarian activities and ability to forecast demand play an important function in enactment of supply chain leagility by humanitarian aid organizations. In addition, the growing frequency and complex nature of emergencies makes it more important for the humanitarian sector to incorporate local emergency capacity at its heart and build that capacity as part of resilient development plans.

Humanitarian organizations utilize the business continuity frameworks to get ahead of difficulties and come up with systematic retaliation methods to guard the important proficiencies against possible future disturbances involving protracted shortages. Business continuity is an administrative process that spots risks and susceptibilities that could affect the chances of activities and processes to be resilient. The business continuity framework helps build organizational resilience and the aptitude for an operative reaction to disturbance. Organizations have the ability to react swiftly and efficiently to safeguard processes by dedicating time to a practice referred to as business impact analysis thus considerably lowering damages and expenditure. Humanitarians need to evaluate their weaknesses, the implications of such, and come up with strategies to get them through coercion. The key is to prioritize the essential business processes and ensure that they are both efficient and resilient. Another principle that govern business continuity is that plans are living documents that ought to be tested and put into practice. Chaudhri, Cordes and Miller (2019) recommended that whenever there is an occurrence, it is a practical opportunity for humanitarian organizations to put their plans to trial, find out what works and what doesn’t, and modify their plans in regard to conclusions made. The organizations can then hold dedicated debrief sessions to establish whether the methods they applied were effective and whether new discoveries have been made.

4.6.3 Supply Chain Efficiency

An examination of supply chain efficiency in humanitarian aid organizations was conducted using open-ended questions to the supply chain managers. Two items were used seeking the various forms of wastes in humanitarian supply chains and the mechanisms humanitarian aid organizations employ to minimize wastes and costs in their supply chains. There is a lot of wastage associated with humanitarian aid because the development of incessant supply chains has been ignored.

Forms of wastes in humanitarian supply chains emerging from the views of supply chain managers include corruption and diversion of funds. With the circumstances existing in most donor-funded humanitarian aid organizations, funds allocated for emergency response are prone to corruption as an external factor. Bureaucrats working at an extremely sluggish pace, even when aware of a crisis at hand may demand illegal payments when importing relief goods into the country and payments to speed up bureaucratic procedures. Fraudulent payments may have to be made at road checks if timely delivery is to be assured. Diversion of funds is predominantly accomplished using several methods of fraud. Arising from this were kickbacks during the placement of orders, making relief items be procured at disproportionate prices and acquiring relief products of a value lower than the one stipulated in the contract. Other ways of diversion of funds identified were sale of goods intended for relief and distribution of relief items to people to whom the aid is not intended in exchange for payment and delaying the spending of emergency funds and investing them in the meantime. Other forms of waste in humanitarian supply chains commonly identified included; waiting time, unnecessary motions and transport, inappropriate processing, unnecessary inventories &defects, theft, misappropriation, poor tracking and control as well as product deterioration. Certainly, the findings of this study support Bader (2020) findings that diversion of aid funds largely reduces the quantity, quality and appropriateness of assistance for the needy and instead serve the interests of hidden target groups to whom the aid was never meant. Concisely, disasters and pandemics provide a smokescreen for dubious transactions for personal benefit with no or little scrutiny. This explains the increase in money-minting schemes by disasterpreneurs.

Mechanisms of addressing supply chain waste and costs in relief operations identified included the eradication of import and tax fees. Furthermore, punishments were imposed for misuse of services, cancellations had to be done the soonest possible, and a binding clarification made. This is to avoid concentrating aid in some places while leaving others out. Checks and balances also emerged to be a control against theft and use of goods made for vulnerable people for private gains. Other internal control mechanisms include audits boosting effective resource utilizations. To control charity fraud, charity-monitoring organizations played a crucial role in eradicating fraud and availing to donors, information about humanitarians. Several extrusive world level oversight organizations existed that attempted to enlighten and shield the public from charity fraud. These organizations are however inconvenienced by the fact that charities are very dependent on donors' empathy, which is instinct generated.

4.6.4 Supply Chain Integration

Examination of supply chain managers' views on supply chain integration was sought using two items in the research instrument. The first question sought to identify the various actors involved in the flow of goods, services and information to alleviate suffering people. The second question sought to identify the connections existing between humanitarian aid organizations and the various supply chain members in the effort of delivering emergency assistance.

Six actors involved in the process of alleviating suffering of vulnerable people emerged. From the views of supply chain managers, the commonly identified humanitarian supply chain actors included donors, logistics providers, military and police, governments, media and the public. Respondents identified the important role and connections of the various supply chain actors in the flow of goods, services and information as indicated. All the participants identified logistics providers to be imperative and that their responsibilities in humanitarian aid included activities such as assembly of goods, transport, warehousing and distribution of the supplies. Host logistics or regional logistics providers could affect the operational effectiveness of

the humanitarian logistics operations. Therefore, the logistics providers have a crucial responsibility in delivery of aid to the victims in a disaster.

Donors emerged important actors since its essential to raise enough financial resources for major crisis containment, which makes financing a significant field for humanitarian organizations. Donors can be specific countries or individuals, foundations and the private sector play part by funding humanitarian operations. Furthermore, national and local governments usually in terms of coordination often influence the activities of the humanitarian aid organizations. Host government influences the participation of other nations. Mohammed (2018) asserted that national and county governments hold a primary role in keeping their citizens safe from avoidable disasters and taking charge of disaster response activities. However, while some act in apt commitment and disaster containment, others lack the necessary capacity or use their efforts in a partisan way. Inspired by this, Nyaga (2019) added that governments hold the main power with the control they have over political and economic conditions and directly affect supply chain processes with their decisions.

The media has a key role in disaster relief operations and their function is mainly related to donations. The media creates widespread knowledge of the status of the disaster hence resulting in humanitarian organizations getting donations. Humanitarian aid organizations therefore rely on the media to reach out to donors and receive donations to fund the relief operations. Humanitarian aid organizations also use their connection to the media to bring to the light the things they believe need more attention. They are also able to appeal to donors to provide more support. Lastly, the military and police involvement can lead to controversy on basis of practical, political and ethical issues. Nevertheless, the military and police can be helpful in complicated relief circumstances as they can provide support in terms of communication, security, logistics and planning.

Concisely, the findings of this study indicate that humanitarian aid is not a one-man show and all the parties involved are potential influencers of the humanitarian supply chain activities. The participation of many different actors leads to complexity of

relief activities thus calling for supply chain integration and proper coordination of humanitarian activities. Contrariwise, the findings of this study indicated that there is poor coordination and poor information sharing among the humanitarian actors in Kenya during inter-agency disaster response thus negatively influencing collective decision-making and actions. The vitality of coordination in crisis response is unquestioned and lack of it could lead to many deficiencies such as wrongful distributions of first responder resources, counter-productive ordering of sequential relief processes and slow evacuations, which lead to escalation of the emergency and surges in numbers of victims.

The findings of this study corroborates with Nnachi (2019) that humanitarian actions mostly involve large numbers of domestic and global actors, who for many times work in the same topographical settings targeting the same objectives. Nevertheless, coordination and collaboration among them has never reached the desired limits. Clarke and Campbell (2018) confirmed that failure of humanitarian supply chain actors to coordinate could result to gaps in coverage and to duplications and inefficiencies in any given emergency response. The increase in number and diversity of humanitarian actors contributes in making coordination appear complicated.

The findings of this study go hand in hand with Dubey, Gunasekaran, Childe, Roubaud, Wamba, Giannakis and Foropon (2019) that humanitarian activities are criticized due to their failure to coordinate and collaborate during humanitarian operations. Comes *et al.* (2020), noted that coordination and cohesiveness is difficult to achieve because of variations in structures and systems among humanitarian aid players. Antoni and Niggl (2020) calls for more coordination among humanitarian aid organizations in the wake of increased complexity of disasters. The old adage that a supply chain is as strong as its weakest link as espoused by Mburu (2017); Osoro, Muturi and Ngugi (2018); Waithira, Mwangi and Shale (2019) is clearly manifested by the findings of this study strengthening the need for supply chain integration. Thus, in the humanitarian context, the humanitarian supply chain is as leagile as its least responsive, resilient, efficient and cooperative chain actor.

4.7 Confirmatory Factor Analysis

Factor analysis as a dimension reduction technique was conducted to retain the smallest number of factors that had the highest influence in terms of the total variance explained. Factor analysis was conducted using Principal Component method approach. The extraction of the factors followed the Kaiser Criterion where an Eigen value of 1 or more indicates a unique factor. Prior to conducting factor analysis, Kaiser-Meyer-Olkin (KMO) criterion was used as a measure for sampling adequacy to determine whether each of the variables was suitable for factor analysis. KMO values greater than 0.5 indicates that the sample is adequate for factor analysis to be applicable. The results for KMO test are as shown in Table 4.12 below.

Table 4.12: KMO Test for the Variables

Variables	Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy
Supply chain responsiveness	0.681
Supply chain resilience	0.601
Supply Chain efficiency	0.648
Supply chain integration	0.637
Organizational characteristics	0.639
Performance of Humanitarian aid organizations	0.505

From the results in Table 4.12, the KMO values for the variables were as follows: supply chain responsiveness (0.681>0.5), supply chain resilience (0.601>0.5), supply chain efficiency (0.648>0.5), supply chain integration (0.637>0.5), organization characteristics (0.639>0.5) and the KMO value for performance of humanitarian aid organizations was 0.505>0.5. Therefore, all the six variables were considered adequate for application of factor analysis.

4.7.1 Factor Analysis for Supply Chain Responsiveness

Principal Components Analysis (PCA) was used to extract maximum variance from the data set with each component. Based on Kaiser's criterion, the first and the second principal components out of nine principal components were extracted. The first two principal components were able to explain 56.3% of the resulting variance

in the data on supply chain responsiveness. The two extracted principal components have eigenvalues greater than 1.0. The result is shown in Table 4.13

Table 4.13: Total Variance Explained

		Initial Eigenvalues		Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.758	39.406	39.406	2.758	39.406	39.406
2	1.183	16.898	56.304	1.183	16.898	56.304
3	.957	9.665	65.969			
4	.790	7.359	73.328			
5	.675	7.065	80.793			
6	.590	5.607	86.400			
7	.502	5.032	91.432			
8	.467	4.674	96.106			
9	.343	3.894	100.000			

Extraction method: Principal Component Analysis

Table 4.14 presents the results of the values of the factor loading of each of the constructs under supply chain responsiveness on the extracted principal components. The item with absolute factor loadings greater than 0.5, on either of the principal components extracted is retained for further analysis (Kassambara, 2017). In this study, all the items under supply chain responsiveness had a factor loading of greater than 0.5. Therefore, the study considered all the nine supply chain responsiveness statements.

Table 4.14: Supply Chain Responsiveness Component Matrix

	Component	
	1	2
SCR1	.475	.739
SCR2	.627	-.046
SCR3	.651	.309
SCR4	.600	.341
SCR5	.728	-.282
SCR6	.662	-.341
SCR7	.623	-.478
SCR8	.645	-.487
SCR9	.705	-.218

4.7.2 Factor Analysis for Supply Chain Resilience

Table 4.15 presents the total variance explained by the Principal components in supply chain resilience data. From the results, the data had nine principal components, out of which the first three principal components were extracted based on Kaiser's criterion. The first three principal components were able to explain 62.8% of the total variance in the data on supply chain resilience.

Table 4.15: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.880	32.000	32.000	2.880	32.000	32.000
2	1.399	15.540	47.541	1.399	15.540	47.541
3	1.371	15.231	62.772	1.371	15.231	62.772
4	.942	10.472	73.244			
5	.805	8.939	82.183			
6	.581	6.451	88.634			
7	.437	4.861	93.495			
8	.325	3.612	97.107			
9	.260	2.893	100.000			

Extraction method: Principal Component Analysis

The factor loadings of each of the constructs under supply chain resilience are presented in Table 4.16. Of the nine statements of supply chain resilience, only seven had a factor loading of greater than 0.5 and were therefore retained for analysis. These items are: SCREL1, SCREL3, SCREL4, SCREL5, SCREL6, SCREL7 and SCREL8.

Table 4.16: Supply Chain Resilience Component Matrix

	Component		
	1	**2**	**3**
SCREL1	.724	-.362	-.316
SCREL2	.492	-.413	.119
SCREL3	.774	-.098	.078
SCREL4	.551	.325	.634
SCREL5	.334	.805	.242
SCREL6	.499	.175	-.602
SCREL7	.443	.473	-.533
SCREL8	.663	-.134	.066
SCREL9	.464	-.248	.373

4.7.3 Factor Analysis for Supply Chain Efficiency

Table 4.17 shows the total variance explained by the components in data relating to supply chain efficiency. Based on Kaiser's criterion, the first, the second and the third principal components out of nine principal components, were extracted. The first three principal components were able to explain 73.55% of the total variance in the data on supply chain efficiency.

Table 4.17: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	2.984	37.297	37.297	2.984	37.297	37.297
2	1.593	19.912	57.209	1.593	19.912	57.209
3	1.307	16.338	73.547	1.307	16.338	73.547
4	.656	8.200	81.747			
5	.551	6.893	88.640			
6	.434	5.379	94.019			
7	.263	2.684	96.703			
8	.212	2.247	98.950			
9	.105	1.050	100.000			

Extraction method: Principal Component Analysis

The loadings on the three factors extracted by the principal component method are indicated in Table 4.18. All the nine items under supply chain efficiency had a factor

loading greater than 0.5 on either of the three factors hence all the statements under this construct were considered for analysis.

Table 4.18: Supply Chain Efficiency Component Matrix

	Component		
	1	**2**	**3**
SCE1	.222	-.175	.850
SCE2	.668	.099	.337
SCE3	.604	.366	.441
SCE4	.081	.840	-.165
SCE5	.713	.400	-.150
SCE6	.701	-.482	-.100
SCE7	.666	-.552	-.276
SCE8	.821	.127	-.373
SCE9	.713	.406	-.155

4.7.4 Factor Analysis for Supply Chain Integration

Presented in Table 4.19 is the total variance explained by the factors in supply chain integration data. The result indicates that only three out of the nine factors were extracted based on Kaiser's criterion. The first three factors were able to explain about 73% of the total variance in the supply chain integration data.

Table 4.19: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	2.741	39.156	39.156	2.741	39.156	39.156
2	1.322	18.880	58.035	1.322	18.880	58.035
3	1.047	14.957	72.993	1.047	14.957	72.993
4	.787	11.242	84.234			
5	.464	6.635	90.869			
6	.336	4.799	95.668			
7	.203	2.332	98.000			
8	.116	1.212	99.212			
9	.075	0.788	100.000			

Extraction method: Principal Component Analysis

As per the results in Table 4.20, all the items under supply chain integration were considered as they had loadings greater than 0.5 on any of the three factors.

Table 4.20: Supply Chain Integration Component Matrix

	Component		
	1	**2**	**3**
SCI1	.858	-.050	-.023
SCI2	.797	-.154	.282
SCI3	.701	.078	-.260
SCI4	.348	-.851	.195
SCI5	.645	.105	.144
SCI6	.502	.266	-.710
SCI7	.298	.695	.580
SCI8	.687	-.245	.445
SCI9	.354	.578	-.234

4.7.5 Factor Analysis for Organizational Characteristics

Table 4.21 indicates the total variance explained by the factors in data on organizational characteristics. Out of the nine possible factors under this construct, only the first two were extracted as they had eigenvalues greater than 1. As shown in the result, these factors explained about 61.62% of the total variance in organizational characteristics data.

Table 4.21: Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	2.487	41.456	41.456	2.487	41.456	41.456
2	1.210	20.163	61.619	1.210	20.163	61.619
3	.972	14.205	75.824			
4	.515	6.810	82.634			
5	.318	5.968	88.602			
6	.298	3.985	92.587			
7	.272	2.964	95.551			
8	.212	2.465	98.016			
9	.178	1.984	100.000			

Extraction method: Principal Component Analysis

Presented in Table 4.22 is the component matrix of the extracted factors from the organizational characteristics data. Corresponding to each item was their loading on the factors. As revealed by the result, all the items had a factor loading of greater than 0.5 on either of the two factors, thus, all the statements pertaining organizational characteristics were retained for analysis.

Table 4.22: Organizational Characteristics Component Matrix

	Component	
	1	**2**
OC1	.257	.532
OC2	.804	-.263
OC3	.869	-.010
OC4	.655	.166
OC5	.520	-.692
OC6	.565	.593
OC7	.543	.489
OC8	.680	.506
OC9	.546	-.465

4.7.6 Factor Analysis for Performance of Humanitarian Aid Organizations

The results in Table 4.23 shows the total variance explained by the components in data relating to the performance of humanitarian aid organizations. The Principal Component method extracted one factor out of the possible 4 factors, based on Kaiser's criterion. The one factor explained about 65.49% of the total variance in the performance of humanitarian aid organizations' data.

Table 4.23: Total Variance Explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	1.965	65.485	65.485	1.965	65.485	65.485
2	.979	28.613	93.098			
3	.465	5.022	98.120			
4	.056	1.880	100.000			

Extraction method: Principal Component Analysis

The component matrix result in Table 4.24 shows that financial appeal coverage, financial resource utilization, disaster impact risk and beneficiary satisfaction had loadings of 0.781, 0.505, 0.678 and 0.980 on the first factor, respectively. Consequently, all the items were considered for analysis as they loaded more than 0.5 on the extracted factor.

Table 4.24: Component Matrix for Performance of Humanitarian Aid Organizations

	Component 1
Financial Appeal Coverage	.781
Financial Resource Utilization	.505
Disaster Impact Risk	.678
Beneficiary Satisfaction	.980

4.8 Test of Assumptions of the Study Variables

4.8.1 Testing of Outliers of the Study Variables

Outliers were tested univariately on both independent and dependent variables. Univariate outliers are extreme values for a single variable. Cases or observations showing characteristics or values that are markedly different from the majority of cases in a specific set of data (Ilyas & Chu, 2019) are normally dropped. This is because they distort the relationship between variables by either creating a correlation that should not exist or suppressing a correlation that should exist. Consequently, multivariate testing of outliers on the dependent variable using Mahalanobis d-squared produced reasonable boxplots where all the constructs were symmetrical and with no outliers identified. Multivariate outliers are an unusual combination of scores on a number of variables (Leys, Klein, Dominicy & Ley, 2018).

4.8.2 Normality Tests of the Study Variables

The normality of data distribution was assessed by examining its skewness and kurtosis (Soberón & Stute, 2017). A variable that has an absolute skew-index value greater than 3.0 is extremely skewed whereas a kurtosis index greater than 8.0 is an extreme kurtosis (Soberón & Stute, 2017). Further, Verma and Abdel-Salam (2019) stated that an index smaller than an absolute value of 2.0, representing skewness and an absolute value of 7.0 is the least violation of the assumption of normality. The results of the normality test of the dependent variable indicated skewness and

kurtosis in the range of -1 and +1 as shown in Table 4.25. This means that the assumption of normality was satisfied.

Table 4.25: Normality Test of Independent and Dependent Variables

Construct		Statistic	S. E
Supply Chain Responsiveness	Mean	4.2118	0.02404
	Median	4.2857	
	Std. Deviation	0.40931	
	Range	1.57	
	Skewness	-0.244	0.143
	Kurtosis	-0.886	0.285
Supply Chain Resilience	Mean	4.1675	0.02083
	Median	4.2857	
	Std. Deviation	0.35468	
	Range	1.86	
	Skewness	-0.431	0.143
	Kurtosis	0.966	0.285
Supply Chain Efficiency	Mean	4.0733	0.02808
	Median	4.125	
	Std. Deviation	0.47824	
	Range	1.88	
	Skewness	-0.717	0.143
	Kurtosis	-0.15	0.285
Supply Chain Integration	Mean	4.1675	0.02438
	Median	4.1429	
	Std. Deviation	0.41521	
	Range	1.86	
	Skewness	-0.53	0.143
	Kurtosis	0.439	0.285
Organizational Characteristics	Mean	4.3563	0.0224
	Median	4.3333	
	Std. Deviation	0.38153	
	Range	1.83	
	Skewness	-0.868	0.143
	Kurtosis	0.875	0.285
Performance of Humanitarian Aid Organizations	Mean	6.7157	0.04628
	Median	6.7308	
	Std. Deviation	0.78815	
	Range	2.99	
	Skewness	0.179	0.143
	Kurtosis	-0.709	0.285

To corroborate the skewness and kurtosis results, the graphical representation showed the line signifying the actual data distribution closely follow the diagonal in the normal Q-Q plot as illustrated in Figures 4.1 to 4.6 below, connoting normal distribution (Lorenzo-Arribas, 2019). In Q-Q plot, or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, whereby, a sensibly straight line implies a normal distribution (Lorenzo-Arribas, 2019). By and large, if the points in a Q-Q plot depart from a straight line, then the assumed distribution is called into question (Lorenzo-Arribas, 2019).

Figure 4.1: Q-Q Plot of Supply Chain Responsiveness

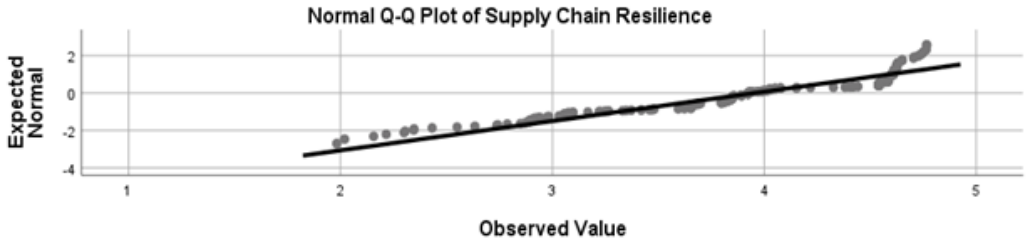

Figure 4.2: Q-Q Plot of Supply Chain Resilience

Figure 4.3: Q-Q Plot of Supply Chain Efficiency

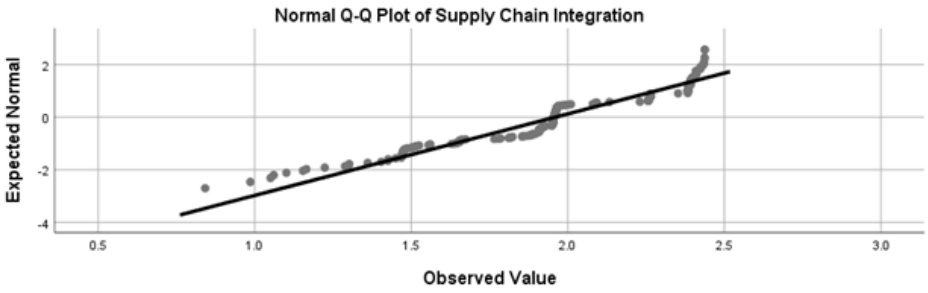

Figure 4.4: Q-Q Plot of Supply Chain Integration

Figure 4. 5: Q-Q Plot of Organizational Characteristics

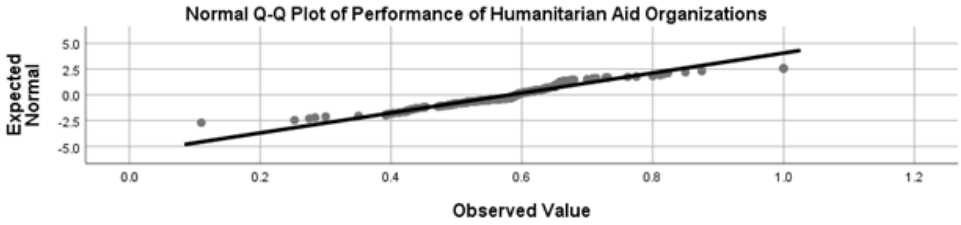

Figure 4.6: Q-Q Plot of Performance of Humanitarian Aid Organizations

4.8.3 Autocorrelation Test

One of the basic assumption for regression analysis is that the residuals of the model should be independent, that is, the residuals should not be auto correlated. Durbin Watson test was conducted to check for auto correlation. A value toward 0 indicates positive autocorrelation, a value near 2 signifies non-autocorrelation and a value toward 4 indicates negative autocorrelation. The rule of thumb is that Durbin-Watson statistic values in the range of 1.5 to 2.5 are relatively normal. Values beyond this range could be cause for concern. According to Wainaina (2017), values under 1 or more than 3 are a cause for concern. The results in Table 4.26 shows that the Durbin-

Watson d =1.976, which is in the normal range hence it was assumed that there was no auto-correlation in the multiple linear regression data.

Table 4.26: Durbin-Watson Test for Autocorrelation

Model	Durbin-Watson
1	1.976

4.8.4 Multicollinearity Test

Multicollinearity is a case of multiple regression whereby the predictor variables are themselves highly correlated. Multicollinearity poses serious effects on the least squares estimates of the regression coefficients, the most significant of which is resulting to the acceptance of the null hypothesis more readily (Winship & Western, 2016). Multicollinearity diagnostics was conducted using Variance Inflation Factor (VIF) and Tolerance statistics. The VIF is the reciprocal of the tolerance statistics. The variance inflation factor (VIF) for each term in the model measures the combined effect of the dependences among the regressors on the variance of that term. One or more large VIF indicate multicollinearity. Tolerance is inverse of the coefficient of determination (R^2). Tolerance is estimated by 1 - R^2. Other factors equal, researchers crave soaring levels of tolerance, as low tolerance levels could severely affect results that involve multiple regression analysis. A VIF of above 5 is usually regarded as evidence of Multicollinearity. While a tolerance statistic of less than 0.20 is also taken as a cause for multicollinearity concern. The results in Table 4.27 shows the test results for multicollinearity using tolerance and VIF. With tolerance values being more than 0.2 and VIF values below 5, it was concluded that there was no multicollinearity problem in this study.

Table 4.27: Table of Multicollinearity Statistics

Variable	Tolerance	VIF
Supply Chain Responsiveness	.814	1.229
Supply Chain Resilience	.749	1.336
Supply Chain Efficiency	.611	1.635
Supply Chain Integration	.667	1.500
Organizational characteristics	.674	1.483

4.8.5 Heteroscedasticity Test

Another assumption of multiple regressions is that the residuals are homoscedastic. Heteroscedasticity in regression analysis occurs when the variance of the residuals (errors) vary across the observations. The study employed Breusch-Pagan to test the null hypothesis that the errors have equal variance (errors are homoscedastic) versus the alternative hypothesis that the errors are heteroscedastic. Breusch-pagan test gives a chi-square value and a significance value, whereby a p-value < 0.05 indicates that there is heteroscedasticity while a p-value greater than 0.05 indicates heteroscedasticity does not exist. Table 4.28 shows the results obtained from running the tests. From the table, the Breusch-Pagan test p-value was 0.481, which was greater than 0.05 indicating that heteroscedasticity does not exist thus the assumption of homoscedasticity of the residuals had not been violated.

Table 4.28: Heteroscedasticity Test Results

Test	Chi-square value	Sig.
Breusch-Pagan	3.482	.481

4.8.6 Linearity Test

Linearity of the regression model tests the consistency of the gradient that represents the relationship between the response and predictor variables. If the slope of change in the relationship between the variables is fickle then it is difficult to perform regression analysis on the study data (Gianinetti, 2020). Testing for linearity can be done in a number of methods, yet the easiest is the deviation from linearity test performed by ANOVA. The test indicates that the variables are not linear if the significant value for deviation from linearity is less than 0.05 (Myers, 2017). Linearity was tested using the ANOVA test of linearity, which computes both the linear and nonlinear components of a variable duo where nonlinearity is significant if the F significance value for the nonlinear component is below 0.05. All the computed readings were above 0.05 as shown on Table 4.29 confirming linear relationships (constant slope) between the predictor variables and the dependent variable.

Table 4.29: Linearity Test Results

Variable	Sample Size	Linearity (ANOVA Test)	
Threshold: assumption if met		F	p>0.05
Supply Chain Responsiveness	290	1.225	0.111
Supply Chain Resilience	290	0.831	0.881
Supply Chain Efficiency	290	1.172	0.151
Supply Chain Integration	290	1.025	0.098
Organizational Characteristics	290	1.517	0.425

4.9 Inferential Analysis

4.9.1 Correlation of Study Variables

Table 4.30 illustrates the correlation matrix between the independent variables. Correlation is essentially a tool for determining how a collection of variables relate (Gogtay & Thatte, 2017) thereby facilitating the testing for multicollinearity. That the correlation values are not close to 1 or -1 is an indication that the factors are sufficiently different measures of separate variables (Gogtay & Thatte, 2017). It also implies that the variables are not multicollinear. When there is no multicollinearity, the study is able to utilize all the independent variables.

Table 4.30: Results for Correlation of Study Variables

		Performance of HAOs	SC Responsiveness	SC Resilience	SC Efficiency	SC Integration	Organizational characteristics
Performance of HAOs	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	290					
Supply Chain Responsiveness	Pearson Correlation	.765**	1				
	Sig. (2-tailed)	0.000					
	N	290	290				
Supply Chain Resilience	Pearson Correlation	.708**	.595**	1			
	Sig. (2-tailed)	0.000	0.000				
	N	290	290	290			
Supply Chain Efficiency	Pearson Correlation	0.661**	0.310	.350**	1		
	Sig. (2-tailed)	0.000	0.002	0.000			
	N	290	290	290	290		
Supply Chain Integration	Pearson Correlation	.639**	.535**	.423**	.455**	1	

	Sig. (2-tailed)	0.000	0.000	0.000	0.000		
	N	290	290	290	290	290	
Organizational Characteristics	Pearson Correlation	.475**	.275**	.331**	.516**	.308**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	290	290	290	290	290	290

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

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation coefficient ranges from -1.00 to +1.00. The value of -1.00 signifies a perfect negative correlation whereas a value of +1.00 represents a perfect positive correlation. A value of 0.00 implies the absence of any relationship among variables being tested. This is in line with the findings of Akoglu (2018). Table 4.30 indicated that supply chain responsiveness and supply chain resilience have significant positive relationship as attributed by the correlation coefficient of 0.595 and p-value< 0.05. This is expected because a resilient supply chain is robust and adjusts back to normal after disruptions thus making it responsive to the needs of vulnerable people notwithstanding the circumstances. Supply chain resilience certifies the ability of an organization to detect potential hazards, organize resurgence and change the schedule in respect to unexpected circumstances and the level of urgency, and alter supplier capabilities when the unforeseen occurs. For quick recovery to be possible, humanitarian organizations should have the ability to figure out the disturbed supplies, the products comprising those components, the existing stock across the supply chain and options for alternative supply plan. This is in the effort of being leagile enough so as not to be incapacitated by disruptions by understanding quickly and acting faster.

The results shows presence of a positive and significant relationship between supply chain responsiveness and supply chain efficiency as proved by the p-value and the correlation coefficient ($r=0.310$, $p<0.05$). Usually waste within the supply chain makes the supply chain sluggish to react and respond to societal needs. Inefficiency in activities, because of failed coordination, results in poor responsiveness and time wastage in the acquiring of the items needed for a particular disaster.

There is a strong and significant relationship between supply chain responsiveness and supply chain integration ($r=0.535$, $p<0.05$). This is because supply chain responsiveness refers to the ability of an organization and its partners to react to opportunities and exceptions in a consistent, unified and collaborative manner that satisfies vulnerable populations and reduces supply chain costs. Humanitarian aid is not a one-man show and all the parties involved are possible influencers of the activities. This diverse inclusivity leads to complexity of relief operations thus calling for supply chain integration and proper coordination of humanitarian

activities. The appropriateness of integration in disaster response management is unchallenged, with absence of coordination resulting in a variety of potential letdowns that certainly lead to crisis intensification and increased casualty counts.

The results indicate that there is significant positive weak correlation between supply chain resilience and supply chain efficiency ($r=0.350$, $p<0.05$). To be resilient, humanitarian supply chains have a goal of developing increased efficiency through elimination of waste in the unpredictable nature of humanitarian supply chain. However, it difficult to reduce waste completely along the supply chain. There is a significant positive moderate correlation between supply chain resilience and supply chain integration ($r=0.423$, $p<0.05$). This is because for supply chains to revert to the normal state or move to a new more desirable state, a lot of information sharing and cohesiveness is required among partners. Resilience in humanitarian sector is the ability of the supply chain to survive and thrive in crises and turbulences and this requires combined efforts from parties involved.

There is a very significant positive relationship between supply chain efficiency and supply chain integration ($r=0.455$, $p<0.05$). There is proof that coordination presence enhances the level of efficiency of the overall disaster operation, while its absence leads to wastage of resources not to mention crucial response time. Failure of humanitarian actors to work together can lead to gaps in coverage and to duplications and inefficiencies in any given emergency response. From the findings in Table 4.30, all the independent variables are positively related to organizational characteristics as attested by the respective correlation coefficients: supply chain responsiveness ($r=0.275$, $p<0.05$), supply chain resilience ($r=0.331$, $p<0.05$), supply chain efficiency ($r=0.516$, $p<0.05$) and supply chain integration ($r=0.308$, $p<0.05$). All the relationships are rendered significant since their p values are less than 0.05.

4.9.2 Multiple Regression Analysis Results

The research used multiple regression analysis to establish the linear statistical relationship between independent and dependent variables of this study. The five hypotheses as stated in this study were tested using regression models.

a) Test of Hypothesis 1: Supply Chain Responsiveness and Performance of Humanitarian Aid Organizations in Kenya

A correlation analysis for the construct, supply chain responsiveness was conducted to find out how supply chain responsiveness correlated with performance of humanitarian aid organizations in Kenya. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation whereas that of +1.00 represents a perfect positive correlation. A value of 0.00 indicates absolute absence of a relationship between variables being tested (Akoglu, 2018). Table 4.31 shows that the Pearson correlation coefficient was 0.765. These findings indicate that there is a strong positive linear relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya.

Table 4.31: Correlation Analysis for Construct Supply Chain Responsiveness

Variables		**Performance of HAOs**	**Supply Chain Responsiveness**
Performance of HAOs	Pearson Correlation	1	.765**
	Sig. (2-tailed)		.000
	N	290	290
Supply Chain Responsiveness	Pearson Correlation	.765**	1
	Sig. (2-tailed)	.000	
	N	290	290

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

*. Correlation is significant at the 0.05 level (2-tailed).

The researcher conducted regression analysis to examine the influence of supply chain responsiveness on the performance of HAOs. The hypothesis to test for this specific objective was:

H_{01}: Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in figure 4.7 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the i^{th} observation yi and are used to provide information about the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance and in determining whether additional terms in the model would be useful.

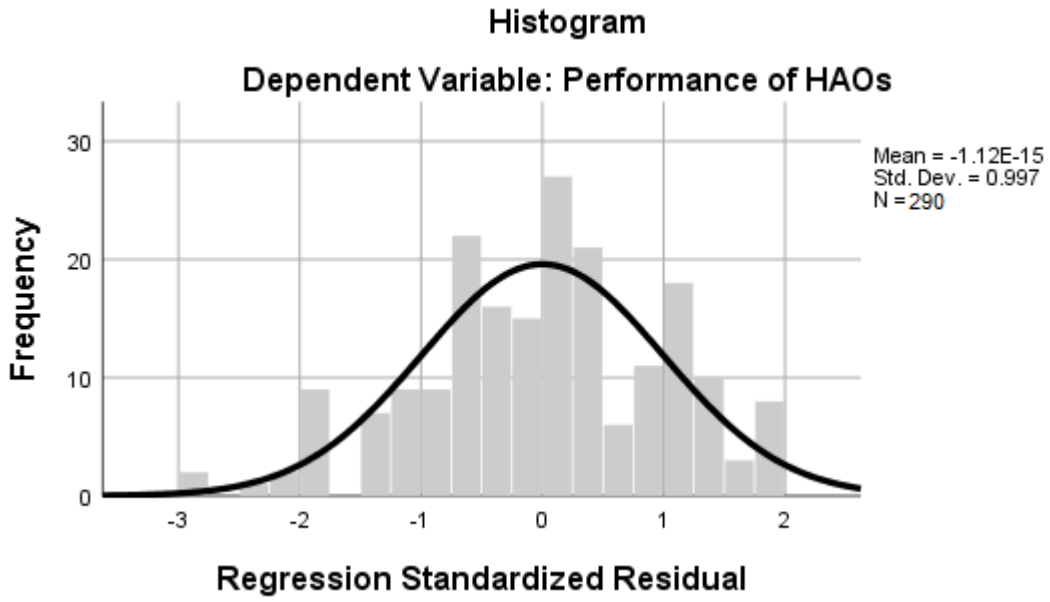

Figure 4.7: Histogram supply chain responsiveness on performance of Humanitarian Aid Organizations

The linear regression model shows R^2=0.585 which means that about 58.5 percent of the total variance in the performance of humanitarian aid organizations in Kenya can be explained by supply chain responsiveness. The result is shown in Table 4.32.

Table 4.32: Model Summary of Supply Chain Responsiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.765[a]	.585	.579	.74484

a. Predictors: (Constant), Supply Chain Responsiveness

b. Dependent Variable: Performance of Humanitarian Aid Organizations

Further test on the ANOVA shows that the significance of the F-statistic is less than 0.05 (F=12.440, p<0.05) as indicated in Table 4.33. This is an implication that supply chain responsiveness has a significant influence on performance of humanitarian aid organizations.

Table 4.33: ANOVA of Supply Chain Responsiveness

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.439	1	7.439	12.440	.000[a]
	Residual	172.081	288	0.598		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Supply Chain Responsiveness

Presented in Table 4.34 are the coefficients and t-statistics of the resulting model. The constant term $\beta_0 = 5.77$, implies that if supply chain responsiveness is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 5.77. The regression coefficient for supply chain responsiveness was positive and significant ($\beta_1 = 0.224$, p<0.05), with a t-value of 3.556. This implies that for every unit increase in supply chain responsiveness, performance of humanitarian aid organizations is predicted to increase by 0.224 units.

Table 4.34: Coefficients of Supply Chain Responsiveness

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.770	0.477		12.101	0.000
	Supply Chain Responsiveness	0.224	0.063	0.765	3.556	0.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Performance of Humanitarian Aid Organizations = 5.770 + 0.224 Supply Chain Responsiveness

From the results in Table 4.31 to Table 4.34 above, the null hypothesis that supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya, is rejected. The results revealed that supply chain responsiveness contributes positively towards performance of humanitarian aid organizations in Kenya. The findings are in harmony with Jahre (2017) argument that humanitarian organizations operation in unstable environments necessitate strategies that enhance their responsiveness to the needs of vulnerable people. This calls for supply chain readiness, swift disposition of the needed resources, and capacity to cope proficiently in different settings. Sharing the same view are the extant researches (Ganguly, Padhy and Rai, 2017; Behl and Dutta, 2019; Agarwal, Kant and Shankar, 2019) which argued that the operational performance of humanitarian supply chains relies on their ability to respond swiftly to the needs of vulnerable populations and undertake dynamic operations. For this to be possible, humanitarian supply chains must be responsive, amenable and efficient. This is further supported by Munyoro (2020) findings that proper supply chain response to the humanitarian needs in case of disasters is considered to be mitigation and satisfying the initial and vital needs of the survivors. Thus, it ought to be done in the shortest time using the least amount of the resources to reduce the terrible effects of the disaster.

b) Test of Hypothesis 2: Supply Chain Resilience and Performance of Humanitarian Aid Organizations in Kenya

A correlation analysis for the construct supply chain resilience was conducted to determine how supply chain resilience correlated with performance of humanitarian aid organizations. Table 4.35 indicates that the Pearson correlation coefficient was 0.708. These findings indicate that there is a strong positive linear relationship between supply chain resilience and performance of humanitarian aid organizations.

Table 4.35: Correlation Analysis for Construct Supply Chain Resilience

Variable		Performance of HAOs	Supply Chain Resilience
Performance of HAOs	Pearson Correlation	1	.708**
	Sig. (2-tailed)		.000
	N	290	290
Supply Chain Resilience	Pearson Correlation	.708**	1
	Sig. (2-tailed)	.000	
	N	290	290

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

*. Correlation is significant at the 0.05 level (2-tailed).

The researcher conducted regression analysis to establish the influence of supply chain resilience on the performance of humanitarian aid organizations. The hypothesis to test for this specific objective was:

H_{02}: Supply chain resilience does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in figure 4.8 indicates that the data was normally distributed. The residual explains the error in the fit of the model to the i^{th} observation yi and are essential in determining the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in

checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful.

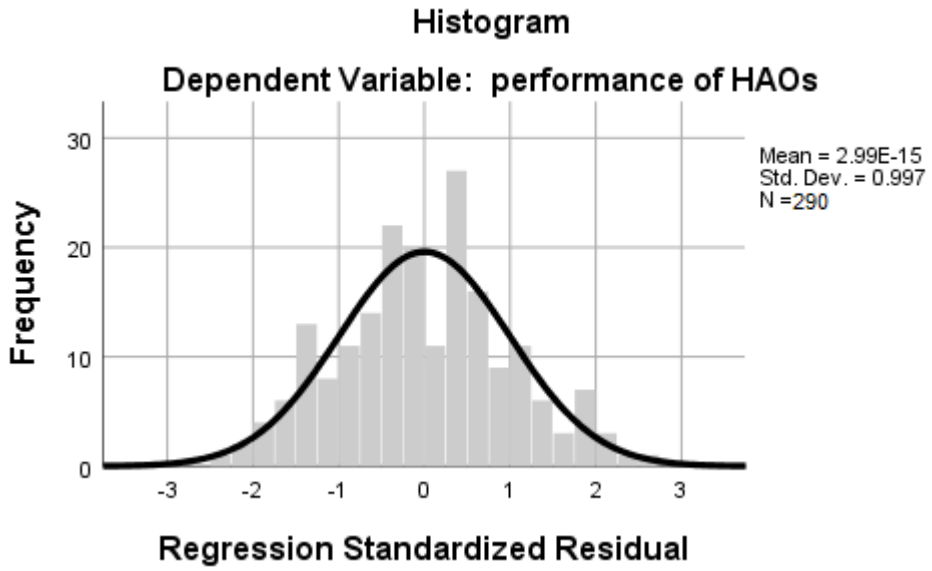

Figure 4.8: Histogram Supply Chain Resilience on performance of Humanitarian Aid Organizations

The summary of the linear regression model used for this specific objective indicates a coefficient of determination, R^2=0.501 which means that about 50.1 percent of the change in the performance of humanitarian aid organizations in Kenya can be explained by supply chain resilience. The result is presented in Table 4.36.

Table 4.36: Model Summary of Supply Chain Resilience

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708[a]	.501	.492	.67172

a. Predictors: (Constant), Supply chain resilience

b. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.37 shows the ANOVA result of the regression of performance of humanitarian aid organizations on supply chain resilience. The result indicates that the significance of the F-statistic is less than 0.05 (F=17.036, p<0.05), an implication that supply chain resilience has a significant influence on performance of humanitarian aid organizations.

Table 4.37: ANOVA of Supply Chain Resilience

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.026	1	10.026	17.036	.000[b]
	Residual	169.494	288	.589		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Supply Chain Resilience

Shown in Table 4.38 are the coefficients and t-statistic obtained from the model. The constant term $\beta_0 = 4.527$ is interpreted to mean that if supply chain resilience is held

constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 4.53. The regression coefficient for supply chain resilience was positive and significant ($\beta_1 = 0.525$, p<0.05), with a t-value of 4.127. This implies that a unit

increase in supply chain resilience is predicted to increase the performance of humanitarian aid organizations by 0.525 units.

Table 4.38: Coefficients of Supply Chain Resilience

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	4.527	.532		8.507	.000
	Supply Chain Resilience	.525	.127	.708	4.127	.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Performance of Humanitarian Aid Organizations = 4.527 + 0.525 Supply Chain Resilience

From the result in Table 4.35 to 4.38 above, the decision is to reject the null hypothesis that supply chain resilience does not significantly influence the performance of humanitarian aid organizations in Kenya, and conclude that that supply chain resilience has a significant influence on the performance of

humanitarian aid organizations in Kenya. As a matter of the fact, disaster happening cannot be avoided, but its consequences can be mitigated through a holistic resilient management of the relief supply chain operations. The findings of this study concur with Naburuk (2018) that, a supply chain resilient management strategy improve the performance and effectiveness of humanitarian logistics and relief supply chains operation, while lack of it imposed huge dramatic consequences for stricken populations. Further, Grange, Heaslip and McMullan (2019) in their study figured out the platform to encourage a professionalization of the supply chain resiliency disciplines in relief operations and strengthen the corresponding functions during the humanitarian aid processes after disaster happening.

c) Test of Hypothesis 3: Supply Chain Efficiency and Performance of Humanitarian Aid Organizations in Kenya

A correlation analysis for the construct supply chain efficiency was conducted to establish how supply chain efficiency correlated with performance of humanitarian aid organizations. Table 4.39 shows that the Pearson correlation coefficient was 0.661. These findings indicate the presence of a strong positive linear relationship between supply chain efficiency and performance of humanitarian aid organizations.

Table 4.39: Correlation Analysis for Construct Supply Chain Efficiency

Variable		Performance of HAOs	Supply Chain Efficiency
Performance of HAOs	Pearson Correlation	1	.661*
	Sig. (2-tailed)		.000
	N	290	290
Supply Chain Efficiency	Pearson Correlation	.661**	1
	Sig. (2-tailed)	.000	
	N	290	290

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

*. Correlation is significant at the 0.05 level (2-tailed).

Regression analysis was conducted to determine the influence of supply chain efficiency on the performance of humanitarian aid organizations. The hypothesis to test for this specific objective was:

H_{03}: Supply chain efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in figure 4.9 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the i^{th} observation yi and are used to explain the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful.

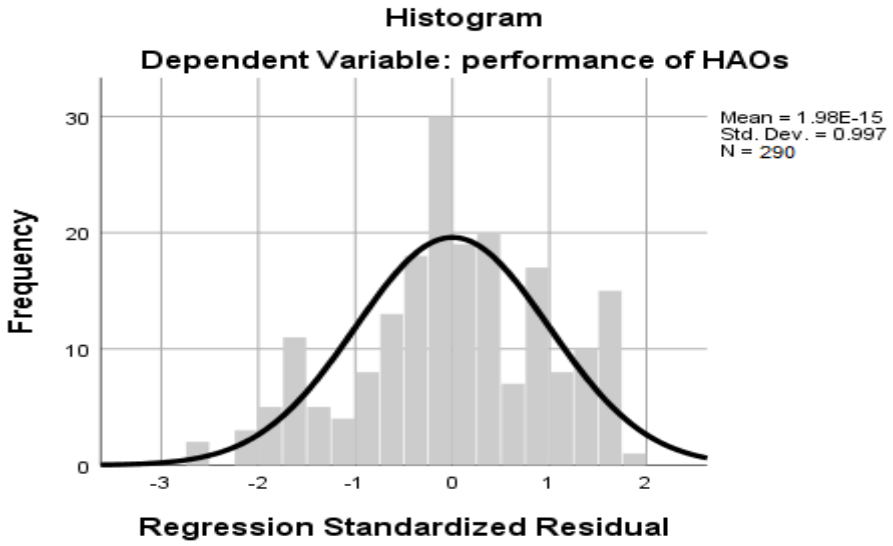

Figure 4.9: Histogram Supply Chain Efficiency on performance of Humanitarian Aid Organizations

Presented in Table 4.40 is the model summary of regression of supply chain efficiency on performance of humanitarian aid organizations. The results show R^2=0.436 which means that about 43.6 percent of the total variation in the performance of humanitarian aid organizations in Kenya can be attributed to supply chain efficiency.

Table 4.40: Model Summary of Supply Chain Efficiency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.661[a]	.436	.427	.78413

a. Predictors: (Constant), Supply Chain Efficiency
b. Dependent Variable: Performance of Humanitarian Aid Organizations

Further test on the ANOVA shows that the regression model involving performance of humanitarian aid organizations as the dependent variable and supply chain efficiency as the predictor, is very significant at 5% level of significance (F-statistic=35.587, $p<0.05$), as indicated in Table 4.41. This is an implication that supply chain efficiency has a very significant influence on the performance of humanitarian aid organizations in Kenya.

Table 4.41: ANOVA of Supply Chain Efficiency

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.743	1	19.743	35.587	.000[c]
	Residual	159.777	288	.555		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations
b. Predictors: (Constant), Supply Chain Efficiency

Further, Table 4.42 presents the coefficients and t-statistic of the resulting model. The constant term $\beta_0 = 4.490$, implies that if supply chain efficiency is kept constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 4.490. The regression coefficient for supply chain efficiency was positive and significant at 5% level of significance ($\beta_1 = 0.547$, $p<0.05$), with a t-value of 5.965. This is interpreted to mean that for every unit increase in supply chain efficiency, performance of humanitarian aid organizations is predicted to increase by 0.547 units.

Table 4.42: Coefficients of Supply Chain Efficiency

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	4.490	.376		11.949	.000
	Supply Chain Efficiency	.547	.092	.661	5.965	.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Performance of Humanitarian Aid Organizations = 4.490 + 0.547 Supply Chain Efficiency

From the results in Table 4.39 to Table 4.42 above, the null hypothesis that supply chain efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya, is rejected. This result revealed that supply chain efficiency contributes positively towards performance of humanitarian aid organizations in Kenya. The findings of this study are in line with Balle, Jones, Chaize and Fiume (2017) that for organizational effectiveness and for gaining competitive advantage in cost, it is necessary for the organization to eliminate waste. In general, waste is the failure to add, or is a barrier to adding, value for the beneficiary. The humanitarians deal with unknown or ever-changing actors and uncertain supply and demand. The findings also confirm the argument by Larson and Foropon (2018) that humanitarian operations generally face high uncertainty, changing priorities and requirements, unstable supply chains, and a combination of sudden demand surges with supply of unordered (material) donations of limited use. This adds up to create a challenging environment for process management thus difficulties in waste elimination.

d) Test of Hypothesis 4: Supply Chain Integration and Performance of Humanitarian Aid Organizations in Kenya

A correlation analysis for the construct supply chain integration was conducted to find out how supply chain integration correlated with performance of humanitarian aid organizations. Table 4.43 shows that the Pearson correlation coefficient was 0.639. These findings indicate that there is a positive linear relationship between supply chain integration and performance of humanitarian aid organizations in Kenya.

Table 4.43: Correlation Analysis for Construct Supply Chain Integration

Variable		Performance of HAOs	Supply Chain Integration
Performance of HAOs	Pearson Correlation	1	.639*
	Sig. (2-tailed)		.000
	N	290	290
Supply chain integration	Pearson Correlation	.639**	1
	Sig. (2-tailed)	.000	
	N	290	290

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

*. Correlation is significant at the 0.05 level (2-tailed).

The researcher conducted regression analysis to establish the influence of supply chain integration on the performance of humanitarian aid organizations. The hypothesis to test for this specific objective was:

H_{04}: Supply chain integration does not significantly influence the performance of humanitarian aid organizations in Kenya.

The histogram in figure 4.10 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the i^{th} observation yi and are used to provide information about the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful.

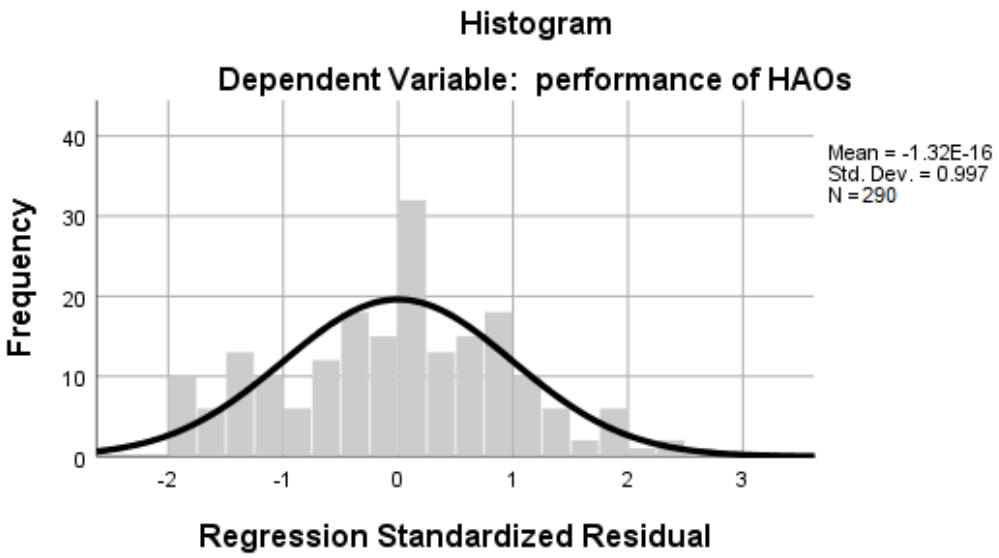

Figure 4.10: Histogram Supply chain integration on performance of Humanitarian Aid Organizations

The linear regression model shows R^2=0.409 which means that about 40.9 percent of the change in the performance of humanitarian aid organizations in Kenya can be explained by supply chain integration. The result is shown in Table 4.44.

Table 4.44: Model Summary of Supply Chain Integration

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639[a]	.409	.398	.73092

a. Predictors: (Constant), Supply Chain Integration
b. Dependent Variable: Performance of Humanitarian Aid Organizations

The ANOVA result in Table 4.45 indicates that the significance of the F-statistic is less than 0.05 (F=13.406, p<0.05). This implies that supply chain integration has a significant influence on performance of humanitarian aid organizations in Kenya.

Table 4.45: ANOVA of Supply Chain Integration

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.990	1	7.990	13.406	.000[d]
	Residual	171.530	288	.596		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Supply Chain Integration

The result in Table 4.46 gives the coefficients and t-statistic obtained from the model. The constant term $\beta_0 = 5.597$, indicates that if supply chain integration is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 5.597. The regression coefficient for supply chain integration was positive and significant ($\beta_1 = 0.268$, $p<0.05$), with a t-value of 2.424. This implies that a unit increase in supply chain integration is predicted to lead to 0.268 increase in the performance of humanitarian aid organizations in Kenya.

Table 4.46: Coefficients of Supply Chain Integration

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	5.597	.464		12.069	.000
	Supply Chain Integration	.268	.071	.639	2.424	.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Performance of Humanitarian Aid Organizations= 5.597 + 0.268 Supply Chain Integration

From the results in Table 4.43 to Table 4.46 above, the null hypothesis that supply chain integration does not significantly influence the performance of humanitarian aid organizations in Kenya, is rejected. This result revealed that supply chain integration had significant positive influence on the performance of humanitarian aid organizations in Kenya. The study mirrors the findings by Som, Cobblah and

Anyigba (2019) that the effectiveness of supply chains based on the extent of integration between supply chain actors is predicted by the level of information and operational interaction between the various actors along the supply chain. Wankmüller and Reiner (2019) argued that peak states of coordination, cooperation and collaboration among the actors in relief activities are essential for efficient logistics processes in procurement of goods, transportation and warehousing. The absence of the three factors during the making of decisions could lead to distasteful decisions, which can have a negative impact on the recipients' wellbeing. To reach the peak of humanitarians' performance, various relief actors ought to strive for increased coordination, cooperation and collaboration in the course of relief operations. Tatham *et al.* (2017) asserts that insufficient coordination and cooperation among humanitarian actors occasionally amounts to surplus amounts in some places and deficiency in others. Wankmüller and Reiner (2019) argued that the competitive nature of humanitarian organizations signify immense obstructions for performance enhancements in disaster and relief

The findings of this study confirm Mushanyuri and Ngcamu (2020) argument that disaster response attracts diverse stakeholders or role players. The different role players come with divergent expectations, equipment and mission, which sometimes create discord amongst them. The discord amongst the different role players impedes the effectiveness of humanitarian supply chains thus the importance of supply chain integration. Meesters and Wang (2021) further noted that the success of disaster response depends heavily on the information available and the coordination of activities by diverse role players. In agreement with the study findings is Chirchir (2018) who affirmed the importance of supply chain integration as it entails designing coordinated flows of information and materials that help firms create smooth processes throughout the extended supply chain. Smooth information and material flows blur boundaries between supply chain partners, and enable humanitarian organizations to reduce uncertainty in the supply chain thereby enhancing their performance. The findings of the study also mirror Caldecott (2017) that during the relief operations in disasters the performance of the humanitarian aids supply chain is affected awkward due to lack of coordination approaches and less joint and holistic supply chain strategies between operation management and human

actors that are performing in the scene. On the contrary, Vanpoucke, Vereecke and Muylle (2017) established that collaboration between humanitarian organizations is not an easy task because of many barriers, as each humanitarian organization has their own structure, IT system, management style and different rules of procedure.

4.9.3 Overall Regression Model

A multiple linear regression analysis was done to examine the relationship between independent and dependent variables before including the moderating variable (organizational characteristics). An ordinary least square regression model was then established without the moderating variable. The model was of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \text{..... (1)}$$

Where: Y=Performance of Humanitarian Aid Organizations

β_0 = Y intercept

X_1 = Supply Chain Responsiveness

X_2 =Supply Chain Resilience

X_3 = Supply Chain Efficiency

X_4 =Supply Chain Integration.

ε =Error term

β1, β2, β3 and β4 represent the coefficient of each independent variable.

The adjusted R^2 is the coefficient of determination. This value explained how performance of humanitarian aid organizations varied with supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration. The study findings in table 4.47 indicate that supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration are jointly positively associated with performance of humanitarian aid organizations as indicated by the Pearson Correlation R, value of 0.848.

The histogram in figure 4.11 indicates that the data was normally distributed. The residual describes the error in the fit of the model to the i^{th} observation yi and are used to provide information about the adequacy of the fitted model. According to Wogi, Wakweya and Tesfay (2018), analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful.

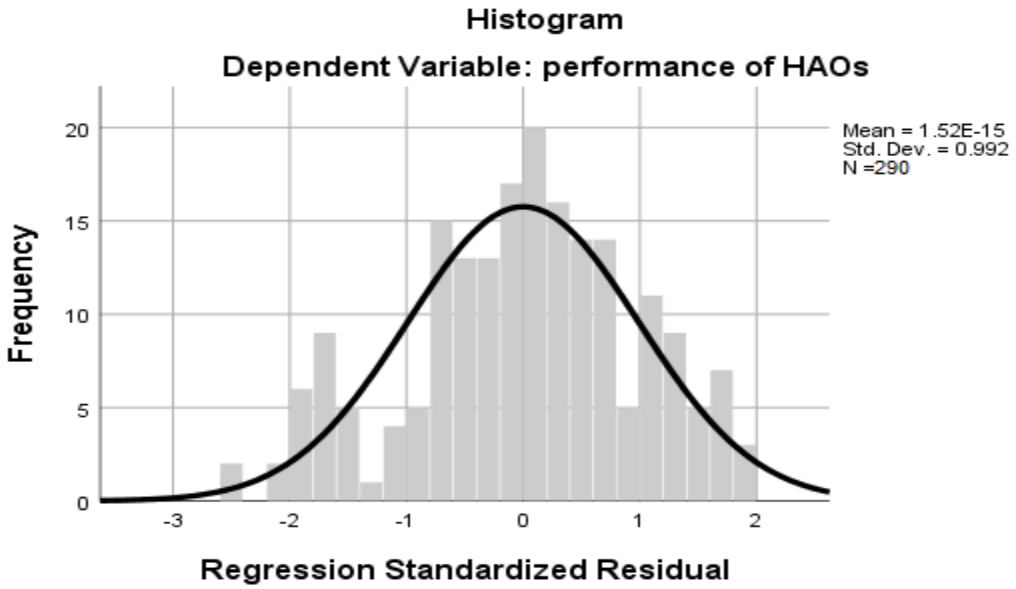

Figure 4.11: Histogram performance of Humanitarian Aid Organizations

Furthermore, the model summary table shows that 71.9 % of change in performance of humanitarian aid organizations can be explained by four predictors namely with supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration. This is an implication that the remaining 28.1% of the

variation in performance of humanitarian aid organizations could be accounted for by other factors not involved in this study.

Table 4.47: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.848[a]	.719	.692	.49346

a. Predictors: (Constant), Supply Chain Responsiveness, Supply Chain Resilience, Supply Chain Efficiency and Supply Chain Integration

Analysis of variance (ANOVA) was done to establish the fitness of the model used. The ANOVA table shows that the F-ratio (F=10.961, $p<0.05$) was statistically significant. This means that the model used was appropriate and the relationship of the variables shown could not have occurred by chance.

Table 4.48: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.935	4	5.984	10.961	.000[b]
	Residual	155.585	285	.546		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

b. Predictors: (Constant), Supply Chain Responsiveness, Supply Chain Resilience, Supply Chain Efficiency and Supply Chain Integration

The estimated coefficients (βs) show the contribution of each independent variable to the change in the dependent variable. The coefficients table results show that supply chain responsiveness (β=.532, $p<0.05$), supply chain resilience (β=.316, $p<0.05$), supply chain efficiency (β=.415, $p<0.05$) and supply chain integration (β=.458, $p<0.05$) positively and significantly affected performance of humanitarian aid organizations. This implies that an increase in any of the factors results to an improvement in performance of humanitarian aid organizations in Kenya.

Table 4.49: Coefficients of Determination

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.409	0.641		5.318	0.000
	Supply chain responsiveness	0.532	0.115	0.668	4.626	0.000
	Supply chain resilience	0.316	0.081	0.442	3.901	0.000
	Supply chain efficiency	0.415	0.074	0.512	5.608	0.000
	Supply chain integration	0.458	0.098	0.583	4.673	0.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

The model before moderation was:

Performance of Humanitarian Aid Organizations = 3.409 + 0.532 Supply Chain Responsiveness + 0.316 Supply Chain Resilience + 0.415 Supply Chain Efficiency + 0.458 Supply Chain Integration.

4.9.4 Moderating Effect of Organizational Characteristics

The study hypothesis was;

H_{05}: Organizational characteristics does not have a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya.

The Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Responsiveness and Performance of Humanitarian Aid Organizations in Kenya

To test the moderating effect of organizational characteristics on the relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya, the study built-in the following three models;

Models:

Model 1: $Y = \beta_0 + \beta_1 X_1 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_1 X_1 + \beta_Z Z + \varepsilon$

Model 3: $Y = \beta_0 + \beta_1 X_1 + \beta_Z Z + \beta_{1Z} X_1 * Z + \varepsilon$

Upon regressing the variables and as shown in Table 4.50, the Coefficient of Determination (R^2) for the first model was 0.585, meaning that supply chain responsiveness on its own, contributes 58.5% to the performance of humanitarian aid organizations in Kenya. Nevertheless, when organizational characteristics was introduced, relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya changed significantly. Table 4.50 indicates that the R^2 before the introduction of organizational characteristics was 0.585 (58.5%), which changed significantly to 0.663 (66.3%) upon introduction of organization characteristics, implying a 7.8% increase. This meant that supply chain responsiveness together with organization characteristics could explain up to 66.3% of the performance of humanitarian aid organizations in Kenya. Upon adding the interaction term X_1*Z, there was an improvement of the model to R^2 of 0.733, an increase of 7%. Briefly, the R^2 increased by 7.8 percent when the organizational characteristics was considered in addition to the supply chain responsiveness and

increased by 7.0 percent when the interaction between the moderator and the supply chain responsiveness was considered.

The results implied that organizational characteristics as a predictor adds value to the model and moderates the relationship between supply chain responsiveness (X_1) and performance of humanitarian aid organizations in Kenya (Y).

Table 4.50: Moderating effect of organizational characteristics on the relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.765[a]	.585	.579	.74484	.585
2	.814[b]	.663	.661	.33453	.078
3	.856[c]	.733	.731	.29801	.070

a. Predictors: (Constant), Supply Chain Responsiveness
b. Predictors: (Constant), Supply Chain Responsiveness, Organizational Characteristics
c. Predictors: (Constant), Supply Chain Responsiveness, Organizational Characteristics, interaction between supply chain responsiveness and organizational characteristics
d. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.51 shows the ANOVA results for the models considered in testing for the moderating effect of organizational characteristics on the relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya. The results, Model 1 (F-statistics=12.440, $p<0.05$), Model 2 (F-statistics=9.119, $p<0.05$) and Model 3 (F-statistics=9.611, $p<0.05$), indicates that all the three models remained significant despite use of the different predictors.

Table 4.51: ANOVA for the Models Used to Test for the Moderating Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.439	1	7.439	12.440	.000[b]
	Residual	172.081	288	.598		
	Total	179.520	289			
2	Regression	10.723	2	5.362	9.119	.000[c]
	Residual	168.797	287	.588		
	Total	179.520	289			
3	Regression	16.434	3	5.478	9.611	.000[d]
	Residual	163.086	286	.570		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.52 presents the regression coefficients, the t- statistic and the significance of the coefficients obtained from the three models, used to investigate whether organizational characteristics has moderating effect on the relationship between supply chain responsiveness and the performance of humanitarian aid organizations in Kenya. The result indicates that when supply chain responsiveness considered in this study was used in a multiple linear regression, the constant term $\beta_0 = 5.77$, implies that if supply chain responsiveness is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 5.770. The regression coefficient for supply chain responsiveness was positive and significant (β_1=0.224, P< 0.05) with a t-value of 3.556. This implies that for every unit increase in supply chain responsiveness, performance of humanitarian aid organizations in Kenya is predicted to increase by 0.224 units.

When the moderator is included, the results of model 2 shows that supply chain responsiveness (β=0.450, p<0.05) and the moderator organizational characteristics (β=0.244, p<0.05) have a significant positive influence on performance of humanitarian aid organizations in Kenya. In model 3, the interaction effect between supply chain responsiveness and the moderator (organizational characteristics) was investigated. The result indicated that there was a significant positive influence on the performance of humanitarian aid organizations in Kenya from the interaction between organizational characteristics and supply chain responsiveness (β= 2.209, t = 5.055, p<0.05).

Table 4.52: Coefficients for the Models Used to Test for Moderating Effect

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	5.770	.477		12.096	.000
	Supply Chain Responsiveness	0.224	.063	.365	3.556	.000
2	(Constant)	2.493	.661		3.772	.000
	Supply Chain Responsiveness	0.450	.125	.479	3.600	.000
	Organizational Characteristics	0.244	.138	.411	1.768	.000
3	(Constant)	2.130	.622		3.424	.000
	Supply Chain Responsiveness	.518	.505	.726	1.026	.000
	Organizational Characteristics	.305	.416	.440	0.733	.000
	Supply Chain Responsiveness * Organization Characteristics	2.209	.437	.896	5.055	.000

a. Dependent Variable: Performance of humanitarian aid organizations

Thus, the regression models after moderation becomes:

Model 1: $Y = 5.770 + 0.224X_1$

Model 2: $Y = 2.493 + 0.450X_1 + 0.244Z$

Model 3: $Y = 2.130 + 0.518X_1 + 0.305Z + 2.209X_1Z$

The study hypothesized that organizational characteristics does not have a moderating effect on the relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya. The interaction effect between the supply chain responsiveness and organizational characteristics measures the moderation effect. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. From

the results in Table 4.50 to Table 4.52, the null hypothesis is rejected and the study conclude that organizational characteristics has a moderating effect on the relationship between supply chain responsiveness and performance of humanitarian aid organizations in Kenya.

The Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Resilience and Performance of Humanitarian Aid Organizations in Kenya

To test the moderating effect of organizational characteristics on the relationship between supply chain resilience and performance of humanitarian aid organizations in Kenya, the study built-in the following three models;

Models:

Model 1: $Y = \beta_0 + \beta_2 X_2 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_2 X_2 + \beta_z Z + \varepsilon$

Model 3: $Y = \beta_0 + \beta_2 X_2 + \beta_Z Z + \beta_{2Z} X_2 * Z + \varepsilon$

The model summary result in Table 4.53 indicates that the unadjusted coefficient of determination for model 1 is 0.501. This implies that the supply chain resilience considered in this study accounts for only 50.1 percent of the total variation in the performance of humanitarian aid organizations, the remaining 49.9 percent change in the performance of humanitarian aid organizations can be attributed to other factors not considered in this study.

For model 2, the R^2 =0.610, an implication that supply chain resilience and organizational characteristics accounts for about 61.0 percent of the total change in the performance of humanitarian aid organizations, and thus the remaining 39.0

percent of the variation in the performance of humanitarian aid organizations can be accounted for by other factors not of interest in this study.

For model 3, the R^2 =0.669 and this implies that supply chain resilience, organizational characteristics as well as the interaction between supply chain resilience and the organizational characteristics, accounts for 66.9 percent of the total variation in the performance of humanitarian aid organizations, the remaining 33.1 percent change in the performance of HAOs can be attributed to other factors. The R^2 increased by 10.9 percent when the organizational characteristics was considered in addition to the supply chain resilience and increased by 5.9 percent when the interaction between the moderator and the supply chain resilience was considered.

Table 4.53: Moderating effect of organizational characteristics on the relationship between supply chain resilience and performance of humanitarian aid organizations in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.708[a]	.501	.492	.67172	.501
2	.781[b]	.610	.608	.35947	.109
3	.818[c]	.669	.666	.33199	.059

a. Predictors: (Constant), Supply Chain Resilience
b. Predictors: (Constant), Supply Chain Resilience, Organizational Characteristics
c. Predictors: (Constant), Supply Chain Resilience, Organizational Characteristics, interaction between supply chain Resilience and organizational characteristics
d. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.54 shows the ANOVA results for the models considered in testing for the moderating effect of organizational characteristics on the relationship between supply chain resilience and performance of humanitarian aid organizations. The results, Model 1 (F-statistics=17.036, $p<0.05$), Model 2 (F-statistics=15.713, $p<0.05$) and Model 3 (F-statistics=15.729, $p<0.05$), indicates that all the three models remained significant despite use of the different predictors.

Table 4.54: ANOVA for the Models Used to Test for the Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Resilience and Performance of Humanitarian Aid Organizations

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.026	1	10.026	17.036	.000[b]
	Residual	169.494	288	.589		
	Total	179.520	289			
2	Regression	17.723	2	8.862	15.713	.000[c]
	Residual	161.797	287	.564		
	Total	179.520	289			
3	Regression	25.434	3	8.478	15.729	.000[d]
	Residual	154.086	286	.539		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.55 presents the regression coefficients, the t- statistic and the significance of the coefficients obtained from the three models, used to investigate whether organizational characteristics has moderating effect on the relationship between supply chain resilience and the performance of humanitarian aid organizations in Kenya. The result indicates that when supply chain resilience considered in this study was used in a multiple linear regression, the constant term $\beta_0 = 4.527$, implies that if

supply chain resilience is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 4.527. The regression coefficient for supply chain resilience was positive and significant ($\beta_1 = 0.525$, $p<0.05$), with a t-

value of 4.127. This implies that for every unit increase in supply chain resilience, performance of humanitarian aid organizations is predicted to increase by 0.525 units.

When the moderator is included, the results of model 2 shows that supply chain resilience ($\beta=0.529$, $p<0.05$) and the moderator organizational characteristics ($\beta=0.274$, $p<0.05$) have a significant positive influence on performance of humanitarian aid organizations. In model 3, the interaction effect between the supply chain resilience and the moderator (organizational characteristics) was investigated.

The result indicated that there was a significant positive influence on the performance of humanitarian aid organizations from the interaction between organizational characteristics and supply chain resilience (β= 0.402, t = 1.836, p<0.05).

Table 4.55: Coefficients for the Models Used to Test for Moderating Effect

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	4.527	.532		8.507	.000
	Supply Chain Resilience	.525	.127	.708	4.127	.000
2	(Constant)	2.668	.342		7.801	.000
	Supply Chain Resilience	.529	.218	.539	2.427	.000
	Organizational Characteristics	.274	.008	.281	1.880	.001
3	(Constant)	3.873	.283		13.686	.002
	Supply Chain Resilience	.654	.070	.663	9.343	.000
	Organizational Characteristics	.326	.075	.357	4.347	.000
	Supply Chain resilience * Organization Characteristics	.402	.219	.572	1.836	.000

a. Dependent Variable: Performance of humanitarian aid organizations

Thus, the regression models after moderation becomes:

Model 1: $Y = 4.527 + 0.525X_2$

Model 2: $Y = 2.668 + 0.529X_2 + 0.274Z$

Model 3: $Y = 3.873 + 0.654X_2 + 0.326Z + 0.402X_2Z$

The study hypothesized that organizational characteristics does not have a moderating effect on the relationship between supply chain resilience and performance of humanitarian aid organizations in Kenya. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. From the results in Table 4.53 to Table 4.55, the null hypothesis is rejected and the study conclude that organizational characteristics has a moderating effect on the relationship between supply chain resilience and performance of humanitarian aid organizations in Kenya.

The Moderating Effect of Organizational Characteristics on the Relationship Between Supply Chain Efficiency and Performance of Humanitarian Aid Organizations in Kenya.

To test the moderating effect of organizational characteristics on the relationship between supply chain efficiency and performance of humanitarian aid organizations in Kenya, the study built-in the following three models;

Models:

Model 1: $Y = \beta_0 + \beta_3 X_3 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_3 X_3 + \beta_z Z + \varepsilon$

Model 3: $Y = \beta_0 + \beta_3 X_3 + \beta_Z Z + \beta_{3Z} X_3 * Z + \varepsilon$

Upon regressing the variables and as shown in Table 4.56 the Coefficient of Determination (R^2) for the first model was 0.436, meaning that supply chain efficiency on its own, contributes 43.6% to the performance of humanitarian aid

organizations in Kenya. Nevertheless, when organizational characteristics was introduced, relationship between supply chain efficiency and performance of humanitarian aid organizations in Kenya changed significantly. Table 4.56 indicates that the R^2 before the introduction of organizational characteristics was 0.436 (43.6%), which changed significantly to 0.665 (66.5%) upon introduction of organization characteristics, implying a 0.229 (22.9%) increase. This meant that supply chain efficiency together with organization characteristics could explain up to 66.5% of the performance of humanitarian aid organizations in Kenya. Upon adding the interaction term X_3*Z, there was an improvement of the model to R^2 of 0.673, an increase of 0.011. In a nutshell, the R^2 increased by 22.9 percent when the organizational characteristics was considered in addition to the supply chain efficiency and increased by 1.1% when the interaction between the moderator and the supply chain efficiency was considered.

The results implied that organizational characteristics as a predictor adds value to the model and moderates the relationship between supply chain efficiency (X_3) and performance of humanitarian aid organizations in Kenya (Y).

Table 4.56: Moderating effect of organizational characteristics on the relationship between supply chain efficiency and performance of humanitarian aid organizations in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.661[a]	.436	.427	.78413	.436
2	.815[b]	.665	.661	.33421	.229
3	.822[c]	.676	.673	.32834	.011

a. Predictors: (Constant), Supply Chain Efficiency
b. Predictors: (Constant), Supply Chain Efficiency, Organizational Characteristics
c. Predictors: (Constant), Supply Chain Efficiency, Organizational Characteristics, interaction between supply chain efficiency and organizational characteristics d. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.57 shows the ANOVA results for the models considered in testing for the moderating effect of organizational characteristics on the relationship between

supply chain efficiency and performance of humanitarian aid organizations in Kenya. The results, Model 1 (F-statistics=35.587, p<0.05), Model 2 (F-statistics=21.884, p<0.05) and Model 3 (F-statistics=17.951, p<0.05), indicates that all the three models remained significant despite use of the different predictors.

Table 4.57: ANOVA for the Models Used to Test for the Moderating Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	19.743	1	19.743	35.587	.000[b]
	Residual	159.777	288	.555		
	Total	179.520	289			
2	Regression	23.765	2	11.883	21.884	.000[c]
	Residual	155.755	287	.543		
	Total	179.520	289			
3	Regression	28.434	3	9.478	17.951	.000[d]
	Residual	151.086	286	.528		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.58 presents the regression coefficients, the t- statistic and the significance of the coefficients obtained from the three models, used to investigate whether organizational characteristics has moderating effect on the relationship between supply chain efficiency and the performance of humanitarian aid organizations in Kenya. The result indicates that when supply chain efficiency considered in this study was used in a multiple linear regression, the constant term $\beta_0 = 4.490$, implies

that if supply chain efficiency is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 4.490. The regression coefficient for supply chain efficiency was positive and significant ($\beta_1 = 0.547$,

p<0.05), with a t-value of 5.965. This implies that for every unit increase in supply chain efficiency, performance of humanitarian aid organizations is predicted to increase by 0.547 units.

When the moderator is included, the results of model 2 shows that supply chain efficiency (β=0.623, p<0.05) and the moderator organizational characteristics (β=0.312, p<0.05) have a significant positive influence on performance of humanitarian aid organizations. In model 3, the interaction effect between the supply chain efficiency and the moderator (organizational characteristics) was investigated. The result indicated that there was a significant positive influence on the performance of humanitarian aid organizations from the interaction between organizational characteristics and supply chain efficiency (β= 0.345, t = 3.165, p<0.05).

Table 4.58: Coefficients for the Models Used to Test for Moderating Effect

Model		Coefficients[a] Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.490	.376		11.949	.000
	Supply Chain Efficiency	.547	.092	.661	5.965	.000
2	(Constant)	1.645	.235		7.000	.000
	Supply Chain Efficiency	.623	.105	.645	2.543	.000
	Organizational Characteristics	.312	.108	.395	2.888	.000
3	(Constant)	1.093	.153		7.144	.001
	Supply Chain Efficiency	.644	.234	.651	2.752	.000
	Organizational Characteristics	.214	.041	.236	5.220	.000
	Supply Chain Efficiency * Organization Characteristics	.345	.109	.405	3.165	.000

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Thus, the regression models after moderation becomes:

Model 1: $Y = 4.490 + 0.547X_3$

Model 2: $Y = 1.645 + 0.623X_3 + 0.312Z$

Model 3: $Y = 1.093 + 0.644X_3 + 0.214Z + 0.345X_3Z$

The study hypothesized that organizational characteristics does not have a moderating effect on the relationship between supply chain efficiency and performance of humanitarian aid organizations in Kenya. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. From the results in Table 4.56 to Table 4.58, the null hypothesis is rejected and the study conclude that organizational characteristics has a moderating effect on the relationship between supply chain efficiency and performance of humanitarian aid organizations in Kenya.

The Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Integration and Performance of Humanitarian Aid Organizations in Kenya

To test the moderating effect of organizational characteristics on the relationship between supply chain integration and performance of humanitarian aid organizations in Kenya, the study built-in the following three models;

Models:

Model 1: $Y = \beta_0 + \beta_4 X_4 + \varepsilon$

Model 2: $Y = \beta_0 + \beta_4 X_4 + \beta_z Z + \varepsilon$

Model 3: $Y = \beta_0 + \beta_4 X_4 + \beta_Z Z + \beta_{4Z} X_4 * Z + \varepsilon$

The model summary result in Table 4.59 indicates that the unadjusted coefficient of determination for model 1 is 0.409. This implies that the supply chain integration considered in this study accounts for only 40.9 percent of the total variation in the performance of humanitarian aid organizations, the remaining 59.1 percent change in the performance of humanitarian aid organizations can be attributed to other factors not considered in this study.

For model 2, the R^2 =0.610, an implication that supply chain integration and organizational characteristics accounts for about 61.0 percent of the total change in the performance of humanitarian aid organizations, and thus the remaining 39.0 percent of the variation in the performance of humanitarian aid organizations can be accounted for by other factors not of interest in this study.

For model 3, the R^2 =0.750 and this implies that supply chain integration, organizational characteristics as well as the interaction between supply chain integration and the organizational characteristics, accounts for 75.0 percent of the total variation in the performance of humanitarian aid organizations. The remaining 25.0 percent change in the performance of humanitarian aid organizations can be attributed to other factors. The R^2 increased by 20.1 percent when the organizational characteristics was considered in addition to the supply chain integration and increased by 14.0 percent when the interaction between the moderator and the supply chain integration was considered.

Table 4.59: Moderating effect of organizational characteristics on the relationship between supply chain integration and performance of humanitarian aid organizations in Kenya

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change
1	.639[a]	.409	.398	.73092	.409
2	.781[b]	.610	.608	.35947	.201
3	.866[c]	.750	.745	.32834	.140

a. Predictors: (Constant), Supply Chain Integration
b. Predictors: (Constant), Supply Chain Integration, Organizational Characteristics

c. Predictors: (Constant), Supply Chain Integration, Organizational Characteristics, interaction between supply chain Integration and organizational characteristics d. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.60 shows the ANOVA results for the models considered in testing for the moderating effect of organizational characteristics on the relationship between supply chain integration and performance of humanitarian aid organizations in Kenya. The results, Model 1 (F-statistics=13.406, $p<0.05$), Model 2 (F-statistics=9.961, $p<0.05$) and Model 3 (F-statistics=9.429, $p<0.05$), indicates that all the three models remained significant despite use of the different predictors.

Table 4.60: ANOVA for the Models Used to Test for the Moderating Effect

Model		ANOVA[a] Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.990	1	7.990	13.406	.000[b]
	Residual	171.530	288	.596		
	Total	179.520	289			
2	Regression	11.654	2	5.827	9.961	.000[c]
	Residual	167.866	287	.585		
	Total	179.520	289			
3	Regression	16.151	3	5.384	9.429	.000[d]
	Residual	163.369	286	.571		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations
b. Predictors: (Constant), Supply Chain Integration
c. Predictors: (Constant), Supply Chain Integration, Organizational Characteristics
d. Predictors: (Constant), Supply Chain Integration, Organizational Characteristics, Interaction between Supply Chain Integration and Organizational Characteristics

Table 4.61 presents the regression coefficients, the t- statistic and the significance of the coefficients obtained from the three models, used to investigate whether organizational characteristics has moderating effect on the relationship between supply chain integration and the performance of humanitarian aid organizations in Kenya. The result indicates that when supply chain integration considered in this study was used in a multiple linear regression, the constant term $\beta_0 = 5.597$, implies

that if supply chain integration is held constant, then there will be a positive performance of humanitarian aid organizations in Kenya by 5.597. The regression

coefficient for supply chain integration was positive and significant ($\beta_1 = 0.268$, $p<0.05$), with a t-value of 2.424. This implies that for every unit increase in supply chain integration, performance of humanitarian aid organizations is predicted to increase by 0.268 units.

When the moderator is included, the results of model 2 shows that supply chain integration ($\beta=0.325$, $p<0.05$) and the moderator organizational characteristics ($\beta=0.206$, $p<0.05$) have a significant positive influence on performance of humanitarian aid organizations. In model 3, the interaction effect between the supply chain integration and the moderator (organizational characteristics) was investigated. The result indicated that there was a significant positive influence on the performance of HAOs from the interaction between organizational characteristics and supply chain integration ($\beta= 0.976$, $t = 1.914$, $p<0.05$).

Table 4.61: Coefficients for the Models Used to Test for Moderating Effect

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	5.597	.464		12.069	.000
	Supply Chain Integration	.268	.071	.639	2.424	.000
2	(Constant)	2.475	.235		10.532	.000
	Supply Chain Integration	.325	.206	.359	1.577	.000
	Organizational Characteristics	.206	.087	.247	2.368	.000
3	(Constant)	2.119	.264		8.027	.000
	Supply Chain Integration	.413	.140	.457	2.950	.000
	Organizational Characteristics	.250	.143	.765	1.748	.001
	Supply Chain Integration * Organization Characteristics	.976	.510	.996	1.914	.000

a. Dependent Variable: Performance of Humanitarian aid organizations

Thus, the regression model after moderation becomes:

Model 1: $Y = 5.597 + 0.268X_4$

Model 2: $Y = 2.475 + 0.325X_4 + 0.206Z$

Model 3: $Y = 2.119 + 0.413X_4 + 0.250Z + 0.976X_4Z$

The study hypothesized that organizational characteristics does not have a moderating effect on the relationship between supply chain integration and performance of humanitarian aid organizations in Kenya. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. From the results in Table 4.59 to Table 4.61, the null hypothesis is rejected and the study conclude that organizational characteristics has a moderating effect on the relationship between supply chain integration and performance of humanitarian aid organizations in Kenya.

The Overall Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Leagility and Performance of Humanitarian Aid Organizations in Kenya

Moderated Multiple Regression (MMR) analysis was followed to determine the moderating effect of organizational characteristics on the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. The moderating model tests whether the prediction of a dependent variable Y, from an independent variable X, differs across levels of a third variable Z. MMR technique consisted of two steps. In the first step, the main effects of the predictor (supply chain leagility) and the hypothesized moderator (organizational characteristics) were estimated using regression. To assess the moderating effect of organizational characteristics, the following models were used:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_Z Z + \varepsilon \text{.............................} (2)$$

The second step consisted of adding the interaction term to the equation (3) as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_Z Z + \beta_{1z} X_1 * Z + \beta_{2z} X_2 * Z + \beta_{3z} X_3 * Z + \beta_{4z} X_4 * Z + \varepsilon$$

Where:

β_0 = Y intercept

β_1, β_2, β_3 and β_4 represent the coefficients of each independent variable.

β_z = the estimate of the population regression coefficient for Z

$\beta_{1Z}, \beta_{2Z}, \beta_{3Z}$ *and* β_{4Z} = are the estimates of the population regression coefficient for the product term (X*Z)

Z= Organizational Characteristics.

Y=Performance of Humanitarian Aid Organizations

ε = a residual term.

The hypothesis to test for this specific objective was:

> **H_0:** Organizational characteristics does not have a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration and performance of humanitarian aid organizations in Kenya.

The moderated multiple linear regression involved three models. Model 1: estimating the main influence of the supply chain leagility on the performance of HAOs; Model

2: estimating the main influence of the supply chain leagility and the moderator, and Model 3: estimating the effect of the interaction between the moderator and the supply chain leagility. The model summary result in Table 4.62 indicates that the unadjusted coefficient of determination for model 1 is 0.719. This implies that the supply chain leagility considered in this study accounts for only 71.9 percent of the total variation in the performance of HAOs, the remaining 28.1 percent change in the performance of HAOs can be attributed to other factors not considered in this study. For model 2, the R^2 =0.783, an implication that supply chain leagility and organizational characteristics accounts for about 78.3 percent of the total change in the performance of HAOs, and thus the remaining 21.7 percent of the variation in the performance of HAOs can be accounted for by other factors not of interest in this study. For model 3, the R^2 =0.827 and this implies that supply chain leagility, organizational characteristics as well as the interaction between supply chain leagility and the organizational characteristics, accounts for 82.7 percent of the total variation in the performance of HAOs, the remaining 17.3 percent change in the performance of HAOs can be attributed to other factors. The R^2 increased by 6.4 percent when the organizational characteristics was considered in addition to the supply chain leagility and increased by 10.8 percent when the interaction between the moderator and the supply chain leagility was considered.

Table 4.62: Summary Models Used to Test for the Moderating Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R square change
1	.848[a]	.719	.692	.49346	.719
2	.885[b]	.783	.763	.71839	.064
3	.909[c]	.827	.818	.65124	.108

a. Predictors: (Constant), Supply Chain Responsiveness, Supply Chain Resilience, Supply Chain Efficiency and Supply Chain Integration
b. Predictors: (Constant), Supply Chain Responsiveness, Supply Chain Resilience, Supply Chain Efficiency ,Supply Chain Integration and Organizational Characteristics
c. Predictors: (Constant), Supply Chain Responsiveness, Supply Chain Resilience, Supply Chain Efficiency, Supply Chain Integration, Organizational Characteristics, interaction between supply chain leagility and organizational characteristics
d. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.63 shows the ANOVA results for the models considered in testing for the moderating effect of organizational characteristics. The results, Model 1 (F-

statistics=10.961, p<0.05), Model 2 (F-statistics=12.770, p<0.05) and Model 3 (F-statistics=15.92, p<0.05), indicates that all the three models remained significant despite use of the different predictors.

Table 4.63: ANOVA for the Models Used to Test for the Moderating Effect

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.935	4	5.984	10.961	.000[b]
	Residual	155.585	285	.546		
	Total	179.520	289			
2	Regression	32.953	5	6.591	12.770	.000[c]
	Residual	146.567	284	.516		
	Total	179.520	289			
3	Regression	60.767	9	6.752	15.920	.000[d]
	Residual	118.753	280	.424		
	Total	179.520	289			

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Table 4.64 presents the regression coefficients, the t- statistic and the significance of the coefficients obtained from the three models, used to investigate whether organizational characteristics has moderating effect on the relationship between supply chain leagility and the performance of HAOs. The result indicates that when supply chain leagility components considered in this study are used together in a multiple linear regression, then supply chain responsiveness (β=.532, *p<0.05*), supply chain resilience (β=0.316, p<0.05), supply chain efficiency (β=0.415, p<0.05) and supply chain integration (β=.458, *p<0.05*) have significant positive influence on the performance of HAOs.

When the moderator is included, the results of model 2 shows that supply chain responsiveness (β=0.529, p<0.05), supply chain resilience (β=0.244, p<0.05) supply chain efficiency (β=0.308, p<0.05), supply chain integration (β=0.450, p<0.05) and the moderator organizational characteristics (β=0.564, p<0.05) have a significant positive influence on performance of HAOs.

In model 3, the interaction effect between the supply chain leagility and the moderator (organizational characteristics) was investigated. The result indicated that:

(i) There was a significant positive influence on the performance of HAOs from the interaction between organizational characteristics and supply chain responsiveness (β= 1.101, t = 3.149, p<0.05),

(ii) there was a positive significant influence on the performance of HAOs from the interaction between organizational characteristics and supply chain resilience (β= 1.144, t = 2.816, p<0.05).

(iii)there was a significant positive influence on the performance of HAOs from the interaction between organizational characteristics and supply chain efficiency (β= 2.209, t = 5.059, p<0.05) and

(iv)There was a positive significant influence on the performance of HAOs from the interaction between organizational characteristics and supply chain integration (β= 1.777, t = 3.117, p<0.05).

Table 4.64: Coefficients for the Models Used to Test for Moderating Effect

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	3.409	0.641		5.318	0.000
	Supply Chain Responsiveness	0.532	0.115	0.668	4.626	0.000
	Supply Chain Resilience	0.316	0.081	0.442	3.901	0.000
	Supply Chain Efficiency	0.415	0.074	0.512	5.608	0.000
	Supply Chain Integration	0.458	0.098	0.583	4.673	0.000
2	(Constant)	2.493	0.661		3.772	0.000
	Supply Chain Responsiveness	0.529	0.114	0.515	4.640	0.000
	Supply Chain Resilience	0.244	0.038	4.11	6.421	0.000
	Supply Chain Efficiency	0.308	0.113	0.487	2.726	0.007
	Supply Chain Integration	0.450	0.125	0.479	3.600	0.000
	Organizational Characteristics	0.564	0.135	0.273	4.178	0.000
3	(Constant)	31.131	7.278		4.277	0.000
	Supply Chain	4.674	1.498	2.427	3.120	0.002

Responsiveness					
Supply Chain Resilience	5.306	1.798	2.388	2.951	0.003
Supply Chain Efficiency	9.168	1.864	5.563	4.918	0.000
Supply Chain Integration	7.598	2.536	4.003	2.996	0.003
Organizational Characteristics	8.202	1.723	3.97	4.760	0.000
Supply Chain Responsiveness * Organization Characteristics	1.101	0.35	3.779	3.146	0.002
Supply Chain Resilience * Organization Characteristics	1.144	0.406	3.668	2.818	0.005
Supply Chain Efficiency * Organization Characteristics	2.209	0.437	8.896	5.055	0.000
Supply Chain Integration * Organization Characteristics	1.777	0.57	6.272	3.118	0.002

a. Dependent Variable: Performance of Humanitarian Aid Organizations

Thus, the overall regression model after moderation becomes:

Model 1: $Y = 3.409 + 0.532X_1 + 0.316X_2 + 0.415X_3 + 0.458X_4$

Model 2: $Y = 2.493 + 0.529X_1 + 0.244X_2 + 0.308X_3 + 0.450X_4 + 0.564Z$

Model 3:

$$Y = 31.131 + 4.674X_1 + 5.306X_2 + 9.168X_3 + 7.598X_4 + 8.202Z + 1.101X_1Z + 1.144X_2Z + 2.209X_3Z + 1.777X_4Z$$

The study hypothesized that organizational characteristics does not have a moderating effect on the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. The interaction effect between the supply chain leagility and organizational characteristics measures the moderation

effect. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. From the results in Table 4.50 to Table 4.64, the null hypothesis is rejected and the study conclude that organizational characteristics has a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya.

Discussion on the Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Leagility and Performance of Humanitarian Aid Organizations in Kenya

Three indicators were used to measure organizational characteristics; organizational structure, firm size and organizational age. Respondents were asked to indicate the number of years their humanitarian aid organizations had existed in the humanitarian industry. The findings of the study indicated that humanitarian aid organizations had varied experiences in the industry. The respondents were also asked to indicate the number of employees working in the organizations. The number of employees was used to measure organizational size. The organizational size is associated with the resources in possession and the cost of running the firm. The organizational size decides the systems used to keep their operations running. Humanitarian aid organizations differ a lot on basis of financial, technical and operational capacities, which is dependent on their sizes, structure and experience in the industry.

Age of an organization affects the implementation of supply chain leagility in humanitarian aid organizations. The efficient and effective supply of information in older firms can be attributed to their firm age. The younger a firm is, means the lesser the relationships established. Older firms are better experienced in selection and application of information. According to a study by Kücher, Mayr, Mitter, Duller and Feldbauer-Durstmüller (2020), experience obtained from existing longer in the field of humanitarian relief, places older firms at an operational advantage. Older firms are also safer placed at establishing reliable networks, business associates and

have the faith of financial institutions. They have also established a good reputation in their line of operation, which is an important drive to operational success.

Conversely, among the actors in complex emergencies, big and old humanitarian aid organizations have the least barriers and strengths to entry in a disaster zone. Big and experienced organizations have an advantage over their young and small counterparts in implementation of supply chain leagility. This confirms the findings by Chan, Teoh, Yeow and Pan (2019) that the big and experienced organizations have the ability to respond fast. This is because most big relief humanitarian aid organizations have conventional procedures laid down in case there is need for emergency response. They also have access to sufficient labor, material and monetary resources readily available for emergency response. Additionally, they can easily acquire extra resources when need arises. These factors make big and experienced humanitarian aid organizations able to respond rapidly to complex emergencies. Again, the experienced humanitarian aid organizations have the advantage of maneuverability. This makes the humanitarian aid organizations access many complicated or remote places. Some well-endowed humanitarian aid organizations have established air or sea transport capabilities and that means they can access any place. Rogerson and Ritchie (2020) asserted that the small local humanitarian aid organizations should be credited for their significant addition in relief activities. Although they may fall back behind their international counterparts in regard to human and financial resources, they make up for this with their better domestic knowhow and familiarity of the distressed populations. Matar and Eneizan (2018) supported the findings of this study and affirmed that age and size have a positive relationship with performance of an organization and should therefore be accorded due attention.

Organizational structure entails grouping of people and responsibilities into different divisions to enhance synchronization of communication, decisions and actions within an organization (Burton & Obel, 2018). Chain of command, reporting structures, span of control, power, authority and responsibility are clearly specified and assigned to persons as per their status in an organization. Subsequently, the structure of the organization governs the rate of decision-making and the flow of information in and

outside an organization. Making of decisions gets slower when many people are expected to give their contribution thereby leading to slackened humanitarian services. The organizational structure adopted by humanitarian aid organizations influences the implementation of supply chain leagility in the context of emergence and relief assistance. Centralization, formalization, red tape and complexity structures determines how humanitarian aid organizations response to disasters. Centralization focuses on the location of decision-making authority the organization. Omweri (2018) notes that if a bureaucrat has limited discretion power in decision-making, they would need approval from a higher ranking but if otherwise, the decision can be made without consent. Formalization is the extent to which an organization has documented rules and regulations in paper form. Formalization ensures orderliness and record of the employee conduct. Red tape are burdensome administrative rules and procedures that have undesirable impacts on organizational performance. Complexity is the number of sub-units levels, and specialization within an organization. Shareef, Dwivedi, Kumar, Hughes and Raman (2020) concluded that, the absence or weakness of organizational structure has adverse effects on the performance of an organization despite the supply chain design adopted. Rigidity and bureaucracy in organizational structure results in a bewildering morass of contradictions: confusion within roles, unnecessary ambiguity, a lack of co-ordination among humanitarian functions, failure to share ideas, and slow decision-making. The organization structure in disaster management should be less complex and fully centralized. Disaster response should be prompt to save life and property. Valero (2015) asserted that organization structure is a crucial factor in swift, on time disaster response. This implies that, weakness in organization structure inhibits practical, well-organized and well-timed emergency response. This confirms the assertion by Takeda, Jones and Helms (2017) that a rigid, administrative authority and bureaucratic control method in disaster containment usually results in ineffective emergency response. Concisely, organizational age, firm size and organizational structure affect the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya.

4.10 Trend Analysis for Performance of Humanitarian Aid Organizations

Trend analysis, a technique for extracting an underlying pattern was used to spot a pattern on the sub-constructs of performance of humanitarian aid organizations in the five years (2015-2019).

4.10.1 Financial Appeal Coverage

The findings in Figure 4.12 indicate proportionate increase in funding by humanitarian aid organizations upon financial appeals over a period of five years (2015-2019). This means that humanitarian organizations have mastered the art of soliciting funds and mobilizing resources from sources ranging from individual donors, foundations, corporations, governments and other alternatives. Donors willingly fund humanitarian aid organizations, but even this comes at a price, as donors demand to be updated on how the funds they contribute are put to use and thus demand to be presented with tangible and provable results. As advised by Ye, Y and Yan (2020), failure of humanitarian organizations to attain competence might not only lead to loss of lives, but also to loss of vital donor funds. Though the funding has increased over the last five years, the amount is still not sufficient for humanitarian operations.

Roddy, Strange and Taithe (2018) cautioned humanitarians that are in constant pursuit of new opportunities to raise funds not to fall prey to fraudsters. Further, humanitarian aid organizations should not solicit from the public in the name of charity using illusive methods or use the funds obtained for purposes not intended by the donors. This is termed as charity fraud regarded as a repulsive kind of dishonest business practice as it manipulates philanthropic persons who decide to give donations in the belief that they are helping the needy. Disappointment and mistrust resulting from deceitful charity solicitation or embezzlement of funds leaves a negative impression of fundraising appeals even on an authentic capacity, which means even the legitimate charities, lose the confidence of donors. The graphical presentation of the proportionate funds realized from financial appeals by humanitarian aid organizations in the year 2015 through 2019 reveals an increasing trend as shown in Figure 4.12.

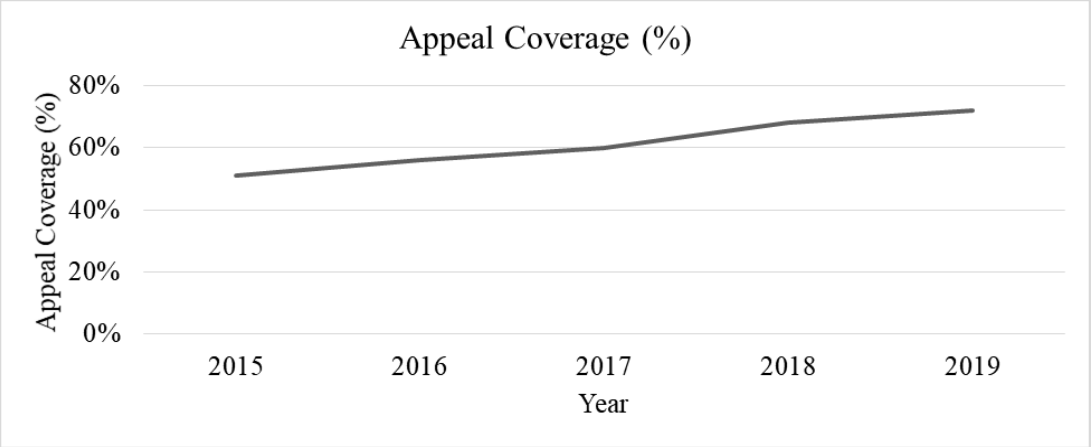

Figure 4.12: Proportionate Funds Raised in Financial Appeal from 2015 to 2019

4.10.2 Financial Resource Utilization

Trend analysis was done for financial resource utilization to show how humanitarian organizations use funds raised upon financial appeals. The findings of this study indicate that over the years (2015-2019 period) humanitarian aid organizations have received increasing donor funding upon financial appeals and subsequently efficiently utilized the funding for running humanitarian operations. This is because in recent years, humanitarians have been under constant pressure from donors pledging a lot but demanding to be guaranteed that their efforts are going to the intended purpose (Kabetu & Iravo, 2018). The close involvement of donors in terms of expenses paid leaves humanitarian bodies under pressure to keep track of relief operations to the very end besides the basic input and output. Due to this, humanitarian organizations have to give interest to result as well, be accountable and transparent in their operations. Farahani, Lotfi, Baghaian, Ruiz and Rezapour (2020) found out that humanitarian organizations functioning in the emergency circle are often under constant pressure to deploy immediate resources without enough knowledge of the nature of resources required on the ground and the amounts. More pressure on resource utilization and performance is a result of increased natural and conflict compelled disasters, which demand more simultaneous relief operations around the world.

The need for accountability has driven donors to demand for competitive procurement of goods by humanitarian organizations and that the goods meet the proper standards. The donors now require humanitarian aid organizations to continuously find new innovative ways of minimizing costs of running while exhibiting better performance. According to Rogal (2019), humanitarians are fraudulent if they fail to provide the correct information about the proportions applied for particular business expenses, thereby exaggerating the amount of donation they need to execute charitable activities. All charitable organizations require finances to run. Some however take this to another level with unreasonably high costs which means, very little is left for the actual cause. Charities may participate in annihilating fraud by availing information to potential donors about services offered and the fraction of donations received is to be used for the actual charitable cause; the donors can use the information provided to decide the organization they find it appropriate to support. The findings of this study revealed that the proportion of funds spent on humanitarian operations dropped significantly between the years 2017 (61.16%) and 2018 (60.45%) as indicated in Figure 4.15. This is attributed to the political environment in Kenya.

Table 4.65: Descriptive Statistics for the Proportionate Expenses Incurred in Humanitarian Operations

Year	Proportion of Amount Spent on Humanitarian Operations (%)
2015	63.86
2016	67.41
2017	61.16
2018	60.45
2019	70.50

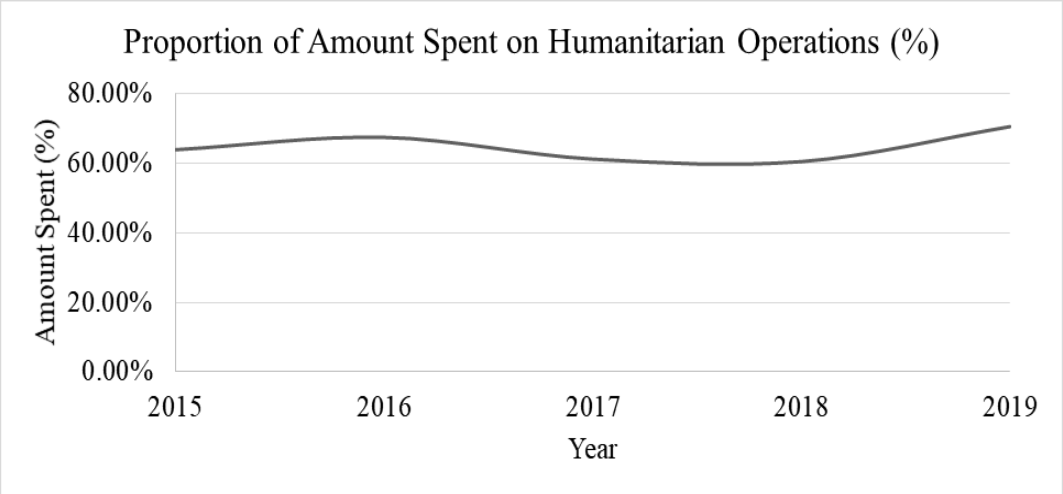

Figure 4.13: Proportion of Funds Spent on Humanitarian Operations

4.10.3 Disaster Impact Risk

Disaster risk is expressed as the likelihood of loss of life, injury or destruction and damage from a disaster in a given period and is widely recognized as the consequence of the interaction between a hazard and the characteristics that make people and places vulnerable and exposed. Disaster risk reduction is a main component in disaster relief management and sustainable livelihoods. It is an approach to analyze impact and reduce the cause of disasters (Huang, Wang & Liu, 2021). Disaster Risk Index is one of the medium that enable to calculate the impact of hazard/disasters to livelihoods. The index monitors the evolution of risks according to their degree of physical exposure, degree of risk and degree of relative vulnerability. Despite the increase in disasters in the contemporary period, the findings in this study revealed a decline in Disaster Risk Index indicating a weakening impact of disasters to vulnerable populations. This is in harmony with Rono (2018) study that disasters are common in Kenya and the regularity of occurrence and numbers of victims is increasing every day. The increase in numbers of victims is primarily a result out of the growing populations with human activities contributing to the frequency of occurrence. This means that quick, efficient, coordinated and smooth response to disasters supplemented with preparedness, prediction and warning systems can reduce the disruptive impacts of disasters on vulnerable populations. Disaster Risk Reduction is the systematic development and

application of strategies, policies and practices in the context of sustainable livelihoods to minimize vulnerabilities and the unfolding impact of disaster to society. Exposure to disasters increases the vulnerability of the poor thus deepening their poverty and preventing them from taking advantage of economic opportunities. Nyandiko (2020) concluded that poverty is the catalyst of the soaring numbers of disasters as poor citizens are at a higher chance of being exposed to factors that fuel disasters. Sharing the same view is Sarabia, Kägi, Davison, Banwell, Montes, Aebischer and Hostettler (2020) that effective delivery of humanitarian aid is an imperative element for reducing the impact of disasters. However, disaster response is not designed to address the root causes of disasters and over-reliance on relief results in a perpetuation of existing risks and a cycle of recurrent disasters. Thus, while it is important to provide timely and appropriate humanitarian assistance, it is equally crucial that efforts are made to tackle the longer-term challenges associated with risk reduction. A key element of disaster response is to make lives and livelihoods disaster resilient thus protecting existing livelihoods.

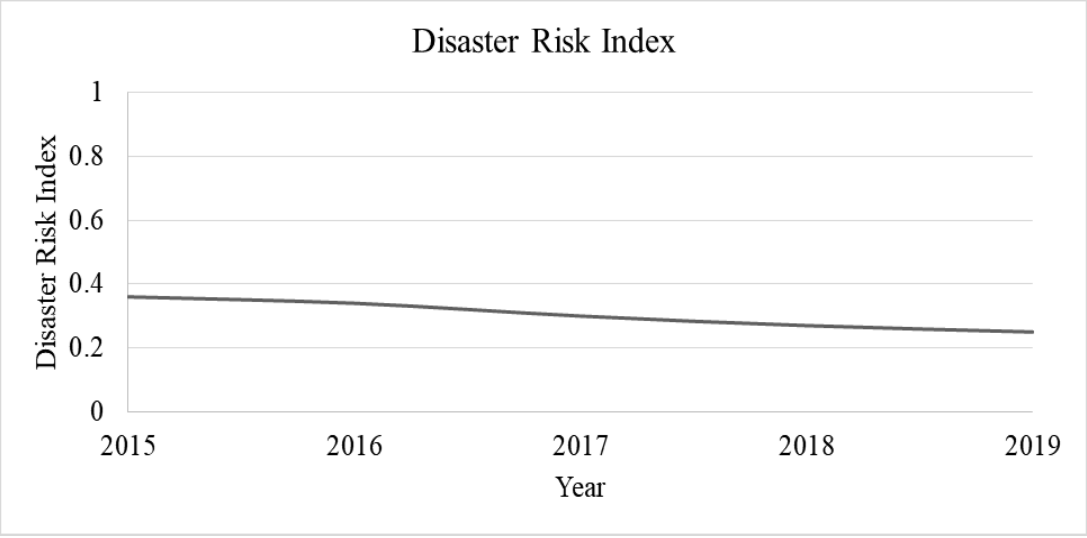

Figure 4.14: Disaster Risk Index

4.10.4 Beneficiary Satisfaction

The study sought to determine the mechanisms and channels that humanitarian aid organizations employ to receive complaints and feedback from beneficiaries of their humanitarian operations. Emerging from the views of supply chain managers,

the commonly used complaints mechanisms included suggestion and complaint boxes, community help desks, daily complaint hours, hotlines and helplines, social media, online complaints, community feedback logs, complaint committees, complaints via public media, open meetings and public hearings.

Complaints mechanism in a relief and humanitarian context provide a safer environment for vulnerable members of a community and increase beneficiary voice and power. Further, complaints mechanisms demonstrate that the humanitarian organizations recognizes, promotes and protects beneficiaries' rights, including the right to comment and complain. The freedom to complain helps build and maintain good relations, trust, transparency and dialogue between the humanitarians and the beneficiaries. Establishing a complaints system that suits beneficiary needs and which helps them exercise their right to complain is critical. Ruppert, Sagmeister and Steets (2016) asserted that it is impossible to find one complaint mechanism that suits every humanitarian context thus a mix of mechanisms ensured full coverage and access. From the views of the respondents, there is shrinkage of complaints from beneficiaries in the 2015-2019 period, an indication of beneficiary satisfaction with humanitarian operations.

4.11 Model Optimization

Based on the results of hypothesis testing, a model optimization was conducted. The model optimization is presented in Table 4.66 below.

Table 4.66: Model Optimization

	Objective	Null Hypothesis	Rule	P-Value	Comment
1	To examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya.	Supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya.	Reject the null hypothesis if P value is less than 0.05	0.00	Reject Null Hypothesis
2	To establish the influence of supply chain resilience on performance of humanitarian aid organizations in Kenya.	Supply chain resilience does not significantly influence the performance of humanitarian aid organizations in Kenya.	Reject the null hypothesis if P value is less than 0.05	0.00	Reject Null Hypothesis
3	To determine the influence of supply chain efficiency on performance of humanitarian aid organizations in Kenya.	Supply chain efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya.	Reject the null hypothesis if P value is less than 0.05	0.000	Reject Null Hypothesis
4	To examine the influence of supply chain integration on performance of humanitarian aid organizations in Kenya.	Supply chain integration does not significantly influence the performance of humanitarian aid organizations in Kenya.	Reject the null hypothesis if P value is less than 0.05	0.000	Reject Null Hypothesis
5	To determine the moderating effect of organizational characteristics on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration and the performance of humanitarian aid organizations in Kenya.	Organizational characteristics does not have a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration and performance of humanitarian aid organizations in Kenya.	Reject the null hypothesis if P value is less than 0.05	0.000	Reject Null Hypothesis

The aim of a model optimization was to guide in derivation of the final model (revised conceptual framework) where only the significant variables were included in the model. After conducting hypotheses testing, the study came up with a revised

conceptual framework. In the new conceptual framework, all the significant variables, that is, supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and organizational characteristics were included. The framework is as presented in Figure 4.15.

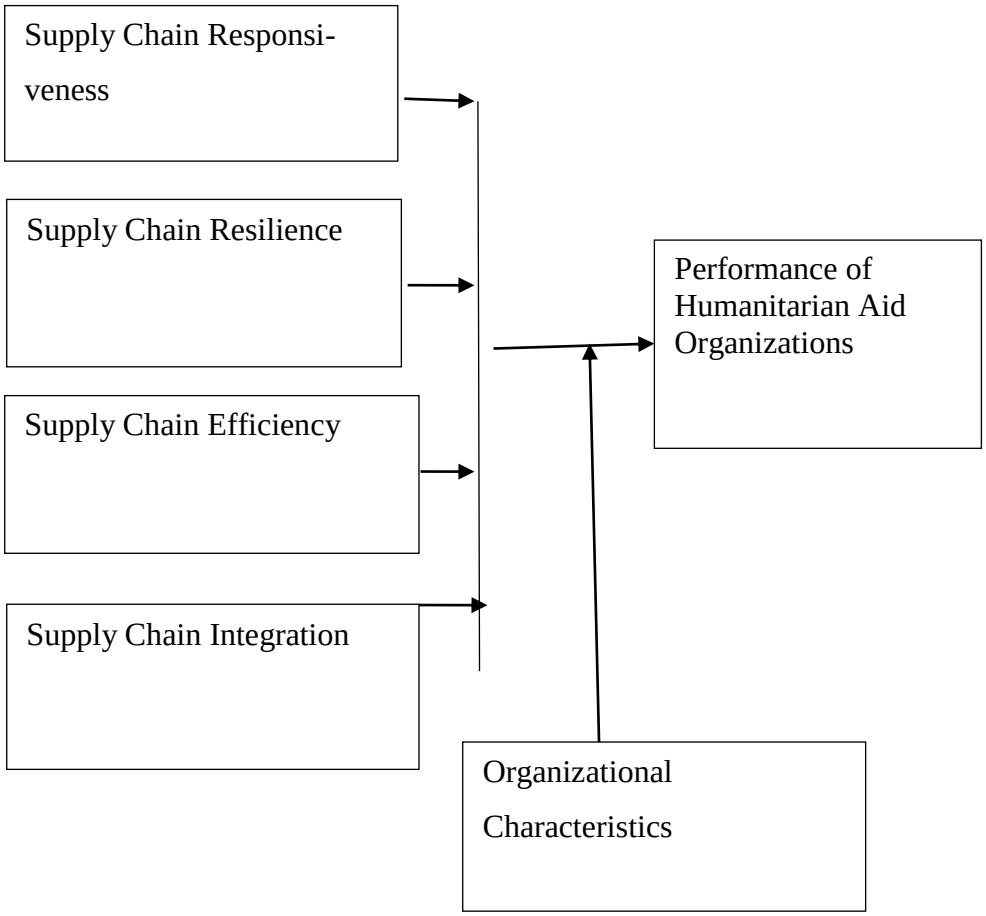

Figure 4.15: Optimized Conceptual Framework

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the major findings of the study. It also draws conclusion and recommendations for practice and provide suggestions for areas of further research based on the results of this study.

5.2 Summary

The general objective of this study was to determine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya. In particular, the study sought to examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya; to establish the influence of supply chain resilience on performance of humanitarian aid organizations in Kenya; to determine the influence of supply chain efficiency on performance of humanitarian aid organizations in Kenya; to examine the influence of supply chain integration on performance of humanitarian aid organizations in Kenya and to determine the moderating effect of organizational characteristics on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya.

The study findings indicated that supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration jointly are positively associated with performance of humanitarian aid organizations. Furthermore, the four predictors explain 71.9% of change in performance of humanitarian aid organizations. This is an implication that the remaining 28.1% of the variation in performance of humanitarian aid organizations could be accounted for by other factors not involved in this study.

Secondly, organizational characteristics was found to have a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply

chain efficiency, supply chain integration and performance of humanitarian aid organizations in Kenya. Supply chain leagility and organizational characteristics accounted for about 78.3% of the total change in the performance of humanitarian aid organizations. The summary of findings focus on the specific objectives that guided the study.

5.2.1 Influence of Supply Chain Responsiveness on Performance of Humanitarian Aid Organizations

The first objective of this study sought to examine the influence of supply chain responsiveness on performance of humanitarian aid organizations in Kenya. This objective was measured using supply chain velocity, supply chain reactivity and supply chain visibility as indicators of supply chain responsiveness. The findings of the study revealed that humanitarian aid organizations in Kenya have supply chains designed to be responsive to the needs of vulnerable populations. The humanitarian supply chains are designed to evaluate, consider and cover needs of vulnerable people quickly while enabling a view of the movements of materials along the supply chains. Further, to increase the element of supply chain velocity and reactivity, humanitarian aid organizations have established close relationships and partnerships with suppliers in the effort to improve responsiveness. The humanitarian supply chains are also designed to be flexible to meet the needs of vulnerable people in aspects of transportation, assembling and dispatch.

However, the ability of humanitarian supply chains to respond quickly to emergencies and disasters is a challenging task influenced by various challenges facing humanitarian supply chains such as lack of information, insufficient resources and poor funding. This means that despite the supply chains being designed to be responsive to emergencies, there is still an element of sluggishness in most humanitarian supply chains in Kenya resultant from the challenges faced. This shows lack of preparedness by humanitarian aid organizations in responding to emergencies and disasters. Preparedness entails all the activities undertaken before a disaster strikes that enhance the readiness of humanitarian organizations and communities to respond effectively to emergencies. Preparedness actions are crucial as they shorten

the time required for the subsequent response phase and potentially speed recovery. Supply chain responsiveness reduces the time taken to respond to emergencies hence saving lives and improving resource utilizations by the aid organizations.

Findings from the narratives of supply chain managers on supply chain responsiveness revealed the various disasters and situations triggering the need for supply chains to be responsive by disrupting communities at large in Kenya. The findings indicated that Kenya has suffered a range of disasters, that are broadly assorted on basis of origin as either manmade (anthropogenic) or natural in nature. The commonly identified natural disasters in Kenya included disease outbreaks, plagues/invasions, floods, landslides/mudslides, droughts and famine. Other natural disasters (geophysical in nature) that can be severely destructive though not very common in Kenya included earthquakes and volcanic eruptions. Common manmade disasters identified included structural/buildings collapse, chemical leaks, oil spillovers, manmade fires, terrorist activities, human conflicts, traffic accidents and politically instigated violence between tribes/groups. The study found out that the diversity, prevalence and extent of the disasters have greatly increased in the recent time amounting increased number of victims.

In addition, four strategies adopted by humanitarian aid organizations to increase supply chain responsiveness emerged from the views of supply chain managers. Among them is modularization in supply chain management, which requires splitting up of a greater whole into substitutable parts that exist together flawlessly and in many different combinations and permutations wholes. Humanitarian supply chains use modular solutions through pre-packaged modules, which can be moved to any part of the world at any time. Another strategy commonly identified from the views of supply chain managers to increase responsiveness in humanitarian supply chains is shortened lead-times. This was achieved by utilization of local sources of supply or through having strategic suppliers ready to deliver when need arises. Prior transport and capacity planning also emerged as a strategy used by humanitarian aid organizations to respond quickly to disasters. Unknown circumstances and ruined infrastructure cause difficulty in transport and capacity planning. Lastly, the postponement strategy that dictates that the organizations ought to suspend the

creation or distribution of the final product as long as it takes was identified. The postponement strategy effectively reduces inventory obsolescence and eliminates the risk and uncertainty costs that arise from having unwanted commodities. The driving forces making humanitarian aid organizations to design responsive supply chains emerged as the need to rescue lives, pressure from donors and the increased number of disasters and emergencies in the contemporary period.

Multiple regressions analysis revealed that there is a positive significant linear relationship between supply chain responsiveness and performance of humanitarian aid organizations. The null hypothesis that supply chain responsiveness does not significantly influence the performance of humanitarian aid organizations in Kenya was thus rejected revealing that supply chain responsiveness contributes positively towards performance of humanitarian aid organizations in Kenya. Concisely, it is from the quick evaluation, consideration and coverage of needs of vulnerable people that humanitarian aid organizations benefit a large number of people efficiently and effectively using donor resources.

5.2.2 Influence of Supply Chain Resilience on Performance of Humanitarian Aid Organizations

The second objective was to establish the influence of supply chain resilience on performance of humanitarian aid organizations in Kenya. This objective was measured using supply chain flexibility, supply chain robustness and supply chain adaptability in the opinion statements given. The findings in the study revealed that leagility design of supply chains enables humanitarian supply chains to be resilient by achieving the elements of flexibility, alignment and reduction in supply chain vulnerability. Humanitarian supply chains are prone to vulnerabilities and disruptions emanating internally or externally to the organizations. The adoption of leagility design in supply chains give humanitarian aid organizations the capacity to survive, adapt and sustain in the event of turbulences. Leagility design enables humanitarian supply chains to recover from inevitable risky events in an effective way.

Narratives from supply chain managers revealed the various challenges faced by humanitarian supply chains in implementing leagility design as insufficient

resources, poor coordination, demand uncertainty, indifference in development approaches and community poverty and illiteracy. From the examination of the views of supply chain managers, insufficient resources emerged as a major constraint of the humanitarian supply chains in Kenya. Humanitarian aid organizations strain in accessing sufficient, necessary and reliable financing for their charitable work. Humanitarian aid organizations have limited resource mobilization skills and are less focused in raising funds locally opting to wait for global donors to approach them. Donors are highly looked upon, hence creating the need to constantly impose changes to match donor expectations. This makes humanitarian organizations susceptible to donor demands making it hard to measure their effectiveness.

Demand uncertainty was identified as a challenge too in implementation of leagility design in humanitarian aid organizations in Kenya. The uncertainty and unpredictability of happenings, especially in the context of sudden-onset disasters in regard to timing, location, nature and magnitude make it hard to predict supply and demand. The risk of disruption becomes inevitable thereby making it appropriate to prepare for disaster containment. Predetermination of the demand graph is fundamental in making supply chain decisions.

Poor coordination within the humanitarian supply chains was identified as a challenge to leagility design. In extreme tragedies, strong coordination is of importance to the effective delivery of aid to victims. In the absence of synchronization, humanitarian aid organizations end up duplicating projects in the same area, or may all be working in one location or totally in an undeserving population. In most cases, lack of strong central coordinating mechanism make the work of humanitarian aid organizations look haphazard. Host governments tend to bilateral and multilaterals and in most cases seem to ignore humanitarian aid organizations especially in making decisions. Recommendations or concerns from humanitarian aid organizations are regarded as technically invalid thus not given consideration.

Respondents identified indifference in development approaches as a disruption to humanitarian supply chain leagility. Many humanitarian organizations are still

focusing upon ‘hardware’ approach to development that is the development of infrastructure and service delivery; in preference to the ‘software’ approach of empowering people and local institutions to handle their own matters. Illiteracy and poverty remain major issues. Humanitarian organizations are well aware of the growing and massive needs of poor people and are concerned as to what they can do to keep the situation in check. There is absence of sustainability and embracement of development interventions by communities.

For humanitarian aid organizations to overcome the vulnerabilities and disruptions affecting their supply chains there is need to embrace utilization of local resources by raising funds from local businesses, individuals, government and locally generated income. For this to be realized, humanitarian aid organizations ought to have strong governance and accountability mechanisms, clear strategies and local credibility. Proper coordination of humanitarian activities and ability to forecast demand play a significant duty in implementing supply chain leagility by humanitarian aid organizations. In addition, the growing numbers and evolving complexity of emergencies increases the need for the humanitarian division to include the local emergency capacity at its disaster containment plans.

Humanitarian organizations use the business continuity frameworks to predict shortcomings and develop procedural retaliation and recovery plans to guard important proficiencies against the potentially devastating effects of extended scarcity. Business continuity is an administrative process that detects risks and vulnerabilities that may impact the capacity of processes to be robust or to recover. The business continuity framework enables build organizational resilience and the likelihood for a swift response to disturbance. By setting aside time for business impact analysis, organizations can react quickly and effectively to protect operations, significantly plunging both damages and expenses. Humanitarians should weigh their weaknesses, define the bearing of the same on their performance, and come up with strategies for operating under pressure. The secret is to put emphasis on vital business operations and ascertain their competence and resilient.

A correlation analysis for the construct supply chain resilience conducted to find out how supply chain resilience correlated with performance of humanitarian aid organizations showed that there is a positive linear relationship between supply chain resilience and performance of humanitarian aid organizations. The decision to reject the null hypothesis that supply chain resilience does not significantly influence the performance of humanitarian aid organizations in Kenya was thus arrived concluding that supply chain resilience has a significant influence on performance of humanitarian aid organizations.

5.2.3 Influence of Supply Chain Efficiency on Performance of Humanitarian Aid Organizations

The third objective sought to determine the influence of supply chain efficiency on performance of humanitarian aid organizations. Based on the study findings, leagility is an essential design of waste management in humanitarian supply chains. Leagility design creates checks & balances and enables systems use improving waste management. Waste elimination is a continuous exercise in humanitarian supply chains involving identification of non-value adding activities in the supply chains and eliminating them. Majority of the organizations had managed to eliminate the non-value adding operations in their supply chains but still some humanitarian aid organizations were yet to. Minimization of waste enhances resource utilizations in the organizations. Most humanitarian supplies are classified in the relief items category that encounters particular challenges related to in-kind donations ranging from storage and transportation bottlenecks that bring about inefficiency.

An examination of waste management practices in humanitarian supply chains was conducted among the supply chain managers seeking the various forms of wastes and the mechanisms humanitarian aid organizations employ to minimize wastes in the supply chains. Forms of wastes in humanitarian supply chains emerging from the views of supply chain managers included corruption and diversion of funds. In the current conditions existing in many donor funded humanitarian aid organizations, emergency aid is constantly threatened by corruption due to misplaced oversight. Funds meant for humanitarian aid are siphoned through different means. Arising

from this were kickback agreements when placing orders making relief goods be ordered at excessive prices and accepting relief goods of poorer quality than was agreed in the contract. Other ways of diversion of funds established were sale of relief goods to dealers and wrongful delivery of relief goods to persons to whom they are not meant in exchange for payment. Others may delay the spending of emergency funds and meanwhile use the same for personal investment. The profits earned are then divided among those responsible. Undoubtedly, diversion of funds in large quantities creates a negative effect on the magnitude of assistance for those who need it and generates benefits for a few unseen individuals to whom the aid was never meant. Diversion of aid funds largely reduces the quantity, quality and appropriateness of assistance for the needy and instead serve the interests of hidden target groups to whom the aid was never meant. Normally, the quality and relevance of the assistance is affected. Concisely, disasters and pandemics provide a smokescreen for dubious transactions for personal benefit with no or little scrutiny. This explains the increase in money-minting schemes by disasterpreneurs.

Mechanisms of addressing supply chain wastage in relief operations included the eradication of import and tax fees. Furthermore, punishments were imposed for misuse of services and invalidations had to be done the soonest possible and a valid explanation provided. Checks and balances also emerged to be a control against theft and use of goods made for vulnerable people for private gains. Other internal control mechanisms include audits boosting effective resource utilizations. To control charity fraud, charity-monitoring organizations played a crucial role in eradicating fraud and availing to donors, information about humanitarians. Several extrusive world level oversight organizations existed that attempted to enlighten and shield the public from charity fraud.

Multiple regressions analysis revealed that there is a positive significant linear relationship between supply chain efficiency and performance of humanitarian aid organizations. The null hypothesis that supply chain efficiency does not significantly influence the performance of humanitarian aid organizations in Kenya was thus rejected revealing that supply chain efficiency contributes positively towards performance of humanitarian aid organizations in Kenya.

5.2.4 Influence of Supply Chain Integration on Performance of Humanitarian Aid Organizations

The fourth objective sought to examine the influence of supply chain integration on performance of humanitarian aid organizations in Kenya. This objective was measured using supply chain collaboration, supply chain coordination and information sharing as indicators. The findings revealed that supply chain leagility is fostered in various forms in humanitarian aid organizations ranging from virtual integration, process integration, collaborative planning and information sharing. The findings of this study indicate that humanitarian aid organizations have effective communication among all the supply chain partners. Sharing of this information among supply chain members has a significant impact on the performance of humanitarian aid organizations and efficiency of their supply chains. This is because sharing information allows humanitarian aid organizations to settle on better alternatives and to make informed decisions in the event of emergencies or disasters. Exchanging information between partners in a supply chain creates advantage to an organization, as a product of elimination of possible inconsistency of the exchanged information obtained thereby resulting in achievement of a mode of exchanging standard information. Information was a key factor that held together all the players in the supply chain responsible for humanitarian response by holding meetings. Additionally, when actors have quality information, it leads to superior coordination and decision making and thereby improving the response to beneficiaries. Information is a central element connecting all players responsible for humanitarian activities. Additionally, key enhancements had been effected on information technology and communication infrastructure to enable the realization of more enhanced coordination and collaboration among the actors of humanitarian work. Nonetheless, gaps remained regarding the generation, analysis and dissemination of proper information, before, during and post disasters. These gaps are mainly a result of the nature of humanitarian response, which may be ideally hypothesized as a complex system. The findings also indicate that humanitarian organizations embrace framework contracting where they have standby strategic suppliers for various critical products and services to cater for emergencies. Embracing leagility design

enables humanitarian aid organizations to consider the partners' input as pertains to the attributes of products and services needed in case of emergencies.

Examination of supply chain managers' views on supply chain integration was sought where six actors involved in the process of alleviating suffering of vulnerable people emerged. From the views of supply chain managers of humanitarian aid organizations in Kenya, the commonly identified included donors, logistics providers, military &police, governments, media and the public. Respondents identified the important role and connections of the various supply chain actors in the flow of goods, services and information as indicated. Logistics providers were identified by all the participants to be imperative and that their responsibilities in humanitarian aid included activities such as assembling the goods, transportation, warehousing and distribution of the supply. Therefore, the logistics providers have a key responsibility in delivering the aid to the populations affected by disasters.

Donors emerged important actors since its essential to raise enough financial resources for major crisis containment, which makes financing a significant field for humanitarian organizations. Donors can be specific countries or individuals, foundations and the private sector play part by funding humanitarian operations. Furthermore, national and local governments usually in terms of coordination often influence the activities of the humanitarian aid organizations. Host government influences the participation of other nations. National and county governments hold a primary role in keeping their citizens safe from avoidable disasters and taking charge of disaster response activities. However, while some act in apt commitment and disaster containment, others act with absolute ignorance or misdirect their efforts. The media play a crucial role in disasters by creating attention and providing updates which lead to donations. Humanitarian aid organizations therefore rely on the media to reach out to donors and receive donations to fund the relief operations. Humanitarian aid organizations also use their relationship with the media to bring to public attention issues they find more important. This relationship with the media can be of great importance in complex emergencies as besides creating awareness to the public, it encourages donors to provide more support. Lastly, though the military and police involvement can be quite controversial in terms of practical, political and

ethical issues, they are helpful in complicated relief circumstances as they can provide support in terms of communication, logistics and planning capabilities. Concisely, the findings of this study indicate that humanitarian aid is not a one-man show and all the parties involved are prospective influencers of the activities. The participation of many diverse players results in complexity of relief operations thus calling for supply chain integration and proper coordination of humanitarian activities. In addition, the findings of this study indicate that there is poor coordination and poor information sharing among the humanitarian actors during inter-agency disaster response thus negatively influencing collective decision-making and actions. The need for coordination in disaster management goes unquestioned, as failure to be organized increases the possibility of failures, which translate to the disaster escalating and possibly the number of victims increasing. Failure of humanitarian aid organizations to cooperate with each other could lead to imbalanced distribution of relief. There is a high number of diverse humanitarian actors, which makes coordination seem unrealizable. The old adage that a supply chain is as strong as its weakest link is clearly manifested by the findings of this study, strengthening the need for supply chain integration, since in this context, the humanitarian supply chain is as leagile as its least responsive, resilient, efficient and cooperative actor.

Multiple regressions analysis revealed that there is a positive significant linear relationship between supply chain integration and performance of humanitarian aid organizations. The null hypothesis that supply chain integration does not significantly influence the performance of humanitarian aid organizations in Kenya was thus rejected revealing that supply chain integration contributes positively towards performance of humanitarian aid organizations in Kenya.

5.2.5 Moderating Effect of Organizational Characteristics on the Relationship between Supply Chain Leagility and Performance of Humanitarian Aid Organizations

The fifth objective sought to determine the moderating effect of organizational characteristics on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency, supply chain integration and performance of

humanitarian aid organizations in Kenya. The findings revealed that organizational characteristics have a moderating effect on the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. Supply chain leagility and organizational characteristics accounted for about 78.3% of the total change in the performance of humanitarian aid organizations. Supply chain leagility, organizational characteristics as well as the interaction between supply chain leagility and organizational characteristics accounted for 82.7% of the total variation in the performance of humanitarian aid organizations. The R^2 increased by 6.4 percent when the organizational characteristics was considered in addition to the supply chain leagility and increased by 10.8 percent when the interaction between the moderator and the supply chain leagility was considered. The interaction effect between the supply chain leagility and organizational characteristics measures the moderation effect. The rule of thumb is that, if there is a significant influence on the dependent variable from the interaction between the moderator and independent variable, moderation is supported, otherwise, the moderation is not supported. Thus, the null hypothesis was rejected and the study concluded that organizational characteristics has a moderating effect on the relationship between supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration and performance of humanitarian aid organizations in Kenya.

Three indicators were used to measure organizational characteristics; organizational structure, organizational size and organizational age. Respondents were asked to indicate the number of years their humanitarian aid organization had existed in the humanitarian industry. The findings of the study indicated that humanitarian aid organizations had varied experiences in the industry. The respondents were also asked to indicate the number of employees working in the organizations. Employee tally was used to measure organizational size. The organizational size determined the amount of resources in possession and the cost of operation. The size of the organization dictates the schemes they apply to run their operations. Humanitarian aid organizations differ a lot in financial, technical and operational capabilities, which is dependent on their sizes, structure and experience in the industry.

Age of an organization affects the implementation of supply chain leagility in humanitarian aid organizations. The efficient and effective supply of market information in older firms can be attributed to their firm age. The younger a firm is, means the lesser the relationships established. Older firms are also more proficient in selection and application of information. Older firms are also safer placed at establishing reliable networks, business associates and have the faith of financial institutions. They have also established a good reputation in their line of operation, which is an important drive to business success.

Conversely, among the actors in complex emergencies, big and old humanitarian aid organizations have the least barriers and strengths to entry in the disaster zone. Big and experienced organizations have an advantage over their young and small counterparts in implementation of supply chain leagility. The big and experienced organizations have the ability to react quickly as most big relief humanitarian aid organizations have conventional procedures laid down in case there's need for emergency response whether man made or natural. They also have access to sufficient labor, material and monetary resources readily available for emergency response. Additionally, they can easily acquire extra resources when need arises. These factors make big and experienced humanitarian aid organizations able to respond rapidly to complex emergencies. Again, the experienced humanitarian aid organizations have the advantage of maneuverability. This makes the humanitarian aid organizations access many complicated or remote places. Some well-endowed humanitarian aid organizations have established air or sea transport abilities and that means they can access any place.

Organizational structure entails classification of people and responsibilities in different units to enhance coordination of information exchange, resolutions and activities inside an organization. Chain of command, reporting structures, span of control, power, authority and obligation are plainly explained and assigned to individuals according to the positions they hold in an organization. Subsequently, organizational structure is responsible for the speed of decision-making and the exchange of information both internally and externally. The levels of influence inside an organization determine the speed at which information flows. When many people

are expected to contribute, a lot of time is wasted in consultation leading to delayed service delivery.

The organizational structure adopted by humanitarian aid organizations influences the implementation of supply chain leagility in the context of emergence and relief assistance. Centralization, formalization, red tape and complexity structures determines how humanitarian aid organizations response to disasters. The organization structure in disaster management should be less complex and fully centralized. Disaster response should be swift to avoid loss of life and resources. The structure of the organization plays a key role in punctual disaster response. This implies that a weak organization structure hinders a proficient, well-organized and convenient response to emergencies. It is thus essential to establish a malleable organization structure for humanitarian organizations in order to achieve coordination among the bureaucrats in times of humanitarian crisis. A rigid, bureaucratic command and bureaucratic control approach to emergency management generally leads to an ineffective emergency response. Concisely, organizational age, organizational size and organizational structure affect the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya.

5.3 Conclusion

The study concludes that supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration jointly are positively associated with performance of humanitarian aid organizations. Furthermore, the four predictors explain 71.9% of change in performance of humanitarian aid organizations an implication that the remaining 28.1% of the variation in performance of humanitarian aid organizations could be accounted for by other factors not involved in this study.

5.3.1 Supply Chain Responsiveness

From the study findings, it could be concluded that supply chain responsiveness had a positive significant influence on performance of humanitarian aid organizations in Kenya. The study showed that there was a strong relationship between supply chain responsiveness and performance of humanitarian aid organizations. The findings of

the study revealed that humanitarian aid organizations in Kenya have supply chains designed to be responsive to the needs of vulnerable populations. The humanitarian supply chains are designed to evaluate, consider and cover needs of vulnerable people quickly while enabling a view of the movements of materials along the supply chains. However, the ability of humanitarian supply chains to respond quickly to emergencies and disasters is a challenging task influenced by various challenges facing humanitarian supply chains. This means that despite the supply chains being designed to be responsive to emergencies, there is still an element of sluggishness in most humanitarian supply chains in Kenya resultant from the challenges faced. This shows lack of preparedness by humanitarian aid organizations in responding to emergencies and disasters. Supply chain responsiveness reduces the time taken to respond to emergencies hence saving many lives and improving resource utilizations by the aid organizations.

From the findings, there is need for supply chains to be responsive as triggered by the various disasters and situations disrupting communities at large in Kenya. The findings indicated that Kenya has experienced many forms of disasters, categorized based on basis of the cause/origin as manmade (anthropogenic) or natural. Frequently experienced natural disasters in Kenya included disease outbreaks, plagues/invasions, floods, landslides/mudslides, droughts and famine. Other natural disasters (geophysical in nature) that can be utterly devastating but occur less frequently in Kenya included earthquakes and volcanic eruptions. Common manmade disasters identified included structural/buildings collapse, chemical leaks, oil spillovers, manmade fires, terrorist activities, human conflicts, traffic accidents and politically instigated violence between tribes/groups. The diversity, frequency of occurrence and magnitude of the disasters has been on the rise in the recent times resulting in increase in number of people affected. To increase supply chain responsiveness, humanitarian aid organizations have adopted various strategies such as modularization, postponement, shortened lead times and prior transport and capacity planning. The driving forces making humanitarian aid organizations to design responsive supply chains emerged as the need to rescue lives, pressure from donors and the increased number of disasters and emergencies in the contemporary period.

5.3.2 Supply Chain Resilience

Regarding to supply chain resilience, it could be concluded that supply chain resilience had a positive significant linear influence on performance of humanitarian aid organizations in Kenya. Humanitarian supply chains are prone to vulnerabilities and disruptions emanating internally or externally to the organizations. The adoption of leagility design in supply chains give humanitarian aid organizations the capacity to survive, adapt and sustain in the event of turbulences to save lives of vulnerable populations. Leagility design enables humanitarian supply chains to recover from inevitable risky events in an effective and efficient way that minimizes wastage of scarce resources.

The findings from the study revealed the various challenges faced in implementation of supply chain leagility by humanitarian aid organizations as insufficient resources, demand uncertainty, poor coordination within the humanitarian actors, indifference in development approaches and community poverty and illiteracy. For humanitarian supply chains to overcome these vulnerabilities, local resource mobilization makes it possible to raise funds from local businesses, individuals, government and locally generated income. For this to be realized, humanitarian aid organizations need to have a capable administration, systems that shun fraud, apparent plans and internal credibility arising from proper design of their supply chains.

Proper coordination of humanitarian activities and ability to forecast demand play an important responsibility in the employment of supply chain leagility by humanitarian aid organizations. In addition, the increase in numbers and complexity of disasters intensifies the need for the humanitarian department to include the local emergency capacity in its pre disaster plan and reinforce the capacity as a part of resilient development plans. The findings of this study indicate local capacity as one of the main fields in need of improvement and on which to build on in the country. To build on resilience of supply chains, humanitarian aid organizations should strive to make local capacity building an essential field in emergency response where partnerships bring together knowledge and humanitarian experience in a working relationship that

is collaborative, risk sharing and one that involves the affected populations to avert, alleviate and prepare for disasters.

Humanitarian organizations utilize the business continuity frameworks to predict threats and come up with organized containment strategies to safeguard major proficiencies from the destructive effects of protracted shortages. Business continuity is an administrative method that detects hazards and shortcomings that might affect the consistency of organizational setups and procedures. The business continuity framework enables the organization develop pliability and the capacity to effectively respond to crisis. By creating time for a process called business impact analysis, organizations can react swiftly and efficiently to safeguard processes thereby decreasing damages and expenditure. Humanitarians should evaluate their weaknesses, establish the implications and come up with strategies for operating under pressure

5.3.3 Supply Chain Efficiency

Equally, it could be concluded that supply chain efficiency had a positive influence on performance of humanitarian aid organizations. Waste management is a continuous exercise in humanitarian supply chains involving identification of non-value adding activities in the supply chains and eliminating them. Minimization of waste enhances resource utilizations in the organizations. Majority of the organizations had managed to eliminate the non-value adding operations in their supply chains but still some humanitarian aid organizations were yet to. One of the major objectives of humanitarian supply chains is adeptness and scaling down the use of rare resources, as this goes against the aim of humanitarian supply chains of saving as many lives as possible.

Forms of wastes in humanitarian supply chains emerging from the findings of this study included corruption and diversion of funds. High rates of diversion of funds decreases the range of support for those that need it while creating interest for unknown groups of people who were never meant to be the beneficiaries. This affects the value, nature and necessity of the assistance. Concisely, disasters and pandemics provide a smokescreen for dubious transactions for personal benefit with

no or little scrutiny. This explains the increase in money-minting schemes by disasterpreneurs. Mechanisms of addressing supply chain wastes in the process of disaster containment included elimination of the import and tax charges. In addition, punishments were imposed on people who abused services and annulments were made immediately with a binding clarification. Checks and balances also emerged to be a control against theft and use of goods made for vulnerable people for private gains. Other internal control mechanisms include audits boosting effective resource utilizations. To control charity fraud, charity-monitoring organizations played a significant role in exterminating fraud and availing information to donors about humanitarians.

5.3.4 Supply Chain Integration

Another conclusion made by the study is that supply chain integration has significant influence on performance of humanitarian aid organizations in Kenya. The findings of this study indicate that humanitarian aid organizations have effective communication among all the supply chain partners. Sharing information allows humanitarian aid organizations to decide on better choices and to make informed decisions in the event of emergencies or disasters. In addition, when players have quality information it results in better coordination and making informed decisions, which translates to better services for beneficiaries. Further, notable developments had been made to the information technology and communication infrastructure to enhance organization and cooperation between the involved players. However, gaps remained regarding obtainment, assessment and distribution of quality information before, during and post a disaster. This could be a result of the state of response, which can be ideally conceptualized as a complex system. It can be concluded that humanitarian organizations embrace framework contracting where they have standby strategic suppliers for various critical products and services to cater for emergencies. Embracing leagility design enables humanitarian aid organizations to consider the partners input as pertains to the attributes of products and services needed in case of emergencies.

Concisely, the findings of this study indicate that humanitarian aid is not a one-man show and all the parties involved are potential influencers of the operations. The commonly identified supply chain actors included donors, logistics providers, military &police, governments, media and the public. The participation of the many diverse actors contributed to the complexity of relief operations thus calling for supply chain integration and proper coordination of humanitarian activities. On the contrary, the findings of this study indicated that there is poor coordination and poor information sharing among the humanitarian actors during inter-agency disaster response thus negatively influencing collective decision-making and actions. The need for coordination in containment of crisis is unchallenged, as lack of coordination has been seen to amount in certain failure, which then results in crisis intensification and possibly a higher number of victims. Failure of humanitarian aid organizations to cooperate can lead to concentration of aid in one place while neglecting others.

5.3.5 Moderating Effect of Organizational Characteristics

The findings revealed that organizational characteristics have a moderating effect on the relationship between supply chain leagility and performance of humanitarian aid organizations in Kenya. The study concluded that supply chain leagility is positively associated with performance of humanitarian aid organizations in Kenya. Organization structure is an important aspect in realization of swift disaster response. This means that a frail structure impedes effective, efficient and well-timed disaster response. It is therefore essential to ensure that the organization structure in humanitarian aid organizations is flexible to attain easy coordination among the bureaucrats in the case of an emergency. Age and size of humanitarian aid organizations was also found crucial in establishment of networks, resource mobilizations and maneuverability giving organizations an operational advantage to respond fast to emergencies. This makes the humanitarian aid organizations reach many hard to reach areas and populations. Concisely, most humanitarian aid organizations have partially implemented leagility design in their supply chains knowingly or unknowingly. Despite the implementation of supply chain leagility, humanitarian aid organizations still witnessed elements of poor information sharing

and poor coordination , sluggish response, wastage in the supply chains and disruptions of the chains, all affecting the efficient and effective handling of emergency assistance.

5.4 Recommendations of the Study

The study sought to examine the influence of supply chain leagility on performance of humanitarian aid organizations in Kenya, with a view of making recommendations to scholars, researchers, humanitarian industry, donors and policy makers. The study recommendations are in line with the objectives, findings and conclusion of the study.

5.4.1 Supply Chain Responsiveness

The findings of this study established that most humanitarian aid organizations had knowingly or unknowingly partially implemented leagility design in their supply chains. This study therefore recommends that supply chains managers should fully adopt leagility design in their humanitarian supply chains. The supply chain professionals should establish strategic collaborative working partnerships and agreements with industry players and experts to allow expertise and near precision responsiveness to needs of vulnerable people in an efficient and coordinated manner. Each one of these players apply their operational expertise, assets and networks to what they do best hence creating a leagile supply chain which is responsive to the needs of vulnerable populations.

The study also established that the culture of disaster preparedness in Kenya is lacking despite the increasing resource allocations for the same. It is paramount that Kenya stays prepared to minimize the effect of calamities on people and sources of livelihood. There is absence of a legal framework and clear coordination across different types of disasters or across actors. Developing Standard Operating Procedures containing many types of disasters is a vital approach that should be prioritized by the Kenyan government operating hand in hand with implementing agencies to ensure all parties benefit from preparation. Once formulated, these procedures should be restructured from time to time to replicate new observations

and internal and external changes. International, national and subnational actors have a role to play and should join hands with humanitarian supply chains to establish the culture of preparedness, which is long overdue in Kenya.

The study established that humanitarian aid organizations operate in a volatile, uncertain, complex and ambiguous environment due to changing needs of vulnerable people. To achieve and sustain a supply chain that is resilient and responsive to the changing needs and volatile environment, the study recommends the need for organizations to design and implement a supply chain that incorporates lean and agility operation across the value chain. Furthermore, it is advisable for humanitarian aid organizations to explore hybrid supply chain approach that allows it to switch between lean and agile depending on the dynamics and environment.

5.4.2 Supply Chain Resilience

The study findings indicate that humanitarian aid is not a one-man show and all the parties involved are potential influencers of the operations. With the disasters getting more frequent and severe, humanitarian aid organizations that rely on global supply chains to secure their inbound materials and outbound product flows are highly affected. Humanitarian aid organizations need to stay resilient, no matter what hits. The study recommends to donors to build and strengthen the local capacity of the affected nations and populations to prevent, prepare for, alleviate, and contain humanitarian crises, with an aim of making sure that governments and societies can efficiently perform their obligations and coordinate effectively with humanitarian actors. This also includes promotion of local industries and local supplies increasing supply chain responsiveness and supply chain resilience in the event of global supply chain disruptions. Particularly in sudden onset crises, neighboring communities on a voluntary basis undertake immediate humanitarian assistance. It may take some days for organized national or international humanitarian aid to get to the affected places. Local capacities save lives in the first vital hours thus responsiveness.

Humanitarian aid organizations should seek the help of technology in ensuring resilience in their supply chain. The presence of technologies such as in-memory computing and improved analytics algorithms, help organizations solve complicated

supply chain questions with ease and without wasting quality time. Rapid analysis and data accuracy are two crucial factors for organizations aiming for resilient supply chains. Organizations need to deploy versatile digital supply networks to be ready to deal with the unexpected and unpredictable events that continue to unfold. There is need to reimagine humanitarian supply chains and move from a static view of supply chain to envisioning a supply chain as an organic system. Like dancing, there is need to follow both established steps and improvise when necessary.

The study recommends that, in the effort of ensuring supply chain resilience and preparedness, supply chain managers should formulate backup or continuity plans long before disaster strikes to ensure minimal supply chain disruptions. For the disasters that allow for advanced warning, supply chain managers can proactively reroute supplies to other ports or roads, stock up on parts for production and communicate with beneficiaries and vendors. When emergency supply chain management is involved, a fraction of alertness could save the day. Investing seemingly small portions of time and resources for the sake of being prepared can prove to be a great decision when a disaster occurs, reducing the effect on people and infrastructure.

The study recommends the use of outsourcing, spare capacity and use of local suppliers to mitigate against humanitarian supply chain vulnerabilities. In addition, supply chain professionals should come up with new ways of predicting demand in a volatile, uncertain, complex and ambiguous environment learning from data from previous disasters. Humanitarian supply chain actors need to be familiar with supply chain vulnerabilities and the implications to the community and its lifelines so they can come up with reliable plans of responding to disasters and adapt easily in times of crisis.

5.4.3 Supply Chain Efficiency

This study also recommends that donors should increase their funding on humanitarian aid operations, but this benefit should come at a price, that donors demand to date with accounts of how their funding is put to use and to see assessable results. Donors should demand humanitarian aid organizations to obtain the

necessary items efficiently and that the goods be provided to the beneficiaries meeting the high quality requirements in an effective, efficient and speedy way. Donors should also demand accountability of humanitarian aid organizations.

At the county level, the study recommends improvements such as subnational budget allocation and timely disbursement to guarantee better preparedness and a sturdier reaction. County government officials also have a better opportunity to learn more about disaster and resilience measurement, climate change dynamics and modelling, and disaster response triggers and thresholds. While responsibility has been manifested, crucial steps need to be taken to see to it that Kenya is prepared for any potential disasters to lessen their impact on people.

5.4.4 Supply Chain Integration

Based on the study findings, it was noted that supply chain integration had a positive influence on the performance of humanitarian aid organizations in Kenya. The study recommends that humanitarian aid organizations should improve the use of information technology and computerized structures to integrate supply chain processes and ensure distinguishability of internal activities and procedures. For supply chain integration to be effective, data must be readily available, timely, accurate and in a format that communicates necessary information to all supply chain actors. Sharing information significantly increases supply chain integration because information rules out doubt therefore decreasing the quantity of buffer inventory required. Exchange of information promotes vibrant actions and decisions. Exchange of advanced information is vital for the coordination of activities across humanitarian supply chains. There is necessity for better information access to enable humanitarian agencies to respond swiftly to changes in their working environment. Information sharing must be taken seriously, as it is a masterpiece that holds all activities and resources together along the supply chain.

In addition, humanitarian aid organizations are recommended to boost their supply chain integration and in general, the supply chain leagility by exploring and embracing advanced and emerging technologies such as big data analytics, internet of things, cloud computing, machine learning, artificial intelligence, social media and

block chain. Supply chain functions can utilize big data analytics to unearth insights on demand pattern and inventory to enhance supply chain leagility and changing needs to drive the development and delivery of differentiated products that align with the need. Employing big data can reinforce the swift running of enquiries, precision in demand forecast thereby solving sourcing challenges and reduce the costs of operation. Supply chains can use rising technology such as radio-frequency identification, sensors, GPS tags, chips and barcodes to track and provide real-time information about the position of an inventory and then communicate this data to an application, which enhances the visibility of inventory's route to all supply chain actors and speeds up decision and collaborative efforts.

Cloud computing allows various supply chain applications and platforms to work and exchange data with one another in real time with the ability to improve swift communication and order fulfillment thereby improving the efficiency of the supply chain. Adopting and applying cloud-based technology in humanitarian supply chain management could result in palpable values and benefits such as cost savings, real-time visibility, improved forecasting and planning, streamlined processes, improved security, flexibility enabling leagility design. Supply chains can leverage on block chain technology to monitor and obtain real-time details of a required asset or material, and track shipments to better predict where a shipment is; when it will arrive and in what condition. Block chain can provide enhanced supply chain visibility, which can lead to improved just-in-time planning and accurate inventory management while reducing waste across the entire humanitarian supply chain. Social media can be a valuable way to obtain information from communities. It also provides a platform for communities to raise issues and demand accountability from aid agencies. Through technology, beneficiaries get the opportunity to call the shots in humanitarian response making it beneficiary-driven, thus giving beneficiaries a voice and a tool to self-organize.

In a country with a wide exposure to risks faced by different people at different times, it is necessary to develop strategies and ensure shared earnings between humanitarian actors. A multi-stakeholder approach that involves representatives from public sector, private sector, humanitarian sector, academia, military, beneficiaries

and the media should be involved in drafting disaster management legislations and push for disaster preparedness to be enshrined in it. The study recommends for a creation of a disaster preparedness plan that gives the way forward in times of tragedies or natural disasters. This plan should consider all types of hazards every particular place is susceptible to and maybe what is unlikely. The plan should be aligned to other humanitarian actors/partners disasters plans for uniformity. Supply chain risk propagation is better effective when companies get the earliest possible warning of possible disastrous occurrences. The study further recommends that the laws and regulations drafted to legislate humanitarian sector should strike the delicate balance between protecting public interests and providing an enabling environment for humanitarians to pursue their charitable purposes. Legislations geared towards ensuring compliance and less towards enablement should be discouraged.

In addition, humanitarian aid organizations have and will always play a crucial part in complex emergencies. This study proposes that all humanitarian supply chain actors come together and formulate a common response to complex emergencies, making use of the different competences of different players. Encouraging public conscience and inspiring donor response is essential to a fruitful response to emergencies. Humanitarian supply chain actors should be strengthened and supported in performing their roles, as this will lead to swift and efficient service delivery to the disturbed populations.

5.4.5 Organizational Characteristics

The study findings indicate that the size of an organization and experience obtained from existing longer in the field of humanitarian and disaster relief, places big and older firms at an operational and maneuverability advantage compared to their counterparts in disaster response. This study recommends for creation of an enabling environment for the small and local humanitarian organizations topped up with adequate financing as this cadre of humanitarian aid organizations have the advantage of a better domestic knowhow and familiarity of the distressed populations and localities. Subsequently, the study findings indicated that weakness of

organizational structure has adverse effects on the performance of the organization despite the supply chain design adopted thereby leading to slackened humanitarian services. This is because structure of the organization governs the rate of decision-making and the flow of information in and outside an organization. The study recommends that humanitarian aid organizations should adopt flexible, less complex and fully centralized organizational structure in disaster management for prompt response to save life and property. This is upon realization that organization structure is a crucial factor in swift, on time disaster response and any weakness in organization structure inhibits practical, well-organized and well-timed emergency response.

5.4.6 Contribution of the Study

This study contributes to knowledge in the less explored field of supply chain leagility particularly in the humanitarian setting to increase efficacy in their supply chains. This study took a holistic approach by studying lean and agile adjoined to constitute supply chain leagility as a hybrid concept hence giving a clearer perspective. This study also help resolve the inconsistencies on leanness and agility and their connection and contradiction and whether the two paradigms are mutually exclusive or complementary concepts by affirming that the hybrid supply chain leagility has a positive influence on performance of humanitarian aid organizations. Further, the study looked at the direct and indirect influence of supply chain leagility thus providing broader insights in the area of humanitarian supply chains as little is known about the moderating effect of organizational characteristics on the relationship between supply chain leagility and performance of humanitarian aid organizations.

African countries suffer several complex humanitarian challenges and the population is highly prone to humanitarian calamities in comparison with the rest of the world. African countries also suffer from lack of national resources available to support people in times of humanitarian crisis, commonly known as coping capacity. Thus, a clear understanding and sufficient knowledge on supply chain leagility will facilitate implementation and problem solving process. The context of this study is

Kenya, which is in Africa. This study will serve as a reference point for African countries who wish to implement leagility in their humanitarian supply chains. Moreover, it was noted that existing studies adopted different research methodologies, models and data analysis methods that varied and resulted to inconsistencies in the research findings. This study adopting a survey research design allowed for more sophisticated and comprehensive analyses to avoid the shortcomings, exigencies and inconsistencies suffered in extant studies. Lastly, this study contribute to literature of existing theories thus refining and reinforcing them. The study is incognizant of the importance of archiving of data collected and used in scientific research for future replication and repurposing as research builds on knowledge and supports existing knowledge with proven facts.

5.5 Areas for Further Research

This study was not exhaustive by any means and it is hence necessary that another study be replicated in other sectors of the economy, such as commercial/private and public sectors. This research was based on humanitarian aid organizations in Kenya and there is need to undertake similar studies in public or commercial sector to uncover the underlying relationships between supply chain leagility and organizational performance, and the findings may identify interesting comparisons. Such studies may validate, support or contradict the findings of this particular study. The study focused on four supply chain leagility components, which included supply chain responsiveness, supply chain resilience, supply chain efficiency and supply chain integration. The finding that these components could not account for up to 28.1 % of the variations in performance of humanitarian aid organizations calls for future research to interrogate other possible supply chain leagility components. Furthermore, future studies may consider other moderating variables apart from organizational characteristics.

Similarly, the data was purposefully collected from single informant representatives of each participating humanitarian aid organization and this may be biased. This study recommends, improving the data, a similar research to be conducted from multiple informant groups such as humanitarian operation managers, finance

managers among others, to come up with a variety of outcomes by creating discussions among respondents with different skills, experiences and motivation. Future studies could also conduct a comparative study using a different research methodology and models to determine whether the results would be somewhat different. Further, research can be carried out on beneficiaries or donors' perspective on performance of humanitarian aid organizations. This will shed more light in making appropriate humanitarian supply chain decisions in relation to relief and disaster response. Alternatively, future research may narrow down to specialized forms of humanitarian supply chains such as disaster and relief supply chains, relief food distribution chains, medical supply chains or the developmental aid supply chains among others, as this will help unleash the unique characteristics under which each operate.

This study focused on the downstream part of the whole humanitarian supply chain relatively neglecting the upstream chain. Future studies may focus on fundraising and donation management since humanitarian supply chain is a system involving different components from upstream to downstream; and the whole chain is an "organic" system that requires seamless integration. Studies on other parts of the holistic humanitarian supply chain could be a direction for future research.

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APPENDICES

Appendix I: Introduction Letter

Erastus Kiswili Nyile (PhD Student)

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

P.O. BOX 62000-00200 City Square Nairobi

Date: ……

The Supply Chain Manager,

Dear Sir/Madam,

RE: ACADEMIC RESEARCH THESIS

I am a PhD student at Jomo Kenyatta University of Agriculture and Technology pursuing a PhD programme in Supply Chain Management. One of the requirements for the award of the degree is to write a dissertation in my area of study. The title of my research is **"Supply Chain Leagility, Organizational Characteristics and Performance of Humanitarian Aid Organizations in Kenya".** A questionnaire has been designed and attached. It will be used to gather relevant information to address the research objectives of the study.

It is the assurance of the researcher that the information given will be treated with utmost confidentiality and will be solely used for the purpose of this study. Your positive response will be highly appreciated. Thank you in anticipation.

Yours Sincerely,

Erastus Kiswili Nyile

PhD Student, JKUAT.

Email: nyileras@gmail.com

Appendix II: Questionnaire

Kindly respond to all the questions to the best of your knowledge. Responses should be in form of a tick **(√)** or a cross (X) and should be placed in the appropriate box matching your view of the stated issues. You are assured that this information will only be used for academic purposes and utmost confidentiality will be ensured.

PART A: Demographic Information

1. Please indicate the name of the organization you belong to _____ *(Optional)*
2. Please indicate the gender of the respondent Male ()
   Female ()

3. Respondents level of education

Diploma () Undergraduate () Post-graduate Diploma () Masters ()
PhD ()

4. Kindly indicate the respondent's years of experience in the industry
   Less than 2 years ()
   2-5 years ()
   5-10 years ()
   10-20 years ()
   Above 20 years ()

5. Kindly indicate the number of employees in your organization ……

6. Kindly indicate the age of the organization
   Less than 2 years ()
   2-5 years ()
   5-10 years ()
   10-20 years ()
   Above 20 years ()

7. Please indicate the classification of activities undertaken by your organization
   Disaster relief activities ()
   Both development and emergency response ()

PART B: Supply Chain Responsiveness

Please indicate the extent you agree with the following statements by marking in the appropriate boxes

Use a scale of 1-5, where (**1-Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent)**

Statements on Supply Chain Responsiveness	**1**	**2**	**3**	**4**	**5**
a) Your supply chain evaluates, considers and cover needs quickly by providing basic essentials to alleviate suffering people.					
b) The supply chain has an element of visibility enabling the view of the movements along the supply chain, including identity, location and status of transit together with planned and actual dates and times for the events					
c) Leagility enables reliability of supply chains					
d) The ability of humanitarian organizations to respond quickly to emergencies might be challenging due to issues of resources, funding and lack of information					
e) A guarantee of the humanitarian supply chain to quickly deliver is a real selling point if that order arrives quickly, accurately and complete otherwise its termed as waste.					
f) Your organization has a close partnership with suppliers that enables delivery of requested supplies within the requested time and place especially when handling a disaster or an emergency					
g) Your supply chain has high degree of flexibility in terms of assembling and transportation structure to meet the needs of suffering people					
h) Your supply chain undertakes activities before disasters occur that enhance the readiness of humanitarian organizations and the society to counter the emergencies.					
i) Supply chain preparedness is crucial as it minimizes the time spent in undertaking the immediate response and increase the odds of quick recovery					

In your own opinion, explain the common disasters in Kenya that make population/communities vulnerable thus triggering the need for supply chain responsiveness

……
……..

In your own opinion, what are the strategies adopted by humanitarian organizations to make their supply chains more responsive?

……
……

What are the driving forces making humanitarian organizations design their supply chain to be responsive to societal needs?

……
……

Part C: Supply Chain Resilience

Please indicate the extent you agree with the following statements by marking in the appropriate boxes

Use a scale of 1-5, where (**1-Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent)**

Statements on Supply Chain Resilience	**1**	**2**	**3**	**4**	**5**
a) Leagility enables the supplier chain to become resilient					
b) Out of adoption of Leagility supply chain flexibility has been achieved					
c) Supply chain alignment has been made possible by Leagility					
d) Leagility improves supply chain adaptability and reduces supply chain vulnerability					
e) Your organizational supply chain is prone to vulnerabilities and disruptions from both external factors and internal factors such as financial and internal business-process vulnerabilities.					
f) The humanitarian organizations cope with disruptions and vulnerabilities either reactively					

or proactively					
g) Supply chain flexibility enables humanitarian organizations to deal with the effects of unplanned changes, uncertainty and volatile environment in which these organizations operate in					
h) Leagility practices give humanitarian aid organizations the capacity to survive, adapt and sustain the business in the face of turbulent change					
i) Through leagility practices our supply chain have apparent ability to recover from inevitable risk events more effectively than others					

In your own opinion, briefly mention the main challenges faced by humanitarian aid organizations in implementing supply chain leagility.

……
……

In your own opinion, how can humanitarian supply chains be resiliently designed to overcome vulnerabilities and disruptions?

……
……
……

Part D: Supply Chain Efficiency

Please indicate the extent you agree with the following statements by marking in the appropriate boxes

Use a scale of 1-5, where (**1-Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent)**

Statements on Supply Chain Efficiency	**1**	**2**	**3**	**4**	**5**
a) Your organization's supply chain emphasizes on reduction of waste of resources by identifying non-value adding activities and eliminating them.					

b) Minimization of waste or loss of product enhances resource utilization and is continually improved amounting to increased supply chain efficiency					
c) The organization has managed to eliminate non-value adding operations in their supply chain					
d) Supply chain leagility creates checks, balances and system use that improves waste management process.					
e) Your organization has eliminated cumbersome planning processes to create an enhanced supply chain with an improved inventory and standard operating procedures.					
f) Through waste elimination practices, the organization have a better value proposition					
g) Your supply chain has a systematic approach designed to create robust, effective processes and improve existing processes to meet organizational performance goals now and into the future.					
h) Your supply chain uncover the best solutions for creating and storing inventory to deliver products and services to vulnerable populations at minimal operating costs.					
i) Your supply chain employs strategic network analysis to look at a wide range of metrics including physical facilities and inventories, costs for warehousing, transportation, labor and distribution networks.					

In your own opinion, identify the various forms of wastes/inefficiencies in humanitarian supply chains

……
……

Please explain the mechanisms employed by your humanitarian organization to minimize wastes and optimize costs in their supply chain

.....
.....

Part E: Supply Chain Integration

Please indicate the extent you agree with the following statements by marking in the appropriate boxes

Use a scale of 1-5, where (**1-Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent)**

Statement of supply chain integration	**1**	**2**	**3**	**4**	**5**
a) Leagility has fostered various forms of integration including Virtual integration, process integration, collaborative planning and information sharing					
b) Your supply chain has effective communication among all supply chain members enhancing the various relationships that exist between departments within one organization or the relationship between various organizations.					
c) Shipments of the components that the firm needs can be easily arranged through the Internet or a networked computer system.					
d) Information sharing amongst partners in the humanitarian supply chain has significant impact on organization performance and efficiency of their supply chains.					
e) Sharing of information allows humanitarian aid organizations to decide on better choices in regards to ordering, capacity allocations, and material planning, due to better visibility of demand, supply and inventory					
f) Humanitarian organizations have strategic suppliers for various critical products and services especially for catering for emergencies					
g) Leagility has enabled partners' input to be considered as pertains to products or services attributes considered during emergencies					
h) Humanitarian actions involve large numbers of domestic and global actors working in the same topographical settings targeting the same objectives thus coordination is needed for smooth flow of operations					
i) Coordination and information sharing among the humanitarian actors during inter-agency disaster response influencing collective decision-making and humanitarian actions.					

In your own opinion, highlight the various supply chain actors involved in the flow of goods, services and information to alleviate suffering people.

……
……

Please comment on the connection between your organizations and the various supply chain members in the effort to deliver and provide emergency assistance

……
……

PART F: Organizational Characteristics

Please indicate the extent you agree with the following statements by marking in the appropriate boxes

Use a scale of 1-5, where (**1-Not at all, 2-Small Extent, 3-Moderate Extent, 4-Large Extent and 5- Very Large Extent)**

Statements on organizational characteristics	**1**	**2**	**3**	**4**	**5**
a) Organizational characteristics affect leagility and thus organizational performance					
b) The structure of an organization governs the rate of decision-making and the flow of information in and outside the organization					
c) Organizational structure is a crucial factor in swift and on time disaster response.					
d) A rigid, administrative authority and bureaucratic control method in disaster containment usually results in ineffective emergency response.					
e) Firm's size among humanitarians affect their strategies and performance					
f) Resource availability among humanitarian firms affect their performance					
g) Humanitarian aid organizations differ a lot on basis of financial, technical and operational capacities, which is dependent on their sizes, structure and experience in the industry.					
h) Industrial experience obtained from an organization existing longer in the field of humanitarian relief, places the organization at an operational advantage.					
i) Older firms are safer placed at establishing reliable networks, business associates and have the faith of financial institutions					

PART G: Performance of Humanitarian Aid Organizations

Kindly indicate your firm's performance with respect to the following humanitarian organizational performance indicators.

a) Financial Appeal Coverage

Funds raised	The proportion of funds raised upon humanitarian aid organizations making financial appeals compared to funds required	For each of the past 5 years please indicate the proportion of funds raised by your humanitarian aid organization upon financial appeals. **Year** **Proportion (%)** **2015** **……..** **2016** **…….** **2017** **……..** **2018** **……** **2019** **……**

To what would you attribute to the above trend?

.....

b) Financial Resource Utilization

Financial Resource Utilization	How financial resources were utilized in humanitarian operations	For each of the past 5 years please indicate how financial resources were utilized by clearly showing the proportion of funds used in humanitarian operations **Year** **Proportion (%)** **2015** **…….** **2016** **……..** **2017** **……** **2018** **……..** **2019** **……..**

To what would you attribute to the above trend? ……..

c) Disaster Impact Risk

Disaster Impact Risk	The disaster risk index computed as a product of the frequency of disaster occurrence and the severity of disasters	For each of the past 5 years please indicate the Disaster Risk Index for the specific years. **Year** **Index** **2015** **…….** **2016** **……..** **2017** **……** **2018** **……..** **2019** **… ……..**

To what would you attribute to the above trend?

.....

d) Beneficiary Satisfaction

Your organizations has well established mechanisms and channels for receiving complaints and feedback from beneficiaries of humanitarian operations.

Yes/No ….....

If yes, kindly indicate the common mechanisms employed by your organization to receive complaints……

Please comment on the trend of complaints received from the year 2015 to 2019……

THANK YOU

Appendix III: List of Humanitarian Aid Organizations

1	A Rocha Kenya	166	Kenyamed Aid Funds For Promotion Of Natural Medicine In Kenya
2	Abanyala Floods Relief Se	167	Kenya Red Cross Society
3	Abha Light Foundation	168	Kickstart International Inc. Kenya
4	Abyei Community Action For Development	169	Kingdom Driven Ministries Kenya
5	Action Aid International Kenya	170	Kito International (Kenya)
6	Action For Children In Conflict Uk In Kenya	171	Kivuli Project
7	Action For Empowerment – Kenya	172	Komaza Kenya
8	Action Nowkenya	173	Kosmos Solutions International
9	Adeso	174	Ladder Foundation
10	Adopt A Village In Africa – Kenya	175	Landmine Action (Kenya)
11	Advanced Initiatives For Population And Development	176	Lena Foundation
12	Adventist Development And Relief Agency International (Somalia Projects)	177	Liverpool Vct, Care And Treatment
13	Adventist Health System East – Central Africa	178	Maahad Daawah Organisation
14	Adventures In Mission – Kenya	179	Maasai Association – Kenya
15	Afriafya	180	Macheo Children's Centre
16	Africa Community Development Foundation	181	Magna Children At Risk
17	Africa Digna	182	Mainyoito Pastoralist Integrated Development Organisation
18	Africa Health And Development International	183	Make Way Partners
19	Africa Peace Forum	184	Mani Tese-Kenya Branch
20	Africa Refugee Relief And Development Organization	185	Map International
21	Africa Village Empowerment	186	Margaret Okari Children's Foundation
22	Africaalliance Of Ymcas	187	Matanya's Hope
23	African Biological Safety Association	188	Mathare Youth Sports Association
24	African Christian Mission International	189	Matibabu Foundation
25	African Collaborative Centre For	190	Med25 International Kenya

	Earth System		
26	African Conservation Tillage Initiative	191	Medicins sans Frontieres
27	African Family Health	192	Middle East Reformed Fellowship (Merf)
28	African Institute For Development Policy Research And Dialogue	193	Mines Advisory Group
29	African Media Initiative	194	Mkomani Clinic Society
30	African Medical And Research Foundation	195	Mothers 2 Mothers Kenya
31	African Network For Agriculture, Agroforestry And Natural Resources Education	196	Movement Against Susbstance Abuse In Africa
32	African Network For Internationalization Of Education	197	Mumias Kids Centre
33	African Network For The Prevention And Protection Against Child Abuse And Neglect – Kenya Chapter	198	Muslim Education And Welfare Association
34	African Network For The Prevention And Protection Against Child Abuse And Neglect – Regional Office	199	National Association For The Prevention Of Starvation – Kenya
35	African Population And Health Research Centre Kenya	200	National Democratic Institute For International Affairs
36	African Virtual University	201	Noble Actions International Organization
37	African Wildlife Foundation	202	Nomad Charities – Kenya Chapter
38	African Woman And Child Feature Service	203	Norwegian Refugee Council Kenya
39	Afrika Able Organization	204	Oasis Of Friends Restoration Centre
40	Agricultural Growers Resource Organization Development Economic Viability	205	One Million African Stories
41	Amref Health Africa	206	Onekid Oneworld
42	Anppcan – Kenya.African Network For The Prevention And Protection Against Child Abuse And Network	207	Open Arms International
43	Ashoka East Africa	208	Opening Village Doors Foundation
44	Association Christian Resource Organization Serving Sudan	209	Oxfam
45	Aviation Sans Frontieres – Belgium	210	Pamoja Women Development Programme
46	Awake Citizens Corps	211	Pan African Climate Justice

			Alliance
47	Awake Citizens Corps Kenya	212	Pastoralist Intergrated Support Programme
48	Baobab International Africa	213	Peace Building, Healing And Reconcilliation Programme
49	Basic Needs Uk In Kenya	214	Peepoople Kenya
50	Baylorcollege Of Medicine Children's Foundation – Kenya	215	Pharmacess Foundation
51	Beacon Of Hope	216	Pinnacle Appropriate Technologies Foundation
52	Best Buddies Kenya	217	Plan International
53	Better Poverty Eradication Organization	218	Plant Resources Of Tropical Africa
54	Bible Translation And Literacy (E.A)	219	Platform For Land Use Sustainability – Kenya
55	Business Services Market Development Project	220	Poverty Eradication Network
56	Call Africa	221	Programme For Appropriate Technology In Health (Path)
57	Care Highway Humanitarian Aid	222	Project Lighthouse Kenya
58	Care International	223	Red Crescent Societies
59	Caring For Kenya's Kids	224	Refugee Education Trust- Kenya
60	Carolina For Kibera Organization	225	Regional Institute For Social Enterprises (Rise)
61	Centrale Humanitaire Medico – Pharmaceutique	226	Relief International – Kenya
62	Centre For Economic And Liberitarian Affairs	227	Retrak International
63	Centre For Heritage Development In Africa	228	Riana Development Foundation
64	Centre For Legal Rights, Education, Advocacy And Development	229	Riders For Health
65	Centre For Social Responsibility And Accountability	230	Rieko Kenya
66	Centre Humanitaire Medico-Pharmaceutique	231	Rural Agency For Community Development And Assistance (Racida)
67	Chalbi Scholars Organization	232	Rural Development Through Social Appropriation Of Technologies (Rudesat) International
68	Child Refuge Centres International	233	Rvices
69	Childslife International	234	Sadiki Development Programme

70	Chosen Children International	235	Safety Foundation For Development
71	Chosen Children Of Promise	236	Save The Children
72	Christadelphian Meal – A – Day Fund	237	Sayari Think Tank
73	Church World Service And Witness	238	Seas Of Life Missions Kenya
74	Citizens Against Violence Organization	239	Servant Leadership And Environmental Conservation International
75	Citizens' Network For Foreign Affairs	240	Shinebean Kenya
76	Climate Cohesion Foundation	241	Sinapis Organization
77	Coast Women In Development	242	Sisdo Micro Finance
78	Col'or Kenya	243	Skills Active Forward Kenya
79	Compassion To The Regions Beyond	244	Social Initiative For Development
80	Computers For Schools Kenya	245	Somali Canadian Education And Rural Development Organization
81	Concern Worldwide	246	Somali Minority Rights And Aid Forum
82	Co-Operative Housing Foundation (Chf) International	247	Source – Net Women Empowerment Program
83	Co-Operazione Internazionale	248	Southern And Eastern African Trade Information And Negotiations Institute
84	Daasanach Development Organization	249	Spurgeon Child Care Kenya
85	Development Policy Management Forum	250	Staff Of Hope Incorporated Organization
86	Development Support Initiatives For Research And Education In Africa	251	Stichting Centre On Housing Rights And Evictions
87	Development Training And Research Africa	252	Strengthening Community Partnership And Empowerment
88	Dream Again Foundation	253	Sustainable Development And Peace Building Initiatives
89	East African Wildlife Society	254	Tact Africa
90	Electoral Institute For The Sustainability Of Democracy In Africa	255	Take Heart Association Project
91	Elewana Education Project	256	Teach A Child Africa-Kenya Chapter
92	Engender Health	257	Tear Fund
93	Engenderhealth	258	Technology For Health In Africa(Weltel Africa)

94	Family Health Options Kenya	259	Terre Des Hommes Foundation
95	Farm Strategies Organization	260	The 410 Bridge International
96	Festus Molenje Memorial Children And Youth Foundation	261	The African Conservation Foundation – Kenya
97	Fh Association	262	The Development Assistance For Rural Enterprise (Dare) Foundation
98	Filmaid – Kenya	263	The Education Kenya International Fund
99	Filsan Organisation	264	The International Service For The Acquisition Of Agri – Biotech Applications (Isaaa Africenter)
100	Footsteps Into Change Organization	265	The Kalonzo Musyoka Foundation
101	Forum Syd Swedish Ngo Centre For Development Cooperation	266	The Kenya Organization For The Environmental Education
102	Foundation For Sustainable Development-Kenya	267	The Kenyan Runner Foundation
103	Freddy Janam Africa Foundation	268	The Palmhouse Foundation
104	Free The Children	269	The Salminis Home For The Orphans In Kenya
105	Freedoms House Foundation – Kenya	270	The Salvation Army Kenya
106	Friendly Action Network Organization	271	The Samburu Project – Kenya
107	Friends Of Londiani Kenya	272	The Turning Point Trust-Kenya
108	Friends Of Ozone – Africa	273	The Windle Charitable Trust
109	Full Gospel Churches Of Kenya Development Projects	274	The World Student Christian Federation
110	Generations Alive Africa	275	The Youth Agenda
111	Ghetto Light Youth Organization	276	Think Impact Kenya
112	Girls Leading Our World Initiative	277	Thread Of Life Organization
113	Glad's House	278	Transparency International
114	Global Coaching Centre Foundation	279	Total Action Guild Of Kenya
115	Global Deaf Connection /Kenya	280	Touch A Life International
116	Global Health Action	281	Ugunja Community Resource Centre
117	Global Implementation Solution	282	Ujima Foundation For Training And Development
118	Good News Productions International-Africa	283	Undugu Society Of Kenya
119	Gua Africa	284	Unite 4 Africa Inc.

120	Haki Water Organization	285	United Global Volunteers International
121	Hand In Hand Eastern Africa	286	University Of Washington Global Assistance Program Kenya
122	Hatua Likoni Organization	287	Upendo Children's Development Organization
123	Hearth To Hearth Ministries Inc	288	Uplifting Men And Youth In Africa
124	Heavenly Treasures Kenya	289	Upper Tana Environmental Conservation And Management Agency
125	Help A Child Africa	290	Uweza Foundation
126	Heshima Kenya	291	Value Addition And Cottage Industry Development Initiative Africa
127	Himilo Relief And Development Association	292	Veterinaires Sans Frontieres Norway
128	Hope For The Nations Kenya	293	Veterinaires Sans Frontiers Belgium (Vsf-Dzp)
129	Hope In Action Association – Kenya	294	Veterinaires Without Borders
130	Horn Of Africa Refugee Support Organization	295	Veterinaries Sans Frontiers (Vsf) Switzerland
131	Human Appeal International (Kenya)	296	Viafrica Kenya Foundation
132	Human Quality Assessment Services	297	Vihda Association
133	Human Rights Watch	298	Vijana Against Aids And Drug Abuse
134	Humanitarian And Charitable One Trust Kenya	299	Vijiji Projects
135	I – Link Community Services Organization	300	Vision Africa Give A Child A Future
136	I Serve Africa	301	Voluntary And Community Development Project
137	Ima World Health	302	Volunteers For Africa
138	Incas Foundation	303	Water And Development (Maji Na Ufanisi)
139	Independent Medico-Legal Unit	304	Water For All Organization
140	Indiana Institute For Global Health – Kenya	305	Water Organization Kenya
141	Information Training And Outreach Centre For Africa	306	Watershed Corp Kenya
142	Initiatives For Development Of East African Region	307	Watoto Education Initiative
143	Institute For Enhancing	308	Wezesha By Grace

	Participatory Learning		
144	Institute Of Environment And Water Management	309	Willing Hearts International Society – Canada
145	International Centre For Reproductive Health	310	Woman To Woman Africa
146	International Child Support	311	Women And Health Alliance International
147	International Federation of Red Cross	312	Women Aviators In Africa
148	International Friendship League Of Kenya	313	Women In Law And Development In Africa (Wildaf)
149	International Rescue Committee	314	World Concern International
150	Intrahealth International	315	World Corps Kenya
151	Ipas Africaalliance	316	World Health Organisation
152	Islamic Relief-Kenya	317	World Neighbours – Kenya
153	Italian Agency For The Development And Assistance To New Sudan	318	World Vision Kenya
154	Jam International	319	World Food Programme
155	James Njuguna Foundation	320	Worldlife Foundation Kenya
156	Jami Iyatu Taalimil Quran	321	Wycliffe Bible Translators Africa
157	Jitegemee Children Program	322	Youth Agenda
158	Joining Hands Together Africa	323	Youth Alive! Kenya
159	Just Say No To Drugs Organisation	324	Youth For Education In Sudan
160	Kenya Alliance For Advancement Of Children	325	Youth Net Africa
161	Kenya Community Based Health Financing Association	326	Youth Opportunities Upheld (Y.O.U), Inc. Kenya
162	Kenya Connect	327	Youth Support-Kenya
163	Kenya Education Partnerships	328	Zeitz Foundation
164	Kenya Education Project	329	Zoa Refugee Care-Netherlands
165	Kenya Enterprise Opportunity	330	Zuia Mtoto Asipotee