LEAGILE SUPPLY CHAIN PRACTICES AND SUPPLY CHAIN PERFORMANCE OF NON-GOVERNMENTAL HEALTH ORGANIZATIONS IN NAIROBI, KENYA

BY

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2017
DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

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CAROLINE KOORI
D61/83911/2016

This Research project has been submitted for examination with my approval as the University supervisor

SUPERVISOR

Signed: _____________________ Date: __________________________

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DEDICATION

This project is dedicated to my family and colleagues who gave me invaluable moral support throughout the period.
ACKNOWLEDGEMENTS

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## ABBREVIATIONS AND ACRONYMS

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ASC</td>
<td>Agile Supply Chain</td>
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<tr>
<td>DFID</td>
<td>Department for International Development</td>
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<tr>
<td>EFA</td>
<td>Exploratory Factor Analysis</td>
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<td>FSCA</td>
<td>Exploratory Factor Analysis</td>
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<td>ICS</td>
<td>Internet Connection Sharing</td>
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<td>ICT</td>
<td>Information and communication technology</td>
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<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<td>IS</td>
<td>Information System</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>LSCM</td>
<td>Leagile Supply Chain Management</td>
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<td>MCDM</td>
<td>Multiple-Criteria Decision-Making</td>
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<td>NGOs</td>
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<td>RBV</td>
<td>Resource Based View</td>
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<td>SCM</td>
<td>Supply Chain Management</td>
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<td>SCP</td>
<td>Supply chain performance</td>
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<td>SPSS</td>
<td>Statistical Package for Social Science</td>
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<td>TCE</td>
<td>Transaction Cost Economics Theory</td>
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ABSTRACT

This study focused on leagile supply chain practices and the performance of the supply chain in non-Governmental organizations operating in the health sector in Nairobi, Kenya. The primary aim of the research sought to ascertain the lean-agile supply chain practices implemented by Non-Governmental health organizations in Nairobi, the second objective to determine the relationship between lean-agile supply chains practices and supply chain performance, and third objective to establish the challenges. The study employed a descriptive cross-sectional design on a population of 98 registered health NGOs by NGO Coordination Board and systematic sampling technique was employed where, a total of 49 NGO’s were selected for the study. The respondents for the study were operations managers and supply chain managers or equivalent positions in the respective NGOs. The data for the study was collected using primary data which were self-administered questionnaire through drop and pick later method which consisted of open and closed ended and secondary data from published data and journals. Data analysis was done by use of descriptive statistics i.e. measures of central tendency and also measures of variations, and inferential statistics which include regression analysis and also correlation analysis. Data was presented in form of tables. The study findings established that leagile supply chain practices have a significant effect that is positive on the performance of the supply chain and that the organizations’ management needs to build a strong relationship between the leagile supply chain practices and supply chain performance to be competitive in their supply chain activities. The study recommended that NGOs should adopt the leagile supply chain practices so that they can improve their supply chain performance. Further, process monitoring, operation planning be done to enhance continuous improvement in addition to enabling information sharing with suppliers, SC partners and staff to enhance supply chain performance. The study was faced with limitations including limited period of time, insufficient resources and reluctance of respondents to share information because of the fear of intimidation or the possibility of using the information to create an image that is negative for the particular institution. This study suggested that other researchers should undertake research on link between LSCM practices on organizational performance of Non-Governmental health firms and the benefits or challenges the accompanying Leagile supply management practices on organizational performance. There is also need to undertake similar studies in public or private service health institutions to uncover the underlying relationships with performance and the findings may identify interesting comparisons.
CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The only constant phenomenon in the current business environment is change and from this reality, being agile in supply chain activities has turn out to be a basis for not only creating firm’s competitiveness, but one for enhancing chances of the long-term sustainability of the organizations as well. (Lee 2014). With this reality it becomes imperative that organizations continuously scrutinize the environment and respond as well as adjust to not only the changing operational demands but also customer needs and their ever-present potential of supply chain disruptions. Under such an environment, an organization will need to be able to react to changes in its environment in conjunction with its key suppliers and customers (Wagner & Silveira-Camargos, 2011).

In the process of reacting to the operating environment demands, an organization’s supply chain agility ought to be characterized by how fast it is and also quality and responsiveness to efficiently satisfy its customers’ needs as well as markets. Implementation of supply chain strategy to guide a firm during operational unpredictability aims at cost efficiencies and leanness. The inclusion of agile strategies, for example, is associated with speedy and proficient response to the dynamic market needs, the capacity to tailor products and services to fit customers’ needs, and ability of the firm to deliver innovative products in a manner that is cost-effective (Blome, Schoenherr & Rexhausen, 2013). Therefore implementation of a supply chain that is lean-agile by an organization is expected to affect its supply chain performance for both business and non-business oriented entities.

In investigating the effect of leagile supply chain strategy on the performance of an organization supply chain, the study relied on the Resource Based View (RBV)
improved with dynamic competences outlook. The RBVs rationale is that analysis of firms ought to be based on the resources they have such that if the resources portray characteristics of being valuable, rarity, inimitability and also non-substitutability, they make up firms capabilities that would create competitive advantage (Barney, 1991). Accordingly, organizational capabilities including the ability to innovate new products and services are viewed as a resource that if well harnessed will create the necessary competitiveness to the firm.

Non-governmental organizations and Africa at large has experienced funding challenges in the last decade from the economic depression in the Western Countries-who are the major donors to the Kenyan NGOs, to a more recent change in leadership in America that has tended to look inwards in its funding and consequently scaling down funding to Africa projects. The number of NGOs that offer similar services has increased whereupon new NGO are created that duplicate existing offerings and by seeking funds from the same donors, the options available to the NGOs has also reduced and all these have introduced the need for the organizations to embrace agile and lean supply chain strategies that will allow them to adjust appropriately to the changing demands of their operating environment. Non-governmental organizations need to identify programs that can be adjusted depending on the availability of the funds available as well as making their supply chain be agile enough to adapt to the market demands. Hence, local NGOs should be responsive, competent, and flexible and act quickly to the environment demands.

1.1.1 Lean-Agile Supply Chain Practices

Fisher (1997) in an attempt to develop a feasible supply chain strategy put forward two different strategies that aim at developing a well-organized and receptive supply chain with regard to products, functional operations and innovative capacity of a firm.
According to Cousins and Menguc (2006) the aim of a lean supply chain strategy is to generate worth that originates from suppliers all the way to the end customers so as to get rid of all non-value adding cost that originate from supply chain activities and ensure that there is a steady agenda in production. All these actions are aimed at improving process efficiency and maintain firm competitiveness through economies of scale in an environment that is stable and predictable.

For the agile supply chain, McKone-Sweet and Lee (2009) assert that it aims to grow a partner’s network that is flexible and reconfigurable so as to enable sharing of competences as well as market knowledge to ensure continued survival and prosperity in an unpredictable market environment through the achievement of quick response to changes in the market. A supply chain strategy that is leagile on the other hand brings together some attributes of both lean and agile strategies by utilizing make-to-stock strategies for high volume and stable demand products (lean) while at the same time utilizing make-to-order strategies for all other products (agile). This implies that a supply chain that is leagile provides a production capacity that is flexible to cover unexpected increase in the demand or unexpected order for raw materials while at the same time utilizing delay strategies for forecasted products, which are then assembled and also configured ahead of orders from final customer (Goldsby et al., 2006).

The concept of agility has been proposed in the present day operating environment as a reaction to increased level of uncertainty in markets that are advanced. Naylor, Naim and Berry (2009) highlight that “agility means applying market knowledge and vital corporation to exploit profitable opportunities in a rapidly changing market place”. Therefore, supply chain agility is important for an organization in order to produce or offer service according to customer needs. For a manufacturing firm to respond to customers’ requirement, agility is required in its supply chain and be able
to quickly take action to unpredictable demand and also product lifecycles that are short (Gligor, Esmark & Holcomb, 2015).

Agility in the supply chain practices is critical when firms want to quickly respond to changing needs of customers through introduction of new products and also in handling the changes that occur regarding delivery requirements in terms of quantity as well as time. A case in point where agility is manifested, as exemplified by Lee (2012), is Zara’s Fashion House that has an reliable and highly responsive supply chain that facilitates the company to present innovative designs weekly and then avail them to its outlets worldwide within 15 days. As such, agility is associated with flexibility and responsiveness of a firm and will be dependent on organizational structures, processes, information systems and mindsets.

1.1.2 Supply Chain Performance

Zhang and Okoroafo (2015) define Supply chain performance as the organizations ability to lower the cost of supply chain through the delivery of right product at the right place at the right time. According to Vogel (2011), procurement performance is highly influenced by macro factors namely supply chain management and corporate supply chain. It is on this basis that firms have shifted from individual organizational performance to procurement and supply chain performance in order to enhance bottom line performance within the whole chain. Supply chain performance measurement is also defined as the overall set of measures used to estimate both the competence and capability of the supply chain (Kurien & Qureshi, 2011). Supply Chain performance is incidental to efficiency and effectiveness of the Supply Chains in delivering services to the end user. Many businesses are focusing on continual improvement as a means of enhancing their core competitive advantage using Supply Chain Management.
According to Lee and Billington (2012), discrete sites in any Supply Chain fail to increase efficiency and effectiveness if they pursue goals independently. All Supply Chain members should understand the measurements and offer minimum chances for manipulation (Schroeder, Anderson & Cleveland, 2010). In this respect, performance models and studies should be formulated so that business goals and the achievement of these goals can be measured. This will allow for the effectiveness of the techniques or strategies used to be easily accessed.

Kurien & Qureshi, (2011) defined supply chain performance measures as the general metrics utilized to estimate both the competence as well as the capability of the supply chain. There has been formulation of a number of measures to assist in gauging supply chain activities and determining the appropriate gauge type is not easy since focusing on one aspect such as cost reduction may improve cost effectiveness at the expense of the performance of the entire supply chain system (Arrowsmith, 2013).

Due to this, more realistic supply chain models like Supply Chain Operations Reference (SCOR) need to be developed which lead to better measurement of supply chain performance. The SCOR is perceived as a balanced system of performance measurement since it covers five important processes of the supply chain namely; plan; source; make; deliver; and return (Supply Chain Council, 2015). The performance of the supply chain has an effect on ability to give value to the customer, particularly in the most fundamental element of product availability (Yeung 2008). Measures of performance ought to represent the members in the process of SCM. This is the main inspiration following the development of consistency initiatives such as the supply chain operations reference (SCOR) model.
1.1.3 Non-Governmental Health Organization in Nairobi

Non-Governmental organizations are non-profit firms organized on different levels which include local, national or international level whose function is to deliver services and also humanitarian functions, presenting the concerns of the citizens to the respective governments, advocating as well as policy monitoring and also encourage political input by providing the information necessary (Achayo, 2012).

Non-governmental organizations (NGOs) are important and they play a critical role in today’s world due to their ability of achieving impacts faster than the governments of the day. The development of NGOs have aided and relieved the government of its pressure to deliver to the citizens of their countries (Ombati, 2010). Thus, due to the importance they provide nations, their inputs and establishment is necessary because they help reduce the gap for unemployed.

As supply chain operations increases, leagile management needs to be handled with utmost professionalism since NGOs receive funding from donor institutions such as Rockefeller Foundation thus, there is need to have accountability by following laid down procurement procedures in the grant agreements with the various donor funding institutions. Leagile practices adoption within the NGO sector are highly desirable and this ensures that supply chain non critical activities and operational cost are reduced to ensure higher efficiencies Also, inventory to order, production, warehousing, location decision and simulation will come in handy when doing supply chain management for NGO sector (Leslie, 2002). However, because of the availability of several registration frameworks, NGOs in Kenya operate in varied forms and operational structures (Mbote 2000).
According to the NGO Coordination Board (2011), there are 98 registered and active health related NGO’S in Nairobi with a larger roles whereby they can be explained by several factors which are historical, political and also socio-economic. For example, almost all NGO health services in Kenya are religious-based which originates from the history of the country’s colonization by the missionaries (Gilson 1994). Due to the magnitude of their contribution, NGOs cannot be overlooked in the decentralization efforts of the healthcare system. These organizations are playing a fundamental responsibility in development efforts of the country’s economy. For example, since the endorsement of the NGO Act, there has been a general increase in the economic importance of NGOs as providers of health, educational, food, social, and environmental services (NGO coordination board 2011).

1.2 Research Problem

Contemporary business situation is comprised of firms facing a competitive environment that is aggressive which arises from business globalization, changes in the technology, shorter lifecycles of goods, economic downsized in the traditional donor countries and more enlightened consumers with exceptional and rapidly changing needs (Shabaninejad 2014).

Non-Governmental Organizations in Kenya have been facing financial strain as a result of their major donor scaling down financial support to these organizations. The private, public and non-profit sectors need the managers of the organization to evaluate, create and change how they do business due to the constantly changing external environment. These include re-configuring their supply chain so as to not only uphold and advance effectiveness as well as efficiency between organizations, but also to improve the way that the organizations structure their projects to adjust to any changes that occur in the course of implementation.
The capacity of a NGOs’ supply chain to adjust quickly to the demands of the environment will determine whether the firm will be able to continue meeting its goals put into question its sustainability. Adoption of a lean and agile supply chain is one such supply chain strategy that can enhance the performance of a firm.

Numerous researches have been conducted on why an organization needs to adopt a lean-agile supply chain. At the global scene, Cecere (2012) sought to establish the perception of manufacturing firms in the adoption of agile supply chain. He found that while 89% of the companies surveyed acknowledged the value of the agile supply chain strategy, a small number understood ways in which it led to enhanced performance of the supply chain.

Ramana, Rao and Kumar (2013) sought to evaluate metrics of performance of leagile supply chain through fuzzy MCDM on select Indian manufacturing firms. They found that priority systems for performance measurement of leagile supply chain was appreciated by the firms and this enabled organization recognize their strengths to move towards continuous improvement. Gligor, Esmark, & Holcomb (2015) researched on the performance outcomes of supply chain agility and established that effective deployment of resources enhances firm supply chain agility and by extension the firm’s bottom line operations.

Locally, Ndambuki (2014) investigated how supply chain integration affected supply chain performance in international humanitarian organizations in Kenya. The findings were that the organizations capacity to integrate their supply chain is affected by poor infrastructure, high staff turnover in the field and the inability of the organization to anticipate disaster; and a lack of resources due to earmarking of funds. Mutheaka (2014) sought to establish the link between lean supply chain practices and supply chain responsiveness among firms that process in Kenya. The findings were that the
common lean supply chain practices applied among the oil processing firms in Kenya were those that relate to demand, waste management, standardization, behavioral, quality inspection activities and quality assurance practices.

Similarly, Thuranira (2016) investigated how lean supply chain management components affected operational performance amongst tea factories in Kenya. The results were that different factories adopt different lean supply chain strategies depending on their time of introduction to lean supply chain management. The findings also established that most of the factories had adopted lean practices on their procurement, production as well as warehousing.

However, the above studies concentrated on profit oriented organizations that effective management of their supply chain affects their profit level. The effect lean-agile supply chain practices had the performance of supply chains of Non-Governmental organizations has not received much attention. This research thus intended to bridge this existing knowledge gap by finding answers to the following question: how does lean-agile supply chain strategy affect supply chain performance of health related Non-Governmental Organizations in Nairobi, Kenya?

1.3 Research Objectives

The study’s main objective was to determine the impact of Leagile supply chain practices on supply chain performance of Non-Governmental health Organizations in Nairobi. The particular objectives of research were:

i. To establish the leagile supply chain practices implemented by Non-Governmental health organizations in Nairobi.
ii. To determine the relationship between lean-agile supply chains practices on the supply chain performance of Non-Governmental health organization in Nairobi.

iii. To establish the challenges faced by health Non-Governmental health organizations in Nairobi.

1.4 Value of the Study

This study was significant because it contributed to both policy and practice on the effect of lean-agile supply chain strategy on the firm’s supply chain performance. As a result of this study, local Non-Governmental Organizations in Kenya can utilize the findings as well as recommendations to achieve improved performance by putting in place supply chain strategies to ensure broad effective supply chain performance. The management of the various NGOs was able to identify the key factors to consider in adopting appropriate supply chain strategies. The study helped and explained how ASC strategy improves the performance of the SC by illustrating that SC practices provide a positive link that between ASC strategy and SC performance.

The government and policymakers should also utilize the findings of this research to establish the structures and processes that enable them to deepen supply chain strategies in the country which is good for economic growth. Consequently, the policy makers in particular, was able to identify mechanism that was harnessed by the regulators to attain better performance of private sector firms which is a grave blue map for the growth of the economy as well as improvement in Kenya.

The study findings on the other hand acted as reservoir of knowledge for future researchers in the same topic. It provided basis for further research on the effect of lean-agile strategies on their operational performance.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter focuses on key questions involving leagility and its effect on organizational performance. The areas discussed include: theories underpinning the study; effect of leagile on SCP and challenges to the implementation of leagile among the NGOs. In addition, this section covers empirical studies related to the study and a summary of literature and research gaps as well as the conceptual model to the study.

2.2 Theoretical Framework

To understand the concept of the leagility and firm performance, the dominant theories that were used were the transaction cost theory and the systems theory. These are discussed below.

2.2.1 Transaction Cost Economics Theory

Transaction Cost Economics theory seeks to determine the actual costs incurred in the process of outsourcing, the production of products and the delivery of services including transaction costs, contract costs, coordination costs and search costs. It offers an analytical framework used in making similarities between firms lean and agile practices (Lacity & Hirschheim, 1995). This theory facilitates the determination of leagile practices success in terms of economic benefits associated with reducing and elimination of waste or non-critical activities.

TCE provides the best decision making basis to help firms to decide what waste to eliminate and all arrangements required in order to ensure leagile strategies are achieved. Infrequency of contracting, environmental and relationship uncertainties are the determinants of the magnitude of transaction cost, which, in turn, provides a
basis for the evaluation of leagile decision making. TCE deals with not only experiences but also outcomes of adopting leagile. Van Hoek (2000) asserts that, analyzing the transaction cost and deciding whether to “buy or make” helps the manager to adopt organizational forms which reduce the transactional costs. This theory is a vital tool in managerial decision making. Various researches have been done on transaction cost theory and their findings and conclusions reported. The transaction cost approach is related to this study as it gives a good framework that helps organizations decide what leagile processes they should adopt and which they should maintain. It also helps in success prediction of outsourcing in terms of financial benefits.

2.2.2 Resource Based Theory

This theory is mainly based on the internal competences of the firm which are its resources and capabilities. The competitive advantage of a firm mainly arises from the firm’s capabilities, which are unique and non-substitutable which have a great influence on the performance of the firm (Barney, 1991). This theory argues that there is imperfect transfer of resources across firms since they are heterogeneously distributed and disagree with the assumptions of traditional economics that resources are perfectly mobile and homogeneous (Barney, 1991).

Organizations should effectively manage, allocate and exploit resources so as to gain superior performance. Sehgal (2010) further points out those organizations that are capable to appropriately tie to precise programs and proceedings or to environmental prospects are further to be expected to develop abilities that yield in better performance. The limitations of the resource-based view and the transaction cost theory has led to the development of the relation view which combines the two approaches and it focuses creation of value through many forms of partnerships
between the two parties. Dyer and Singh (1998) argue that relational rents arise when partners combine, share, or invest their assets, capabilities, or knowledge, or adopt effective governance to improve synergies and lower their transaction costs.

2.3 Leagile Supply Chain Practices

The leagile strategy is a hybrid approach that combines the characteristics of individual agile and lean features of a supply chain. Whitten, Green Jr., & Zelbst (2012) assert that an agile supply chain (ASC) facilitates easy access to marketplace information, buyer favorites and inexpensive achievement that is required to be adopted in order to be able to respond to changing customer demands and also be able to introduce new products. In addition, it is argued that info distribution with other SC partners increases the level of facilities collaboration and co-ordination. Such collaboration will involve exchanging timely schedules, inventory levels and lead times which will facilitate timely design and delivery of those products and successfully implementing inter-firms progressions (Saraf, Langdon & Gosain 2007).

Johnson, Lee, Sanin and Grohmann (2013) are of the view that a firm can exploit its range and response flexibilities to widen its manufacturing alternatives for decrease of necessary charges or time. Similarly, advanced level of industrial flexibility aids firms to fine-tune and condense break between scheduling and execution, which by extension increases its ability to improvise its operations. Consequently, firms can increase their supply chain flexibility by improving speed of trade arrangement movements between states. Agarwal et al., (2014) stress that an agile firm can alter its current configuration and are able to implement necessary improvements in different industry surroundings in a well-timed style through optimizing collaborations of strategic and industrial elasticity’s between all the parties in supply chain. This study focused on four Leagile practices consisting of continuous improvement, waste
management, information sharing, demand management and responsiveness to market changes.

2.3.1 Continuous Improvements

Its long-standing viewpoint on continuous improvement (referred as Kaizens in Toyota production Systems) remains similarly significant in lean production (Green and May, 2005; Salem et al., 2006) argued that there was need to minimize or eliminate as well as improving on the agility of construction processes over a given times waste order to reduce waste and increase the efficiency of the construction process over time because long lasting contracts or relationships forms a significant basis in minimizing the old fashioned short-period focus on cost reductions(Green and May, 2005). By participating in teamwork for a sequence of tasks, the transferal of understanding and proficiencies amongst supply chain players on different task is facilitated or improved. Considerable manufacturing has "gone Leagile", through lean production tools and 6 Sigma to boost uninterrupted improvements hence reducing low quality outputs cutting change over time and quantities ordered, slashing lead time and increasing efficiency. The extensive adoptions of constant improvements through lean engineering, 6 Sigma and trades and operations formation have remained the best measures in production for the last decade hence now organizations have focused on continuous improvements on their supply chains to ensure efficiency and outstanding supply chain performance (Salem et al., 2006).

2.3.2 Waste Management

According to Craig, (2004), waste has been defined as everything which can lengthens or obstructs supply chain's movement hence there is need to analyze as a probable non-value adding action .Supply chain associates must work in solidarity or
sometimes independently to eradicate extravagant procedures and additional raw materials along the chain. Firms can identify waste in their supply chain and use the 5s set of principles to lean improvements and reducing waste.

Philips and Nystuen (2002) suggested seven forms of waste which need to be eliminated including overproduction, transportation waste, inappropriate processing, and waste of waiting time, inventory waste, unnecessary motions and product defects. Waste in supply chain pathway need to be revealed, categorized and decreased in same approach as waste in production so as to develop enormous savings possibilities. Waste can also be generated during the product flow between partners in the supply chain. Product manufacturers have many options for reducing waste if there is a process in place for the identification and measurement of waste causes.

Reasons of waste can be measured according to manufacturing processes similar to product deficiencies, impreciseness with forecasting and equipment breakdown. They can also be measured in terms of inherent cause, such as when a product’s packaging is ineffective or the set-up of manufacturing lines inefficiently planned (Lee, 2004).

2.3.3 Supply Chain Information Sharing

Sharing of information refers to the degree to which significant and proprietary information gets communicated to a specific supply chain. The nature of the information may be strategic or tactic, about logistic activities, about the customers and market, availability of product, levels of inventory, expeditions and status on production requirement (Huang & Lau (2003)

There are numerous studies that indicate that information sharing amongst partners in the supply chain has significant impact on organization performance and efficiency of their supply chains. Sharing of information allows organizations to decide on better choices in regards to ordering, capacity allocations, manufacture and also material
planning, due to better visibility of demand, supply and inventory. Lysons & Farrington (2006) argued that due to increased competitiveness in the market place, the speed at which information must be passed, shared within the supply chain and the accuracy of the information has become critical success factor for many organizations. Organizations invest in modern software’s that can manage inventory, trigger orders to the suppliers, track shipments, provide real time information on product availability and enable firms to engage in collaborative planning.

In particular Sanders (2010) stated that sharing information among partners in the supply chain has a leveraging power on the performance of organizational which results from elimination of possible inconsistency of the exchanged information therefore leading to the attainment of a platform for sharing information that is standardized. Thus the reduced inconsistency in shared information as regards to all types of supply chain doings, saves the firm from carrying out corrective as well as preventive courses which serves to pay off poor exchange of information between the partners.

Childhouse & Towill (2003) revealed that simplified material flow from the upstream to the downstream level, including streamlining and making highly visible all information flow throughout the chain is an input to effective, efficient and integrated supply chain. Information technology has created new possibilities for improving firm performance more so if the information can be shared with the intended partners. Wu et al., (2006) considered that alignment and advancement of IT are positively connected to supply chain abilities, which in turn are linked to organization’s performance.

Fawcett and Magnan (2008) pointed out that sharing of information inside a supply chain experiences challenges such as the privacy of the shared information, issues to
do with incentive, dependability and information technology cost, antitrust rules, the unchanging and accurateness of the information shared, and lastly the expansion of capabilities which permit organizations to make use of the information shared in an helpful way

2.3.4 Demand Management

Currently, there is imperative tendency on the way thriving companies control their demands, transactions, operations arrangement and inventory management which reflects on how leagile SC systems is regarded as the best systems (Phelps, 2004). Leagile recital is complete in-house leagile optimization progression and consequently controlling of demand becomes integral in accepting theory of leagile productivity in their various processes and systems. The powers of leagile methodology and leanness are further instantaneous and in practical emphasize on wastes, movement and agility hence, SC players comprising the vendors and consumers should work in solidarity so as to ensure customers get the best products especially in terms of quality and prices (Manrodt et al., 2005).

This practice enable support of instantaneous reaction which is premeditated for facilitating organizations dynamics in projects alongside various variables including supplies, consumer order, inventories, and financial goals which then creates supply chain visibility and networks for mapping demand projections , consumer obligations, material levels and monetary forecasting(Aberdeen group, 2010).

2.4 Challenges to the Implementation of Leagile Practices

Non-governmental organizations face various challenges when it comes to the implementation of leagile supply chains. These challenges may be contextual and external to the organization and may totally prevent or hinder the implementation of
leagile supply chains. According to Wangari (2016), these challenges include inadequate funding from donor governments, corporations and individuals for ICT systems. They focus more on relief donations for immediate solutions to immediate situations and ICT systems are not considered fundamental (Reynolds et al., 2005). Humanitarian organizations therefore lack adequate funding for the implementation of ICT systems that drive supply chain leagility.

Government policies and regulations may impede the implementation leagile supply chains. This may range from the nature of the relationships they have with donor governments which may affect funding of the NGO, the red tape involved in the importation and clearance of goods, to the taxes imposed on various items that may be critical in leagile supply chains. Government also has an oversight role in humanitarian affairs and may sometimes obstruct humanitarian efforts. Non-Governmental organizations in evolving world classically devolve their administrative structures whereby field workplaces display great level of independence with slight oversight from the head office (Reynolds et al., 2005). This definitely curtails the development and implementation of leagile supply chains.

Non-Governmental organizations and extra liberation organization’s predominantly experience difficult concerns and encounters in establishing and managing effective ICS linked to NGO technological capacity and administrative strategies and policies (Reynolds et al., 2005). These systems determine how successfully humanitarian aid organizations are likely to react to composite charitable disasters and being vital in the implementation of leagile supply chains.

A majority of NGO’s express the willingness and desire to cooperate with each other, but competition for scarce resources presents encounters to combined exchange of info and sharing same information. This happens especially when information is
reflected as patented or weighty worth to administrations contending for funds from same donors (Reynolds et al., 2005). It prevents the implementation of leagile supply chains because collaboration with other humanitarian affairs organizations cannot be achieved without information sharing.

Majority of disaster relief operations take place in underdeveloped regions. These regions have poor or non-existent physical and communication infrastructure, therefore impeding disaster relief operations. Leagile supply chains are not easy to implement in these regions because they thrive on good physical and communication infrastructure. This is one of the major challenges in the implementation of leagile supply chains in developing and underdeveloped countries.

2.5 Empirical Literature Review

Several studies have been undertaken to explain the nexus between leagile supply chains on the performance of firms. Peng, Liu, Heim (2011) sought to determine the flexible supply chain approach and SC performance by establishing the corresponding characters of SC practices and communication systems proficiency for flexibility. Their study found out that while the focal firm in supply chain may implement developments which may avail required procedures capability for flexibility, operations are unlikely to be attained due to inadequate similar information sharing with suppliers.

Roh, Hong, Min (2013) sought to determine the implementation of a responsive supply chain strategy in global complexity among the manufacturing firms across 24 countries. The study used a total of 751 firms in 2005 and through the use of a sample of 100 manufacturing firms and by using an exploratory factor analysis (EFA), the findings was that the implementation of a responsive supply chain requires
a careful definition of a firms product range, and the frequency and innovativeness of the product offerings. In addition, firms need to define its key implementation practices on areas such as sharing of information with customers, collaboration with suppliers and the use of advanced manufacturing technology to achieve responsiveness to the market. Further, the study found that the key contextual factors that influence the extent of implementation of a responsive supply chain strategy include the size of firms, industry characteristics, and customer and supplier bases and not the location of manufacturing firm. This finding therefore contradict that of Vitasek, Manrodt and Abbott, (2005) who found that the location of the manufacturing firm determines the contextual factors that influence a firms supply chain strategy.

Ramana, Rao and Kumar (2013) evaluated the performance metrics of leagile supply chain through fuzzy MCDM. By using four performance indicators namely: operational, customer service, organizational and flexibility of the 316 firms in India, the results were that responsiveness was the most important enabler while product development flexibility, customer satisfaction and sourcing flexibility were found to be equally important enablers.

Gligor, Esmark and Holcomb (2014) sought to determine performance outcomes of supply chain agility that influence the achievement of agility. The study sought to evaluate the impact of firm supply chain agility (FSCA) on the firm’s Return on Assets using archival data from the Compustat database among 284 manufacturing firms in United Kingdom. Thus, we provide evidence to managers that deploying resource to enhance FSCA can positively impact the firm’s bottom line.

Sohal and Egglestone (1994) carried out a study to investigate the extent to which leagile production has been adopted within Australian organizations and their findings
was existence of benefits accruing from the adoption of leagile production with most of the companies citing strategic benefits being generated by the adoption of leagile production with the extreme development emanating from marketplace modest setting, customer associations and quality constrictions.

Kollberg and Dahlgaard, 2005 carried out a study with objective of assessing suitability of lean thinking in the UK health services by observing at flow model. The study resolved that lean thinking is appropriate in health care settings and that the flow model is a suitable tool for following up these initiatives. This study and findings proved concrete inferences for health care practitioner because it enables them develop measurements of the outcome of Leagile initiatives on existing care processes.

Omondi 2008 did a case study on application of leagile strategy and thinking to business process management of Kenya revenue Authority and found out that Leagile management and application of related tools, equipment’s and techniques is a continuous process at KRA highly driven by the need to improve service delivery and tax collection while netting those evading taxes.

Wasonga, (2014) carried a study on leagile supply chain management practices in service industry in Kenya a case of Kenyatta National Hospital and established a positive connection amongst leagile supply chain practices and enhanced supply chain management performance. It also recommended incorporation of lean supply chain processes, creation of awareness and motivation of employees in relation to benefits of leagile practices and enhanced organizational awareness and involvement hence efficiency and effectiveness in hospital operations.
2.6 Summary of Literature Review and Research Gaps

From the literature and empirical studies reviewed, it can be deduced that with the integration of the global economic businesses as well as manufacturing, the competition among enterprises is no longer between individual firms but rather how effective the firms’ supply chain is in comparison with other competing firms. It has become evident that SCM aims at reducing supply chain risk and uncertainty; and in the process improves customer service and optimizes inventory levels, business processes, and cycle times.
Table 2: Summary of Literature Review and Research Gaps

<table>
<thead>
<tr>
<th>Scholar</th>
<th>Study</th>
<th>Findings</th>
<th>Research Gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heim (2011)</td>
<td>Agile Supply chain strategy on SC performance</td>
<td>Agile strategy has a positive impact on SC performance</td>
<td>The study was only based on 205 Peru firms and hence the results could not be applied to African countries</td>
</tr>
<tr>
<td>Roh &amp; Hong (2013)</td>
<td>Determine the implementation of responsive supply chain strategy in global complexity among global manufacturing firms</td>
<td>Implementation of a responsive supply chain requires a careful definition of a firms product range, frequency and innovativeness</td>
<td>Failure to bring out effects of agile supply chain strategy on supply chain performance</td>
</tr>
<tr>
<td>Ramana &amp; Kumar (2013)</td>
<td>Evaluation of agile SC performance metrics of 316 firms in India through fuzzy MCDM</td>
<td>Responsiveness was the most significant enabler with product development flexibility, customer satisfaction</td>
<td>The study failed to look at challenges affecting adoption of agile supply chain strategies</td>
</tr>
<tr>
<td>Esmark &amp; Holcomb (2014)</td>
<td>Evaluation of firm supply chain agility impacts on return of Assets of 284 manufacturing firms in UK</td>
<td>supply chain agility had a Positive impact on firms return on assets</td>
<td>The study failed to address the challenges and the adoption extent of agile strategy</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ndambuki (2014)</td>
<td>Effect of supply chain integration on the supply chain performance of international humanitarian organizations in Kenya</td>
<td>Organizations capacity to integrate their supply chain is affected by poor infrastructure, high staff turnover in the field and the inability of the organization to anticipate disaster; and a lack of resources</td>
<td>Failed to clearly bring out the relationship between variables and influence supply chain performance</td>
</tr>
<tr>
<td>Mutheaka (2014)</td>
<td>establish the link between lean supply chain practices and supply chain responsiveness among vegetable oil processing firms in Kenya</td>
<td>Common lean supply chain practices applied among the oil processing firms in Kenya were those that relate to demand, waste management, standardization, behavioral, quality inspection activities and quality</td>
<td>There was no link provided or established between lean supply chain practices and supply chain responsiveness among vegetable oil processing firms in Kenya. Also I failed to address the challenges</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Title</td>
<td>Findings</td>
<td>Context/Notes</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Kollberg and Dahlgaard, 2005</td>
<td>Assessing suitability of lean thinking in the UK health services by observing at flow model</td>
<td>The study resolved that lean thinking is appropriate in health care settings and that the flow model is a suitable tool for following up these initiatives</td>
<td>Faced in implementation of the said practices</td>
</tr>
<tr>
<td>Sohal and Egglestone (1994)</td>
<td>Investigate the extent to which leagile production has been adopted within Australian organizations</td>
<td>Existence of benefits accruing from the adoption of leagile production with most of the companies citing strategic benefits being generated by the adoption of leagile production</td>
<td>The findings did not show any correlation between leagile supply chain practices on supply chain performance. The study population was not in a Kenyan context</td>
</tr>
<tr>
<td>Wasonga, (2014)</td>
<td>leagile supply chain management</td>
<td>Established a positive connection</td>
<td>Failed to establish the challenges</td>
</tr>
</tbody>
</table>
practices in service industry in Kenya a case of Kenyatta National Hospital amongst leagile supply chain practices and enhanced supply chain management performance. associated with adoption of LSCM practices

| Omondi 2008 | Application of leagile strategy and thinking to business process management of KRA | Found out that Leagile management and application of related tools is a continuous process at KRA | Failed to link leagile strategy and thinking with firm supply chain performance |

From the above summary, it is clear that the literature and empirical studies covered above shows that though researchers have gone to great length to establish the various antecedents of SCM and its effect, the results are still not conclusive. The same inconclusive findings can be said of the research works of lean SC practices.

However, the leagile supply chain has received limited attention and possibly due to its recent implementation. In addition most of the studies covered have been in developed world with a bias to manufacturing firms. Though Kuria (2016) researched on the effect of leagile on the performance of humanitarian organizations in Kenya, this study differs because it will be concerned with health NGOs in Kenya.
2.7 Conceptual Framework

The framework outlined below indicates the influence of Leagile supply chain practices on supply chain performance of Non governmental Health institutions in Nairobi.

Figure 2.1 Conceptual Model

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leagile Supply Chain Practices</td>
<td>Supply Chain Performance</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>• Quality Service</td>
</tr>
<tr>
<td>SC Information Sharing</td>
<td>• Flexibility</td>
</tr>
<tr>
<td>Waste Management</td>
<td>• Cost Reduction</td>
</tr>
<tr>
<td>Demand Management</td>
<td>• Delivery Dependability</td>
</tr>
</tbody>
</table>

Source: Researcher (2017)

Null Hypothesis, $H_0$: There is no association between leagile practices and supply chain performance

Alternative Hypothesis, $H_1$: There is an association between leagile practices and supply chain performance
CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The section presents the research design, the population targeted, the methods for collecting data and the data analysis techniques employed.

3.2 Research Design

The research design adopted for this particular study was descriptive cross-sectional design. A cross sectional study analyses data which has been collected across an entire population so as to be able to get a view of the particular population at a single point in time. Descriptive design method provided data from cross section of the selected population by describing the variables of interest (Burns & Grove, 2003).

3.3 Target Population of the Study

The targeted population of the research consisted of the entire health NGOs with operations in Nairobi. As at December 2016, the NGO Coordination Board had registered 98 health NGOs in Nairobi and actively involved in health related matters (Appendix II).

3.4 Sampling Design

The study used systematic sampling in which the researcher obtained the list of the population from the NGO Coordination Board of all the registered health NGOs and then take a sample in which every even numbered firm in the list will be picked for the research and this resulted in 49 NGO’s being selected for the study (Appendix II). Mugenda & Mugenda (2003), assert that a representative sample entails at least 10% of the target population therefore the sample of 49 organizations is considered as adequate representative.
3.5 **Data Collection**

Primary and secondary data was used in the research. Secondary data was gathered from published data and journals whereas Primary data was gathered by use of questionnaires that consisted of questions intended to extract detailed responses for qualitative and quantitative analysis respectively. The respondents for the study were operations managers and supply chain managers or equivalent positions in the respective NGOs.

3.6 **Data Analysis**

Analysis of the collected data was done by use of descriptive statistics which included measures of central tendency and also measures of variations. The data was then cleaned to get rid of inconsistencies then subsequently, classified on the basis of likeness and then tabulated. The questionnaires were then coded numerically to aid statistical analysis. Data analysis was done with the use of statistical package for social sciences (SPSS) as per the questionnaires. The results of the study were then presented using tables to summarize the respondent answers. The regression analysis took the form:

\[ Y = \alpha + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + \hat{\epsilon} \]

\[ Y = \text{Health NGO Supply chain performance} \]

\[ \alpha = \text{Constant (Co-efficient of intercept)} \]

\[ X_1 = \text{Continuous Improvements} \]

\[ X_2 = \text{Waste Management} \]

\[ X_3 = \text{Information sharing} \]

\[ X_4 = \text{Demand management} \]

\[ \hat{\epsilon} = \text{Error Term} \]

\[ B_1 \ldots B_5 = \text{Regression co-efficient of variable} \]
<table>
<thead>
<tr>
<th>Objective</th>
<th>Data Collection</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 To establish the lean-agile supply chain strategies adopted by Non-Governmental health organizations in Nairobi</td>
<td>Close ended questionnaires</td>
<td>Use of Descriptive statistics</td>
</tr>
<tr>
<td>2 To determine the relationship between lean-agile supply chains practices on the supply chain performance of Non-Governmental health organization in Nairobi</td>
<td>Use of closed ended questionnaires</td>
<td>Correlation and regression analysis</td>
</tr>
<tr>
<td>3 To establish the challenges faced by health Non-Governmental health organizations in Nairobi</td>
<td>Open and closed ended questionnaires</td>
<td>Use of descriptive statistics</td>
</tr>
</tbody>
</table>

Source: Researcher (2017)
CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This section covers the presentation, interpretation as well as discussion of findings. The objective of this research was to determine how Leagile supply chain practices impacted supply chain performance of non-governmental health organizations in Nairobi. The objectives of the study were to identify Leagile supply chain practices implemented by non-governmental health organizations in Nairobi, establish the challenges faced and to establish what effect Leagile supply chain management practices had on supply chain performance of non-governmental health organizations in Nairobi.

4.2 Response Rate

The target population of this research was 49 non-health organizations. Out of 49 respondents who included the supply chain managers and operations managers or their equivalent, 37 responses were obtained. This gives a response rate of 76%. The study did not achieve a 100 per cent response rate because some of the questionnaires were not fully filled and others had some inconsistent information. However, Kothari (2004) indicates that a response rate of 50% and above is sufficient for analysis and making inferences.

4.3 General Information

The general information comprised of the length of continuous service with NGO, NGO length of operations in Kenya and number of employees and as well as budget of supply chain activities at the non-governmental health organizations.
4.3.1 Length of continuous service with the NGO

The managers were required to specify their length of continuous service with NGO and the findings were as shown in the table 4.1.

Table 4.1: Length of continuous service distribution

<table>
<thead>
<tr>
<th>Length of continuous service with NGO</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than Five years</td>
<td>14</td>
<td>37.8</td>
</tr>
<tr>
<td>5-10 years</td>
<td>17</td>
<td>45.9</td>
</tr>
<tr>
<td>10-15 years</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Over 15 years</td>
<td>4</td>
<td>10.8</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

As indicated in table 4.1, Most of the respondent (45.9%) had been service in their respective organizations for a period between 5 -10 years while 37.8% had each been in the organization for less than 5 years. Generally over 62% of the respondents had worked in the respective NGOs for over five years and were deemed to be knowledgable on the research subject area.

4.3.2 NGO operations in Kenya

The respondents were required to show how long they have been operating in Kenya.

The results were as presented in Table 4.2 below

Table 4.2: NGO year’s operation Distributions

<table>
<thead>
<tr>
<th>NGO operations in Kenya</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5 years</td>
<td>7</td>
<td>18.9</td>
</tr>
<tr>
<td>6-10 years</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td>11-15 years</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td>Over 16 years</td>
<td>4</td>
<td>10.8</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

From the findings on table 4.2 above, Over 80% of the NGOs sampled had operated in Kenya for over five years.19% of the NGOs had operated in kenya for less than
five years and 11% for over 16 years respectively. From the above findings, this corresponds with the working experience of the majority of the respondents.

### 4.3.3 Number of Employees

The researcher sought to find out the number of employees in the respective NGOs and the findings were as shown in Table 4.3.

Table 4.3: Number of employee’s distribution

<table>
<thead>
<tr>
<th>Number</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>3</td>
<td>8.1</td>
</tr>
<tr>
<td>11-20</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>21-30</td>
<td>12</td>
<td>32.5</td>
</tr>
<tr>
<td>Above 30</td>
<td>17</td>
<td>45.9</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

As per the findings, majority of the NGOs (90%) had more than 10 employees with 45.9% having more than 30 employees which qualifies them to SME based on the number of staff.

### 4.3.4 Budget of supply chain activities

The respondents were required to indicate the budget allocated to supply chain activities by their NGOs and the results are as indicated in the Table 4.4 below.

Table 4.4: Budget allocation distribution

<table>
<thead>
<tr>
<th>Budget</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20%</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>20-40%</td>
<td>9</td>
<td>24.3</td>
</tr>
<tr>
<td>40-60%</td>
<td>15</td>
<td>40.5</td>
</tr>
<tr>
<td>Over 60%</td>
<td>8</td>
<td>21.7</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

From the findings above, 62% of the NGOs were found to spend over 40% of their budget on supply chain activities. Consequently, it can be concluded that indeed the NGOs supply chain activities consumes a large proportion of their budget and hence the necessity to adopt appropriate Leagile supply chain practices.
4.4 Leagile Supply Chain Management Practices

The study sought to find out the level to which Leagile practices in the supply chain have been taken up by non-governmental health organizations in Nairobi. Continuous improvement, supply chain information sharing, waste management and demand management were considered and the respondents were required to rate their effect on supply chain performance. A Likert scale was used where 5 signified to a very large extent, 4 = Large extent, 3 = Moderate extent, 2 = Small extent, 1 = Very small extent.

**Table 4.5: LSCM Practices Descriptive Statistics**

<table>
<thead>
<tr>
<th>Practices</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand management</td>
<td>4.161</td>
<td>.671</td>
</tr>
<tr>
<td>Information sharing</td>
<td>4.158</td>
<td>.714</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>3.851</td>
<td>.513</td>
</tr>
<tr>
<td>Waste management</td>
<td>3.819</td>
<td>.120</td>
</tr>
</tbody>
</table>

*Source: Research Data (2017)*

The findings from table 4.5 above revealed that Leagile supply chain management practices at non-governmental health institutions have been implemented to a large extent. Means of between 3.819 and 4.161 were registered with an overall mean of 4.06 registered indicating non-governmental health institutions in Nairobi have embraced the merits connected with leagile supply chain management practices. Sharing of information and demand management had the highest mean of 4.158 and 4.161 indicating that non-governmental health institutions has adopted them to a large extent. The findings also revealed that continuous improvement(3.851) and waste management(3.819) have been implemented to a moderate extent by NGOs health institutions. The findings corresponds with the literature review on research done by
Kollberg & Dahlgaard (2005) on assessing suitability of lean thinking in UK Health services firms which concluded that 60% of the health firms in UK had adopted lean thinking practices to large extent.

4.5 Leagile Supply Chain Management Practices and Supply Chain Performance

The second objective looked to find out if there was an existing relationship between leagile supply chain management practices and performance of supply chain of NGOs health institutions in Nairobi. Regression was employed to help establish if there is an existing relationship between the dependent and the independent variable, as well as to determine the magnitude of the association amongst the study variables. The findings are as shown below

Table 4.6: Regression Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t/z</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.128</td>
<td>.735</td>
<td>.174</td>
<td>.863</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>.472</td>
<td>.198</td>
<td>.364</td>
<td>2.385</td>
</tr>
<tr>
<td>Waste management (X2)</td>
<td>.035</td>
<td>.233</td>
<td>.022</td>
<td>0.150</td>
</tr>
<tr>
<td>Information sharing (X3)</td>
<td>.679</td>
<td>.115</td>
<td>.679</td>
<td>5.892</td>
</tr>
<tr>
<td>Demand management (X4)</td>
<td>.693</td>
<td>.161</td>
<td>.573</td>
<td>4.316</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

As per the SPSS generated Table 4.8, the equation \( Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon \) becomes: \( Y = 0.128 + 0.364X_1 + 0.022X_2 + 0.679X_3 + 0.573X_4 \)

The Z tables are X1=2.385, X2=0.150, X3=5.892 and X4=4.316, According to the findings, all are higher than 1.96 except for waste management indicating that all variables are significant predictors of supply chain performance except waste management. This is corroborated by P values which are all less than 5 % (X1=2.3%, X3=0% and X4=0%) except for waste management(X2) which is 88.1%.
Table 4.7 Model Summary (R^2)

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>R Std. Error of the Estimate</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.818^a</td>
<td>.669</td>
<td>.628</td>
<td>.61229</td>
<td>.006</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

a. Predictor Variable: (constant); X_1 = CI, X_2 = WM; X_3 = IS, X_4 = DM

From the results in Table 4.2 above, R^2 is 0.669 which means that demand management, information sharing, continuous improvement and waste management explain 67% of the variation in supply chain performance. This implies that the four independent variables contribute 67% to the supply chain performance of NGOs health institutions while remaining 33% is explained by other factors which have not been captured in the study model. The standard error of the estimate shows that on average, the performance level deviate from the projected regression line by a score of 0.61229.

Table 4.8 Analysis of Variance

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>3.251</td>
<td>4</td>
<td>.650</td>
<td>5.358</td>
</tr>
<tr>
<td>Residual</td>
<td>1.699</td>
<td>33</td>
<td>.121</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4.950</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

The analysis of variance shows whether or not a model is a good fit for the data. The numerator for α = 5% whose degree of freedom (df) = 4, denominator (df) = 32 and critical F value is (2.6896). The findings above show that the calculated F value is (5.358) which is greater than the F-critical (2.6896), which shows that the model is statistically significant and hence can be used in predicting the influence of the independent variables on the dependent variable. The p-value is 0.6% which is lower
than the significance level of 5%, which corroborates the findings that the model is statistically significant.

4.6 Challenges facing adoption of Leagile Supply Chain Practices

In regard to challenges facing implementation of LSCM practices at NGOs, the researcher sought to define the magnitude to which various challenges affects implementation of leagile supply chain management practices. The findings is as presented Table 4.9 below

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our staff are adequately trained and equipped to manage a leagile supply chain</td>
<td>4.162</td>
<td>.834</td>
</tr>
<tr>
<td>ICT systems are robust enough for the implementation</td>
<td>4.081</td>
<td>.954</td>
</tr>
<tr>
<td>Data and information is shared within the organization</td>
<td>4.027</td>
<td>.897</td>
</tr>
<tr>
<td>Level of collaboration with other humanitarian organizations</td>
<td>4.000</td>
<td>1.080</td>
</tr>
<tr>
<td>Organization structure supports supply chain leagility</td>
<td>3.919</td>
<td>.983</td>
</tr>
<tr>
<td>Policies and procedures support supply chain leagility</td>
<td>3.865</td>
<td>.9765</td>
</tr>
<tr>
<td>Level of collaboration with other humanitarian organizations</td>
<td>3.835</td>
<td>1.005</td>
</tr>
<tr>
<td>Our ICS supports the implementation of a leagile supply chain</td>
<td>3.813</td>
<td>.787</td>
</tr>
<tr>
<td>Physical infrastructure impedes our implementation of LSCM</td>
<td>3.729</td>
<td>.991</td>
</tr>
<tr>
<td>Unfavorable Government policies and regulations</td>
<td>3.514</td>
<td>.837</td>
</tr>
</tbody>
</table>

Source: Research Data (2017)

The result in Table 4.9 reveals that the common challenge faced by the NGOs is insufficient government policies and regulations that support the implementation of a leagile supply chain (M=3.514, SD=0.837) as well as a lack of appropriate physical infrastructure to support the implementation of a leagile supply chain. The small standard deviation implies that majority of the respondents were in agreement regarding the effect of the two practices in the leagile agile supply chain.
implementation. On the other level of continuum, the least challenge faced by the organizations was a lack of adequately trained and equipped staff to manage a leagile supply chain (M=4.162, SD=0.834) and insufficient ICT systems are robust enough for the implementation of supply chain leagility (M=4.081, SD=0.964). Similarly, data and information was found to be less of a challenge because data and information is shared efficiently within the organizations.

4.7 Discussion of the Findings

The need for a firm supply chain to be flexible in its supply chain is not only restricted to profit oriented firms but also the non-governmental organizations which have had to adapt to the changing humanitarian needs that occur unexpectedly in more frequent incidences. The findings on the study with regard to the effect of leagile on the supply chain performance with health NGOs in Nairobi reinforces the need for organizational strategy to be implemented through a distinct set of activities (Porter 1996). In line with this position, the study findings suggested that a leagile supply chain process when implemented through particular systematic processes can accomplish superior SC performance hence corresponding with findings of Heim (2011) which concluded that agile strategy has an impact that is positive SC performance.

The study also revealed that leagile supply chain management have been implemented at non-governmental health institutions to a large extent which corresponds with the findings of Sohal & Egglestone (1994) through their study investigating the degree to which leagile production had been adopted within organizations in Australia.

The study found that the leagile supply chain such as continuous improvement, waste management and information sharing are associated with appropriate performance
and was determined to provide a positive link to the NGOs performance. However, the findings show that many of the health NGOs have not invested ICT systems that are not robust enough to support supply chain leagility. This is supported by the study findings of Wasonga, (2014) on a case study of Kenyatta hospital established a positive connection amongst leagile supply chain practices particularly information technology, sharing and enhanced supply chain management performance of service industries. Sanders (2010) stated that sharing of information among partners in the supply chain, has a power of leverage on organizational performance through the elimination of potential inconsistency of the exchanged information therefore enabling the attainment of a consistent platform for sharing information.

Heim (2011) noted that the strengths presented by leagile approach and leanness are more instant and practical focus on waste, flow as well as flexibility thus, partners in supply chain together with the suppliers upstream and downstream clients can work jointly to afford value to the customer. The finding indicated that responsive supply chain has assisted in meeting needs, saving lives, achieving time targets and enhanced the impact of activities. Moreover, Agarwal (2014) stressed that an agile firm can address challenges hindering implementation of LSCM practices as well as altering its current configuration and are able to implement necessary improvements in a business environment that is new in an opportune manner through taking advantage of the synergies of strategic and service flexibilities amongst all the involved individuals in a supply chain. The findings showed that the ability of an NGO to respond promptly and implement leagile supply chain management practices is determined on how it put measures in place to address and mitigate the outlined challenges faced during LSCM practices implementation.
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section covers the summary of findings, the conclusion, limitations as well as the recommendations in line with the topic of study which is to establish the leagile supply chain practices and the performance of the supply chain of non-governmental health organizations operating in Nairobi, Kenya.

5.2 Summary of Findings

The results of this research indicate that leagile supply chain practices have an effect that is significant and positive on the supply chain performance. An additional scrutiny of the weights connected with the continuous improvement, waste management, and information sharing and demand management indicators suggests that they all have a role that is important in the performance of NGOs. The dominant finding is that the four leagile practices facilitate resource flexibility and therefore enable the NGOs respond promptly to the humanitarian situation that arises. The study found that the continuous improvement encompassed the NGO process of monitoring and planning its operations to enhance their service delivery in a more flexible ways and consequently be in a position to meet the ever changing demands in the market. In addition, the study finding indicated waste management minimizes waste or loss of product improves resource utilization and the level of stock held by the organization is optimal as a result of using the leagile principles in your supply chain.

The information sharing indicated that the data and information sharing within the organization enhances our performance and SC partners sharing information with the organization that helps establishment of business planning. In addition, the demand
management shown that the responsive supply chain has assisted in meeting needs, saving lives, achieving time targets and enhanced the impact of activities. The connection between supply chain leagility and organizational performance of the NGO has established there is a continuous improvement. The study found that despite the positive effect of the four predictor variables to the supply chain performance, the study found that the NGOs face different challenges which affect their level of adopting the leagile practices effectively. The dominant challenge faced by the organizations include, the NGO staff being in adequately trained and equipped to manage a leagile supply chain and the ICT systems that are not robust enough for the implementation of supply chain leagility.

5.3 Conclusions

Leagile supply chain practice in organization requires organization capabilities that will enhance the performance of the supply chain effectively. The organization’s management needs to build a strong connection between the Leagile supply chain practice and the supply chain performance to have a competitive supply chain. Basing on the findings of the study, conclusions are made that continuous improvement entailed the process monitoring and an operation planning is done to enhance continuous improvement which is adopted by the companies through leagile practice. The organization need to adopt the waste management in order to minimizes waste or loss of product improves resource utilization.

The information sharing is important to organization because it enhances the performance and SC partners sharing information with the organization that helps establishment of business planning. In addition, the demand management of responsive supply chain has assisted in meeting needs, saving lives, achieving time targets and enhanced the impact of activities. The study also concluded that the
challenges to the adopted during the implementation of the leagility in supply chain were; the NGO staff are adequately trained and equipped to manage a Leagile supply chain and the ICT systems are robust enough for the implementation of supply chain leagility.

5.4 Recommendations

The main goal of LSCM practices in a company is to offer effectual managing of inbound and outbound activities associated with dissemination of information along supply chain. The study established that using Leagile supply chain management practices can help enhance efficiency and reduce operating cost, which is critical in achieving organization success. The study recommends that the NGOs should develop and design Leagile supply chain management practices and control systems depending on their size to ensure that all the needs of the organization are adequately addressed. The research established that the benefits of Leagile supply chain management practices outweigh the challenges and hence should be utilised to optimize supply chain operations and rescue cost of operations.

The study recommends that Non-Governmental health firms in Nairobi should hire competent supply chain staff to be entrusted in implementation, management and measurement of the Leagile supply chain management practices. The employees should receive training and motivation to reduce the margin of error and chances of mismanagement or sabotaging of LSCM practices implementations. This will eventually elevate the credibility of supply chain information captured and aid optimal decision making in non-governmental health institutions which will translate to increased flexibility, customer satisfaction and reduced cost of operations. The study further recommends that there should be laid down policies on Leagile supply
chain management practices and practice implementation to avoid malice and malpractices that would lead to unsuccessful adoption of Leagile supply chain management practices within non-governmental health institutions in Nairobi Kenya.

5.5 Limitations of the Study

A number of difficulties faced researcher during the course of this research. One is the challenge of time as well as resources which limited the collection of information particularly where the respondents delayed in filling the questionnaire and travelling expenses for collection of the filled questionnaires.

NGOs health firms’ information is considered to be proprietary and confidential. This resulted to the respondents showing some level of reluctance in sharing the information because of the fear of intimidation or the possibility of using the information to create an image that is negative for the particular institution. The challenge was handled by the researcher by way of assurance of utmost confidentiality and that the information was only going to be used for purposes of academics. This study was being undertaken within a limited period of time which meant that feedback from respondents in non-governmental health firms was required in within this shorter period. If adequate time was allocated, there could have been a higher response rate. Lastly, the results of this research largely relied on the respondent’s opinion. There was no direct control of accuracy of information on the part of the researchers. This challenge was countered through seeking clarifications from the respondents on any ambiguities found on the responses.

5.6 Suggestions for Further Research

This study concentrated efforts on establishing LSCM practices and its impact on the performance of the supply chain in Non-Governmental health organizations operating
in Nairobi Kenya. The researcher also explored the extent at which LSCM practices have been implemented and the challenges faced by Non-Governmental health firms during implementation of LSCM practices. The study was however not but serves as a basis for more research to conduct on more variable to come up with more information concerning the same. The study focused on organizational performance without analyzing quantitative details of the performance, future research can be done to analyze quantitative aspect of performance such as changes in customer satisfaction and delivery lead time among others.

This study suggests that other researchers should undertake to the research on link amongst LSCM practices on organizational performance of Non-Governmental health firms and the benefits or challenges the accompanying Leagile supply management practices on organizational performance. The research never considered the possible solutions to the challenges facing the application of LSCM practices at Non-Governmental health firms in Nairobi Kenya hence further study needs to be instituted to investigate the possible solution to the challenges faced by same health institutions in the implementing Leagile supply chain management practices. Finally, this research was based on organizations in the NGOs sector and there is need to undertake similar studies in public or private health institutions to uncover the underlying relationships between LSCM practices on performance and the findings may identify interesting comparisons.
REFERENCES


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Altarum Institute, The Boeing Company and Messier-Dowty Inc.


APPENDIX I: QUESTIONNAIRE

Section A: Demographic Characteristics of Respondents

1. Name of the health NGO (Optional)…………………………………………………

2. Length of continuous service with the NGO?
   a) Less than five years ( )   b) 5-10 years ( )
   c) 10 -15 years ( )   d) Over 15 years ( )

3. How long has your NGO been in operation in Kenya?
   a) Under 5 years ( )   b) 6 – 10 years ( )
   c) 11 – 15 years ( )   d) Over 16 years ( )

4. How many employees are there in your NGO?
   a) Less than 10 ( )   b) 11 - 20 ( )
   c) 21 – 30 ( )   d) Over 31 Employees ( )

5. What percentage of your budget goes to supply chain activities?
   a) Less than 20% ( )   b) 20% - 40% ( )
   b) 40% - 60% ( )   d) Over 60% ( )
Section B: Leagile Supply Chain Practices

6. Please indicate the extent to which leagile supply chain practices have been implemented in your organization. Using the following rating: 5 = to a very large extent, 4 = Large extent, 3 = Moderate extent, 2 = Small extent, 1 = Very small extent

<table>
<thead>
<tr>
<th>Continuous improvement</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is the use of 6 Sigma to drive continuous improvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leagile processes are frequently reviewed in order to improve on them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process monitoring and operations planning is done to enhance continuous improvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are less defects, reduced setup times and order quantities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The company adopts continuous improvement through Leagile Practices</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Waste Management

- There is effective material management in our supply chain
- Minimizing waste or loss of product improves resource utilization
- Non value adding activities has been reduced over time
- Simplified processes and technologies for serving supply chain partners has been adopted
- There has been less return outwards to the suppliers
- The level of stock held by the organization is optimal as a result of using the leagile principles in your supply chain
- The firm has been able to eliminate the non-value adding Operations in its supply chain

Information sharing

- We are able to capitalize on resources, meet needs and achieve time targets because our supply chain operations run smoothly
- ICT systems enable us to share with our partners and have more timely responses
- Data and information sharing within the organization enhances our performance
- Adoption of IT in our operations has facilitated effective sharing of
information with suppliers and customers
SC partners being informed in advance of changing needs
Efficiency has enabled us to better utilize resources, meet needs, save more lives and achieve time targets
SC partners sharing information with the organization that helps establishment of business planning

**Demand management**

A responsive supply chain has assisted in meeting needs, saving lives, achieving time targets and enhanced the impact of activities
Supply chain flexibility enables us to meet needs, save more lives, achieve time targets and improve the impact of our activities and projects
We firmly manage the demand signal and collaboration from point of consumption
The firm undertakes continuous record and monitoring of customers’ demands
Knowledge sharing with supply chain partners has been enhanced to ensure customers get the right services as per their demands

---

**Section C: Supply Chain Leagility and Performance**

7. Please indicate the relationship that exists between supply chain leagility and performance have been realized in your organization. Use 1-Not at all, 2-Small extent, 3-Moderate extent, 4-Great extent and 5-Very great extent.

<table>
<thead>
<tr>
<th>Statement</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous improvement has led to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Quality service delivery to customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Reduced cost of operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Management has led to:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Supply chain flexibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Minimized cost of operations along supply chain</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>iii. Responsiveness to customer needs</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Information sharing has led to
i. Customer satisfaction
ii. Supply chain responsiveness to changes in demands
iii. Quality service delivery in Non-governmental health firms

Demand management has led to
i. Quality service delivery to customers
ii. Delivery dependability from customers
iii. Reduction in cost of serving customers due to accurate information on their demands and delivery needs

Section D: Challenges to the adoption of Leagility in supply chain

8. Please indicate the barriers of supply chain leagility implementation within your organization, rank by a tick in the appropriate box the nature and extent to which you consider these attributes significant using the following rating; 5 = to a very large extent, 4 = Large extent, 3 = Moderate extent, 2 = Small extent, 1 = Very small extent

<table>
<thead>
<tr>
<th>Challenges</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT systems are robust enough for the implementation of supply chain leagility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government policies and regulations support the implementation of a leagile supply chain</td>
<td></td>
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</tr>
<tr>
<td>Organization structure supports supply chain leagility</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policies and procedures support supply chain leagility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of collaboration with other humanitarian organizations</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Data and information is shared within the organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our staff are adequately trained and equipped to manage a leagile supply chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical infrastructure impedes our implementation of a leagile supply chain</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of collaboration with other humanitarian organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our ICS supports the implementation of a leagile supply chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU SO MUCH FOR YOUR TIME
APPENDIX II: LIST OF THE HEALTH NGO’s IN NAIROBI

1. Africa Harvest Biotech Foundation International
2. Africa Inland Mission International Services
3. AHF Plaza
4. ACTED
5. Action (African Development and Emergency Organization ADEO)
6. Africa Mental Health Foundation
7. African Institute for Health & Development
8. African population and health research centre
9. Afya Research Africa
10. Aga Khan Foundation
11. Aids Healthcare foundation
12. America Friends Service Committee
13. Amref Health Africa
14. Arise Child Development Organisation
15. Capture Foundation International
16. CARE International Kenya
17. Christian Mission Aid
18. Consortium for National Health Research. (CNHR)
19. Concern worldwide Kenya
20. Central Medical Centre
21. Centre for Adolescent and Geriatric Outreach Services
22. Centre for Development of Enterprise (CDE)
23. Centre for Health Solutions – Kenya
24. Childfund Kenya
25. Childhood Cancer Initiative
26. Clinton Health Access Initiative
27. Confessional Ecumenical Foundation
28. Crisis Pregnancy Ministries
29. DANYA International Kenya
30. Easylife Organization Clinic NGO
31. Elizabeth Glaser Pediatric Aids Foundation
32. Engender Health Ltd
33. Ecumenical Pharmaceutical Network (EPN)
34. FHI 360
35. Family Care Medical Care
36. Family Health International
37. Family Health Options (FHOK)
38. Foundation for Health and Social Economic Development Africa
39. Global Health Public Foundation
40. Green Alliance Foundation
41. Health GAP
42. Help Age
43. Hope Worldwide Kenya
44. I Choose Life
45. International Prime Services Organization
46. International Rescue Committee
47. Intersos Kenya
48. IntraHealth International Inc
49. Ipas Africa Alliance
50. JHPIEGO Kenya

51. Kenya AIDS NGO's Consortium

52. Kenya Community Based Health Financing Association.

53. Kenya Health Care Federation

54. Kenya NGO Alliance Against Malaria (KeNAAM)

55. Kenya Sustainable Health Aid (KESHA)

56. Kenya Voluntary Development Association

57. Kenya Water for Health Organization

58. Kenyan Health Care Initiatives

59. Kenyan-Hearl National Foundation

60. Kenya Society for the Mentally Handicapped

61. LVCT Health

62. Management Sciences for Health - Kenya Country Office

63. Marie Stopes Kenya

64. Mathare Child Development Centre (MCDC)

65. Map International

66. Mercy Corps

67. Moraa new hope foundation

68. Mother/Child AIDS Support Organization(MOCASO)

69. MSF Switzerland

70. National council of NGOs

71. National Organization of peer Educators – NOPE

72. NPI Africa.

73. Olive Leaf Foundation

74. Oxfam
75. PACT Kenya
76. Pan Africa Climate Justice Alliance
77. Partners for Care
78. Path finder International
79. Providence Whole Care International
80. PSI-Kenya
81. PATH Kenya
82. Poverty Be History Organization
83. Poverty Relief Aid
84. Relief International – Kenya
85. Reproductive Health Services
86. RTI International
87. Safe Water and AIDS project- SWAP
88. Save the Children
89. Separations International
90. Support For Tropical Initiative In Poverty Alleviation
91. The Association of People with AIDS in Kenya (TAPWAK)
92. The Kenya Association for Maternal & Neonatal Health- KAMANEH
93. The Kenya Red Cross
94. The National Health Development Organisation
95. The palladium group
96. The vision international
97. Tumaini Fund For Economic Development International
98. Ufadhili Trust