

**EMERGENCY SUPPLY CHAIN PREPAREDNESS AND PERFORMANCE
OF LARGE FOOD AND BEVERAGE MANUFACTURING FIRMS IN
NAIROBI, KENYA AMID COVID-19**

BY

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DEDICATION

This project is dedicated to my family for their encouragement and continuous support throughout my studies.

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Special appreciation goes to God for providing me with the strength and knowledge to work on the things I can influence, and granting me serenity to accept the things that I cannot influence. A special thanks goes to my family members, my supervisors Dr. Ombati Ogoro and Mr. Akello Earnest who gave me some insights on supply chain prowess. More appreciation all the lecturers at The University of Nairobi: School of Business, Department of Management Science for the advice, guidance and support they gave me throughout the research period.

ABBREVIATIONS AND ACRONYMS

COVID-19	Corona Virus-2019
ESC	Emergency Supply Chains
JIT	Just in Time
LFHI	Low-frequency-high-impact
RDT	Resource Dependency Theory
SCRES	Supply Chain Resilience
SCs	Supply Chains
SCV	Supply chain Visibility

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ABSTRACT

The study's purpose was to establish the influence of emergency supply chain preparedness on performance of large food and beverage manufacturing firms in Nairobi, Kenya. The study had three specific objectives: to find out the extent of adoption of emergency supply chain preparedness by the large food and beverage manufacturing firms in Nairobi, Kenya, to evaluate the effect of COVID-19 pandemic measures on large food and beverage manufacturing firms in Nairobi, Kenya and to establish the relationship between emergency supply chain preparedness and performance of large food and beverage manufacturing firms in Nairobi, Kenya. The study used descriptive research design and census was carried out on all the 46 large food and beverage manufacturing firms in Nairobi, Kenya as the population was manageable. The study used primary data which was acquired through questionnaires that were sent by electronic email by in form of google forms. The findings indicate that supply chain visibility and supply chain collaboration were adopted to a large extent whereas supply chain robustness, risk management culture and creating redundancy were adopted to a moderate extent by the large food and beverage manufacturers in Nairobi, Kenya. The manufacturers were negatively impacted by the COVID-19 measures set by the government especially lockdown, curfew hours and working from home as employees were laid off and production rates also reduced. The outcome also reveals that supply chain visibility, supply chain robustness, supply chain collaboration, risk management and culture and creating redundancy all had a positive and substantial relationship with manufacturing firm's performance as noted by the p values of less than 0.05 and thus emergency supply chain preparedness positively influences manufacturing firm's performance in Nairobi. The study recommends that managers of large food and beverage manufacturing firms must adopt emergency supply chain preparedness practices if they are to enhance their performance as it has been noted by the findings. The managers, stakeholders and decision can use the outcome of the study to ascertain supply chain emergency preparedness practices that influences firm's performance and capitalize on them to be able to enhance the performance even further. Future research should concentrate on the influence of emergency supply chain preparedness on firm's performance of small, medium and large manufacturing firms in Nairobi, and not limit to just food and beverage manufacturing firms, to see if the outcome will corroborate or contradicts this study.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Terrorist assaults, natural disasters, and health pandemics from the previous numerous years have all underlined the minimal levels of catastrophe readiness that are in many organizations (Abbas, 2009). For the duration of emergencies, numerous aid businesses are regularly faced with major troubles in the transportation of massive amounts of special items from distinctive points of origin to distinctive endpoints within the areas that catastrophe has hit. The movement of elements and relief workforces ought to be performed hastily and efficaciously to maximize the survival charge of the affected populace and reduce the expenditure on the said operations (Haghani, 2009). Thus, this interferes with the process affecting the entire supply chain and the need for Emergency Supply Chain (ESC) Preparedness.

COVID-19 outbreak has led to incredible disruption of supply chains globally and also locally. The pandemic has devastating impacts on companies and other sectors globally, large food and beverage manufacturers included. Many entities have remained shut and supply chain severely disrupted as observed by Xu, Elomri, Kerbache and El Omri (2020). A drop in global demand and the consequential commodity price drips, impacted product transformation and export performance of African nations as compared to the international counterparts on COVID-19 control measures (UNCTAD, 2020). Exporters have therefore been affected, specifically those which might be worried in key international value-chains including food and beverage manufacturers. The change-associated effects of COVID-19 depicts the enduring underutilization of African's nation's regional market.

The resource dependency theory (RDT) and transaction cost economics theory guided the research. The RDT asserts that companies are suffering from their operating environments which makes them want to control dependencies on assets through putting in place of various sorts of inter-firm arrangements (Hillman, Amy & Withers, Michael & Collins, Brian, 2009). This concept truly brings out how the supply and the amount of resources corporations have an impact on the behavior of the firm. The transaction cost economics theory alludes that for a most suitable organizational structure economic efficiency may be done with the aid of minimizing the cost of exchange.

1.1.1 Emergency Supply Chain Preparedness

Emergency supply chain preparedness entails all actions taken by an entity to enhance capability of rapidly responding within the immediate outcome of an unexpected occurrence along and across the supply chain. It involves improvement of reaction techniques, design and implementation of caution structures, plans on how to evacuate, physical activities to test emergency maneuvers and preparing an entity's employees and supply chain members with drills for responding to emergency (Tatham, 2014). Emergency preparedness entails being prepared on what groups can accomplish and undertake when faced with disastrous situations with a purpose to enhance their response whilst disaster strikes (Van, 2009).

Emergency supply chain preparedness encompasses the act of reorganizing the supply chain network with reference to resource mobilization, relief items prepositioning and postponement (Luke, 2009). To gain the proper ESC preparedness, an evaluation is important with a purpose to evaluate the demanded items and services. The variance is in the sort of catastrophe that happens, quantity of affected persons, the demanded and availability of resources and the ease with which one can be able to work on the ground. Consequently, there may be need for adopting supply chain control as a crucial strategy of responding to disasters (Ronaldo.2009).

Emergency Supply chain preparedness is the establishment of a system before the striking of an emergency so as to manage every necessary items that is needed for the rapid response to an outbreak and ascertaining that the items get to a place where they are needed as efficiently as possible. A supply chain is viewed as a system that integrates and brings together diverse specialists from the vendors to the ultimate client's service and production with an aim of ensuring that there is a flawless flow of vital information along the chain. This aids in ensuring that the company's necessities are adequately met (Azevedo et al. 2013). An emergency supply chain is organized around three components namely people and processes, commodity planning and transport and logistics. People and planning basically puts in place structures that enables the ESC to function and they are governance, organizational structure and financing. Commodity planning entails the commodities or goods that the ESC are responsible for and how they will be handled and it involves commodity forecasting, procurement and sourcing and stockpiling. Transport and logistics factors in how the products will move to where they are needed and entails warehousing and storage, transport and waste management as well as data visibility.

Supply chain emergency preparedness enables to address a Disaster better, enables in mitigating the risks and assuaging the ache caused by the disaster (Thomas, 2007). To measure ESC

preparedness this study used SC visibility, SC robustness, SC collaborations, culture of managing risk management and creating redundancy (Ho, William & Zheng, Tian & Yildiz, Hakan & Talluri, Sri, 2015).

1.1.2 Firm Performance

Firm performance is the capability of a corporation to meet its undertaking by proper management, solid leadership and a continual re-dedication to attaining desirable outcome (Richard, 2009). Bonasia (2010) alluded that organizational overall performance is attached to the ideas of effectiveness and efficiency. A commercial enterprise agency must produce the right products using the least possible assets if it is to have a robust organizational performance. Firms generally try to perform properly in a number of areas of organization (Reuter, 2010). They need to add as much cost as possible of their production procedure. Organizations try to perform well in terms of the market in that they must gain as much market share as they can. They should be generating a product that is in call for and they must be generating it at a fee that allows them to compete on the market.

Based on this study, to measure firm performance, the study used timeliness based on the ability of firms to respond to disaster and pandemics on time to meet overwhelming customer needs required to save lives. This study also used cost as a measure of performance since manufacturing firms are profit making firms and despite occurrences of disasters or pandemics and the urge to meet needs of the clients, they have to meet their sole purpose of cost minimization and profitability in the long run. Flexibility was used too to measure organizational performance to ascertain how flexible manufacturing firms can be to alarming and varying demands in times of disasters and pandemics (Van, 2011).

1.1.3 COVID-19 pandemics

Corona viruses (CoVs) are positively sensed single strated RNA viruses which are classified under sub-family of Orthocoronavitinae with 14 genera; Alpha, Beta, delta and gamma Coronaviruses. Alpha CoVs and beta CoVs have the origins from the bats and rodents, and on the other hands, delta CoVs and Gamma CoVs originates from avian species. Scientific research indicates that beta CoVs including SARSCOV-1 was put aside from bats in the year 1992 where the Civet cats were the intermediate hosts; MERS-CoV were put aside from dometry Camels in 2003, the finally the SARS-CoV-2 which was primarily named as 2019 novel coronavirus (2019-nCoV) caused COVID-19. This has the potential to be transmitted from one human to another through respiratory droplets emanating from either the following means; aerosols, by sneezing and coughs. Where

symptomatic people are key source of transmission. COVID-19 has estimated incubations time of between seven to 14 days (Anjorin, 2020). This disease promotes difficulties in respiration for which the SARS-COV-2 is responsible. The initial incidence of this virus was in the City of Wuhan, Hubei province in China on 31st Dec 2019. (WHO, 2020) From then, the virus has crossed borders from city to city country to country and continent to continent at a very high pace claiming lives of people, shut down of businesses and social policies among other havoc, (Oxford Economics, 2020).

According to (Mervin 2020), there is an urgent need for governments in Africa to put capital in resilient healthy system to establish robust response and post pandemic economic recovery (Kryk et al, 2020). Those depending on these materials from the firms were unable to have acquire them and thus hampering their operations. In as much as the flights transporting cargo had increased, Shira (2020) not that it was not enough to satisfy the needed demand. International supply chain has thus been placed at a susceptible state by the increased need of having in place a network of transportation that is safe, secure and reliable. In as much as some countries had not closed their borders, Shira (2020) indicates that most people spend a lot of time at the borders due to heightened security measures, seeking for approvals and strict custom procedures in place. The transportation of products are thus delayed and the suppliers incur additional costs.

1.1.4 Large Food and Beverage Manufacturing Firms in Nairobi

The food and beverage sector is termed as the sector that produces beverages and food products to be sold for the aim of consuming. It entails researching on and designing the product, testing the food or beverage, sourcing for the right raw material and components, process and preserving the product, ensure it is well packaged and finally advertising and marketing it to the consumers as explained by Villinus (2008). Food and beverage sector can be categorized into nine sub-sectors namely: vegetables and fruit, meat, fats, dairy and its sub-products, fish, animal feeds, starch products and grain mill and lastly beverages. Since it is essential to life and health, the sector plays a unique role in creating economic opportunities as observed by Krishnaswamy (2007).

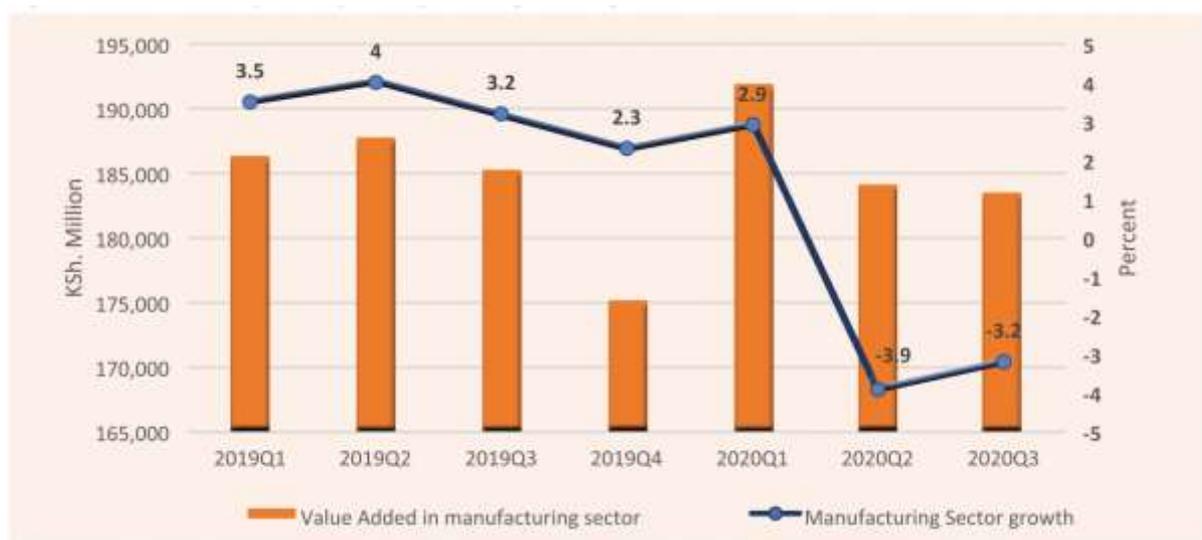
In Kenya, the biggest member of the manufacturing sector in relation to its structure, its contribution to the economy and performance is the food-processing sector, which consists of tobacco, beverage and food, with approximately 1,900 businesses ranging from small family owned entities to large multinational corporations based on the report by the KAM (2019). Large manufacturing entities are the manufacturing entities with a yearly revenue of £ 5.75 million or workers exceeding 250. According to the Kenya Association of Manufacturers (2019), Nairobi is

made up of 46 large food and beverage manufacturing companies categorized as bottled water, food, tobacco, herbs and spices, wine and beer and carbonated drinks.

In developing nations, the sector is even more important as agriculture appears to dominate almost every sector of the economy (Krishnaswamy, 2007). Many challenges face the industry, including the economic downturn, increase in prices of food, rising costs of transportation occasioned by increasing prices of oil and its by-products and a slump in demand by the consumer as per the Food and Beverage Industry Global Report (2018). Based on KNBS statistical Abstract (2020) the sector shrank by 3.9% in 2020 as compared to 2019, but it still accounted for more than a third (33.4%) of overall manufacturing output and employed 89,319 people.

Awino (2015) asserts that manufacturing is a crucial industry in the country that contributes significantly to Kenya’s economic development. The sector has the possibility of generating foreign exchange earnings and diversify the nation's economy through exports. This industry has developed with regards to its contribution to the nation's GDP and offered employment opportunities over time. The effect of COVID-19 pandemic in Kenya was strongly hit in the second quarter of 2020 since the nation implemented strict precautions intended to contain the virus's spreading. Manufacturing output fell by 3.2% in 2020 Q3 and 3.9 percent in 2020 Q2, following a 2.9 percent increase in 2020 Q1 (Figure 1.1). The reduction was seen in food and non-food manufacturers. The sector's value added fell to KSh.183 billion in 2020 Q3 from KSh.191 billion in 2020 Q1.

Figure 1. 1 Trends in quarterly manufacturing sector growth rate and value add



Source: KNBS, Quarterly GDP report, Third Quarter, 2020

1.2 Research problem

Given the existing social and economic scenery, supply chains all over the world are experiencing major disruptions and complications in adapting to the diverse needs, preferences and demands of a locked-down world. According to a report issued in April 2020 by supply chain digital, 94 percent of Fortune 1000 entities have been disrupted due to COVID-19 pandemic, with 75 percent negatively impacted (Supply Chain Digital, 2020).

Food and beverage manufacturers face a myriad of challenges including increased cost of ingredient and producing products, enhanced input duties, regulatory bodies have duplicated laws, competition within the sector, insufficient raw material supplies, increased handling of material, costs associated with advertising and distributing, sluggishly developing and implementing policies, using outdated technology and skills and emergence of COVID-19 (Kihunyu & Thogori, 2021; KAM, 2021). With these and many other challenges, the firms need to heavily invest on emergency supply chains so that they may be prepared to avert and deal with most of the challenges before they even occur

A number of studies on emergency supply chain preparedness have been conducted. Globally, Hale and Moberg (2015) researched on improving supply chain disaster preparedness and they ascertained that to achieve continued ability to meet customer needs in times of disasters there is need to store emergency supplies in each facility to cut on costs and improve the accessibility of these emergency supplies. Ala, Jahre and Luk (2016) on logistics preparedness framework and research agenda ascertained that there was no uniform understanding across firms on what makes up logistics preparedness and that lack of clear framework results to low visibility on logistics preparedness. Hurtz, Jensen and Kernberg (2016) researched on Emergency-preparedness planning in developed nations and the results demonstrate the importance of a broad empirical arena impeding numerous empirical views of the SC network in preparedness plans and shifting to continuing crises. Gunessee and Subramanian (2020) carried out a study on ambiguity and its survival mechanisms in SC teachings from Covid-19 virus and usual catastrophes. The findings ascertained a positive correlation between ambiguity and decisions involving supply chains.

Locally, Kihunyu and Thogori (2021) focused on the role of humanitarian SCM practices on performance of Kenyan international nongovernmental organizations and noted that Humanitarian SCM Practices influenced performance. Mutindi (2019) on logistics preparedness and disaster response of global humanitarian organizations ascertained that logistics preparedness enhanced disaster response of humanitarian organizations. Naburuk (2018) on Supplier collaboration and

supply chain resilience among relief organizations in Kenya noted non-existent correlation between Supplier collaboration and supply chain resilience. Njuru (2015) studied on drivers of disaster management preparedness in Nakuru's public secondary schools. The findings of this study ascertained that ministry of education funds are highly dependent on by schools in disaster preparedness followed by funds from fundraising. Ogajo (2013) researched on the influence of fire disasters on mitigation and preparedness in commercial premises in Kisumu CBD. The findings indicated that to a moderate extent, the respondents had adequate knowledge on the fire disaster equipment and preparedness.

From the previous studies, the researcher did not find any existing research that has examined emergency supply chain preparedness and firm performance in the large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic. This presents a gap that this study aims to fill by answering these questions; what is the level of emergency supply chain preparedness in large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic? What is the relationship between emergency supply chain preparedness and firm's performance of large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic?

1.3 Objectives of the study

The general and specific objectives steered the study

1.3.1 General Objectives

To investigate the influence of emergency supply chain preparedness on the firm's performance of large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic

1.3.2 Specific Objectives

- i. To determine the level of emergency supply chain preparedness in large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic
- ii. To establish the effect of COVID-19 pandemic on large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic
- iii. To determine the relationship between emergency supply chain preparedness and firm's performance of large food and beverage manufacturing firms in Nairobi, Kenya amid COVID -19 pandemic.

1.4 Value of the study

The significant finding shall be advantageous to the authorities seeing that it will shade light on what supports packages and strategies necessary to facilitate supply chain operations of manufacturing sector in Kenya. These measures will assist enhance productivity and sustainability of millennium goals such as vision 2030. Similarly, the authorities can also rely upon the findings of this study to set up programs in the manufacturing sector in Kenya to grow employment opportunities for the residents.

Manufacturing industry players may additionally rely upon the findings of this study to properly align their supply chain preparedness measures amid epidemics and other catastrophic outbreaks. This could have a wonderful impact at the competitiveness of the manufacturing corporations in Kenya as well as inform them on how well the company can be conversant with supply chain disruption to maintain their overall performance and as a consequence their profitability.

Other corporations not the manufacturing enterprise may even discover the findings of this vital on the grounds that COVID-19 has unsettled and interfered with the supply chains for all industries of enterprise entities.

To the educational researchers as well as students, findings of this study will gift extra facts and key processes in assessing supply chain preparedness. Similarly, the study will contribute know-how to the present literature in supply chain preparedness and processes to deal with epidemic and outbreak disruption on supply chain.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Manufacturing corporations had been the backbone of economic surge of many nations with the aid of rising business improvement. They play an essential position in country wide economies by using supplying job possibilities and supporting large industries (Anuar & Yusuff, 2011). To maintain these contributions, manufacturing corporations should no longer only come to be an increasing number of advanced in their technology and production procedures, however also, they need to undertake international-magnificence SCMPs. Sandhu et al. (2013) stated that SCM practices are appeared as operational features and fundamental activities inside the firm, which determines the effectiveness and performance of its supply chain. The primary aim of SCM idea is to beautify the long-term aggressive corporations' performance and their supply chains by way of integrating their capabilities, techniques, and operations internally and externally with other companions. Those companions specifically consist of the providers, manufacturers, distributors, and clients (Kim, 2006). This chapter presents the literature review, an assessment of supply chains in manufacturing firms as influenced by COVID-19 as well as empirical review on supply chain preparedness.

2.2 Theoretical Review

An overview of related theories expressing the supply chain preparedness amid COVID-19 pandemic is presented here. This study was anchored by Resource Dependence Theory and the Transaction Cost Economics Theory.

2.2.1 Resource Dependence Theory

Resource Dependence Theory explains how resources from outside given firms effect on organizational operations. The fundamental argument of RDT is that organizations depend on resources which originate from the environment, made from numerous companies (Hillman, Amy & Withers, Michael & Collins, Brian, 2009). RDT depicts businesses reliance on every other's assets which includes raw materials, goods; services, finance, and expertise, to enable facilitate their achievement Halldorson, Kotzab, Mikkola and Larsen, (2007). The theory assumes that clients and suppliers are interconnected in a network through useful resource dependence and the interrelationships are characterized with the aid of swapping of presently owned sources and co-creation of recent ones, Sanderson, Lonsdale and Mannion (2015).

RDT supports the concept of outsourcing that's one of the areas that the current researcher covers. Companies have one of a kind abilities and via outsourcing they are consequently able to benefit get admission to resources which might be in the surroundings. The idea will permit firms inside the supply chain to review their activities and determine which must be done within the company and which ought to be outsourced, the positions, roles and responsibilities that individuals in the supply chain could play, and in the end whether or not there should be incentives among the individuals to be able to in addition consequences (Halldorson et al., 2007).

2.2.2 Transaction Cost Theory

The goal of transaction cost theory is to determine the actual costs of outsourcing the production of goods or services, which includes contractual costs, costs of transacting, searching costs and costs of coordinating activities. According to Vaxevanou and Konstantopoulos (2014), the theory has been the most widely embraced outsourcing theory in recent years. This theory is thought to be the best decision-making tool for firms in determining which functions to outsource and which to perform internally, resulting in prior arrangements of implementing modifications in the entity that arise upon the outsourcing of the functions. According to Van Hoek (2000), analyzing the cost of transaction and making a trade-off decision of "buy or make" foretells that a decision maker is likely to embrace or lean towards the decision that is most likely to any lower transactional costs.

This managerial decision is typically swayed by different investment and specified asset factors as noted by Williamson (1996). When higher investment levels of specialized assets arise, a higher extent of improbability in the transaction is definite. This reduces the probability of it occurring within the firm.

As a result, transaction cost theory is an important tool in making decisions by the managers. Several studies on TC have been conducted, and their outcomes have been published. Spiller (2010) examines TC approach and compares it to the regulatory transaction cost economy theory. Teece (2010) investigates its impact on theory of management and practice. Tadelis (2010) investigates the decisions made by the firm with the aid of transactional cost theory while

2.3 Emergency Supply Chain Preparedness

The vast negative impact of disasters on people's properties and lives and the unpreparedness to the unexpected catastrophe by persons, firms or nations have occasioned the need to deeply understand and fathom how to effectively and efficiently prepare how to tackle emergency whether by individual firms or through the entire supply chains The firms are therefore working more and

coming up with innovative ways of having chains that are prepared for any emergency that arises. In the month of June and July of 2009, properties were displaced never to be found from floods in Ghana which was assumed to be worth US\$ 5,813,954.7 with a number of deaths recorded. Similar incidences occurred in 1999, 2001, 2010, 2015, etc. The cost of disasters continues to be substantial in terms of environmental and social measures such as physical damage, human sufferings, death and other psychological traumas. This has led to the setting up of various institutions such as: Japan Meteorological Agency and the National Disaster Management Organization (NADMO) in Ghana.

Ivanov et al. (2017) note that Low-frequency-high-impact (LFHI) events sustain a significant threat to supply chains (SCs) whose impact transverse through the supply chains through a ‘ripple effect’. Epidemic outbreaks are seen as a unique classification of a LFHI SC risk. Firms have placed massive actions in ensuring that they have a robust and resilient supply chains that can withstand in times of emergencies whether naturally caused or through industrial LFHI activities – for instance the Hurricane Katrina (2005), Japan’s tsunami and earthquake (2011), BASF plant explosion (2016) just to mention but a few.

Emergence COVID virus interrupted supply chains causing many firms to shut down their distribution channels as well as production. Apple’s assembler (Foxconn) is has been reported to be working below their normal capacity. Apple’s suppliers in different countries and continents were also adversely affected by lockdowns set by their respective governments and thus were unable to supply parts to them. A survey by ISM covering approximately 600 US firms indicated that vendors were operating at half their usual capacities which resulted to longer lead times as indicated by the 57% of the surveyed firms and a negative revenue bearing of between 5.6percent to 15 percent (ISM, 2020). Disaster preparedness refers to arrangements designed to ensure that a country or community is aware of and prepared for any disaster, and that if a disaster occurs, all resources and services required to deal with the situation are mobilized and deployed in an efficient and timely manner. This goal is only attainable if there is effective disaster management planning, resource management, and coordination among stakeholders. There is thus the need for entities to engage themselves in emergency supply chain preparedness practices. The emergency supply chain preparedness practices that the study focused on are SC visibility, SC robustness SC collaboration, risk management and creating redundancy which are discussed below.

2.3.1 Supply Chain Visibility

Bichanga and Mwangi (2014) define supply chain visibility as the skill of obtaining timely and accurate information along the SC activities and networks which enhances entities to make faster and more accurate decisions. Firms require a complete overview of their supply chain network to be able to coordinate and control the processes and logistical networks. One of the supply chain's ensuing competitiveness is supply chain visibility, which delivers instant, micro-level view required to perform key activities of simulation, monitoring, controlling, notifying and measuring. This ability will grow into becoming progressively critical as supply chains develop into interconnected networks, with several enterprises having control of a sole process dispersed across business partners, rather than a single enterprise controlling multiple processes.

Bichanga and Mwangi (2014) on determine the effectiveness of SCV by in the retail supply chain using Uchumi Supermarket in Kenya as an example. Supply chain visibility was found to be effective in supply chain of the retail firms. Supply chain visibility was found to be vital in gaining control over the logistics processes and network in Uchumi Supermarket. As a driver of SCV, information technology gave rise to faster flowing of information along the supply chain, enhancing accountability and transparency to supply chain members and enhanced record keeping and accurate reporting. The study however does not present the case of supply chain visibility during the period of COVID-19 pandemic in addition it has only focused on one retail firm in the retail industry thus its findings cannot be generalized to the manufacturing firms hence posing a knowledge gap to be investigated.

2.3.2 Supply Chain Robustness

A production process is seen as robust if it consistently upholds conventional performance at a favorable level, even when faced with substantial and weighty changes (Mondal Ray & Maiti, 2014). According to Brunslett (2009), "a supply chain is robust, or resilient, in the face of a threat if the threat is not capable of producing any 'lethal' effects on the system." However, what distinguishes a robust system with a resilient system is the resilient system has the means and is capable of adapting to the risk. Supply chain robustness allows for smooth procedure in a variety of situations as well as the reduction of unfavorable risk outcomes, resulting in a competitive edge as noted by Vieira and Lemos (2009). Supply chain robustness, like SCRES, is a new concept with no widely accepted description (Vieira & Lemos, 2009). As a result, it is critical to comprehend the various definitions of supply chain robustness so as to enhance a better understanding of the idea and how it relates to SCRES.

Wallenburg and Wieland (2013) views SCV as the means and capability of a SC to endure disturbance and remain functional. Whether usual activities would be resumed, the entity is capable of meeting demand of consumers, meet performance goals and the supply chain would proceed uninterrupted with daily activities. According to Xiao, Kung, and Lau (2012), the robustness of a SC system indicates its might of withstanding outside turbulences.

2.3.3 Supply Chain Collaboration

Supply chain relationships are built on integration, coordination and collaborations from clients to vendors (Shukor et al., 2020). Collaboration, according to Gu, Yang and Huo (2021), is an agreement between or among supply chain members to integrate their assets for mutual proceeds. According to Ji, Yuan, Feng and Wang (2020), entities should come up with routines and strategies that enhances collaboration between partners. The key pillars of a strategic and beneficial relationship are trust, faith and transparency (Tran, Childerhouse & Deakins, 2016). Resilinc (2018) argued that information sharing among supply chain partners assists in substituting information with lead time and stock, minimizes costs, minimize variability of demand, boosts the level of serviced and develops responsive chains. To be able to better manage risks successfully, companies are to adopt close relationships with their supply chain partners (Polyviou, Croxton & Knemeyer, 2019).

2.3.4 Risk Management culture

Risk Management is an approach that entails risk identification, evaluation, measurement and prioritization of risks followed by resource deployment to reduce or eliminate the risk, then monitor and control possibility of occurrence and or the consequences that the risk may cause and enhance achievement of opportunities. Supply chain risk management's objective is to ensure that uncertainty occurrence in business does not alter, disrupt or deflect business goals endeavors (Antunes et al., 2015). Supply chain risk mitigation thus involves taking steps to eliminate or reduce adverse effects in times of emergency along the supply chain. Development of risk mitigation culture in an organization means that the management puts in place the culture of managing risks and develops it upstream and downstream across the firm's network (Fattahi et al., 2017). Management may use several techniques to institute a culture of mitigating risks across the entity's chains of supply (MacDonald et al., 2018), assigning a team that is dedicated to managing risks in all department to assess risks along the chains and update the risk register and provide communication through clear channels as observed by Shin and Park (2021). Scheibe and Blackhurst (2018) observe that policies of risk management are to be made up of the risk concept,

preparedness in risk management and their responsibility. Furthermore, management of risks help companies to undertake analysis to evaluate, control and monitoring of risks in the supply chain department (Revilla & Saenz, 2017). Mitigating risk as it occurs by minimizing its impact is considered as a crucial part of managing risk. For a risk-mitigation strategy to be seen as successful, it should frequently result in a reduction in the negative consequences. A properly planned and well implemented strategy of mitigating risk often substitutes an uncertain occurrence with a more manageable and expectable response according to Chapman and Ward (2007).

2.3.5 Creating Redundancy

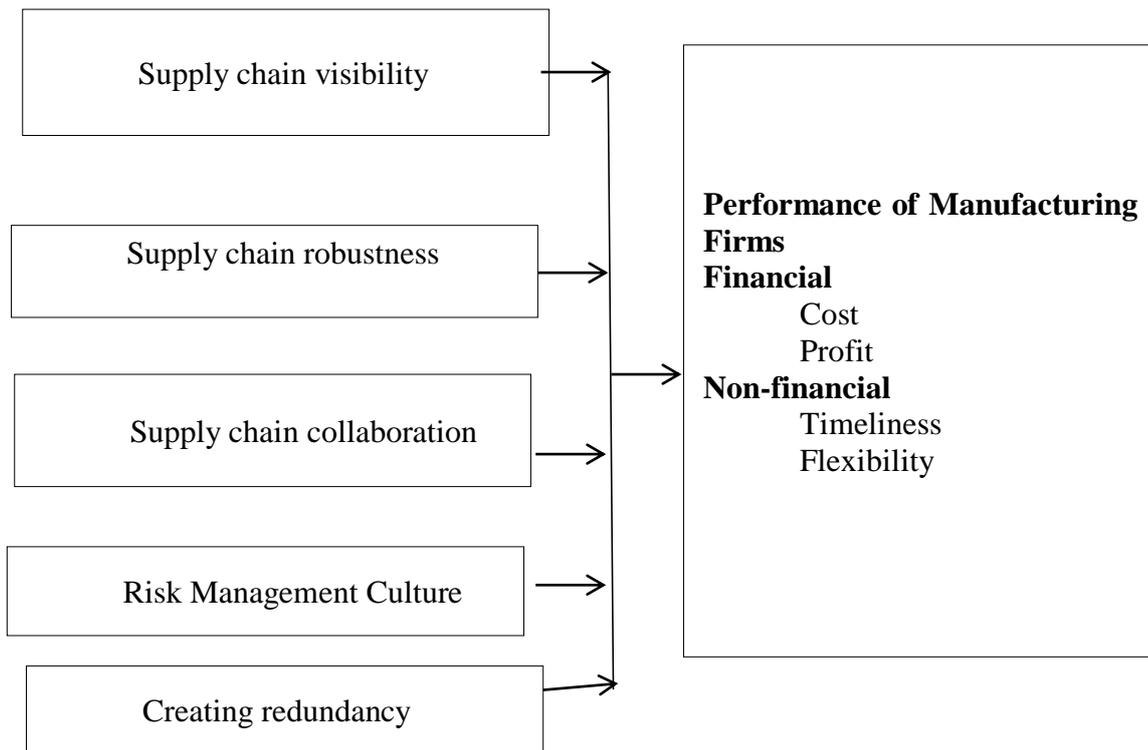
Redundancy is the well calculated and careful utilization of additional capacity and stock which may be called upon when an emergency arises to deal with, for example, absence of supply or extra demand as explained by Christopher and Peck (2004). Generating redundancy is quite a costly way of enhancing resilience. Spare capacity, for instance, is required along the crucial mean to minimize possible vulnerability and construct resilience (Gunasekaran et al., 2014). It is crucial to remember, however, that when depending on redundancy to construct SCRES, some aspects like geographic location and overall demand ought to be deliberated. If redundant vendors are located near the interrupted supply network, they may be impacted as well.

It is affirmed that redundancy entails duplicating capacity to sustain operations in case of a catastrophe (Rice & Caniato, 2003), and can be seen as a route to flexibility (Gunasekaran, Helo, & Hao, 2014). Various scholars prefer such non-redundancy-based flexibilities because they protect entity's resources as concluded by Blackhurst (2018).

2.4 Conceptual Framework

This illustrates the interrelatedness between variables Kothari (2017). The independent is emergency SC preparedness which is operationalized by SC visibility, SC robustness, SC collaboration, culture of managing risk and creating redundancy. Dependent variable is the manufacturing firm's performance and it's characterized by financial and non-financial performance.

Figure 2. 1 Conceptual Framework



Independent Variables

Dependent Variable

Source: Modified from Dolgui et al. (2018)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter highlights the methodology deployed in seeking answers for the research's questions and the objectives. Specifically, the chapter covered the study's design that was adopted, outline the target population, lay out how data was collected and the targeted respondents and finally reveal how each objective was analyzed. These are discussed below.

3.2 Research Design

Descriptive design was adopted in order to achieve the objectives. It allowed the researcher to have firsthand information with optimum control of other variables such as bias information that would interfere with validity of the findings (Burns, 2003). Descriptive research design is often used to describe a population's characteristic and since the study aimed at answering the "what" questions, then it was the most suitable research design for this study (Cooper & Schindler, 2008).

3.3 Population

This is an assembly of components and people who are under investigation (Ngechu, 2004). Target population refers to the population from whom information needed in the study is obtained from. The research focused on all Nairobi's large food and beverage manufacturers which are 46 as can be seen in APPENDIX III (KAM, 2019). The population was studied wholesomely and as a result, census method was used as it is appropriate (Statpak, 2014).

3.4 Data Collection

The study mainly relied on primary data sources that were acquired by structured questionnaires. The questionnaire mainly contained questions developed from the objectives. The Questionnaire was segmented into four parts. Part I covered the demographic information, Part II had emergency supply chain preparedness dimensions, Part III featured the effects of COVID-19 effect parameters and Part IV covered firm's performance dimensions. The questionnaires were dispensed using the drop-and-pick later method as well through electronic mail. There are several data collection instruments a researcher can engage in the process of collecting data for a study. The primary data illustrated the actual scenario of the affiliation between variables. Therefore, the use of the questionnaires was the preferred option as it was more effective, elaborate and the most cost-effective way of gathering information in a short duration. The targeted research respondents were

the Procurement and or Supply Chain Manager as they relate closely with the suppliers and every member along the supply chain as well as their involvement in making strategic decisions thus were best suited to answer questions. One questionnaire was sent for each large food and beverage manufacturing firm and thus 46 respondents from the 46 large food and beverage manufacturing firms

3.5 Data Analysis

The data was quantitatively analyzed through SPSS. Ogula (1998) views analysis of information as an activity involving transforming data into summaries. The research made use of SPSS to analyze data using descriptive statistics and tables were used to present the outcome. Descriptive statistics analyzed objective (i) and (ii) while objective three was analyzed using regression analysis with emergency supply chain preparedness as the independent variables and firm's performance as the dependent variable.

The regression model for this study is shown below.

$$Y_1 = \beta_0 + \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5 +e.....$$

Where;

Y= Firms Performance

X₁= Supply chain visibility

X₂= Supply chain robustness

X₃= Supply chain collaboration

X₄= Risk management culture

X₅= Creating redundancy

β₀ = Constant

Table 3.1 outlines a summary of collecting data tools and data analysis techniques. The table guided the researcher in knowing how the objectives of the study was achieved methodologically.

Table 3. 1 Summary of data collection and data analysis

Objectives	Data to be collected	Method of data collection	Analysis needed
Background information	PART I	Structured Questionnaire	Descriptive Statistics
Emergency supply chain preparedness	PART II	Structured Questionnaire	Descriptive Statistics
COVID-19 Pandemic measures	PART III	Structured Questionnaire	Descriptive Statistics
Emergency supply chain preparedness and firms performance	PART IV	Structured Questionnaire	Regression analysis

Source; Study Data (2021)

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

The aim of the research was to establish the influence of emergency supply chain preparedness on organizational performance of the large food and beverage manufacturing firms in Nairobi. Chapter four focuses on the analysis of the collected data from the respondents, tabulates the results and discusses the findings as per the objectives.

4.2 Response Rate

The study targeted 46 large manufacturers of food and beverage in Nairobi. The researcher managed to collect 37 complete questionnaires representing 80.43% reply rate which was seen as satisfactory for data analysis. Table 4.1 illustrates the outcome.

Table 4. 1 Rate of Response

Response	Frequency	Percent
Returned questionnaires	37	80.43
Unreturned questionnaires	9	19.57
Total	46	100

Source: Study Data (2021)

4.3 General information

The general information was collected from the large food and beverage manufacturers in Nairobi to get a view on the respondents as well as the manufacturing firms itself. This covered the educational level of the respondents, position that they occupied in the manufacturing entities, and how long they had worked in the manufacturing firms of which the results are subsequently discussed.

4.3.1 Education Level

The study aimed at establishing the level of academic that the participants had attained the highest. Table 4.2 illustrates that 5.41% had certificate as their highest level of education, 13.51% had attained diploma level, 54.05% had bachelor's Degree while 27.03% had master's degree as the highest education level. Hence, majority had attained above bachelor's degree as the highest levels and thus were well educated and had knowledge to contribute in the study. The participants of the study were well educated meaning that the large food and beverage manufacturing firm's employs educated personnel to fill the managerial positions and thus they are exposed and well informed.

Table 4. 2 Education Level

Level of Education	Frequency	Percentage
Certificate level	2	5.41
Diploma level	5	13.51
Bachelor’s Degree level	20	54.05
Master’s Degree level	10	27.03
Total	37	100

Source: Study Data (2021)

4.3.2 Position in the Manufacturing firms

The study aimed at finding out the managerial level that the respondents belonged to. Table 4.3 shows that 18.92% of those who provided the data were junior level staff, 37.84% were mid-level managers while 43.24% were senior level managers. The findings indicate that those who participated in the survey were from diverse managerial levels at the large food and beverage manufacturers in Nairobi. However, a large percentage (81.08%) of the study’s participants were from mid-level to senior level an indication that qualified managers and officers filled the questionnaires and the results can be depended upon

Table 4. 3 Managerial level

Position held	Frequency	Percentage
Junior	7	18.92
Mid-level	14	37.84
Senior	16	43.24
Total	37	100

Source: Study Data (2021)

4.3.3 Length of service

The research set out to know the time frame managers and officers held the positions they were in. Table 4.4 displays that 8.11% of participants had worked for a period not exceeding one year, 13.51%, for one to five yrs, 24.32% for 5 to 10 yrs, 32.44% for ten to fifteen years while the last 21.62% had worked for over fifteen years in the manufacturing firms. This affirms that larger percentage of study’s participants had accrued sufficient experience in the organization and were fit to provide the data.

Table 4. 4 Length of service

Length of service	Frequency	Percentage
Below 1 year	3	8.11
1-5 years	5	13.51
5-10 years	9	24.32
10-15 years	12	32.44
Above 15 years	8	21.62
Total	37	100

Source: Study Data (2021)

4.4 Emergency supply chain preparedness

Objective one sought to determine the extent of adoption of emergency SC preparedness by large food and beverage manufacturing firms in Nairobi and the findings are subsequently discussed.

4.4.1 Supply chain visibility

The study wanted to find out the extent that the large manufacturers of food and beverage in Nairobi had adopted supply chain visibility. From table 4.5, timely and efficient resource reconfiguration (M=3.95, SD=1.13), existence of coordination visibility which aids partners in recognition of the value of their present resources (M=3.55, SD=1.47) and the firm being able to learn and gain new information and knowledge from its supply chain members to aid in emergency preparations (M=3.92, SD=0.73) were all adopted to a large extent by the large food and beverage manufacturers in Nairobi. The company having the visibility for sensing and predicting disruptions on its supply chain to enhance its preparedness positively (M=3.22, SD=1.98) and the firm having the ability to obtain timely external information and rapidly recognize variations in the environment (M=3.34, SD=1.77) were moderately adopted. This means that large food and beverage manufacturers have adopted supply chain visibility to a large extent an indication that the visibility practices are vital in enhancing organizational performance.

Table 4. 5 Supply chain visibility

Factor	Mean	Std. Dev
Timely and efficient resource reconfiguration	3.95	1.129
Existence of coordination visibility which aids partners in recognition of the value of their present resources	3.55	1.474
The company has visibility for sensing and predicting disruptions on its supply chain thus enhancing its preparedness positively	3.22	1.981
The firm has ability to obtain timely external information and rapidly recognize variations in the environment	3.34	1.767
The firm is able to learn and gain new knowledge and information from SC members to aid in emergency preparations	3.92	0.729
Aggregate Score	3.59	1.561

Source: Study Data (2021)

Supply chain visibility was adopted to a large extent (M- 3.59, SD-1.56). The outcome concurs with literature of Bichanga and Mwangi (2014) who found that supply chain visibility aids the firm in obtaining timely and accurate information along the SC activities and networks which enhances entities to make faster and more accurate decisions. Visibility also leads to faster flowing of

information along the supply chain, enhancing accountability and transparency to supply chain members and enhanced record keeping and accurate reporting. Mondal et al. (2014) note that SC Visibility enhances competitiveness is supply chain by delivering of instant, micro-level view required to perform key activities by the firm.

4.4.2 Supply chain robustness

The study aimed at finding out the extent of adoption of SC robustness by the large food and beverage manufacturers in Nairobi. Table 4.6 shows that the company`s supply chain having the ability to resist or avoid disruption was moderately adopted with the means of 3.42 and SD of 1.65 and the company`s SC being capable of providing sustainable value creation under emergency circumstances was moderately with a mean of 3.42 and SD of 1.71. The company`s SC has the ability to carry out its functions during emergency periods (M=3.21, SD=1.88), The firm has the ability to meet consumer demand during disruptions (M=3.38, SD=1.76) and The firm`s supply having the ability to normally continue operating after a risky situation occurs (M=3.19, SD=1.87) were moderately adopted as viewed from the deviations and means. Aggregately, supply chain robustness was adopted to a moderate extent an indication that the large food and beverage manufacturing firms have not invested too much in supply chain robustness practices because maybe they do not view it to have too much affirmative impact on the firm`s performance.

Table 4. 6 Supply chain robustness

Factor	Mean	Std. Dev
The company`s SC has the ability to resist or avoid disruption.	3.45	1.65
The company`s SC is in a position to provide and create sustainable value upon emergency circumstances	3.42	1.71
The company`s SC has the ability to carry out its functions during emergency periods.	3.21	1.88
The firm has the ability to meet consumer demand during disruptions	3.38	1.76
The firm`s supply chain has the ability to normally continue operating after a risky situation occurs	3.19	1.87
Aggregate Score	3.34	1.78

Source: Study Data (2021)

The aggregate score indicates that supply chain robustness was adopted to a medium extent as evidenced by the mean-3.34 and SD -1.78. The results goes against that of Vieira & Lemos (2009) who determined that supply chain robustness allows for smooth procedure in a variety of situations as well as the reduction of unfavorable risk outcomes, resulting in a competitive edge. Wallenburg and Wieland (2013) adds that SCV provides the supply chains with the means and capability to endure disturbance and remain functional. Until the resumption of normal activities, supply chain

robustness ensures that the entity is capable of meeting demand of consumers, meet performance goals and the supply chain would proceed uninterrupted with daily activities as noted by Xiao, Kung et al. (2012)

4.4.3 Supply chain collaboration

The study wanted to find out the level of adoption of supply chain collaboration by the large food and beverage manufacturers in Nairobi. From table 4.7, the firm having an integrated system to enhance collaboration with partners (M=3.91. SD=1.09), the firm involving key suppliers and clients and promptly share relevant information with them (M=3.62. SD=1.16) and the firm having transparent systems to enhance trust and faith with suppliers and clients (M=3.54. SD=1.09) were adopted to a large extent as per the means. The firm coordinating with main suppliers and clients (M=3.43. SD=1.55) and the firm sharing vital information with key shareholders and stakeholders (M=3.41. SD=1.99) were both adopted to a medium extent based on their standard deviations and means. The aggregate score indicate that supply chain collaboration was adopted to a large extent by the food and beverage manufacturers in Nairobi an indication that the manufacturing firms hold supply chain collaboration with high regards and it vital for their performance and that is why they are investing too much in supply chain collaboration practices

Table 4. 7 Supply chain collaboration

Factor	Mean	Std. Dev
The firm has an integrated system to enhance collaboration with partners	3.91	1.09
The firm coordinates with main suppliers and clients	3.43	1.55
The firm involves key suppliers and clients and promptly share relevant information with them	3.62	1.16
The firm has transparent systems to enhance trust and faith with suppliers and clients	3.54	1.09
The firm shares vital information with key shareholders and stakeholders	3.41	1.99
Aggregate score	3.58	1.57

Source: Study Data (2021)

From the aggregate score, it is evident that supply chain collaboration was adopted to a large extent by the large food and beverage manufacturers in Nairobi as indicated by the mean of 3.58 and SD of 1.57. The outcome is consistent with that of Resilinc (2018) who argued that information sharing among supply chain partners assists in substituting information with lead time and stock, minimizes costs, minimize variability of demand, boosts the level of serviced and develops responsive chains. To be able to better manage risks successfully, companies are to adopt close relationships with their supply chain partners as supported by Polyviou, et al., 2019.

4.4.4 Risk management culture

The study aimed at finding out the adoption levels of risk management culture by the large food and beverage manufacturers in Nairobi. Table 4.8 indicates that the firm having a robust risk management department had a mean of 3.61 and SD of 1.38 an indication that it was adopted to a large extent. The firm having a culture of risk management and mitigation (M=3.32, SD=1.69), the firm periodically carries out risk assessment (M=3.43, SD=1.61) and the firm having worked out scenarios of dealing with supply chain disruptions (M=3.24, SD=1.79) were adopted to a medium extent as per their respective means. It is crystal that some of the risk management culture practices were adopted to a large extent while others to a moderate extent. However, the overall score indicate that risk management culture was adopted to a moderate extent. This means that minimal emphasis was given to the risk management culture practices, albeit the clear benefits given by the literature on the relevance of managing risk in emergency supply chain preparedness,

Table 4. 8 Risk management culture

Risk management culture	Mean	Std. Dev
The firm has a robust risk management department	3.61	1.38
The firm has a culture of risk management and mitigation	3.32	1.69
The firm periodically carries out risk assessment	3.43	1.61
The firm has worked out scenarios of dealing with supply chain disruptions	3.24	1.79
Aggregate score	3.41	1.62

Source: Study Data (2021)

Aggregately, risk management culture was adopted to a moderate extent as indicated by the mean of 3.41 and SD of 1.61. The outcome contradicts that of Antunes et al. (2015) who asserts that risk management culture is key to an entity as it ensures that uncertainty occurrence in business does not alter, disrupt or deflect business goals. Revilla and Saenz (2017) also note that management of risks help companies to undertake analysis to evaluate, control and monitoring of risks in the SC department and also be able to mitigate it when it occurs by minimizing its impact.

4.4.5 Creating redundancy

The study wanted to ascertain the level of adoption of creating redundancy by the large food and beverage manufacturers in Nairobi. Table 4.9 portrays that the firm often holding buffer and emergency inventory of ingredients and finished products to be utilized during disruptions was adopted to a large extent as evidenced by the mean of 3.53 and SD of 1.45. The firm having redundant facilities to enable its SC to sustain the operational process even in disruptive seasons when a given facility is rendered non-functional (M=3.32, SD=1.79), the firm utilizing back-up

plants of a crucial facility amid disruptions to sustain the operation's process (M=3.48, SD=1.64) and the firm having the ability to obtain instant information from outside and rapidly identify changes in the surrounding before and during emergency (M=3.43, SD=1.76) were adopted to a medium extent as per the means and SD. The aggregate score shows that creating redundancy, as an emergency supply chain preparedness strategy, was adopted to a moderate extent an indication that the large food and beverage manufacturing firms did not lay much emphasis on it.

Table 4. 9 Creating redundancy

Creating Redundancy	Mean	Std. Dev
The firm often holds buffer and emergency inventory of ingredients and finished products to be utilized during disruptions	3.53	1.45
The company has redundant facilities to enable its SC to sustain the operational process even in disruptive seasons when a given facility is rendered non-functional	3.32	1.79
The company utilizes back-up plants of a crucial facility amid disruptions to sustain the operation's process.	3.48	1.64
The firm has ability to obtain instant information from outside and rapidly identify changes in the surrounding before and during emergency	3.43	1.76
Aggregate score	3.44	1.67

Source: Study Data (2021)

The aggregate score with the mean of 3.44 and SD of 1.67 indicates that creating redundancy was adopted to a moderate extent by the large food and beverage manufacturers in Nairobi. The findings contradicts that of Hale & Moberg (2015) who ascertained that to achieve continued ability to meet customer needs in times of disasters, there is need to store emergency supplies in each facility to cut on costs and improve the accessibility of these emergency supplies. Redundant chains aids in dealing with the absence of supply or extra demand as explained by Christopher and Peck (2004

4.5 Impact of COVID-19 measures

Objective two sought to establish the effect of COVID-19 pandemic on large food and beverage manufacturing firms in Nairobi, Kenya. From table 4.10, Lockdown measures to contain COVID-19 limited access to raw materials to a large extent as shown by the mean of 4.29 and SD of 0.87. Working from home initiatives negatively affected company's ability to meet its production targets to a large extent as illustrated by the mean of 4.24 and SD of 0.72. Stern quarantine measures and wide pre-conditions to restart operations affected the company's performance (M=4.16, SD=0.95) and unpredictable rules applied across diverse jurisdictions and at different stages of government

caused SC disruptions (M=3.91, SD=1.16) to a large extent as shown by their individual means. Lastly, Lock-down measures and curfew hours negatively impacted the firm’s performance to a large extent as per the mean (3.90) and SD 1.18). The aggregate score (M=3.91, SD=1.16) indicates that COVID-19 measures that were put in place affected large food and beverage manufacturing firms to a large extent.

Table 4. 10 Impact of COVID-19 measures on food and beverage manufacturing firms

Impact of COVID 19 measures	Mean	Std. Dev
Lockdown measures to contain COVID-19 limited access to raw materials	4.29	0.87
Working from home initiatives negatively affected company’s ability to meet its production targets	4.24	0.72
Stern quarantine measures and strict pre-conditions to restart operations affected the company’s performance	4.16	0.95
unpredictable rules applied across diverse jurisdictions and at different stages of government caused SC disruptions	3.91	1.16
Lock down measures and curfew hours negatively impacted the firms performance	3.90	1.18
Aggregate score	4.10	0.85

Source: Study Data (2021)

4.6 Emergency supply chain preparedness and firm’s performance

The researcher wanted to establish the association between emergency SC preparedness and firm’s performance amongst large food and beverage manufacturers in Nairobi and the results are discussed below.

4.6.1 Regression Model Summary

Table 4.11 displays the regression model summary of the study.

Table 4. 11 Regression Model Summary

Model	R	R square	Adjusted square	R	Std. Error of the Estimate
I	.882	.654	.723		.176

a. Predictors: (Constant), emergency supply chain preparedness

b. Dependent Variable: firm’s performance

Source: Study Data (2021)

From table 4.11 R^2 is 0.654. This implies that 65% of the firm’s performance is accredited to SC visibility, SC robustness, SC collaboration, culture of managing risk and creating redundancy. This

is considered a good model as just 34.6% of the percentage in the firm's performance is unexplained.

4.6.2 Analysis of Variance

ANOVA gives statistical procedures utilized for testing the relevance of a regression model and is illustrated in the table below.

Table 4. 12 ANOVA Analysis

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	7.891	4	1.342	3.625	.013 ^b
Residual	0.635	32	0.052		
Total	8.526	36			

Source: Study Data (2021)

From table 4.12, the P value of 0.013 (F=3.625) does not exceed 0.05 (5%). This signifies that the model is a suitable predictor of performance and that SC visibility, SC robustness, SC collaboration, culture of managing risk and creating redundancy has a significant correlation with firm's performance.

4.6.3 Regression coefficients

The regressed coefficients were utilized to decide the value of emergency supply chain preparedness and the outcome is presented in table 4.13.

Table 4. 13 Coefficients Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	5.897	1.934		4.529	0.03
SC Visibility	9.475	0.143	0.473	2.545	0.02
SC Robustness	1.981	0.068	0.136	6.746	0.04
SC Collaboration	3.437	0.08	0.764	4.133	0.02
Risk Culture	0.543	0.035	0.543	16.873	0.01
Creating Redundancy	6.376	0.166	0.482	5.650	0.03

Source: Study Data (2021)

The established linear regression equation becomes:

$$Y = 5.897 + 9.475X_1 + 1.981X_2 + 3.437X_3 + 0.543X_4 + 6.376 X_5$$

Where

Y = Firm's performance

X1= supply chain visibility

X2= supply chain robustness

X3= supply chain collaboration

X4= risk management and culture

X5=creating redundancy

From table 4.13, emergency supply chain preparedness (supply chain visibility (t=2.545, P<0.05), supply chain robustness (t=6.476, P<0.05), supply chain collaboration (t=4.133, P<0.05), risk management and culture (t=16.873, P<0.05) and creating redundancy (t=5.650, P<0.05) all possess an affirmative and substantial correlation with the firm's performance. The model illustrates that after SC visibility, SC robustness, SC collaboration, a culture of managing risk and creating redundancy are upheld at a constant, the value of firm's performance becomes 5.897.

4.7 Discussion of study findings

The research had been guided by three objectives all of which were fulfilled. The first objective had to ascertain the extent of adoption of emergency SC preparedness and performance of large food and beverage manufacturing firms in Nairobi. The emergency supply chain preparedness practices covered include SC visibility, SC robustness, SC collaboration, a culture of managing risk and creating redundancy.

Supply chain visibility and supply chain collaboration were adopted to a large extent while supply chain robustness, culture of managing risk and creating redundancy were adopted to a moderate extent by the large food and beverage manufacturing firms in Nairobi. The findings on supply chain visibility concurs with that of Bichanga and Mwangi (2014) who found that supply chain visibility aids the firm in obtaining timely and accurate information along the SC activities and networks which enhances entities to make faster and more accurate decisions. Visibility also leads to faster flowing of information along the supply chain, enhancing accountability and transparency to supply chain members and enhanced record keeping and accurate reporting. Supply chain collaboration was adopted to a large extent by the large food and beverage manufacturing firms in Nairobi an indication that collaboration practices are crucial for the manufacturing firms The outcome is consistent with that of Resilinc (2018) who argued that information sharing among

supply chain partners assists in substituting information with lead time and stock, minimizes costs, minimize variability of demand, boosts the level of serviced and develops responsive chains.

There has also been contrasting and contradictory findings in that it was established that supply chain robustness was adopted to a moderate extent an indication that the manufacturers did not put too much emphasis on the robustness strategies. Vieira & Lemos (2009) determined that supply chain robustness allows for smooth procedure in a variety of situations as well as the reduction of unfavorable risk outcomes, resulting in a competitive edge and thus is vital for an entity. Findings on risk management culture is also contradicted by that of Antunes et al. (2015) who asserts that risk management is key to an entity as it ensures that uncertainty occurrence in business does not alter, disrupt or deflect business goals endeavors. The final disagreeing outcome of Hale and Moberg (2015) found that to achieve continued ability to meet customer needs in times of disasters, there is need to store emergency supplies in each facility to cut on costs and improve the accessibility of these emergency supplies and thus the need of creating redundancies in supply chains.

Objective two sought to establish the effect of COVID-19 pandemic measures on large food and beverage manufacturing firms in Nairobi. The COVID-19 measures found to negatively affect the manufacturers in Nairobi includes lockdown measures to contain COVID-19, working from home, strict regulations set by MoH, restrictive measures of quarantine, ever changing rules to be effected without prior notice and enactment of curfew hours.

On the third objective, overall outcome established that emergency SC preparedness practices (SC visibility, SC robustness, SC collaboration, risk management culture and creating redundancy) have an affirmative and significant correlation with manufacturing firm's performance. The outcome is consistent with that of Shareef, Dwivedi, Mahmud, Wright, Rahman, Kizgin and Rana (2019) who noted that supply chain visibility, agility and robustness are key in enhancing a firm's performance during emergencies. Mutindi (2019) ascertained that logistics preparedness enhanced disaster response of humanitarian organisations. Kihunyu and Thogori, (2021) noted that disaster SCM practices influenced performance of international nongovernmental organizations in Kenya. Bichanga and Mwangi (2014) who found that supply chain visibility aids the firm in obtaining timely and accurate information along the SC activities and networks which enhances entities to make faster and more accurate decisions. Supply chain robustness allows for smooth procedure in a variety of situations as well as the reduction of unfavorable risk outcomes, resulting in a competitive edge and improved firm's performance (Vieira & Lemos, 2009). Supply chain risk

management ensures that uncertainty occurrence in business does not alter, disrupt or deflect business goals as well as in enhancing continuity in operation (Antunes et al., 2015).

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the key outcome of the research, concludes as per the findings, recommendations, limitations and suggestion for future research

5.2 Summary of the study

The study aimed at investigating the influence of emergency supply chain preparedness and large food and beverage manufacturing firm's performance in Nairobi. The objectives were to ascertain the level of adoption of emergency SC preparedness, impact of Covid-19 pandemic and the correlation between emergency supply chain preparedness and large food and beverage manufacturing firm's performance in Nairobi.

On the level of emergency supply chain preparedness adoption by the large food and beverage manufacturers in Nairobi, supply chain visibility and supply chain collaboration were adopted to a large extent. This indicates that the food and beverage manufacturers valued SC visibility and SC collaboration practices and that they play a huge role in ensuring that the large food and beverage manufacturers in Nairobi enhances their firm's performance. Supply chain robustness, risk management culture and creating redundant supply chains were adopted to a moderate extent. This implies that the food and beverage manufacturers have moderately invested in supply chain robustness, risk management culture and creating redundancy as they are viewed to have a medium influence of the firm's performance and thus they are not given too much priorities.

On establishing Covid-19's effect on large food and beverage manufacturers in Nairobi, the COVID-19 measures found to negatively affect them includes working from home, strict regulations set by MoH, restrictive measures of quarantine, ever changing rules to be effected without prior notice and enactment of curfew hours. On ascertaining the correlation between emergency supply chain preparedness and firm's performance, emergency SC preparedness (SC visibility, SC collaboration, robustness, risk management culture and creating redundancy) was established to contain a statistically substantial correlation with firm's performance as supported by the p value of less than 5%.

5.3 Conclusions

The outcome from this study visibly indicates that emergency supply chain preparedness significantly and positively influence large food and beverage firm's performance through minimized costs, enhanced profits, improved timeliness and better flexibility. It is hence concluded that firms need to adopt emergency supply chain preparedness (SC visibility, SC collaboration, SC robustness, risk management culture and creating redundancy) if they are to enhance their performance evidenced by reduced operational cost and increased sales which widens their margins. The firm will also manage to keep timely delivery of services offered and goods delivered to their clients which will lead to satisfied customers as well as enhanced operational flexibility.

Emergency supply chain preparedness (SC visibility, SC collaboration, SC robustness, risk management culture and creating redundancy) have been adopted to different extent as SC visibility and SC collaboration were adopted to a large extent whereas supply chain robustness, risk mitigation culture and having redundant supply chains were moderately adopted. Adoption of emergency supply chain preparedness have been found to have a statistical significant correlation with a firm's performance as observed by their respective p values which was lower than five percent. This thus imply that emergency supply chain preparedness influence a firms' financial and non-financial performance.

It can be concluded that Covid-19 has negatively affected large food and beverage manufacturers in Nairobi through reduced working hours and strict measures set by the ministry of health to curb the spread of the pandemic. Workers were laid off with others working from home which negatively affected company's ability to meet its production targets. Further, a conclusion is drawn that firms that adopt SC visibility, SC robustness, SC collaboration, risk management culture and creating redundancy are likely to enhance their firm's performance in both the financial and non-financial aspects.

5.4 Recommendations

Based on the outcome, it is recommended that firms ought to adopt supply chain visibility so as to enhance their performance. Supply chain visibility was adopted to a large extent and the study recommends that managers must put more emphasis on having the ability to reconfigure supply chain resources efficiently and in a timely manner. The entities also need to have the visibility for sensing and predicting disruptions on its supply chain to enhance its preparedness positively as well as enhancing faster flowing of information along the supply chain, leading to accountability

and transparency. The study recommends that supply chain robustness must be embraced to a large extent by the large food and beverage manufacturers in Kenya as it was noted that supply chain robustness was adopted to a medium extent. The firm's SC should have the ability to resist or avoid disruption as well as being capable of providing sustainable value creation under emergency circumstances. The company's SC also need to have the ability to carry out its functions during emergency periods so that they can be able to meet consumer demand during disruptions.

It is recommended that risk management be adopted to a large extent since it was found be moderately adopted in the large food and beverage manufacturers in Nairobi. Managers and decision makers need to put in place a robust risk management department and have in place a culture of risk management and mitigation. The firms also need to engage themselves in periodically carrying out risk assessment and executing worked out scenarios of dealing with supply chain disruptions so that they can be able to tackle disruptions as they appear. Having redundant supply chains should also be adopted to a large extent by the manufacturers if they are to enhance their financial and non-financial performances since redundant supply chains was moderately adopted. The firms must hold emergency stocks of materials and goods to be utilized during emergency as well as have redundant facilities to permit its SC to sustain the operational process even in disruptive seasons when a given facility is rendered non-functional.

Lastly, the study recommends the implementation of emergency supply chain preparedness to a large extent by the large food and beverage manufacturers in Nairobi as it has been established that emergency supply chain preparedness (SC visibility, SC robustness, SC collaboration, risk management and creating redundancy) influences their performance (financial and non-financial).

5.5 Suggestions for future research

Upcoming studies need to explore why some emergency supply chain preparedness techniques are adopted to a large extent and others immoderately adopted. Other emergency supply chain preparedness practices which are not covered in this study should also be explored and their influences on performance ascertained.

Other studies should focus on how emergency supply chain preparedness practices influences other performance metrics like operational, supply chain, competitiveness, responsiveness or even client's satisfaction.

Future studies should also focus on emergency supply chain preparedness in other sectors (retailing, franchises, pharmaceuticals or county governments) apart from large food and beverage

manufacturers in Nairobi. The context can also be changed from Nairobi to other towns like Mombasa, Kisumu or generally in Kenya.

Drivers of emergency supply chain preparedness practices can also be grounds for upcoming possible studies

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APPENDICES

APPENDIX I: INTRODUCTION LETTER FOR RESEARCH



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FACULTY OF BUSINESS AND MANAGEMENT SCIENCES
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12 October 2021

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

INTRODUCTION LETTER FOR RESEARCH
VALLERY AKINYI DULO REGISTRATION NO. D67/19826/2019

This is to confirm that the above named is a bona fide student in the Master of Science in Supply Chain Management (MSc. SCM) degree program in this University. She is conducting research on *"Emergency Supply Chain Preparedness and Performance of Large Food and Beverage Manufacturing Firms in Nairobi, Kenya, Amid Covid-19."*

The purpose of this letter is to kindly request you to assist and facilitate the student with necessary data which forms an integral part of the Project. The information and data required is needed for academic purposes only and will be treated in **Strict-Confidence**.

Your assistance will be highly appreciated.

Thank you



PROF JACKSON MAALU
DEAN, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES

APPENDIX II: QUESTIONNAIRE

Kindly spare some time to fill this questionnaire. Your input shall be absolutely anonymous, but your response with other respondents will be highly valuable for the analysis of emergency SC preparedness in manufacturing firms in Kenya. Your feedback is for academic use only.

PART 1: BIO DATA

Please tick where appropriate

Age

less than 30yrs 30 to 39 40 to 49 50 to 59 60 and above

Level of Education

Certificate level

Diploma Level

Bachelor's Degree level

Master's Degree level

Other

What position do you hold in your current position?

Junior

Mid-Level

Senior

How long have you served in the current position?

Less than a year 1 - 5 years 5 - 10 year 10- 15 years Above 15years

PART 2: Emergency SC preparedness measures

Kindly rate the level of your agreement with the subsequent measures of emergency Supply Chain Preparedness measures in your company. You have been provided with a 5 points likert scale where 5 represents strongly agree, 4 represents agree, 3 represents neither agree nor disagree, 2 represents disagree and finally 1 represents strongly disagree

Supply chain visibility	5	4	3	2	1
Timely and efficient resource reconfiguration of resources					
Existence of coordination visibility which aids partners in recognition of the value of their present resources					
The company has visibility for sensing and predicting disruptions on its supply chain thus enhancing its preparedness positively.					
The firm has ability to obtain timely external information and rapidly recognize variations in the environment					
The firm is able to learn and gain new knowledge and information from SC members to enhance emergency preparations					
Supply chain robustness	5	4	3	2	1
The company`s supply chain is able to resist or avoid disruption.					
The company`s SC is capable of availing and generating value sustainably amid emergency circumstances					
The company`s SC has the ability to carry out its functions during emergency periods.					
The firm has the ability to meet consumer demand during disruptions					
The firm`s supply chain has the ability to normally continue operating after a risky situation occurs					
Supply Chain Collaboration	5	4	3	2	1
The firm has an integrated system to enhance collaboration with partners					
The firm coordinates with main suppliers and clients					
The firm involves key suppliers and clients and promptly share relevant information with them					
The firm has transparent systems to enhance trust and faith with suppliers and clients					
The firm shares vital information with key shareholders and stakeholders					
Risk Management Culture	5	4	3	2	1
Existence of a robust risk management department					
Present culture of risk management and mitigation					

The firm periodically carries out risk assessment					
The firm has worked out scenarios of dealing with supply chain disruptions					
Creating Redundancy	5	4	3	2	1
The firm often holds buffer and emergency inventory of ingredients and finished products to be utilized during disruptions					
The company has redundant facilities to enable its SC to sustain the operational process even in disruptive seasons when a given facility is rendered non-functional					
The company utilizes back-up plants of a crucial facility amid disruptions to sustain the operation's process.					
The firm has ability to obtain instant information from outside and rapidly identify changes in the surrounding before and during emergency.					

PART THREE: COVID-19 Impacts means and capability

Kindly rate the level of your agreement with the subsequent measures of COVID19 impacts on Supply Chain in your company. You have been provided with a 5 scale where 5 strongly agree, 4 agree, 3 neutral, 2 disagree and finally 1 strongly disagree

	5	4	3	2	1
Lockdown measures to contain COVID-19 limited access to raw materials					
Working from home initiatives negatively affected company's ability to meet its production targets					
Stern quarantine measures and wide pre-conditions to restart operations affected the company's performance					
Unpredictable rules applied across diverse jurisdictions and at different stages of government causing disruptions					
Lock down measures and curfew hours negatively impacted the firms performance					

PART FOUR: performance outcome of implementing emergency supply chain preparedness

Subsequently listed are some of the performance results of implementing emergency supply chain preparedness. Kindly rank the level of your concurrence with the indicators using: 1- strongly disagree, 2- disagree, 3- not sure, 4- agree, 5- strongly agree.

FINANCIAL PERFORMANCE	1	2	3	4	5
Cost Minimization					
Enhanced Profit margins					
NON-FINANCIAL PERFORMANCE	1	2	3	4	5
Improved timeliness					
Enhanced flexibility					

Thank you.

**APPENDIX III: LARGE FOOD AND BEVERAGE MANUFACTURING
FIRMS IN NAIROBI**

1. Aberdares Water Ltd	26. Nairobi Bottlers Ltd
2. Alpine Coolers Ltd	27. Nakumatt Healthy Foods ltd
3. Aqual Ltd Mombasa	28. Nestle Foods Kenya Ltd
4. Aquamist Ltd	29. New Kenya Cooperative Creameries Ltd
5. Bio Foods Kenya	30. Pembe Industries Ltd
6. Blue Label	31. Pepsi Cola
7. Breakfast Cereal Company Kenya Ltd	32. Proctor and Allan
8. Buseki Dairies	33. Safari Ltd
9. Cardbury Kenya and East Africa Ltd	34. Sameer Agriculture & Livestock Ltd
10. Chirag Ltd	35. Sea Foods Ltd
11. Coca Cola Juices Ltd	36. Sierra Brewery
12. Deepys Industries Ltd	37. Sweets Ltd
13. East Africa Ltd East Africa	38. The good water company Ltd
14. East African Breweries Ltd	39. Tropical Heat Industries Ltd
15. Energy Foods Ltd	40. Tru foods
16. Excel Industries Ltd	41. Unga Ltd
17. Farmers Choice Ltd	42. Unilever Kenya Ltd
18. House of Manji Ltd	43. Uzuri Foods Ltd Kenya
19. Kapa oil refineries	44. W.E Tilly Ltd Kenya
20. Ken chic Ltd	45. Kenya Wines Agency Ltd
21. Kenafric Industriess Ltd	46. Wrigleys Company
22. Kenya Sweets Ltd	
23. Kevian Limited	
24. Maize Millers Ltd	
25. Melvin Marsh International	

SOURCE: KAM (2019)