

**THE APPLICATION OF GEOGRAPHIC INFORMATION  
SYSTEMS TO DETERMINE DISTRIBUTION  
STRATEGIES AMONG SOFT DRINK COMPANIES IN  
KENYA**

**BY**

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## DECLARATION

I, the undersigned, declare that the aforementioned research project is my original work and has not been submitted in any manner to any other educational institution for the purpose of earning credit toward a degree or sitting for an examination of any sort.



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## **DEDICATION**

Without God's assistance, it is impossible to imagine how this study could have been concluded successfully. In addition, I would want to use this opportunity to convey my gratitude to my friends and family for all they have done to support me in my pursuit of academic success.

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## **ABBREVIATIONS AND ACRONYMS**

<b>GDP</b>	Gross Domestic Product
<b>GIS</b>	Geographic Information Systems
<b>KAM</b>	Kenya Association Manufacturers
<b>MNC</b>	Multinational Corporation
<b>ROA</b>	Return on Assets
<b>ROE</b>	Return on Equity
<b>KNBS</b>	Kenya National Bureau of Statistics

## ABSTRACT

Utilizing a Geographic Information System to your advantage when deciding which path to travel in next is essential to your overall success. The availability of correct, timely, and accurate data is essential to maintaining rationality while following directives. In the modern world, a geographic information system is essential for either making choices on a day-to-day basis or doing strategic planning for an organization. This study was conducted with the goals of determining the degree to which firms that produce soft drinks have used geographic information systems services and determining the effect that geographic information systems have on distribution methods employed by companies that produce soft drinks that are based in Kenya. The research was based on three different theories: Rodgers' Diffusion of Innovation Theory, The Agency Theory, and Disruptive Innovation Theory. The research used a design known as descriptive cross-sectional. The participants in this research came from 65 different beverage manufacturing companies in Nairobi. According to the findings of the research, Geographic information systems are very important to the distribution tactics that firms that make soft drinks use in Kenya. The corporations that manufacture soft drinks have recently begun to use geographic information systems (GIS) into their distribution networks. The application of geographic information systems was carried out to a reasonable degree. Distribution method was adopted to a significant degree by enterprises producing soft drinks in Kenya. According to the findings of the research, businesses use geographic information systems in order to determine the level of physical accessibility associated with retail site analysis. There is little doubt that beverage manufacturers in Nairobi County, Kenya, have implemented successful distribution tactics as a direct result of the GIS update for their products. Better outcomes in terms of distribution methods would be achieved as a consequence of an increase in the deployment of geographic information systems. According to the findings of the research, businesses should exercise extreme caution before making financial investments in distribution tactics. This is due to the fact that some tactics may be applicable while others may not be applicable at all. Increasing the growth of the company and making sure that they have a distribution network that is more extensive are both things that might be accomplished with the assistance of GIS. The authors of the research suggest that the companies should also vary the distribution tactics that they use. By way of illustration, franchising provides the firms with the guarantee of efficient distribution of their goods. This is because when they collaborate, they are able to accomplish goals that they could not do as a single company.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Due to the intense rivalry that exists in the modern world, corporate managers have been compelled to switch from making management decisions based on their own judgment to using geographic information system data instead. Using IT in management is considered as a competitive advantage since it may help businesses avoid making expensive errors while carrying out essential business functions. According to Gordon (2007), a geographic information system (GIS) is an extremely important resource for a company since it allows managers to back up their judgments with data that can be independently verified. All key decisions that are made inside an organization are based on information that is accessible to management. There are several ways that information might manifest itself inside an entity. Managers at every level of the firm rely heavily on this data to keep tabs on how well things are running. According to Maxwell, Nan, Rotz, and Garcia (2015), information is essential for high-level, high-value, and strategic decision making in any and all types and sizes of enterprises.

This study was guided by three theories namely: Disruptive Innovation theory, Rodger's diffusion of innovation theory and agency theory. Disruptive Innovation theory (Dan & Chieh, 2008), which emphasizes continuous innovation and adaptation to overcome disruptions in business models. It aims to identify factors driving organizational resilience and success in the face of change. Diffusion, as described by Rogers, is the gradual spread of an invention across a society's population (Rogers, 1962). Agency theory postulates that shareholders as the owners (principals) of the firm, hire firm managers (agents) who are

expected to make decisions and act in the owner's/ principal's best interest (Ketchen & Giunipero , 2004).

Kenya's economy receives a significant boost from the contributions made by its industrial sector. According to the KNBS (2020), its contribution to the country's GDP in 2022 was 7.5 percent. According to the KAM (2022) the contribution of industry to the GDP has almost remained unchanged at roughly 10 percent since the country's independence, and it has actually decreased to below 10 percent in the most recent years. Therefore, it is critical for soft drink companies in Kenya to make concerted efforts to strengthen their decision-making capacity in order to implement progressive reforms that would make them more competitive (Atikiya, 2015). The main businesses in the soft drink industry have an edge over smaller competitors thanks to their distribution tactics. Therefore, smaller businesses need to be on the lookout and reevaluate their distribution strategy to be competitive.

### **1.1.1 Geographic Information Systems**

According to Agrawal (2017), the term "Geographic Information Systems" (GIS) refers to a collection of hardware, software, and processes that are designed to record, store, edit, alter, manage, analyze, and display georeferenced data. with the other hand, Geographic Information System (GIS) is defined by Lwin (2011) as a tool for working with and managing geographic information. The constant progress of technology has made it possible for many individuals in many locations to exchange geodata, map processing, and map outs. Accessing GIS data, analyzing that data, and disseminating not just geographical information but also other types of knowledge have all been made easier thanks to the internet, which is an interconnection of hundreds of different types of communications networks. This networking technology is largely responsible for the transition from

centralized GIS systems to distributed GIS systems, the latter of which is the foundation upon which web GIS is built. The system offers capabilities for carrying out geographical and statistical analysis, which helps uncover linkages, patterns, and trends that are not immediately obvious.

Data, hardware, software, personnel/users, and processes are the components that make up Geographic Information Systems (GIS). The cost of the data is the most costly part of a GIS. Raster is simply an image that is represented using pixels, and vector is x,y coordinates that represent a point, line, or polygon geometry (Catherman, 2013). It is comprised of both of these elements. It is possible to get it for free from the people who generate the data, to buy it from those that sell it, or to gather it yourself using a variety of different methods. The term "hardware" refers to the tangible electronic components that come together to form a Geographic Information System (GIS). These components are responsible for the execution of GIS software, which is responsible for tasks such as the storage and processing of data.

A wide variety of tasks may be accomplished via the use of programs. It is possible to break it down into: Application software that immediately carries out anything that the user has requested. The application software, such as QGIS (open source) and ArcGIS (proprietary), is supported by the system software, which enables the application software to carry out its tasks. According to Mackay (2007), it consists of the Windows operating system or Linux as well as middleware software, which acts as a go-between for application and system software. These are some recommendations that should be taken into consideration while operating the GIS system on a daily basis.

### **1.1.2 Distribution strategy**

Distribution strategy, according to Hervani, Helms, and Sarkis (2011), is defined as the process through which items are supplied to end consumers. A distribution strategy, as defined by Stern (2015), is an all-encompassing and coordinated set of actions designed to give a company an advantage in the increasingly competitive arena of product distribution to consumers. In a similar vein, Kumar (2010) argues that distribution networks are groups of autonomous companies that are meant to provide the appropriate goods to clients at the appropriate time. These businesses include manufacturers, distributors, and retailers. Distribution systems are designed to do this. The word "distribution strategy" refers to the process of formulating a plan that will guarantee timely, appropriate, and appropriate delivery of items and services to clients. The organization has access to a wide variety of distribution channels, which may be used in the process of distribution.

Businesses and economies thrive when goods are easily accessible to consumers in all parts of the world, and distribution makes that possible, meeting both their needs and their wants. As a consequence of increased competition and change in the marketplace, companies are finding it harder to get distribution via traditional channels like retailers and wholesalers (Mururi, 2009). When a new product is introduced to the market, distribution strategies play a significant part in deciding whether or not the product will be well received by consumers. This is accomplished by assessing how readily available the product will be to consumers. In order for a firm to have a successful distribution strategy, it is necessary for the company to guarantee that it has sufficient resources and manpower to allocate to the various distribution sites. According to Thompson and Soper (2010), businesses that want

to be successful in the market need to devise appropriate distribution strategies that will aid them in accomplishing their marketing goals. This is an essential step in the process.

According to Webb (2010), the incorporation of the internet into business has resulted in the expansion of new chances, prompting companies to take into consideration the internet when formulating distribution plans. As a direct consequence of this, several businesses are embracing emerging technology in order to better plan their distribution strategy (Gorsch, 2011). To be able to devise an effective distribution strategy, businesses need to have a clear understanding of both their overall company objectives and the outcomes they want to accomplish via the distribution strategy. A company's distribution strategy is the actions it takes to increase its market share, its sales volume, and its geographic reach. Neehams (2010) explains that in order for a corporation to successfully use numerous distribution methods, it must first be able to identify and handle the distribution breadth, degree of channels, franchise, and strategic partnership requirements.

### **1.1.3 Soft Drink Firms in Nairobi, Kenya**

The Kenya Ice and Aerated Water Factory, the country's first indigenous soft drink maker, was established in Mombasa in 1931. This marked the beginning of Kenya's long and illustrious history in the production of carbonated beverages. Carbonated soft drinks, fruit juices and nectars, fruit punch, iced tea, and water are all considered soft drinks. Small-scale manufacturers dominated Kenya's soft industry in the 1940s, and it's important to remember that throughout the years, foreign investment has contributed to the growth of these companies. There was a period when this sector was referred to as the "soft industry." Imports were stepped up after 1945 by MNCs (multinational firms). Brand awareness and product sales both increased as a result of intensive marketing efforts in Kenya (Kishore,

2015). The rise was also aided by the increased accessibility to a larger customer base, which was achieved via the development of both online and brick-and-mortar retail.

Through multinational corporations, there were already signs that foreign companies were attempting to merge with local companies or establish franchising agreements. As an example, the 7-Up firm and the Crystal Springs Aerated Water company amalgamated in the year 1960 (Ibanda, 1979). By the middle of the 1950s, multinational corporations such as Schweppes, Pepsi-Cola, Fitzgerald Baynes, 7-Up, and Coca-Cola had already established themselves and begun operations in Kenya. Some of the well-known franchises in the market, such as Coca-Cola (which opened its first store in 1948) and Pepsi-Cola (which left the country in the 1970s and returned in 2011). According to a survey by Euromonitor International, the companies that produce soft drinks have made significant contributions to Kenya's gross domestic product (GDP). These factors include a consensus predicting a 6% increase in GDP in 2016, which is a positive single digit growth rate. This pertains to financial and work matters. According to the findings of a research (Tetra and Park, 2000), the consumption patterns range increase is expected to be as follows: juices and nectars at 80%, fruit-flavored beverages at 70%, water at 8%, and carbonated drinks at 1.5%.

Carbonated soft drinks have a sizable market share, but the sector as a whole isn't expected to expand much in the near future. As a consequence, several firms in the soda industry have shifted their focus to the booming juice business (Giathi, 2003). The manufacturing industry in Kenya has been confronted with a plethora of issues, some of which include a sluggish economy, a flood of inexpensive imports as a result of the liberalization of the economy, and the proliferation of informal and somewhat unclean beverages. Because of



their lack of good fortune, several players have been forced to shut their businesses. According to Amemba (2013), Pepsi-Cola withdrew from the Kenyan soft drink industry in the early 1980s because of the unfavorable commercial climate. Additionally, Amemba adds that Aspar, which distributed and marketed Schweppes products, went out of business in 2002. However, the industry as a whole seems to have come to terms with the challenges that it faces, as shown by the fact that production of soft drinks increased by 26.3% in 2005, from 203,169 thousand liters in 2004 to 256,599 thousand liters in 2005 (Khanna & Anton, 2002).

## **1.2 Research Problem**

The use of GIS in the process of deciding which way to go in next is essential to achieving success. The availability of correct, timely, and accurate data is essential to maintaining rationality while following directives. Ghaffarzadeh (2015) claims that accurate and up-to-date data may be obtained via a GIS. Such data is essential for good corporate management as it aids in the decision-making process and allows the corporation to carry out other managerial activities including planning, staffing, and control. Most managers have the authority to make decisions without further consultation because of the extensive amount of time they have spent in their positions. As a consequence, management has made several poor choices that have cost a lot of money. However, because of the world's increasing interconnectedness and the widespread belief that the world is a small, interconnected community, rivalry has heated up. This has exposed businesses to the danger of losing their conventional markets to other global enterprises that introduce goods to previously 'inaccessible' regions. As a result of this change, managers have been required to reconsider the processes by which choices are made since there is no place for experiments or

guesswork. Whether it's for day-to-day operations or long-term planning, a contemporary business cannot function without some kind of geographic information system. Individuals, businesses, governments, and nonprofits are all included in this category (Bacchetta and Ernst, 2009).

According to Njeri (2014), the soft drink manufacturing sector of the Kenyan economy has been struggling with issues of sluggish growth and development for the last many years. Kenya's soft drink manufacturers are experiencing rapid growth and success, which poses a threat to the country's poverty rate and job creation rates, which, in turn, should have pushed the industry and the country's economy toward more long-term success, growth, and development. The rivalry in the soft drink manufacturing sector manufacturing sector has been quite fierce, and companies need to be creative and distinctive in their operations as well as aggressive in their execution and implementation of their company in order to survive. The lack of a competitive strategy that can keep a significant percentage of today's upscale and technologically savvy consumers as clients is unquestionably the most significant problem the sector is now experiencing.

There have been a number of research conducted on the topic, both domestically and internationally. Mphatswe, Mate, Bennete, and Rollins (2011) also carried out a study that evaluated the precision of the data sent to the DHIS by all 222 hospitals between the years 2007 and March 2009. This research was done on a global scale. According to the results of the research, the degree of database correctness increased from 26% earlier to 64% later after the engagement. This change occurred after the engagement. In a similar vein, the proportion of the database's data elements that were regarded to be complete increased from 37% to 65% as was seen. On the other hand, Kafetzopoulos (2015) Kour, Tretten,

and Karim (2014) studied the use of online analytics derived from geographic information systems in the context of railway maintenance decision-making. The research used secondary data gathered from measuring sites and uploaded it to the cloud center of a geographic information system, where it is reviewed for correctness and mistakes before being evaluated to aid in the formulation of maintenance choices. The outcomes of the study brought to light the significance of making decisions based on data, which not only improves the process but also contributes to its economic viability and effectiveness. The maintenance and safety limitations of train wheels that are about to be reached are displayed using a variety of tables, graphs, and other data tools in order to facilitate simpler comprehension by the relevant stakeholders. Barney (2011) contends that a successful competitive strategy incorporates both defensive and aggressive maneuvers. A defensive maneuver may be anything that the firm does to provide it a competitive edge over its rivals, such as entering into exclusive arrangements with suppliers or patenting new technologies. An organization is said to be making an offensive move when it engages in operations that aim to improve its position in the competitive landscape.

Locally, Brodsky, Ekirapa, Cannon, and Nudley (2016) conducted research on the issue of understanding information system demand and usage in Kenya, focusing specifically on the accomplishments and problems that were present in the counties of Kakamega, Kilifi, and Kisumu. The findings of the research highlight the need of educating individuals on the usefulness of information systems and convincing them of the significance of using data in decision making. However, Wanza (2017) claims that micro insurance products have a favorable correlation with distribution channels. He bases this claim on the fact that micro insurance products tend to be more expensive. When deciding on distribution tactics,

it is important to take into account the requirements and drivers of the target audience. According to Nyaga (2012), in order for businesses to maintain a competitive edge in the market, they need to implement distribution methods that are successful. He thinks that this is necessary. Delivery times have been cut significantly thanks to direct distribution to major clients, and route markets have become clearer as a result. Businesses have to establish distribution methods that are tailored to the product as well as the operating market. According to Mwikali (2009), the economic climate, competition, and a negative public image are three elements that have a substantial impact on the distribution of KWAL. Less of an effect is had on distribution tactics by managerial obstacles, social-cultural issues, technology developments, and legal issues. The market should be segmented by businesses in order to facilitate simpler distribution, and more resources should be allotted to promote public awareness.

There is no question that a significant number of research have concentrated on geographic information systems. Despite this, there is a paucity of research that investigates the direct connection between geographic information systems and distribution strategies among Nairobi-based soft drink firms. Consequently, the purpose of this study was to answer the following research question. How does the application of geographic information systems determine distribution strategies among soft drink companies in Kenya?

### **1.3 Research Objective**

The objective of the study was to determine the application of geographic information systems to determine distribution strategies among soft drink companies in Kenya.

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

The outcomes of the study are anticipated to be beneficial to a variety of diverse populations. By connecting Disruptive Innovation Theory, Rodgers Diffusion of Innovation Theory and The Agency theory, the findings are anticipated to provide a theoretical contribution as well as advance the boundaries of existing knowledge. This research adds to the expanding amount of evidence supporting theories that have already been shown to be correct in the academic community.

Second, it was beneficial to soft drink manufacturing companies because they will have an in-depth grasp of the numerous distribution strategies that are available to them and how they may implement them. It is anticipated that the research provided business owners and managers of manufacturing companies with a better grasp of the many distribution strategies that are adopted in the marketplaces in which their companies compete. Secondly, the results were also useful to other participants in the business, particularly in terms of gaining some insights into relevant methods they might choose to use in order to remain competitive in the sector.

Finally, the study's results were useful in informing future public policy decisions. Regulatory changes might be crucial if they clarify how to optimize geographic information systems and distribution strategies, both of which are essential to the growth of businesses like these. By informing policy decisions and the development of receptive institutional structures, the study's results will also help the industry as a whole.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

In this chapter, we took a look at some of the previous research, both theoretical and empirical, that relates to our subject. The review of previous research is essential to every study because it affords the investigators the chance to hone the conceptual framework of their investigation. As a result, the literature gives consideration to geographic information systems on distribution strategies.

### **2.2 Theoretical Framework**

This study was based on three theories namely, the Disruptive Innovation Theory, Rodgers Diffusion of Innovation Theory, and The Agency theory.

#### **2.2.1 Disruptive Innovation Theory**

Christensen (1997) developed the theory of Disruptive Innovation, which suggests that a new product or service can disrupt an existing market by providing a more affordable, simpler, or convenient alternative. This hypothesis is useful in competitive marketplaces, because novel offerings have the potential to dramatically alter the competitive environment. Grasping the principles that enable disruptive technologies to establish new markets and products is crucial for achieving success (Kostoff, Boylan, & Simons, 2004). However, the theory is not without its detractors, who claim that its fundamental ideas and principles have been misapplied (Dan and Chieh, 2008). The theory also fails to account for the impacts of company heterogeneity on disruption on firm competence (Markides, 2006), and it does not explain every aspect of innovation or business success.

The theory has flaws, but it is nonetheless useful for company executives since it allows them to foresee the arrival of disruptive breakthroughs and use GIS on distribution methods to create their own (King & Baatartogtokh, 2015). Disruptive innovation also enables customers to purchase products or services that were previously unaffordable, although this may be influenced by other factors such as competition and government regulations. Firms can begin by focusing on the lower end of the market and offering goods and services that lower tier consumers can afford (Christensen, Baumann, Ruggles, & Sadtler, 2006).

### **2.2.2 Rodgers Diffusion of Innovation Theory**

Rogers (1962) is credited as being the pioneer of this notion. Everett Rogers introduced the concept of the diffusion of innovations in 1962. New ideas and technology are diffused at different rates, and this hypothesis seeks to explain why. Diffusion, as described by Rogers, is the gradual spread of an invention across a society's population (Rogers, 1962). Rogers insists that when he uses the phrase, he is referring to dispersion. Human capital is crucial to the commercial success of every new idea, as Rogers (1983) explains in further depth. This success is determined by four primary elements, including the invention itself, communication channels, the passage of time, and a social structure. The significance of the theory in relation to the investigation. The soft drink manufacturing industry in Kenya is recognized as one of the industries with the fastest rate of development, but at the same time it is confronted with a high level of competition throughout Africa. As a result, this hypothesis is pertinent to the primary purpose of the research, which is to investigate the factors that determine the success of geographic information systems services.

Robinson (2009) finds fault with the theory of the spread of innovations on the grounds that it adopts an incredibly unique perspective in comparison to other theories of change.

It does not focus on convincing people to change; rather, it sees change as essentially being about the growth or reinvention of commodities and personalities in order to better fit what the individual wants or needs. According to this theory, people do not evolve through time; rather, innovations should be adapted to fulfil the needs of pre-existing populations instead of expecting people to develop over time.

According to Sevcik (2004), the process of adopting a new innovation is one that requires time and cannot be stated to take place quickly. This does not mean that the process happens immediately, however. The premise of the innovation diffusion model, as argued by Noel (2009), is that the multiple contexts and areas in which almost all new technologies function have independent effects. Therefore, although each center box discusses one significant cause for non-adoption, it does not explain how this may or may not be connected to other factors. The shortcoming of the idea is that it functions more effectively when applied to the initiation of new behaviors than it does to the termination or avoidance of existing ones. It does not take into consideration the resources or social support available to a person in order for them to embrace the new habit (or innovation).

### **2.2.3 The agency Theory**

According to the Agency theory, first proposed by Jensen and Meckling (1976), shareholders (the principals) designate managers (the agents) of a company, who are then tasked with making decisions in the principals' best interest. In light of the fact that managers may have self-interests that are in direct opposition to those of the principals, the Agency theory argues that monitoring systems should be put into place in order to resolve the conflicts between the interests of shareholders and those of management. Nevertheless, the Agency theory has been challenged for its myopic emphasis on how owners settle



disputes between themselves and managers, without appreciating the involvement of other investors in the conflict resolution process. (Donaldson, 1990).

In addition, Eisenhardt, (1989) noted that even in situations when there is a high probability of unscrupulousness, the theory assumes managers would be opportunistic, and it overlooks the competency of the managers. Despite the high potential for unethical conduct on the part of management, this remains the case. The Agency theory, despite the criticisms that have been leveled against it, is pertinent to this investigation because, in the research on the balanced scorecard, the theory addresses implementation and organizational performance difficulties. Companies rely on middlemen to act as their agents and keep inventory on hand (Mitnick, 2000), hence this notion is relevant to distribution strategy. Therefore, this theory is important to distribution strategy. It is essential for every company to take into account agency theory when formulating their distribution strategy since this theory offers options on how to prevent potential problems.

### **2.3 Empirical Studies and Research Gaps**

Ndegwa (2015) investigated the effects of GIS and its implementation in a community-based health information system. The case study was Kenya's Embu county's karurumo community health facility. According to the results of a recent poll, there has been a substantial improvement in the data-use abilities, positive attitudes, and expectations of county governments over the last several years. However, Owour (2008) argues that corporations do deploy distribution strategies, although imperfectly. Franchise agreements should be explored by alcoholic beverage manufacturers and importers as a means of expanding their reach. These other businesses should be able to aid in the distribution of alcoholic beverages to other areas. Because of this, effective dispersal will be ensured

rather than functioning as a single entity. The majority of wine and spirit producers rely on retailers and, on occasion, wholesalers who sell to retailers as their primary distribution route.

Mphatswe et al., (2011) also carried out a research that evaluated the reliability of the data that was submitted to the DHIS between the years 2007 and March 2009 for all 222 hospitals that provided PMTCT care in the districts that were investigated. According to the results of the research, the degree of database correctness increased from 26% earlier to 64% later after the engagement. This change occurred after the engagement. In a similar vein, the proportion of the database's data elements that were regarded to be complete increased from 37% to 65% as was seen. Kafetzopoulos (2015) conducted research on the effects of geographic information systems (GIS) on the productivity of industrial enterprises. The chosen methodology for the research project begins with an EFA, then moves on to a CFA, and finally utilizes SEM. According to the findings of the research, the efficacy of ISO 9001 unquestionably adds to the performance of both products and businesses. However, it does not have any direct bearing on the performance of organizations that are converting; rather, it has an indirect bearing on performance via the intermediary of business performance.

Wanza (2017) contends that there is a beneficial association between distribution tactics and micro insurance products. He bases this claim on the findings of a survey that he conducted. When making choices on the micro insurance business, managers should take distribution methods into consideration, taking into account elements such as the nature of the product, the cost of the product, the nature of the organization, clients, and environmental conditions. When deciding on distribution tactics, it is important to take into

account the requirements and drivers of the target audience. Because of the widespread use of social media, cellphones, and the internet among customers, one of the aspects of technology that microinsurance companies need to take into account when formulating distribution strategies is technology. In order to make informed decisions about railway maintenance, they studied the output of geographic information systems using web analytics. Secondary data collected at measuring sites was transferred to a cloud-based geographic information system for analysis. There, the information was double-checked for mistakes and then evaluated to support upkeep choices. Kour, Tretten, and Karim (2014) are responsible for this study. The study's findings highlighted the value of data-driven decision making, which not only yields better results but also saves money in the long run.

The study conducted by Valentine, Hollingworth, and Schultz (2018) focused on the relationship between information system ethical decision making and organizational commitment tangential relations. The researchers employed structural equation modeling to examine data gathered from various financial institutions in the United States. Worker perceptions of tangential linkages were shown to be positively related to organizational commitment, and these perceptions were found to be directly related to employees' views on data-based decision making. Ingari (2015) found that using a direct distribution approach is associated with a higher likelihood of success in the marketplace. Therefore, this gives buyers the opportunity to show appreciation to the company for making the product more accessible. In contrast to intense and indirect distribution techniques, the great majority of companies adopt direct distribution approaches. An organization's competitive advantage might be marginally affected by either indirect or intensive

distribution strategies. Customers are able to take use of the goods' advantages thanks to intensive distribution, which results in a reduction in the cost of transportation.

A research was conducted by Streufert (2012) to investigate the effects of information relevance and the process of decision-making in an environment that is complicated. Twenty-four male undergraduates from a university in the Midwest were selected at random for the study. In addition to finding no regular patterns in the curves, the research concluded that providing respondents with pertinent information did not affect their decision-making or information-search behavior. According to Mwikali (2009), the economic climate, competition, and a negative public image are three elements that have a substantial impact on the distribution of KWAL. Less of an effect is had on distribution tactics by managerial obstacles, social-cultural issues, technology developments, and legal issues. The market should be segmented by businesses in order to facilitate simpler distribution, and more resources should be allotted to promote public awareness. According to Mwanza and Barney (2011), a competitive strategy should include both defensive and aggressive maneuvers. A defensive maneuver may be anything that the firm does to provide it a competitive edge over its rivals, such as entering into exclusive arrangements with suppliers or patenting new technologies. When a corporation engages in actions that increase its competitive position, such as supplying product features, having additional distribution channels, having extensive marketing, and giving better pricing than rivals, this is considered an offensive move. Nyaga (2012), on the other hand, thinks that businesses need to use distribution strategies that should be effective if they want to have an advantage in the market. This is an argument against the previous one. The Nestle company has been successful in increasing the availability of their products nationwide by

expanding their distribution network to additional parts of the country. Delivery times have been cut significantly thanks to direct distribution to major clients, and route markets have become clearer as a result. When formulating a distribution plan, it is essential to take into account the geography, the target audience, and the applicable laws and regulations. Businesses have to establish distribution methods that are tailored to the product as well as the operating market.

The empirical research that were evaluated focused, for the most part, on various industries. Since these industries function in a variety of diverse business settings, the conclusions cannot be generalized. Case study research designs were utilized in some of the research that was done on geographic information systems, while qualitative research designs were employed in other studies, which is a different technique from the one that was used in this particular study. The regional studies focused on other factors, such as how the firm's competitive edge is affected by geographic information systems, for example. As a result, there is now a knowledge gap, which this investigation aims to address.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter describes the inquiry's research approach. This section examined the study design, demographic, research instrument, data collection methods, and data analysis methods.

### **3.2 Research Design**

The research design used in this study was cross-sectional in nature. Kothari (2004) posits that a cross-sectional survey affords researchers the ability to monitor and elucidate factors of interest within a study project at a certain point in time, without using any kind of manipulation. A descriptive research approach profiles themes, individuals, or events to paint a picture, according to a 2020 study by Mugeni et al. This is achieved by information gathering and the tabulation of needs for variables or their combination. By guaranteeing strict adherence to the protocol, the technique enables the examination of the subjects, timing, and location of a research in relation to the relevant components and their levels of variability.

### **3.3 Population of study**

A researcher's "target population" consists of all the individuals, objects, and phenomena used to generalize about the variables under study (Kothari, 2004). The sample for this research will consist of all of the beverage factories in Nairobi, Kenya. According to the KAM report for 2019, the sample for this study included 65 separate establishments selling soft drinks within the Nairobi area. Because the current population is so tiny, a census will be conducted.

### **3.4 Data Collection**

This research relied heavily on first-hand reports for its data. Most of the information was collected via the use of a standard questionnaire. According to Mugenda & Mugenda (2003), questionnaires are the most effective method for gathering specific, pertinent data. The survey questions are all multiple-choice. There were three sections to the survey, the first of which was devoted to company-specific questions. Systems of geographic information were discussed in the second portion, and distribution strategy will be the primary topic of discussion in the third section. Researchers used the "drop and pick" method to distribute and collect completed questionnaires from the individuals they questioned. In this method, researchers give out blank questionnaires to study participants and collect their completed versions at a later date. The surveys were sent to those in charge of marketing managers, procurement managers at the firm. Additionally, the surveys were made available for distribution by email and other internet platforms.

### **3.5 Data Analysis**

After the data collection phase was complete, the questionnaires were reviewed for uniformity. The questionnaires were revised such that they would be considered comprehensive; this was done to ensure consistency. Discrepancies in the responses are sorted out by editing, tabulating, and coding the data, and accurate quantitative information is added to the responses for further study. These steps are used in order to clean the data. This step's objective is to get the data prepared for further analyses as quickly as possible. Descriptive statistics were used to examine the data, which included measures of central tendency (the mean) and dispersion (variance and standard deviations). The results were

shown using both tabular data and graphical representations. Below is a representation of the simple linear regression model employed in the study.

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where: Y= Geographic information systems

$\beta_0$  is the model 's constant.

$X_1$  = Distribution strategy

$\varepsilon$  =Error Term



## **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND DISCUSSION**

### **4.1 Introduction**

In this chapter, the outcomes of the study are discussed, together with the analysis that was carried out on the data that was gathered. Following the consideration of the relevant literature in the previous chapters, this section presents a discussion of the findings. The purpose of the research was to determine the degree to which soft drink companies have adopted geographic information systems services and to determine the influence of geographic information systems on distribution strategies among soft drink companies in Kenya.

### **4.2 Response Rate**

The total response rate was assessed to be 81.54percent, based on the fact that 53 out of 65 questionnaires were returned. These numbers were used to compute the percentage. The findings of this research offer weight to the assertion made by Mugenda and Mugenda (2013) that it is feasible to achieve pass rates in examinations that are higher than 50%. Results were sufficient for data analysis since, as stated by Babbie (2010), a 70% return rate is regarded to be astounding while a 60% return rate is considered to be acceptable. After an adequate number of surveys were returned, the researcher moved on to the data analysis phase.

**Table 4.1: Response Rate**

<b>Response Rate</b>	<b>Frequency</b>	<b>Percentage</b>
Returned Questionnaires	53	81.54
Not Returned Questionnaires	12	18.46
<b>Total</b>	<b>65</b>	<b>100.0</b>

### **4.3 Organizational Characteristics**

The most important information about the company is provided here. The statistical aids provided a clearer picture of the context around the organization under review. It inquired about the company's asset base, number of distributors, number of monthly sales, and length of time in operation, among other things.

#### **4.3.1 Period of Operation**

The purpose was to establish the period of operation in Kenya shown in Table 4.2 below.

**Table 4.2 : Period of Operation**

<b>Year</b>	<b>Frequency</b>	<b>Percentage</b>
Up to 5 years	4	7.53
6-10 years	10	18.87
11-15 years	16	30.20
Over 16 years	23	43.40
<b>Total</b>	<b>53</b>	<b>100</b>

**Source: Field Data (2023)**

According to the information that is shown in Table 4.2, the vast majority of enterprises that produce soft drinks in Kenya have been operational for more than 16 years (43.40%), between 11 and 15 years (30.20%), 6 to 10 years (18.87%), and finally less than 5 years (7.53%). As a result of this, it is possible to draw the conclusion that the great majority of firms that produce soft drinks have a solid footing in the Kenyan market.

#### **4.3.2 Number of Distributors**

The objective was to ascertain the total number of distributors that Kenyan firms producing soft drinks employ across the country. Table 4.3 presents the findings of the investigation.

**Table 4.3: Number of Distributors**

<b>Branches</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 10	2	3.78
10-20	3	5.66
21- 30	5	9.43
31-40	15	28.30
More than 41	28	52.83
<b>Total</b>	<b>53</b>	<b>100</b>

**Source: Field Data (2023)**

Based on the data in Table 4.3, most the soft drink companies have more than 41 distributors (52.83%), between 31-40 (28.30%), 21-30 (9.43%), 10-20 (5.66%) and lastly less than 10 (3.78%). This indicates that most firms that produce soft drinks are able to extend their market share by recruiting new consumers, which in turn allows them to improve their earnings at the same time.

#### **4.3.3 Asset Base**

The purpose was to establish the asset base of the company in Kenya. The results are shown on Table 4.4.

**Table 4. 4: Asset Base**

<b>Asset Base</b>	<b>Frequency</b>	<b>Percentage</b>
Below KShs 10 billion	5	9.43
KShs 10-20 billion	10	18.87
KShs 21-30 billion	15	28.30
above KShs 30 billion	23	43.40
<b>Total</b>	<b>53</b>	<b>100</b>

**Source: Field Data (2023)**

According to Table 4.4, the majority of the soft drink companies have asset above 30 billion (43.40%), between 21-30 billion at 28.30%, between 10-20 billion at 18.87% and below 10 billion at 9.43%.

#### **4.3.4 Total Sales Per Month**

The purpose was to establish the total sales per month of the soft drink companies in Kenya.

The results are shown on Table 4.5.

**Table 4.5: Total Sales Per Month**

<b>Sales</b>	<b>Frequency</b>	<b>Percentage</b>
Below 20,000,000	4	7.53
50,000,000-100,000, 000	10	18.87
100,000,000- 150,000,000	23	43.20
Over150,000,000	16	30.20
<b>Total</b>	<b>53</b>	<b>100</b>

**Source: Field Data (2023)**

Table 4.5 indicates that most soft drink companies were able to make a total sales in month between 100,000,000- 150,000,000 (43.20%), Over150,000,000 (30.205), 50,000,000-100,000, 000 (18.87%) and lastly Below 20,000,000 (7.53%). This implies that most soft drink companies were able to have high sales turnover due well distribution channels and the marketing activities.

#### **4.4 Extent to Geographic Information Systems Adoption**

Participants were asked to rate the degree to which soft drink businesses had used geographic information systems. The data is summarized in Table 4.6.

**Table 4.6: Extent to Geographic Information Systems Adoption**

<b>Geographic Information Systems Adoption</b>	<b>Frequency</b>	<b>Percentage</b>
No extent	2	4.08
Little extent	4	7.54
Moderate extent	24	45.28
Large extent	13	24.53
Very large extent	10	18.87
<b>Total</b>	<b>53</b>	<b>100</b>

**Source: Field Data (2023)**

Table 4.6 indicates that most soft drink companies were able to adopt geographic information systems at moderate extent (45.28%), large extent (24.53%), very large extent (18.87%), little extent (7.54%) and lastly no extent at (4.08%). This implies that soft drink companies have embraced the use of geographic information systems in their distribution networks.

#### **4.5 Geographic Information Systems**

Geographic information systems were the primary driving forces in this study's findings. Finding out what respondents thought of the geographic information systems was crucial.

**Table 4.7: Geographic Information Systems**

<b>Statement</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev</b>
The firm has incorporated geographic data into their complex network design which is used in firm planning.	53	4.11	1.17
The firm uses Google Maps has web-based GIS mapping to identify competitors.	53	3.73	0.98
The firm has advanced in mapping technology using products such as Nobel's_GeoViewer	53	3.34	1.19
The use of GIS data makes it possible to pinpoint the sites of accidents, and data intelligence enables the optimization of road networks.	53	3.90	0.89
Data obtained from GIS systems are often used in the process of transportation problem management.	53	3.23	1.07
In order to make judgments on packaging, the company uses a combination of market intelligence and geographic information systems.	53	4.18	0.95
GIS have proved essential in ensuring the safety of commodities and services.	53	3.73	1.06



The retail division's usage of GIS allows them to get detailed information about products.	53	3.57	0.99
Utilizing geographic information systems allows for the identification of the inventory checks that are most relevant.	53	3.00	1.02
Geographic information systems are used for the majority of the decision-making processes involved in quality management.	53	3.52	1.05
Data collection and geographic information systems are used in order to keep an eye on the quality cost centers.	53	3.34	1.03
<b>Composite Statistics</b>	<b>53</b>	<b>3.60</b>	<b>0.94</b>

In relation to Table 4.7, the company has included geographic data into its complex network design, which is utilized in firm planning, and received a mean score of 4.11, while the business's combined use of market intelligence and geographic information systems to select packaging options received a mean score of 4.18. The use of GIS data makes it possible to pinpoint the exact sites of accidents, and data intelligence may improve road networks by an average of 3.90 percent. The company identifies rivals with a mean of 3.73 using the web-based GIS mapping capabilities that Google Maps provides. The average number of commodities and services that have been protected via the use of geographic information systems is 3.52. On the other hand, the respondents were in agreement that

appropriate inventory checks are decided by using geographic information systems, as shown by a mean of 03.11. The final result was a mean score of 3.8, which indicates that the majority of respondents agreed that they participate in advertising strategy to a modest amount. The total mean was 3.60, which indicates that respondents agreed that they make modest use of geographic information systems.

#### 4.6 Distribution Strategy

In this particular research, distribution strategy served as the dependent variable. Finding out what respondents thought of the distribution strategy was crucial.

**Table 4.8: Distribution Strategy**

<b>Statement</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev</b>
The distribution tactics that are already in place at your business have a direct bearing on the product uptake that occurs there.	53	4.20	0.89
There is a connection between the company's overall strategy and the distribution strategy of the organization.	53	4.52	1.08
The firm has been able to achieve a competitive edge thanks to the use of distribution tactics.	53	4.30.	0.92
The commissions and policies of the firm are acceptable to the various brokers and intermediaries.	53	4.11	1.10

Customers are content with the distribution approach that is already in place.	53	3.80	0.99
The use of technology into distribution strategies will lead to an increase in product uptake.	53	3.78	0.50
Uptake of the company's products in Kenya is hampered by a lack of key distribution channels.	53	4.64	.57
Your company's distribution tactics are geared toward the needs of the customer and the demands of the market.	53	4.23	.79
In order for your firm to maintain its competitive edge, the distribution tactics are regularly evaluated.	53	3.63	.54
Bringing items directly to customers will result in increased product adoption.	53	4.26	.61
<b>Composite Statistics</b>	<b>53</b>	<b>4.15</b>	<b>0.78</b>

According to Table 4.8, the inability of businesses in Kenya to take use of strategic distribution channels resulted in an average score of 4.64. The overall strategy of the business is connected to the distribution strategy of the organization, which received a mean score of 4.52, and the usage of distribution methods has assisted the organization in gaining a competitive advantage, which received a score of 4.30. Bringing items directly to customers will increase product uptake by a mean of 4.26 percentage points. Your company's distribution tactics, which have a mean score of 4.23, are consumer and market

driven, which is great to hear. With a mean of 4.20, the product uptake of an organization is closely tied to the distribution tactics that are already in place. A mean score of 4.11 indicates that brokers and intermediaries are pleased with the policies and commissions of the firm. On the other hand, in order to keep up with the competition and maintain a score of 3.63, firms continually reassess their distribution tactics. The total mean was 4.15, which suggests that beverage manufacturers in Kenya have adopted distribution strategy to a significant degree. This is shown by the fact that the mean was an even number.

#### 4.7 Regression Analysis

Relationships between the study's variables were analyzed using regression analysis. The primary purpose of this research was to establish a connection between the variables. The purpose of this research was to find ways in which distribution tactics might benefit from GIS.

The model summary was used in order to conduct an investigation into the manner in which the change in independent factors affected the dependent variables. The research looked at how variations in distribution techniques affect geographic information systems and how those differences were assessed.

**Table 4.9: Model Summary on Brand Awareness**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.896 <sup>a</sup>	.794	0.630	0.00291

a. Predictor (Constant): Distribution Strategies

Adjusted R squared was 0.794 implying that there was 79.4% variation of geographic information systems adoption by soft drink companies due to the changes of distribution strategy. The remaining 20.6% of respondents suggest that other variables that contribute to the use of geographic information systems by soft drink firms exist but were not included in the survey. Correlation (or R) coefficients are statistical measures used to show how closely two sets of data are connected to one another. The results of this study indicate a strong positive correlation between the variables studied ( $r = 0.896$ ), suggesting the existence of an underlying causal relationship.

The ANOVA test was carried out in order to establish whether or not the data used by the investigation are statistically significant.

**Table 4.10: Analysis of variance on Distribution Strategies**

<b>Model</b>		<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	14.695	1	14.695	196.561	.001 <sup>b</sup>
	Residual	21.531	51	0.075		
	<b>Total</b>	<b>36.226</b>	<b>52</b>			

a. Dependent Variable: Geographic information systems

b. Predictor (Constant): Distribution strategies

A significant level of 0.001 was revealed by the procedure, according to the ANOVA statistics. Since the value of significance (p-value) is lower than 5%, it is possible to draw inferences based on the data on the parameter of the population. The computed F value was

higher than the F critical value (196.561 > 3.874). The evidence presented here demonstrates that distribution tactics have a substantial impact on the adoption of geographic information systems by soft drink firms in Kenya.

**Table 4.11: Beta Coefficients on Distribution Strategies**

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
1 (Constant)	1.132	0.202		5.604	0.002
Brand awareness	0.428	0.099	0.385	4.323	0.009

a. Dependent Variable: Geographic information systems

The beta coefficient measured the degree of change in consumer perception in relation to brand awareness.

$$Y = a + bx + e$$

Y = Geographic information systems

a = Constant

b = Slope of the line

x = Distribution Strategies

e = Standard Error Term

$$Y = 1.132 + 0.428X_1 + 0.099 \dots \dots \dots \text{Equation 1}$$

The preceding equation shows that the variable greatly affects the Geographic Information Systems of firms, maintaining distribution tactics constant at constant = 1.132.

Geographic information systems are important to soft drink firms' distribution tactics in Kenya ( $\beta = 0.428$ ,  $P = 0.009$ ). This suggests that there was a strong beneficial relationship between distribution tactics and GIS. This indicates that GIS use will rise in tandem with the number of distribution options employed.

#### **4.8 Discussion of Findings**

The corporations that manufacture soft drinks have recently begun to use geographic information systems (GIS) into their distribution networks. The results are consistent with those of Catherman (2013), who conducted research in China to determine a measure of access to enterprises. The methodologies that were used in the study were derived from Network Analysis, a subfield of geographic information systems (GIS) whose functions depend on the use of a network of topologically linked linear structures such as roadways. The findings agree with Catherman's findings. The use of GIS allows researchers to model travel scenarios, which can then be used to simulate the trip lengths that individuals experience. These scenarios may be modeled by adding aspects such as the characteristics of the road, natural geographic barriers, and estimations of both artificial and environmental obstructions en route.

It seems like a respectable amount of work was put into using GIS. Statements that the company uses a mixture of market intelligence and geographic information systems to settle on packaging options, that it incorporates geographic data into its intricate network

architecture, and that it uses geographic data in its firm planning, all lend credence to this theory. The results support the conclusions drawn by Ndegwa (2015), who conducted research examining the impacts of geographic information system and its application in a community health database. The research was conducted as a case study of the Karurumo community health unit in Embu County, Kenya. The poll found that county governments' data-use capacities, positive attitudes toward data, and the expectation that all decisions should be made using data have all increased significantly over the last several years.

Distribution method was adopted to a significant degree by enterprises producing soft drinks in Kenya. This was backed by the following statements: that the strategy of the organization is related to the distribution strategy of the organization, and that the adoption of distribution techniques has helped the company acquire a competitive edge. The data support Owour's (2008) contention that businesses do make use of distribution tactics, but not to an exhaustive degree. Franchise agreements should be used by brewers and importers of alcoholic drinks to expand their channels of distribution. These other businesses should be able to aid in the distribution of alcoholic beverages to other areas. It also agrees with Wanza (2017) that managers in the microinsurance business should consider distribution methods when making choices. These decisions should take into account a variety of aspects, including the nature of the product, the cost of the product, the nature of the company, the consumers, and the environment. When deciding on distribution tactics, it is important to take into account the requirements and drivers of the target market.

The evidence suggests that geographic information systems are a key to distribution strategies. A regression analysis was conducted, and the outcomes were analyzed, in order to investigate the influence that the implementation of geographic information systems in



Kenyan soft drink industries has had. A high R<sup>2</sup> score (0.794) indicates that the model gives a very good fit to the data and that the forecast is accurate. It may be concluded that the regression model is generally significant if the p-value(0.001) is less than 0.05, which it is at a 0.001 level. According to the results of a study conducted by Ndegwa (2015), this is the correct conclusion to draw.

Geographic information systems is significant to distribution strategies of soft drink companies in Kenya. The results corroborate what Dingari (2015) found when he showed that a direct distribution approach has a favorable link towards competitive advantage. Additionally, this gives consumers the option to express their gratitude to the firm for bringing the goods to a location that is more convenient for them. When compared to intense and indirect distribution systems, the vast majority of businesses choose direct distribution tactics. The degree to which indirect distribution and intensive distribution impact a company's competitive advantage is on the moderate side.

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

## **5.1 Introduction**

This chapter gives an overview of the results, together with the researchers' interpretations of those findings, their suggestions, and their conclusions about those findings. This is done in order to ensure that the criteria of the research's ultimate purpose are met.

## **5.2 Summary**

The objective of the study was to determine the degree to which soft drink companies have adopted geographic information systems services and determine the influence of geographic information systems on distribution strategies among soft drink companies in Kenya. It was observed that soft drink companies have embraced geographic information systems. As a result of the widespread belief that GIS services are fairly pricey, it is essential for businesses that sell soft drinks to ensure that the goods and services they provide are of the highest possible quality. To ensure that clients have a positive experience and are willing to recommend the company to others, the staff providing prompt customer service should be of an extraordinarily high quality.

According to the findings, the distribution scope included areas such as towns, the whole nation, and regions. On the other hand, the vast majority of the businesses had distribution networks that extended both regionally and nationally. There was some degree of variability in the number of distributors. It was clear that certain firms' distribution plans did not include the usage of retailers and wholesalers. Despite this, a significant number of

merchants, wholesalers, and distributors were used. The use of distribution techniques has been crucial in the firm gaining a competitive edge.

Customers are pleased with the distribution strategy that is currently being used, and the distribution tactics that have been established by the company are consumer and market focused. According to the results of a simple linear regression study, geographic information systems substantially account for up to 79.4% ( $R^2=0.794$ ) of the diversity in distribution strategy. This suggests that a geographic information system is an important factor to consider when formulating a distribution plan. Further analysis using the regression coefficient demonstrated that all of the distribution methods that were investigated in this research have positive predictive potential.

### **5.3 Conclusion**

According to the findings of the survey, the majority of beverage manufacturers have implemented geographic information systems. When it comes to the examination of retail locations, the companies make use of Geographic Information Systems (GIS) to determine how physically accessible the locations are. The tabular presentation of data makes it more difficult to spot patterns and connections than it would be with the assistance of Geographic Information Systems, which aid in the analysis of all types of data.

There are advantages to use GIS for businesses of all sizes and in almost every sector. GIS is garnering an increasing amount of attention, and people are becoming more aware of its strategic and economic worth. Not just the traditional markets in Kenya, but also other businesses are beginning to recognize the value of Kenya's agricultural sector. Many

prosperous companies in Kenya now make use of geographic information system (GIS) technologies. To go above and beyond the capabilities of traditional data analysis, organizations are now using GIS technologies to integrate, visualize, and analyze data utilizing geography. It is plain to see that beverage manufacturers in Nairobi County, Kenya, have implemented successful distribution tactics as a direct result of the GIS update for their products.

Basing on the second objective, the study concluded that geographic information systems influence distribution strategies among soft drink companies in Kenya. An increase in geographic information systems adoption would result to better result in terms of distribution strategies. Therefore, geographic information systems adoption are a significant predictor of distribution strategies. The bulk of soft drink firms had more than 40 distributors, since this was necessary to serve such a vast area, and these companies utilized more than 10 distributors together. This indicates that businesses are able to grow their market share by luring in new clients, which in turn allows them to boost their revenues simultaneously.

#### **5.4 Recommendations**

When making investments in distribution methods, businesses need to exercise extreme caution. This is due to the fact that some tactics may be applicable while others may not be applicable at all. Increasing the growth of the company and making sure that they have a distribution network that is more extensive are both things that might be accomplished with the assistance of GIS.

In order to maintain their position as market leaders, Kenya's soft drink manufacturers must ensure that their technical capabilities are on par with those of their rivals. The level of competition in this business is significantly influenced by the progression of technology. Companies that produce soft drinks in Kenya are exerting a lot of effort in order to guarantee that they get the most modern equipment. Some of these technologies are designed to ensure that consumers continue to be loyal to a brand, feel valued by the company, and continue to have a favorable image of the brand.

According to the findings of the research, the soft drink manufacturers made use of a variety of distribution tactics, but the scope of their application was insufficient. The researcher suggests to the companies that they should broaden their scope of distribution in their tactics. For example, by entering into franchise agreements, enterprises may ensure the efficient distribution of their goods, since doing together what they could not do as a single entity enables them to realize their full potential.

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

The fact that some company managers were so preoccupied with meetings that they didn't have time to fill out the questionnaires was one of the obstacles that the research had to overcome. The researcher did, however, leave the questionnaires for the participants to fill out in their spare time and followed up with them on a regular basis to serve as a gentle reminder of this fact. After a delay of two or three days, the questionnaires were eventually gathered. In other cases, the researcher was unable to get in touch with the management of the construction companies and was forced to ask the staff for assistance.

Some of the workers had the impression that they were the subjects of an investigation, and as a result, they were reluctant to fill out the questionnaires. The researcher, on the other hand, made an effort to gain the participants' trust by assuring them that their anonymity would be preserved in any study conducted. This anxiety was mitigated in part by the letter of authority to collect data that was sent by the educational establishment, which also assisted in reducing the level of anxiety.

### **5.6 Suggestions for Further Studies**

The methodology for this research is one of quantitative cross-sectional analysis. Due to the restricted amount of time and resources that were available, it was decided that cross-sectional research would be the most appropriate technique for dealing with the problems. Due to the fact that they could only provide organized replies, this methodological approach did not enable the respondents to elaborate on the implications of their responses.

Due to its limitations, this research can only generalize to soft drink companies in Nairobi, Kenya in Kenya. In the future, researchers need studies that examine how geographic information systems affect its distribution strategies in unrelated areas.

## REFERENCES

- Agrawal, S., Gupta, R.D. (2017). Web GIS and Its architecture: a review. Retrieved from <https://doi.org/10.1007/s12517-017-3296-2>
- Amemba, C.S. (2013). Green Supply Chain Best Practices in hospitality industry in Kenya. *Global Journal of Commerce and Management Perspective*, 2(3).
- Bacchetta, M. & Ernst, E. (2009). Globalization and Informal Jobs in Developing Countries. *Journal of Behavioral Economics, Finance, Entrepreneurship, Accounting and Transport*.5(1), 19-29
- Barney, J. (2011) Firms resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Bellofiore, R. (2009). Schumpeter's theory of innovation, development and cycles. *Encyclopedia Of Political Economy*,2,1010-1013.
- Brodsky, I., Ekirapa, A., Cannon, M., & Nutley, T. (2016). Understanding information system and use in Kenya Successes and Challenges in Kakamega, Kilifi, and Kisumu Counties. New York, NY: USAID.
- Catherman, R. (2013). *Monitoring and Evaluating Programs and Projects Using GIS, MEDRIX*, Redmond, WA 98073, USA.
- Ghaffarzadeh, M. (2015). Geographic information system on Management Information System and Decision Support System. *International Journal of Economics, Commerce and Management* 6(3)1-12.
- Gordon, K. (2007). Geographic information system. *Facilitating Information Sharing*. <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/digitizing-the-consumer-decision-journey>.
- Gorsch, D. (2011). "Do hybrid retailers benefit from the coordination of electronic and physical channels?", paper presented at the 9th European Conferences on Information System.
- Hawkins, R., & Davis, C. H. (2012). Innovation and experience goods: a critical appraisal of a missing dimension in innovation theory. *Prometheus*,30(3), 235-259

- Hervani, A. A., Helms, M. M., & Sarkis, J. (2011). Performance measurement for green supply chain management. *Benchmarking: An international journal*, 12(4), 330-353.
- Kafetzopoulos, D. (2015). The impact of geographic information systems on the performance of manufacturing firms, *International Journal of Quality & Reliability Management*, 32(4), 381-399
- Khanna, M. & Anton, W. (2002). Corporate environmental management: regulatory and market-based incentives. *Land Economics*, 78(4) 539-580.
- Kishore B. (2015) Green Supply Chain Management-Challenges and Opportunities *Asian Journal of Technology & Management Research* 5(1) 16
- Kombo, D. K. & Tromp, L. A. (2006). *Proposal and Thesis Writing: An introduction*. Nairobi: Pauline's Publication of Africa, p.77
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. New Delhi. New Age International Publishers, p.8
- KourR., TrettenP. & Karim R. (2014). geographic information system through online data analysis for railway maintenance decision-makingl. *Journal of Quality in Maintenance Engineering* 20(3), 262-275
- Kumar, S. (2010). *Conceptual issues in consumer behavior: the Indian context*. Delhi: Pearson Education.
- Lemanowicz, M. (2015). Innovation in economic theory and the development of economic thought. *Acta Scientiarum Polonorum. Oeconomia*, 14(4), 61-70.
- Lwin, K.K., Murayama, Y. (2011). Web-Based GIS System for Real-Time Field Data Collection Using a Personal Mobile Phone, *Journal of Geographic Information System*, 3: 382-389
- Mackay, K. (2007). *How to Build M&E Systems to Better Support Government*. Washington: World Bank
- Maxwell, L., Rotz, D., & Garcia, C. (2015). *Data and Decision Making: Same Organization, Different Perceptions*. Working Paper No. 36. Oakland, CA: Mathematical Policy Research



- Mitnick, Barry M. (2000). Commitment, revelation, and the testaments of belief: The metrics of measurement of corporate social performance," *Business & Society* (December): 39 (4): 419-465.
- Mphatswe, W., Mate, K., Bennete, S., & Rollins, N. (2011). Improving public health information: a data quality intervention in KwaZulu-Natal, South Africa. *Bulletin World Health Organization*: 90(3): 176–182
- Mururi. P. N. (2010). "Physical distribution strategy' facing Nairobi city center open - air vegetable and fruit sellers". Unpublished MBA Project, University of Nairobi, Kenya, Nairobi, Kenya.
- Mwikali Angela (2009) Factors influencing the distribution channel performance of Kenya wine agencies limited (KWAL) products within the supermarkets in Kenya. *An unpublished master's study of the University of Nairobi*
- Ndegwa C. W. (2015). Assessment of geographic information system use of the community Cealth information system: a case study of karurumo community health unit-Embu County, Kenya.MA research project, university of Nairobi.
- Needham, D., Dransfield, R. C. M., Harris, R. R. M., (2010). *Business for higher awards*, 2nd edition, Heinemann educational publishers.
- Nyaga Stella (2012). Distribution strategies and competitive advantage a case of Nestle company in Kenya. *An unpublished master's study of the University of Nairobi*
- OmongeO.W. Ortago P (2012). Green Supply Chain Management Practices and Competitiveness of Commercial Banks in Kenya. Unpublished MBA project, University of Nairobi.
- Owour Joseph (2007). Distribution strategies adopted by wines and alcoholic spirits manufacturers and importers in Nairobi, Kenya *an unpublished master's study of the University of Nairobi*
- Rao, P. (2015). Greening of the supply chain: a new initiative in Southeast Asia. *International Journal of Operations & Production Management*,22(6)632-655.
- Stem Joyce. (2015). *Strategic Management in the Public Sector*. Abingdon, Oxon UK New York, NY: Routledge.

- Tangen, T. (2014). Performance measurement: from philosophy to practice. *International Journal of Productivity and Performance Management*,53(8)726-737.
- Thompson N., Soper A. (2010). *Values Sell. Transforming purpose into profit through creative sales and distribution strategies*. Williston: Berrett-Koehler Publishers.
- Umer, M. & Afzal, F., 2015. Analysis of Reverse Logistics in Soft-Drink Bottling Industry of Pakistan. [Online] Available at: <http://www.umt.edu> [Accessed 5 December 5, 2017].
- ValentineS., HollingworthD., SchultzP. (2018). information system ethical decision making, lateral relations, and organizational commitment: Building positive workplace connections through ethical operations.
- Wanza F., (2017). Influence of distribution strategies on the uptake micro insurance companies in Kenya *An unpublished master's study of the University of Nairobi*
- Webb, K. L. (2010). "Managing channels of distribution in the age of electronic commerce". *Industrial Marketing Management*, Vol. 31. pp. 95-102.

## APPENDICES

### Appendix I: Research Questionnaire

#### SECTION A: Demographic of the Company

1. Name of the Company (Optional).....
2. The year it was established.....
3. The number of total employees.....
4. How many years has your business been in operation in Kenya?

Up to 5 years  6-10 years  11-15 years  Over 16 years

Please state how many distributors does your firm have in Kenya.

Less than 10  10-20  21- 30  31-40  More than 41

6. Indicate the asset base of the company.

Below KShs 10 billion  KShs 10-20 billion  KShs 21-30 billion  above K Shs 30 billion

7. Total sales per month (Kshs)

Below 20,000,000  Between 50,000,000-100,000, 000  Between 100,000,000-Over 150,000,000

**SECTION B: Extent to Geographic Information Systems Adoption**

8. To what extent does your organization use Geographic Information Systems.

- 1.No extent ( )
- 2. Little extent ( )
- 3. Moderate extent ( )
- 4.Large extent ( )
- 5. Very large extent ( )

**SECTION C: Geographic Information Systems**

9. How much do you agree with the following characteristics of Geographic information systems shown by your company? Please choose the most acceptable response from the list of possibilities using the scale from 1 to 5. 1- Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5 – Strongly Agree.

<b>Component</b>	<b>Strongly Disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
The firm has incorporated geographic data into their complex					

network design which is used in firm planning.					
The firm uses Google Maps has web-based GIS mapping to identify competitors.					
The firm has advanced in mapping technology using products such as Nobel's_GeoViewer					
The use of GIS data makes it possible to pinpoint the sites of accidents, and data intelligence enables the optimization of road networks.					
Data obtained from GIS systems are often used in the process of					

<p>transportation problem management.</p>				
<p>In order to make judgments on packaging, the company uses a combination of market intelligence and geographic information systems.</p>				
<p>The protection of products and services has been accomplished via the use of geographic information systems.</p>				
<p>The geographic information systems that are used by the retail department are used to get product specifications.</p>				
<p>Utilizing geographic information systems</p>				

allows for the identification of the inventory checks that are most relevant.					
Geographic information systems are used for the majority of the decision-making processes involved in quality management.					
Data collection and geographic information systems are used in order to keep an eye on the quality cost centers.					

**SECTION D: Distribution Strategy**

**10.** To what degree do you agree that the following characteristics of your company's distribution strategy are demonstrated by your company? Please choose the most acceptable response from the list of possibilities using the scale from 1 to 5. 1- Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5 – Strongly Agree.

<b>Component</b>	<b>Strongly Disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
The distribution tactics that are already in place at your business have a direct bearing on the product uptake that occurs there.					
There is a connection between the company's overall strategy and the distribution strategy of the organization.					
The firm has been able to achieve a competitive edge thanks to the use of distribution tactics.					
The commissions and policies of the firm are acceptable to the various brokers and intermediaries.					



Customers are content with the distribution approach that is already in place.					
The use of technology into distribution strategies will lead to an increase in product uptake.					
In Kenya, the adoption of products by companies is hampered by a lack of strategic distribution channels.					
Your company's distribution tactics are geared toward the needs of the customer and the demands of the market.					
In order for your firm to maintain its competitive edge, the distribution tactics are regularly evaluated.					
Bringing items directly to customers will result in increased product adoption.					

## **Appendix II: Soft Drink Companies in Nairobi**

- 1) Brava Food Industries Limited
- 2) Milly Fruits Processors Soft Drinks/Juicesanspar Beverages Ltd
- 3) Highlands Min. Water Min. Water/Juices
- 4) Softa Bottling Company Ltd,
- 5) Nairobicrown Foods Min. Water/Juices
- 6) Coca-Cola Bottling Co of Nairobi Ltd
- 7) Kabazi Cannery Mineral Water
- 8) Fresh & Juici Limited
- 9) Jetlak Foods Ltd Juices
- 10) The Kilimanjaro Mineral Water/Juice
- 11) Excel Chemicals Mineral Water/Juice

- 12) Kevian Kenya Ltd Mineral Water/Juice
- 13) Ragos Trading Co. Mineral Water/Juice
- 14) Vilcos Foods Ltd Mineral Water/Juice
- 15) Miritini Kenya Ltd Juices
- 16) Oasis Mineral Water Co Ltd
- 17) Annum Trading Co. Juices/Mineral Water
- 18) Highlands Mineral Water Co Ltd-Depot
- 19) Aquamist Mineral Water
- 20) Fresh Squeeze Ltd
- 21) Mountain Springs Min. Water Mineral Water
- 22) Twin Oaks Ltd Juices
- 23) Kenmal Enterprises Mineral Water
- 24) Cirio Delmonte Ltd Juices
- 25) Seven Sees Investment Mineral Water
- 26) Vilcos Foods Ltd
- 27) Kerio Water Co. Mineral Water
- 28) Razco Limited Juices
- 29) Avodale Water Co. Mineral Water
- 30) Beverage Services
- 31) Litzan Enterprises mineral Water
- 32) Jetlak Foods Ltd
- 33) Samic Enterprises Mineral Water
- 34) Twin Oaks Ltd

- 35) Starplast Ltd Mineral Water
- 36) Cirio Delmonte Ltd
- 37) Kenya Nut Co. Ltd Mineral
- 38) Watercrown Foods
- 39) Pioneer Foods Mineral Foods
- 40) Grange Park Ltd Water
- 41) Ten Out Of Ten Mineral Water
- 42) Bluewave Co. Ltd
- 43) Khetia Drapers Mineral Water
- 44) Cartubox Indu. (E.A) Ltd Water
- 45) Pearl Industries Mineral
- 46) Waterkenya Orchards Ltd
- 47) Waterridgeways Springs Mineral Water
- 48) Aberdares Spring Water
- 49) Longview Ltd Mineral Water
- 50) Nairobi Bottlers Soft Drinks
- 51) World Trade Mineral Water
- 52) Equator Bottlers Soft Drinks
- 53) Alka Clear Water Mineral Water
- 54) Mt. Kenya Bottlers Soft Drinks
- 55) Prime Waters Mineral Water
- 56) Beverage Services Soft Drinks
- 57) Top Kristol (K) Ltd Mineral Water

- 58) Kensil Ltd Mineral Water
- 59) African Safari Club Mineralwater
- 60) Sunlitho Plus Mineral Water
- 61) Clearly Kenyan Mineral Water
- 62) Pearly Waters Mineral Water
- 63) Komax Investment Mineral Water
- 64) Nairobi Mineral Water Mineral Water
- 65) Sheena Food Products Mineral Water

**Source: KAM website (2022)**

**Thank You**