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SUPPLY CHAIN SUSTAINABILITY AND PERFORMANCE OF ALCOHOL MANUFACTURING FIRMS IN KENYA

[1] Kinyundo Maureen Namadi, [2] Dr. Wachiuri Elizabeth

[1] Masters Student, Jomo Kenyatta University of Agriculture and Technology
[2]Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

Alcohol manufacturing firms play a significant role in Kenya's economy, contributing to employment, tax revenues, and export earnings. The sector provides direct and indirect employment opportunities, from production to distribution, benefiting thousands of individuals. The general objective of the study is to assess the influence of supply chain sustainability on performance of alcohol manufacturing firms in Kenya. Specifically, the study sought to to establish the influence of environmental sustainability on performance of alcohol manufacturing firms in Kenya and to determine the effect of economic sustainability on performance of alcohol manufacturing firms in Kenya. This study was guided by: Resource-Based View (RBV) Theory and Innovation Diffusion Theory. The study used a descriptive research design. According to KAM (2023) report, there are 52 registered alcohol manufacturing firms in Kenya. This study therefore targeted 312 management employees working in the 52 registered alcohol manufacturing firms in Kenya. The Yamane formula was adopted to calculate the study sample size. Therefore, the study sample size was 175 respondents. Data collection was done through use of questionnaires. The study carried out a pilot study to pretest and validate the questionnaire. Cronbach's alpha methodology, which measures internal consistency, was used. The study used a total of 18 individuals in the pilot test which represent 10% of target population. Data analysis was done through use of descriptive and inferential statistics. Inferential data analysis was conducted by use of Pearson correlation coefficient, and multiple regression analysis. Inferential statistic is used to make judgments about the probability that an observation is dependable or one that happened by chance in the study. The relationship between the study variables was tested using multivariate regression models. The study results were presented through use of tables and figures. The study concluded that environmental sustainability has a positive and significant influence on performance of alcohol manufacturing firms in Kenya. Further, the study concluded that economic sustainability has a positive and significant influence on performance of alcohol manufacturing firms in Kenya. Based on the findings, the study recommends that the management of alcohol manufacturing firms in Kenya should prioritize economic sustainability as a cornerstone of their business strategy to enhance both profitability and long-term competitiveness. By focusing on efficient resource utilization, cost optimization, strategic investments, and sound financial management, firms can ensure stable growth, reduce operational risks, and maintain profitability even in fluctuating market conditions.

Key Words: Supply Chain Sustainability, Environmental Sustainability, Economic Sustainability, Performance of Alcohol Manufacturing Firms

Background of the study

The manufacturing sector plays a vital role in the economy by driving industrialization, creating jobs, and contributing to GDP growth. It acts as a primary engine of economic development, transforming raw materials into finished products that fuel trade and consumption (Govindan, *et al*, 2020). Manufacturing is crucial for technological innovation, improving productivity, and fostering competitiveness in global markets. Additionally, it supports the service sector and other industries by providing goods that are essential for infrastructure, transportation, and consumer needs (Zailani, *et al*, 2022). This sector also stimulates demand for skilled labor, enhances economic diversification, and generates tax revenues, which can be reinvested into further economic development. Alcohol manufacturing firms are businesses involved in the production and commercialization of alcoholic beverages. These firms use various raw materials (such as grains, fruits, or sugarcane) and processes to create products such as beer, wine, spirits and other alcoholic drinks (Govindan, et al, 2020). These companies may operate at different stages of the alcohol production process, from sourcing raw materials and brewing or distilling, to packaging, marketing, and distributing the final product to consumers (Alzubi & Akkerman, 2022). Alcohol manufacturing firms can vary in scale, from small craft breweries or wineries to large multinational corporations that dominate the global market for alcoholic beverages. Alcohol manufacturing firms play a significant role in both the global economy and the cultural fabric of many societies (Mohamed, *et al*, 2023). These firms are responsible for producing a wide variety of alcoholic beverages, including beer, wine, spirits, and other fermented products, which are consumed in diverse settings, from social gatherings to rituals and celebrations. The scale of alcohol production varies, from large multinational corporations to small craft brewers and distillers, each contributing to the market's richness (Sachin and Rajesh, 2022). These firms drive economic growth, provide employment opportunities, and generate substantial revenue for both local and global markets. Alcohol manufacturing firms contribute to industries such as agriculture, retail, hospitality, and logistics. For instance, raw materials like barley, grapes, and sugar are cultivated by farmers, who then supply them to manufacturers (Zailani, *et al*, 2022). These firms also engage in processing, packaging, distribution, and marketing, generating jobs across a wide range of skill levels. Moreover, the taxes and duties collected from alcohol sales often constitute a significant portion of government revenues, supporting public services and infrastructure. The alcohol industry also plays a crucial role in the global trade of beverages, particularly in the case of wine, spirits, and beer, which are exported around the world (Govindan, *et al*, 2020).

However, alcohol manufacturing firms face both opportunities and challenges in maintaining ethical practices and promoting responsible consumption. On one hand, they are pivotal in promoting innovation within the industry, constantly introducing new products and flavors that attract different consumer demographics (Desalegn & Nadeem, 2024). This innovation includes the development of craft beers, artisanal spirits, low-alcohol options, and alcohol-free alternatives, which reflect changing consumer preferences toward health and wellness. On the other hand, alcohol manufacturers are tasked with addressing the negative social and health impacts of alcohol consumption, such as addiction, alcohol-related accidents, and public health concerns (Nambela & Kasongo, 2024). Many firms have taken proactive steps to promote responsible drinking, invest in health and safety campaigns, and regulate their marketing strategies, especially with regards to vulnerable groups like minors. Alcohol manufacturing firms are subject to a wide range of regulations, which vary by country and region. These regulations are designed to ensure product safety, promote public health, and address issues such as underage drinking or excessive consumption (Adegoke, *et al*, 2021). Firms must adhere to laws governing production, labeling, advertising, and distribution, which often include specific guidelines regarding the alcohol content, warnings about health risks, and restrictions

on marketing to certain demographics. Compliance with these regulations is essential for sustaining public trust and ensuring the long-term success of alcohol manufacturing businesses (Hamdy, Elsayed & Elahmady, 2020).

Supply chain sustainability refers to the practice of managing and optimizing the entire supply chain process in a way that minimizes negative environmental, social, and economic impacts while ensuring long-term viability. It involves making decisions and implementing strategies that not only focus on profitability but also consider the ecological footprint, social responsibility, and ethical practices at every stage, from raw material sourcing to the final product delivery (Mbamalu, *et al*, 2023). Environmental sustainability focuses on minimizing the ecological footprint of business operations. This involves reducing carbon emissions, waste generation, and resource depletion through practices such as energy-efficient production, renewable energy sourcing, and reducing transportation distances. It also includes adopting circular economy principles, where products are designed for reuse, recycling, or remanufacturing, thereby extending their lifecycle. Companies may also focus on sustainable sourcing of raw materials, ensuring that they are responsibly harvested and that biodiversity is protected (Njoki & Achuora, 2020). Economic sustainability ensures that businesses remain profitable in the long run, supporting economic growth while avoiding practices that may be detrimental to workers, communities, or the environment. Companies that focus on economic sustainability look at factors such as resource efficiency, cost reduction, and innovation to maintain long-term profitability (Panya, *et al*, 2023). This study aimed to assess the influence of supply chain sustainability on performance of alcohol manufacturing firms in Kenya.

The performance of alcohol manufacturing firms in Kenya is influenced by a variety of economic, social, and regulatory factors. The alcohol industry in Kenya has seen steady growth in recent years, driven by increasing demand for alcoholic beverages across different income groups (Omweri & Ndolo, 2023). The market consists of both traditional and modern alcoholic drinks, with key players in the sector focusing on beer, spirits, and wine production. Major firms like East African Breweries Limited (EABL) and Kenya Breweries Limited (KBL) have established strong market positions, leveraging extensive distribution networks, advertising, and product diversification. Their ability to adapt to consumer trends, such as a rising preference for premium brands and craft beers, has been a key driver of their performance (Njoki & Achuora, 2020).

Despite these positive trends, the performance of alcohol manufacturing firms in Kenya faces several challenges. The sector is heavily regulated, with the government imposing strict taxes and controls on the production, sale, and distribution of alcohol. These regulatory measures aim to reduce alcohol abuse, especially among the youth, but they also increase operational costs for manufacturers (Mohammed, Lagat & Ngeno, 2021). High taxation has led to an increase in the prices of alcoholic beverages, which can potentially reduce consumer purchasing power and dampen demand. Moreover, regulatory pressures around advertising and product placement have also limited marketing strategies, affecting brand visibility and consumer engagement. Another critical factor influencing performance is the socio-economic context (Panya, *et al*, 2023). Kenya's alcohol market is characterized by a diverse consumer base, ranging from low-income individuals who consume cheaper alcoholic drinks to affluent consumers who prefer high-end products. The performance of alcohol manufacturers is highly sensitive to changes in disposable income and economic conditions. For instance, during periods of economic downturn or rising inflation, discretionary spending on luxury items, including alcohol, may decline, affecting the profitability of firms. Additionally, changing consumer preferences, particularly the growing shift towards health-conscious living, have seen a decrease in the consumption of traditional alcoholic drinks in favor of low-alcohol or non-alcoholic alternatives (Otieno & Kitheka, 2022).

The alcohol manufacturing industry in Kenya also faces competition from the informal sector. Illicit alcohol, often cheaper and more easily accessible, continues to pose a significant threat to the formal alcohol market. This illegal trade not only impacts the revenue of legitimate firms but also raises concerns about health and safety standards (Omweri & Ndolo, 2023). Manufacturers have responded by focusing on strengthening their brand loyalty and increasing the availability of products in both urban and rural markets. Enhanced distribution channels and partnerships with local outlets have been effective strategies for countering the informal market. Technological advancements and innovation have played an important role in improving the performance of alcohol manufacturing firms in Kenya (Njoki & Achuora, 2020). Automation in production processes, better inventory management, and advanced marketing tools have contributed to greater efficiency and reduced operational costs. Firms are increasingly adopting sustainable practices, such as eco-friendly packaging and waste reduction technologies, in response to environmental concerns and consumer expectations. Innovation in product offerings, such as introducing new flavors, packaging, and health-conscious alternatives, has also helped firms maintain competitiveness in a fast-changing market (Mohammed, Lagat & Ngeno, 2021).

Statement of the Problem

Alcohol manufacturing firms play a significant role in Kenya's economy, contributing to employment, tax revenues, and export earnings. The sector provides direct and indirect employment opportunities, from production to distribution, benefiting thousands of individuals (Panya, *et al*, 2023). Additionally, alcohol manufacturing is a key component of the country's agro-processing industry, as it often involves local agricultural products like sugarcane, barley, and maize. The industry also supports government revenue through excise duties and taxes, contributing to the national budget. Moreover, alcohol products, especially beer and spirits, form a large part of the consumer market, further driving economic activity in retail and hospitality sectors (Otieno & Kitheka, 2022).

Alcohol manufacturing firms in Kenya face several challenges related to supply chain sustainability that directly impact them. These challenges stem from a combination of regulatory, operational, and market forces. One of the major challenges that alcohol manufacturing firms in Kenya face is maintaining profitability amidst rising operational costs. The cost of raw materials like barley, maize, and sugarcane has been escalating due to global supply chain disruptions and inflation (Omweri & Ndolo, 2023). The Kenya National Bureau of Statistics (KNBS) reported an inflation rate of 9.6% in 2022, contributing to the higher cost of production. Moreover, the excise tax on alcoholic beverages has been increasing annually, with the Finance Act of 2022 raising the excise duty on alcohol by 10%. This has put additional pressure on profit margins for manufacturers (Panya, *et al*, 2023). In 2022, the Kenya Revenue Authority (KRA) collected Ksh 25 billion from the alcohol sector, highlighting the extent of the tax burden. Furthermore, the illicit alcohol trade continues to undercut legitimate businesses, with the Kenya Association of Manufacturers (KAM) estimating that counterfeits and illicit products claim up to 30% of the market, resulting in a loss of Ksh 60 billion annually for legitimate producers. These combined factors create a challenging environment for manufacturers to maintain profitability (Otieno & Kitheka, 2022).

The alcohol manufacturing industry in Kenya is highly competitive, and market share is hard to secure and maintain, particularly due to inefficiencies in the supply chain. Despite the growing demand for alcohol, with the Kenya National Bureau of Statistics (KNBS) noting a 10% annual increase in alcohol production, smaller manufacturers struggle to keep up with larger players who dominate the market (Njoki & Achuora, 2020). The top five alcohol producers in Kenya control nearly 70% of the market, leaving smaller firms with limited opportunities for expansion. Additionally, the rising cost of raw materials and imported goods

due to fluctuating exchange rates—such as a weakening of the Kenyan shilling in 2023—has made it more difficult for local manufacturers to remain competitive in both local and international markets. This has resulted in higher production costs and a reduction in their ability to offer competitive prices, thus impacting their market share. The inability to scale efficiently and manage costs effectively limits the ability of many firms to capture more of the growing market (Panya, *et al*, 2023).

According to a 2022 survey by Ipsos Kenya, 65% of Kenyan consumers expressed concern about the environmental impact of the products they buy, with 55% willing to pay a premium for sustainably sourced and packaged products (Otieno & Kitheka, 2022). However, many alcohol manufacturers in Kenya still rely on non-sustainable practices, such as using plastic bottles, which negatively affect their appeal to eco-conscious customers. In addition to environmental concerns, there are issues related to the consistency of product quality. A survey by the Kenya Association of Manufacturers (KAM) in 2023 revealed that 42% of consumers reported dissatisfaction with the quality of locally manufactured alcohol, citing issues such as inconsistency in taste and product appearance (Omweri & Ndolo, 2023). These quality issues, often caused by outdated machinery and unreliable suppliers, undermine consumer trust and loyalty. Furthermore, distribution inefficiencies make products less accessible in rural areas, where over 20% of consumers face challenges in obtaining their preferred alcohol brands due to poor distribution networks. As a result, these factors contribute to lower customer satisfaction and hinder brand loyalty (Panya, *et al*, 2023).

The influence of supply chain sustainability on firm performance is profound, especially in industries like alcohol manufacturing. A sustainable supply chain integrates environmental, social, and economic practices, which can lead to long-term benefits for firms (Otieno & Kitheka, 2022). Various studies have been conducted in different parts of the world on supply chain sustainability and firm performance. For instance, Njoki and Achuora (2020) researched on the role of supply chain sustainability on the performance of state corporations. Panya, *et al* (2023) conducted a study on supply chain sustainability and its effects on the performance of sugar sub-sector and Omweri and Ndolo (2023) investigated on sustainable supply chain management practices and performance of humanitarian organizations. However, none of these studies focused on environmental sustainability and economic sustainability on performance of alcohol manufacturing firms in Kenya. To fill the highlighted gaps, the current study sought to assess the influence of supply chain sustainability (environmental sustainability and economic sustainability) on performance of alcohol manufacturing firms in Kenya.

Objectives of the Study

General Objective

The general objective of the study is to assess the influence of supply chain sustainability on performance of alcohol manufacturing firms in Kenya

Specific Objectives

i. To establish the influence of environmental sustainability on performance of alcohol manufacturing firms in Kenya
ii. To determine the effect of economic sustainability on performance of alcohol manufacturing firms in Kenya

Theoretical Framework

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory is a strategic management framework that suggests a firm's resources and capabilities are critical to achieving a sustained competitive advantage.

Unlike traditional perspectives, which often emphasize industry conditions and external forces, RBV focuses on the internal assets of an organization (Kirkpatrick, Klepper & Price, 2020). The theory posits that for a firm to gain a competitive edge, it must possess valuable, rare, inimitable, and non-substitutable resources. These resources can be tangible or intangible, including physical assets, human capital, organizational culture, or intellectual property. RBV also emphasizes the importance of how a firm deploys and utilizes its resources. While owning valuable assets is important, how effectively an organization can leverage these resources determines its ability to outperform competitors (Rugasira *et al,* 2022). This deployment involves not just having the resources but also organizing them in ways that align with strategic goals, ensuring that the firm can sustain its advantage over time. In addition to its internal focus, RBV suggests that firms should continuously build, acquire, and refine their resources (Atieno & Njoroge, 2020). As the business environment changes, resources may lose their value or become easier to imitate, so firms must adapt and innovate. This dynamic approach calls for ongoing investment in developing capabilities, ensuring that the firm's resources remain relevant and superior to those of competitors (Muigua, 2020). This theory was used to establish the influence of environmental sustainability on performance of alcohol manufacturing firms in Kenya.

Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) is a framework that seeks to explain how new ideas, practices, and technologies spread within and between social systems. Developed by Rogers (1962), the theory emphasizes the process by which innovations are communicated over time among the members of a social group (Kurniawan & Managi, 2020). At its core, IDT identifies several key elements that influence the adoption of innovations, including the characteristics of the innovation itself, the communication channels used to disseminate information, the social system in which the innovation is introduced, and the individual adopter's characteristics (Kawiraa, Kiai & Maina, 2020). One of the central components of IDT is the attributes of innovations, which are factors that determine how likely an innovation is to be adopted. Rogers identified five key attributes: relative advantage (the perceived benefits of the innovation compared to existing solutions), compatibility (how well the innovation aligns with existing values and practices), complexity (the perceived difficulty of using the innovation), trialability (the ease with which the innovation can be tested), and observability (the visibility of the innovation's results to others). These attributes play a critical role in shaping perceptions and, consequently, the rate of adoption among potential users (Mwirigi, Makenzi & Ochola, 2020).

Another significant aspect of IDT is the adoption process, which occurs in several stages: knowledge, persuasion, decision, implementation, and confirmation. During the knowledge stage, potential adopters become aware of the innovation. In the persuasion stage, they form opinions about the innovation, which can lead to a decision to adopt or reject it (Rahul, 2020). Implementation involves putting the innovation into practice, and confirmation is the stage where adopters seek reinforcement of their decision, either strengthening their commitment or leading to discontinuance if the innovation does not meet expectations (Mohammed, Lagat & Ngeno, 2021). IDT also emphasizes the importance of social networks and communication channels in the diffusion process. Innovations are often spread through interpersonal communication among peers, opinion leaders, and early adopters who influence others within their social networks. This social aspect highlights that the diffusion of innovations is not merely a linear process but rather a complex interplay of individual choices and social dynamics (Mbamalu, *et al*, 2023). This theory was used to determine the effect of economic sustainability on performance of alcohol manufacturing firms in Kenya.

Conceptual Framework

A Conceptual Framework is a structured representation or model that outlines the key variables or concepts within a study and shows the relationships between them (Mugenda, & Mugenda, 2019). It serves as a guide to help researchers understand the theoretical foundations of their study and how different factors might influence or interact with each other (Cooper, & Schindler, 2019).

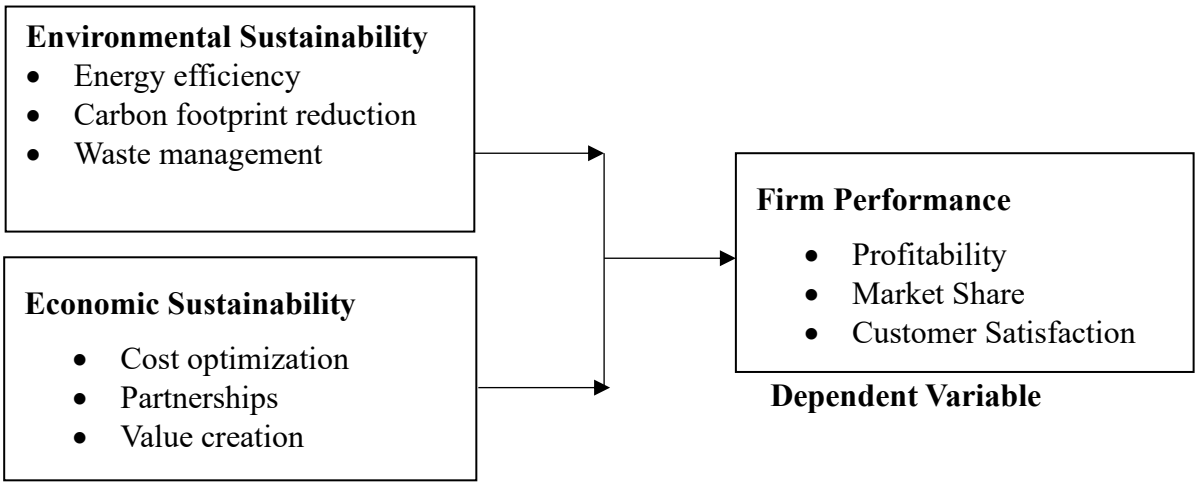

Figure 2. 1: Conceptual Framework

Environmental Sustainability

Environmental sustainability refers to the practice of meeting the needs of the present without compromising the ability of future generations to meet their own needs. It involves making decisions and taking actions that promote the health of the planet, such as reducing resource consumption, minimizing waste, protecting ecosystems, and reducing pollution (Kirkpatrick, Klepper & Price, 2020). Energy efficiency refers to using less energy to perform the same task or activity, thereby reducing the overall energy consumption. This can be achieved through the adoption of advanced technologies, improved processes, and more efficient systems (Atieno & Njoroge, 2020). In the context of buildings, energy efficiency might involve using insulation, energy-efficient appliances, and smart heating and cooling systems to minimize energy usage.

Carbon footprint reduction refers to the efforts and strategies implemented to lower the amount of carbon dioxide (CO2) and other greenhouse gases emitted by human activities (Langat & Kwasira, 2020). This can include various actions such as transitioning to renewable energy sources like solar and wind, reducing vehicle emissions through the use of electric cars, promoting energy-efficient technologies, and encouraging sustainable farming and waste management practices. The goal of carbon footprint reduction is to mitigate climate change by reducing the number of emissions released into the atmosphere, thereby slowing global warming. Waste management involves the collection, disposal, recycling, and monitoring of waste materials to reduce their environmental impact. Effective waste management practices aim to minimize waste generation, maximize recycling and reuse, and ensure that waste is disposed of in an environmentally responsible way (Rugasira *et al,* 2022). This includes sorting waste into categories such as organic, recyclable, and non-recyclable, as well as encouraging the use of sustainable materials that reduce the amount of waste generated.

Economic Sustainability

Economic sustainability refers to the ability of an economy to support long-term economic growth without negatively impacting social and environmental well-being. It involves creating

systems that generate wealth and employment opportunities while ensuring that resources are used efficiently and responsibly (Kurniawan & Managi, 2020). Economic sustainability seeks to balance economic development with the preservation of natural resources, ensuring that economic growth does not lead to resource depletion or environmental degradation. Cost optimization involves the strategic process of identifying and implementing methods to reduce expenses while maintaining or improving the quality of goods or services. This can include streamlining operations, automating processes, negotiating better supplier contracts, and eliminating inefficiencies within the system (Kawiraa, Kiai & Maina, 2020). The goal is to achieve a balance between cost savings and the value delivered, ensuring that resources are used efficiently.

Partnerships refer to collaborations between two or more organizations, businesses, or entities that work together to achieve common goals. These partnerships can take many forms, including joint ventures, strategic alliances, or supplier relationships, and are often formed to combine resources, expertise, and capabilities (Rahul, 2020). By working together, partners can achieve economies of scale, share risks, access new markets, and innovate more effectively. Successful partnerships are built on trust, mutual benefit, and clear communication, and they often create synergies that individual organizations may not be able to achieve on their own. Value creation refers to the process of generating worth for stakeholders, whether through products, services, or experiences, that meet or exceed their needs and expectations. This process can take many forms, such as increasing the efficiency or quality of a product, offering innovative solutions, or enhancing customer satisfaction (Mbamalu, *et al*, 2023). In business, value creation is a key driver of competitive advantage, as companies that consistently deliver value are more likely to build strong customer loyalty, attract investment, and achieve long-term success.

Empirical Review

Environmental Sustainability and Firm Performance

Kirkpatrick, Klepper and Price (2020) conducted a study on the effect of making growth more environmentally sustainable in Germany. This document analyses German environmental policies, including, among others, discussion of air and water quality policy, use of the waste management hierarchy approach and of voluntary agreements. The study found that significant environmental improvements have been achieved, using an approach frequently based on detailed regulations, often developed with the close involvement of industry and even individual polluters. The study concluded that increasing the use of economic incentives, using taxation or tradable permits systems, applied with the maximum degree of uniformity, can help to reduce the costs of environmental policy in the future.

Rugasira *et al* (2022) conducted a study on the effect of reverse logistics and environmental sustainability in selected manufacturing entities in Kampala district, Uganda The study employed a cross-sectional design. The study also used quantitative approaches in collecting and analyzing the data both descriptively and inferentially. The study population was 675 manufacturing entities. Using the purposive sampling technique, the study took a sample of 248. The findings show that there was a low but positive correlation between reverse logistics and environmental sustainability. The study, therefore, concludes that findings are partially supportive of the National Environment Act, specifically concerning the prohibition of littering, Trans boundary movement of waste and classification and management of hazardous waste

Atieno and Njoroge (2020) conducted a study on the effect of the ecotourism metaphor and environmental sustainability in Kenya. However, the inherent gap between theoretical conceptualization of ecotourism as ‘‘green practice expected to address adverse outcomes of

conventional tourism'' and actual environmental impacts of this form of tourism raises the question of whether or not ecotourism in practice complies more closely with its defining criteria. The findings revealed that environmental sustainability was an insignificant concern, as compared to product promotion and corporate image in informing the concept of ecotourism in focal areas. The study concluded that the ecotourism metaphor is an environmental narrative with a face value aim of upholding eco significance in responsible travel.

Muigua (2020) conducted a study on the effect of food security and environmental sustainability in Kenya. Food security is a multifaceted sustainable development topic, linked to health through malnutrition, but also to sustainable economic development, environment, and trade. A population that is food insecure and poorly equipped concerning agricultural production is desperate to survive and this is often at the expense of environmental sustainability since they engage in unsustainable agricultural practices. The study found out that this has adverse effects on both food security and environmental sustainability in the country. The study concluded that there is need for urgency in taking action to fulfill the responsibility to achieve food security for present and future generations.

Economic Sustainability and Firm Performance

Kurniawan and Managi (2020) conducted a study on the effect of economic growth and sustainable development in Indonesia: An assessment. However, the 'dilution effect' on Indonesia's population has outpaced the country's wealth growth, so that its per capita inclusive wealth growth has been negative. The study found that the depreciation of both renewable and non-renewable natural capital is driving the decline in wealth per capita. The study concluded that employing the inclusive wealth framework, we evaluate the extent to which Indonesia achieved economic growth from 1990 to 2014 at the expense of massive natural capital use in violation of basic sustainability criteria

Olayinka (2021) conducted a study on the effect of corporate governance and economic sustainability reporting in Nigeria. This study adopted ex-post facto research design. The population of the study comprised 169 quoted companies on the Nigerian Stock Exchange (NSE) as at December 31, 2019. A sample of 42 quoted companies for the period of 10years (2010-2019) was selected. Data were extracted from published audited annual reports and accounts of the companies. Data were analyzed using descriptive and inferential statistics. The findings revealed that board size, female director and board ownership have positive and significant effect on economic sustainability reporting of selected quoted companies in Nigeria while CEO duality has negative effect on economic sustainability reporting and independent director has insignificant effect. The study concluded that corporate governance promotes economic sustainability reporting.

Mwirigi, Makenzi and Ochola (2020) conducted a study on the effect of socio-economic constraints to adoption and sustainability of biogas technology by farmers in Nakuru Districts, Kenya. The objective of this study, therefore, was to investigate and assess the factors that affect the adoption and sustainability of the technology by dairy cattle farmers. The study employed the expost-facto social survey research design. The target population was the 9466 farmers in Nakuru and Nakuru North districts. . The results of the analysis revealed that while a farmer's socio-economic status significantly influenced the decision to adopt the technology, it did not influence the sustainability of the constructed plants. The research concluded that while the potential of the technology to flourish in the study area is high, its promotion is necessary.

Rahul (2020) conducted a study on the effect of unlikely cities in the desert: The Informal Economy as Causal Agent for permanent "Urban" sustainability in Kakuma refugee camp, Kenya. Refugee camps often evolve into permanent settlements that resemble urban slums in

the inequity, violence, and informal economic structures. The study found that this paper draws on five seasons of ethnographic fieldwork on traders and refugee consumers in Kakuma Refugee Camp, near the Kenya-Sudan border. The study concluded that the narrative that relief food can be culturally inappropriate, unpalatable, and nutritionally deficient in terms of portions distributed is generally accepted by refugees and relief workers alike, at Kakuma and at other refugee settlements

RESEARCH METHODOLOGY

Research Design

The study used a descriptive research design. The descriptive research design is a type of research study design that is used to collect information on the current status of a person or on object (Mugenda, 2019). Information is collected without altering anything in the in the area of study; also known as observational studies. It can be either qualitative or quantitative in nature. This design is preferable for this study because it enabled the researcher to undertake a breadth of observations on phenomenon under study.

Target Population

According to KAM (2023) report, there are 52 registered alcohol manufacturing firms in Kenya. This study therefore targeted 312 management employees working in the 52 registered alcohol manufacturing firms in Kenya.

Table 1: Target Population

Category	Target Population
Top Managers	52
Middle Managers	104
Lower Level Managers	156
Total	**312**

Sample and Sampling Techniques

According to Mugenda and Mugenda (2018), a sample is a smaller group of individuals selected from the population. The Yamane formula was adopted to calculate the study sample size as follows;

$$n = \frac{N}{1+N(e^2)}$$

Where n is the sample size, and N is the population size, e- acceptable sampling error (0.05)

$$= \frac{312}{1+312(0.05^2)}$$

$$= \frac{312}{1.78} = 175.28$$

$n \approx 175$

Therefore, the study sample size was 175 respondents.

Data Collection Instruments

This research used a questionnaire to collect primary data. According to Patton *et. al (*2019), a questionnaire is appropriate in gathering data and measuring it against a particular point of view. It provides a standardized tool for data collection. Structured questions were used to collect primary data from the field. Questionnaires were preferred because they are effective data collection instruments that allow respondents to give much of their opinions pertaining to the research problem (Dempsey, 2019). According to Kothari (2018), the information obtained from questionnaires is free from bias and researchers' influence and thus accurate and valid

data was gathered. The preference for the questionnaire is based on the premise that it gives respondents freedom to express their views or opinions more objectively.

Pilot Test

A pilot study is a small-scale preliminary study conducted before the main research project to test and refine the data collection instrument. Its purpose is to identify potential issues, assess the feasibility of the study, and ensure that the data collection tool work effectively. The study carried out a pilot study to pretest and validate the questionnaire. The study used a total of 18 individuals in the pilot test which represent 10% of target population. The pilot sample was not included in the final study.

Data Analysis and Presentation

The study collected quantitative data from closed- ended questions. The analysis involved both the descriptive and inferential statistics using the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics such as frequency distribution, mean (measure of dispersion), standard deviation, and percentages were used. Descriptive statistics therefore enables researchers to present the data in a more meaningful way, which allows simpler and easier interpretation (Singpurwalla, 2019). Inferential data analysis was conducted by use of Pearson correlation coefficient, and multiple regression analysis. Inferential statistic is used to make judgments about the probability that an observation is dependable or one that happened by chance in the study. The relationship between the study variables was tested using multivariate regression models.

RESEARCH FINDINGS AND DISCUSSIONS

Descriptive statistics

Environmental Sustainability and Firm Performance

The first specific objective of the study was to establish the influence of environmental sustainability on performance of alcohol manufacturing firms in Kenya. The respondents were requested to indicate their level of agreement on various statements related to environmental sustainability and performance of alcohol manufacturing firms in Kenya. The results were as shown Table 2.

From the results, the respondents agreed that their company uses waste management strategies to reduce environmental impact (M= 3.781, SD= 0.646). The respondents agreed that their manufacturing processes prioritize energy efficiency (M=3.770, SD=0.765). Further, the respondents agreed that they have clear sustainability targets for reducing carbon emissions (M=3.668, SD=0.845). The respondents agreed that they comply with all relevant environmental regulations (M=3.654, SD= 0.778). The respondents also agreed that sustainable practices have positively impacted our financial performance (M=3.592, SD=0.801). The respondents also agreed that consumer demand for sustainable products influences their practices (M=3.571, SD=0.692).

Table 2: Environmental Sustainability and Firm Performance

	Mean	Std. Deviation
Our company uses waste management strategies to reduce environmental impact.	3.781	0.646
Our manufacturing processes prioritize energy efficiency.	3.770	0.765
We have clear sustainability targets for reducing carbon emissions.	3.668	0.845
We comply with all relevant environmental regulations.	3.654	0.778
Sustainable practices have positively impacted our financial performance.	3.592	0.801
Consumer demand for sustainable products influences our practices.	3.571	0.692
Aggregate	**3.689**	**0.762**

Economic Sustainability and Firm Performance

The third specific objective of the study was to determine the effect of economic sustainability on performance of alcohol manufacturing firms in Kenya. The respondents were requested to determine the influence of economic sustainability and performance of alcohol manufacturing firms in Kenya. The results were as shown Table 3.

From the results, the respondents agreed that their company invests in long-term financial strategies that support economic sustainability (M=3.872, SD=0.724). Further, the respondents agreed that they focus on optimizing production efficiency to reduce operational costs (M=3.849, SD=0.859). The respondents also agreed that economic sustainability initiatives have led to increased profitability for our firm (M=3.814, SD=0.575). In addition, the respondents agreed that their firm consistently reinvests in innovation to ensure future business growth (M=3.795, SD=0.618). Further, the respondents agreed that sustainable practices have improved their company's competitive advantage in the market (M=3.779, SD=0.701). The respondents also agreed that their company’s economic performance aligns with their commitment to sustainable business practices (M=3.698, SD=0.592).

Table 3: Economic Sustainability and Firm Performance

	Mean	Std. Deviation
Our company invests in long-term financial strategies that support economic sustainability.	3.872	0.724
We focus on optimizing production efficiency to reduce operational costs.	3.849	0.859
Economic sustainability initiatives have led to increased profitability for our firm.	3.814	0.575
Our firm consistently reinvests in innovation to ensure future business growth.	3.795	0.618
Sustainable practices have improved our company's competitive advantage in the market.	3.779	0.701
Our company’s economic performance aligns with our commitment to sustainable business practices.	3.698	0.592
Aggregate	**3.801**	**0.678**

Inferential Statistics

Inferential statistics such as correlation analysis and regression analysis were used to assess the relationships between the independent variables (environmental sustainability and economic

sustainability) and the dependent variable (performance of alcohol manufacturing firms in Kenya).

Correlation Analysis

This research adopted Pearson correlation analysis determine how the dependent variable (performance of alcohol manufacturing firms in Kenya) relates with the independent variables (environmental sustainability and economic sustainability).

Table 4: Correlation Coefficients

		Firm Performance	Environmental Sustainability	Economic Sustainability
Firm Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	153		
Environmental Sustainability	Pearson Correlation	.873**	1	
	Sig. (2-tailed)	.001		
	N	153	153	
Economic Sustainability	Pearson Correlation	.866**	.232	1
	Sig. (2-tailed)	.002	.045	
	N	153	153	153

From the results, there was a very strong relationship between environmental sustainability and performance of alcohol manufacturing firms in Kenya (r = 0. 873, p value =0.001). The relationship was significant since the p value 0.001 was less than 0.05 (significant level). The findings are in line with the findings of Atieno and Njoroge (2020) who indicated that there is a very strong relationship between environmental sustainability and firm performance.

Further, there was a very strong relationship between economic sustainability and performance of alcohol manufacturing firms in Kenya (r =0 866, p value =0.002). The relationship was significant since the p value 0.002 was less than 0.05 (significant level). The findings are in line with the findings of Kurniawan and Managi (2020) who indicated that there is a very strong relationship between economic sustainability and firm performance.

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (environmental sustainability and economic sustainability) and the dependent variable (performance of alcohol manufacturing firms in Kenya).

Table 5: **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.858[a]	.736	.737	.10381

a. Predictors: (Constant), environmental sustainability and economic sustainability

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r-squared for the relationship between the independent variables and the dependent variable was 0. 736. This implied that 73.6% of the variation in the dependent variable (performance of alcohol manufacturing firms in Kenya) could be explained by independent variables (environmental sustainability and economic sustainability).

Table 6: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	111.021	2	55.511	423.748	.001[b]
	Residual	19.625	150	.131		
	Total	130.646	152			

a. Dependent Variable: performance of alcohol manufacturing firms in Kenya.

b. Predictors: (Constant), environmental sustainability and economic sustainability

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 423.748 while the F critical was 3.056. The p value was 0.001. Since the F-calculated was greater than the F-critical and the p value 0.001 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of environmental sustainability and economic sustainability on performance of alcohol manufacturing firms in Kenya.

Table 7: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.374	0.096		3.896	0.003
Environmental Sustainability	0.378	0.099	0.377	3.818	0.004
Economic Sustainability	0.373	0.095	0.374	3.926	0.001

The regression model was as follows:

$$Y = 0.374 + 0.378X_1 + 0.373X_2 \varepsilon$$

According to the results, environmental sustainability has a significant effect on performance of cement manufacturing firms in Kenya (β_1=0.378, p value= 0.004). The relationship was considered significant since the p value 0.003 was less than the significant level of 0.05. The findings are in line with the findings of Muigua (2020) who indicated that there is a very strong relationship between environmental sustainability and firm performance.

Furthermore, the results revealed that economic sustainability has a significant effect on performance of alcohol manufacturing firms in Kenya (β1=0.373, p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant level of 0.05. The findings are in line with the findings of Olayinka (2021) who indicated that there is a very strong relationship between economic sustainability and firm performance.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The study concluded that environmental sustainability has a positive and significant influence on performance of alcohol manufacturing firms in Kenya. Findings revealed that, energy efficiency, carbon footprint reduction and waste management influences performance of alcohol manufacturing firms in Kenya.

Further, the study concluded that economic sustainability has a positive and significant influence on performance of alcohol manufacturing firms in Kenya. Findings revealed that; cost optimization, partnerships and value creation influences performance of alcohol manufacturing firms in Kenya.

Recommendations of the Study

The study recommends that the management of alcohol manufacturing firms in Kenya should integrate environmental sustainability practices into their core business strategies to enhance both operational performance and long-term competitiveness. Sustainable practices—such as efficient water usage, waste management, emission reduction, and adoption of clean energy—can lead to cost savings, improved regulatory compliance, and stronger brand reputation.

Further, the study recommends that the management of alcohol manufacturing firms in Kenya should prioritize economic sustainability as a cornerstone of their business strategy to enhance both profitability and long-term competitiveness. By focusing on efficient resource utilization, cost optimization, strategic investments, and sound financial management, firms can ensure stable growth, reduce operational risks, and maintain profitability even in fluctuating market conditions.

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