SUPPLY CHAIN MANAGEMENT PRACTICES AND PERFORMANCE OF MILK PROCESSORS IN KENYA

NDUNG'U NJERI HELLEN

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DECLARATION

This research thesis is my original work and has not been presented elsewhere for a degree or any other award.

Signature ..……..…… Date 10-09-2021

Ndung' u Njeri Hellen

Department of Business and Economics

D530/1228/2018

This research proposal has been submitted for examination with our approval as the University Supervisors.

Signature ..... Date 10-09-2021

Dr Purity Mukiri Mwirigi

Department of Business and Economics

University of Embu

Signature …… . Date 10-09-2021

Dr Karambu Kiende Gatimbu

Department of Business and Economics

University of Embu

DEDICATION

In loving memory

of

my parents.

May God grant you eternal rest

and

May His perpetual light shine upon your souls forever,

until we meet again.

ACKNOWLDEGMENT

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ACRONYMS AND ABBREVIATIONS

FAO: Food Agricultural Organization

GDP: Gross Domestic Product

JIT: Just in Time

KAM: Kenya Association of Manufacturers

KCC: Kenya Co-operative Creameries

KDB: Kenya Dairy Board

NACOSTI: National Commission for Science, Technology, and Innovation

NAMA.: Nationally Appropriate Mitigation Action

OLS: Ordinary Least Square

SCM: Supply Chain Management

USAID: United States Agency for International Development

VAT: Value Added Tax

DEFINITION OF TERMS

Green procurement: An aspect of supply chain management where the business conducts operations regarding the environment to enhance performance but in a sustainable manner.

Lean Inventory management: A framework used by firms to check inventory levels, identify and eliminate waste to reduce production cost and time while improving quality in production. Inventory leanness involves the use of Just in Time inventory that seeks to eliminate and reduce waste and defects.

Performance: The ability of a firm to achieve her market oriented goals, operational goals as well as financial goals. Performance is the actual result of a firm as compared against its intended results. A firm's overall performance is divided into financial, product- market, and operational performance

Strategic sourcing: The practice of obtaining firm supplies efficiently through a focus on long term benefits to both the firm and suppliers. The tradition considers supplier relationships and efficient communication between business partners.

Supply chain: Extends the concept of integrated management to all organizations involved in the process of product delivery, from suppliers of raw materials to end customers.

Supply Chain Management Practices: Activities that are involved in the acquisition of raw materials from suppliers to end product use and disposal in a supply chain. The practices enhance excellent performance, customer satisfaction, and value when adopted efficiently in organizations.

ABSTRACT

Supply Chain Management practices are activities carried out by an organization to enhance the effectiveness of its supply chain. The practices improve organizational performance and enhance competitiveness. Milk processors act as a link between dairy farmers and the dairy market. Milk processors in Kenya have been performing poorly. There has been a 6.7% decline in performance in the dairy industry. The poor performance is a result of poor quality and low quantities of milk supplies to the processing plants. Only 12% of marketed milk reaches the processing facilities. The capacities are therefore underutilized by over 54% annually. Consequently, this study looks into practices of supply chain management which are strategic sourcing, inventory management, and green procurement and how they influence the performance of milk processors in Kenya. The resource orchestration, lean and the stakeholder theories guided the study. The study was conducted across the country comprising respondents from milk processors in Kenya. The study adopted a quantitative census design and used structured questionnaires in data collection. Validity and reliability was checked. All diagnostic tests were carried out. Correlation analysis followed by multiple regression analysis was conducted to show the relationship between the study variables. A strong and statistically significant relationship was established between strategic sourcing, lean inventory management, green procurement practices and firm performance. The study concluded that practices of supply chain management-strategic sourcing, green procurement and lean inventory management are good measures of firm performance. However, more research needs to be done in the area. The study will provide insights into the management of milk processing firms. When adopted, the supply chain management practices will help milk processors improve performance.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The dairy sector is an agricultural sub-sector that aid the global economy through food and nutrition provision with over 800 Billion liters of milk for consumption. Milk contains significant levels of protein and micronutrients. The micronutrients include Magnesium, Zinc, Potassium, Riboflavin, and vitamin B12 and B5. Traditionally, milk was considered a therapeutic food for the sick, elderly, and infants (Gerosa and Skoet, 2012) but nowadays, milk is a basic commodity in most households (Kenya Association of Manufacturers, (KAM), 2019). According to Food Agricultural Organization, (FAO), (2020) milk and milk products are consumed by around 6 billion people globally. In Europe, America and the Middle East, milk is a major component of the peoples' diet. Developing economies are countries are rapidly growing into colossal milk and milk products consumers (Oliveira, Fox & A 'Mahony, 2019).

Dairy provides over 470 Million jobs globally. Provision of employment act as a contributor to Gross Domestic Product (GDP) in any country. In Pakistan, dairy contributes 11% of GDP per annum (Shahid, Shafique & Shokat, 2012). In Kenya dairy contributes to over 4% national GDP (The National Treasury and Planning, Kenya, 2019). The contribution of the dairy sector towards the achievement of Sustainable Development Goals (SDGs) cannot go unnoticed. SDGs are achieved through ending poverty, combating climate change and achieving gender equality. Poverty can be ended through provision of highly sustainable and nutritious products. Climate change can be addressed through green procurement practices while gender equality can be through involvement of women in dairy activities (Roux, 2017).

Dairy activities help achieve individual national goals. In Kenya, the Big Four agenda-an economic blueprint and the vision 2030-a development blueprint are both national goals. Industrialization of the dairy sector will help achieve both goals. In return, food security will be achieved in the country (The National Treasury and Planning, Kenya, 2019). In Ethiopia, the dairy sector aids economic transformation through growth in income and achieving set governmental goals (Minten, Habte, Tamru & Tesfaye, 2020).

Globally, the dairy industry has been growing immensely. However, it is worth noting that there has been a constant decline in the price of milk in the United Kingdom despite the yield doubling (Dairy UK-Defra, 2020). Farmers are selling directly to consumers; bypassing milk processors. Dairy processing and production in Europe have declined by 6.2 % since the consumers are buying directly at the farm (FAO, 2015). Poor relationships between farmers and milk processing firms in the United Kingdom, make farmers opt to sell milk directly to consumers (Dowing, 2016). In India, the formal dairy sector is characterized by low profitability, high overheads, and inadequate investment in technology (Banerjee & Mishra, 2015).

In most African countries', the dairy sector is domestic and localized. Most milk is delivered in raw form directly to consumers bypassing milk processors (FAO, 2020). The informal channel in most developing economies, plays a major role in provision of milk for consumption. 80% of the Kenyan milk is delivered in raw form. In Tanzania raw milk is delivered at 90% while in Assam (India) raw milk consumption stands at 95% (Blackmore, Guarin, Alonso, Grace & Vorvey, 2020).

It is evident consumers and producers prefer the informal channel to the formal channel of milk marketing. Preference of the informal channel by milk consumers has been attributed to various reasons; milk quality, pricing and availability. Producers prefer the informal channel as it pays immediately and at higher prices (Blackmore *et al*, 2020). After liberalization of the dairy sector in Kenya, producers who are mostly farmers, sold their milk to the new formal entrants with an aim of creating more money. Later, some of the milk processors closed down and defaulted payments of farmers. Some farmers were paid in small batches which left them discouraged. Since then most farmers opt to sell directly to consumers (Kibogy, 2020; Lokuruka, 2016).

In a bid to establish a competitive industrialized dairy sector, the Kenyan government has invested in cooling plants and other infrastructural capabilities. Kenya has joined hands with other nations aiming at improving their processing capacities of milk (FAO, 2020). Milk has characteristics that differentiate it from other agricultural products. The differences shape its trade, processing, and production. In raw form, milk is highly nutritious but very bulky and highly perishable (Knips, 2005) and thus requires processing immediately after collection (FAO, 2019).

Despite the infrastructural capabilities and investments and the surge in demand for processed milk products, processing is still done at low levels in many nations. In Tanzania over 65% of processing capacities are underutilized this has resulted to closure of over 12 processing plants. In Kenya only 46% of installed milk capacities is utilized anually. In Rwanda, underutilization of milk processing capacities is by over 57%. In Uganda, milk processing capacity is underutilized by over 40% (Abulsalamad & Gereffi, 2016; Lokuruka, 2016). The underutilization of processing capacities is a clear sign that processing is done but at low levels across Africa. Kenya is a heavy importer of milk powder and ghee from the United Kingdom since local processing cannot satisfy the growing demand (FAO, 2020).

Numerous challenges such as seasonality in milk production, milk quality issues, postharvest losses, inadequate supply of inputs, fragmented supply chains, high cost of processing, and competition from the informal sector specifically face the milk processing firms in Kenya. The challenges heavily contribute to the underutilization of processing capacities (Maina, Njehia & Eric 2020; Kibogy, 2019). Investments made by milk processors in form of milk treatment plants, pasteurizers, refrigerators, pipes, spares and boilers are expensive. When underutilized firms make losses (Abdulsamad & Gereffi, 2016; Lokuruka, 2016).

Milk processors are a useful link between dairy farmers and the market. Milk processors purchase raw milk and help in the delivery of value-added products (yoghurt, ghee, milk powder, cheese) to the end consumers. A competitive dairy processing sector ought to provide affordable products that are easily accessible in the market. Therefore, dairy processing firms must recognize the role of supply chain management (SCM) practices in improving their performance. Despite the critical role of SCM practices in improving performance, literature is scarce specifically in the milk supply chain in Kenya (Maina et al, 2020). Therefore, the study objective is to empirically explore how SCM affect firm performance of milk processors in Kenya. The SCM practices included in the study are strategic sourcing, lean inventory management and green procurement practices.

Supply chains including the dairy supply chain are becoming complex and this calls for effective management of buyer-supplier relationships as this enhances superior performance (Whipple, Wiedme & Boyer, 2015). Patil and Gogte, (2020) recognize

that suppliers are a critical aspect that contribute to firm success. This however can only be achieved when supplier selection is done in a strategic manner and better relationships are developed between buyers and sellers. Kim and Chai (2017), define strategic sourcing as the process of supplier and supply network management all in a bid to enhance operational, market and financial objectives of a firm. Formation and management of supplier relationships is the backbone of supply chain as they improve form performance (Dash, Das, Tripathy & Nayak, 2018).

The perishability of milk makes the dairy supply chain unique, thus needs unique treatment from and for the dairy chain players (Onam, Omondi & Battenweck, 2019). Good and lean inventory management practices in a dairy firm translate to efficient transportation of milk, which is a perishable product; thus, the firm will not have excess obsolete stock. This practice brings to better firm performance (Atnafu & Balda, 2018). A lean inventory management practice will ensure effective capacity utilization and enhanced performance (Alshoubul, 2018).

The dairy industry has been receiving considerable attention from environmentalists since it contributes to environmental degradation both from a global and local perspective (Deloitte, 2017). The environmental degradation is through land usage, pollution from industrial waste, and animal pesticides and feeds. Farmers are now using manure in place of commercial fertilizers to reduce pollution. Besides, the disposal and use of plastics have a significant concern in the dairy industry. This attention has led to companies like Fair Cape Dairies to use recyclable milk packaging (Fair Cape Dairies, 2019) and Bio Foods Products which has packaging that has 30% less polyethylene terephthalate thus less environmental impacts (Food Business Africa, 2019).

Green Procurement, therefore, is responsible for better environmental and market performance. Consumers identify with sustainable products (Gorante & Kante, 2015). Environmental factors, when implemented in procurement policy, will lead to the development of green procurement in an organization. Greening the entire chain will focus on eco-friendly packaging and delivery of the final commodity to consumers. A ban on plastic bags in Kenya saw dairy processing firms use the right packaging material while adhering to legislation. This practice enhances customer value and, at the same time, reduce expenses in the form of fines. This adherence will ultimately improve firm pe 6rformance (Fair Cape Dairies, 2019).

Despite highlighted interventions, the dairy sector has been performing poorly, more so the processing sector. According to KDB (2017), milk production in 2009 was 4.7 billion liters, and 8 years later, in 2017, it was still stagnating at 4.7 billion liters. The marketed milk value was 465.7 billion Kenya Shillings in 2019 lower compared to 498.3 billion Kenya Shillings as of 2018 thus a significant 6.5% decline in operational performance (KDB, 2017). Besides, the capacities invested in are underutilized by about 54% annually; hence the milk processors lose revenues (KDB, 2020). SCM practices such as strategic sourcing, green procurement practices, and lean inventory management are considered a critical aspect in the development of the agricultural dairy industry to meet the demand of dairy products globally (Muhammad, Akhter & Ullar, 2014).

Many studies have been conducted in the area of SCM practices, performance and customer focus in various parts of the globe. A survey by Bag, (2012) on Indian manufacturing firms shows that green procurement and supply practices enhance efficiency and profitability, thus improved organizational performance. In Kenya, Wanjiku and Mwangangi, (2019) studied SCM practices on beverage manufacturing firms in the case of Cadbury Limited. They found out that operational performance of beverage firms in Kenya can be aided through adoption of effective practices in supply chain management. The dairy sector is productive in the country in terms of both poverty alleviation and food production. Therefore, the study will look into practices involved in supply chain management and how they influence the performance of milk processors in Kenya.

1.1.1 Supply Chain Management Practices

Activities in any value chain encompasses the purchase of materials from suppliers, manufacturing, and distribution of final goods to the end consumer (Bhardwaj, Mor, Singh & Dev, 2016). A value/supply chain incorporates all relevant parties involved either in a direct or indirect manner when a customer request is accomplished (Rawal, 2018). The dairy supply chain consists of raw milk suppliers, plants, warehouses, and the end consumers (Bhardwaj et al., 2016). Increase in dairy products, changes in shopper tastes, and fixation of price by players in the milk industry call for effective SCM. The consumption of milk products has a significant relationship with dairy processing and SCM in that when consumption increases, more pressure is exerted on

supply chain members (Suryanto & Kamalasari, 2018). In building and maintaining effective long term relationships and partnerships with suppliers, SCM is regarded as a key ingredient. Therefore, SCM practices are activities performed by organizations to make a supply chain effective (Kumar & Kushwaha, 2018).

SCM practices have received considerable attention from researchers as they improve firm performance (Kilonzo, 2014; Gorane & Kant, 2015; Alshaboul, 2018). SCM practices are activities involved in planning and management, sourcing and procurement, conversion of raw materials into finished goods, logistics management, and collaboration among supply chain members (Kilonzo, 2014; Alshaboul, Barber, Garza-Reyes, Kumar & Abdi, 2017). SCM practices include strategic sourcing, inventory management, flexibility with partners, supplier collaboration, lean production, information quality management, adoption of Information Technology, Green SCM, Reverse Logistics, internal integration, and customer focus (Gorane & Kant, 2015; Alshaboul, 2018). According to Maina, Njehia, and Eric (2020), SCM practices in the dairy sector include information technology, procurement management, logistics management, customer relationship management, and supplier development.

SCM practices have evolved and they have been identified by scholars and practitioners to be critical to the improvement of firm performance. SCM practices are valuable sources of competitive advantage and help in enhancing profitability in the marketplace (Maina et al., 2020). Firms need to dedicate their resources to SCM practices that will improve the efficient functioning of corporate departments and, in return, enhance organizational performance (Kilonzo, 2014). For this study, SCM practices will include strategic sourcing, green procurement, and lean inventory management. The dairy industry is concerned with perishable raw materials like milk that need proper planning of use and acquisition to avoid waste and spoilage. Therefore, a close relationship with suppliers through strategic sourcing is needed. There is increasing environmental awareness in the supply chain that has led to the inclusion of green SCM practices. Underutilization of milk processing capacities in the country is a form of waste that needs to be addressed through lean inventory practices.

1.1.2 Firm Performance

Firm performance is the ability of a firm to achieve her market-oriented goals as well as financial goals. Performance is the actual result of a firm as compared against its intended results, and higher performance is achievable through valuable outcomes. A firm's overall performance is divided into financial, product- market, and operational performance (Chepchumba & Gitau, 2016). Building a successful firm involves planning factor inputs of production into enhanced capabilities that help a firm to advance towards customers' expectations, thus increased overall performance (Onguko, 2015). In this regard, the measures to be used in the study for return will be the financial, market, and operational performance.

1.1.3 Milk Processing Firms in Kenya

The dairy industry has grown since its liberalization in the 1990s (KAM, 2018). There have been acquisitions (Brookside acquired Buzeki and Delamere) changes in market leaders, and new entrants (Zawadi Dairy Limited, Superior Highland Dairy) in the industry (USAID-KAVES, 2015). Currently, the milk processors count in Kenya stands at 34 (KDB, 2020). The milk processing firms process milk into packaged milk and other milk products such as yogurts, butter, and ghee (KDB, 2020). Milk processing firms in Kenya utilize their processing capacities at 54% annually since only 12% of raw milk makes it to the processing plants (USAID-KAVES, 2015; Lokuruka, 2016).

1.2 Statement of the Problem

The dairy sector is key in poverty alleviation and malnutrition in rural and urban areas through increased household income and a consistent supply of milk products (KAM, 2018; Joto & Odock, 2019). However, a constant decline in the consumption of processed milk products has accelerated the poor performance of milk processing firms in Kenya (Onam, Omondi & Battenweck, 2019). Milk processing firms have been reporting losses (KAM, 2018).

Milk processors are a useful link between dairy farmers and the market. Milk processors purchase raw milk and help in the delivery of value-added products to the end consumers. Numerous challenges such as seasonality in milk production, high cost of processing, and competition from the informal sector are facing the milk processing firms in Kenya (Maina et al., 2020). There has been a reported 6.7% decline in the performance of the dairy industry in 2019 (KDB, 2020). The decline is owed to the

low quality of raw milk and inadequate supplies delivered to milk processors. This affects the capacity utilization and performance of milk processors. Only 12% of marketed milk makes it to the processing plants in Kenya. The capacities invested in by milk processors are underutilized by over 54% annually (Maina et al., 2020). Besides, the move towards sustainable supply chains has seen firms adopt better ways of packaging that have reportedly been expensive. The recent ban on plastics bags hit hard on most milk processors and has affected their performance (NEMA, 2020).

A competitive dairy processing sector ought to provide affordable products that are easily accessible in the market. Therefore, dairy processing firms must recognize the role of SCM practices in improving their performance. Despite the critical role of SCM practices in improving performance literature is scarce specifically in the milk supply chain in Kenya (Maina et al., 2020).

Studies have been conducted in the field of best SCM practices in organizations. Madhavaram and Hunt (2008) and Hassanzadeh and Jafarian (2010) noted that best procurement practices are a strategic tool towards an increase in firm profitability. This study was conducted in India and looked into procurement best practices only. the study failed to address the entire supply chain. Kilonzo (2014), performed a study involving beverage processing firms in Kenya with Cadbury Kenya as the response unit.. The study was exploratory and established that best procurement practices improved customer responsiveness, sales, and profitability. The study by Kilonzo (2014), failed to address green procurement and inventory management practices. From these studies, it is evident that there is an empirical gap in the area of SCM practices more so in the dairy industry. Also, the variables of the study; inventory management, strategic sourcing, and green procurement practices have failed to be addressed in the dairy sector context. Therefore, the central objective of this study is to uncover the influence of supply chain management best practices on performance using milk processing firms in Kenya.

1.3: Objectives of the Study

The study has both general and specific objectives.

1.3.1 General Objective

The general aim of the study was to determine the effects of supply chain management practices on the performance of milk processing firms in Kenya.

1.3.2 Specific Objectives

1. To analyze the effect of strategic sourcing on the performance of milk processing firms in Kenya.
2. To determine the effect of lean inventory management on the performance of milk processing firms in Kenya.
3. To establish the effect of green procurement on the performance of milk processing firms in Kenya.

1.4 Research Questions

1. What is the effect of strategic sourcing on the performance of milk processing firms in Kenya?
2. What is the effect of lean inventory management on the performance of milk processing firms in Kenya?
3. What is the effect of green procurement on the performance of milk processing firms in Kenya?

1.5 Scope of the Study

The study scope was limited to all milk processing firms licensed by the Kenya Dairy Board. The study used quantitative data. The research sought to establish the effect of SCM practices on the performance of milk processors in Kenya.

1.6 Significance of the Study

The study will help the management of milk processors understand supply chain management practices and their effects on performance. The management, therefore, will adopt the supply chain practices and in return improve their firm performance. Under the Vision 2030 blueprint, the dominant aspiration is the transformation of the country into a newly-industrialized state that is globally competitive (KDB, 2020). This can be achieved by the government through increased milk processing and value addition that can be achieved through the adoption of SCM practices by milk processors.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter looks into the theories on which this study will be anchored. An empirical review showing studies done in the past has been included. A conceptual framework showing the relationship between variables is included in the second chapter. A summary of the reviewed research and the research gaps has also been included.

2.2 Theoretical Review

The study was informed by resource orchestration theory, stakeholder theory, and lean theory.

2.2.1 Resource Orchestration Theory

This theory is a development of the customary resource-based view theory by Barney (1951). Assumptions of the resource-based theory are that the skills, capabilities, and resources that a firm possesses are different from another firm, and the resources are immobile. Through these assumptions, the proponents of the theory Barney and Wernerfelt, (2013), argue that a firm should look through a firm to identify resources that can add to a competitive advantage within themselves instead of looking for a competitive environment in the industry.

The resource-based view theory has received criticisms that led to the development of the resource orchestration theory. Carnes & Xu (2015), argue that the approach fails to define a resource explicitly, making it hard to differentiate resources as inputs. The theory fails to explain how managers use and transform these resources to create a competitive advantage. Also, the theory focuses on the internal processes of a firm and fails to explain external circumstances in an industry. The demerit makes the resource-based theory inflexible in explaining both internal and external dynamics in a firm. Thus the need for the resource orchestration theory (Kamau, 2017). As an expansion, Sirmon, Hitt & Ireland (2011), integrated resource management with asset orchestration to develop resource orchestration theory. Resource orchestration assumes that resources alone cannot benefit a firm, but the decisions and actions of managers regarding the use of resources can create value and competitive advantages (Boss, 2014).

The theory bases its emphasis on the actions that can structure while bundling and at the same time leverage effectively the resources of an organization to create customer value and improve performance. The resources of a firm such as knowledge, skills, and information are owned externally by suppliers or internally owned by the organization. The autonomous self-operating suppliers who own the resources need orchestration into more exceptional forms (Wong et al., 2018). It is through this orchestration that a shared vision for the whole organization is established and, thus, better performance through productive opportunities and growth (Sikolia & Muthini, 2019). Strategic sourcing plays a critical role in enhancing orchestration (Wong *et al*., 2018). From the theory, firms that adopt effective practices in their supply chains they can gain competitive advantages and improve their performance. Supply chain management practices are resources that need to be orchestrated to enhance performance in organizations.

2.2.2 Stakeholder Theory

The theory advanced by Freeman (1984), has identified various categories of groups considered as stakeholders inside and outside an organization. According to Freeman (1984), managers need to satisfy the desires and expectations of these stakeholders. The theory explains that utilities created for any stakeholder in a firm influences the performance of that firm (Nthenge, 2019). A firm operates to serve different stakeholders. For suppliers, an organization is bound to maintain adequate and efficient relationships as this will help the firm achieve a consistent and proper number of supplies at fair prices and improved quality. The environment is also a stakeholder and needs to be efficiently taken care of since it influences firm performance through fines and reputation. A firm should adopt green procurement practices since customers prefer green products and green marketing for products (Song, Yu & Zhang, 2016). Supply chain management practices are dependent on a variety of stakeholders- suppliers, customers, employees, and shareholders who need significant consideration (Nderitu, 2016).

2.2.3 Lean Theory

The proponents of the lean theory, Atnafu & Balda (2018), and Kimani (2018) argue that lean theory extends the thought of Just in Time. The lean theory aims to minimize waste in firms and reduce buffer stock (Atnafu & Balda, 2018). The theory provides insights into how manufacturers gain flexibility in their ordering decisions, reducing

inventory stocks, and eliminating inventory costs (Kimani, 2018). Most of the studies have indicated that companies use lean inventory practices to achieve a very high and efficient level of asset utilization and customer satisfaction, and this leads to growth in profitability and market share. Criticisms attributed to this theory are that it is only applicable where there exists a strong and close relationship and collaboration with trading partners, which is somewhat difficult (Kimani, 2018). Milk processing firms in Kenya have invested in milk processing plants that are expensive but always remain underutilized. The underutilization adds up to costs in a firm and reduces the milk processing firm's performance. Insights from lean theory will enable milk processors to create value for themselves, their customers, and achieve efficiencies in inventory management through the reduction of costs (Kimani, 2018).

2.3 Empirical Review

2.3.1 Strategic Sourcing and Performance of Milk Processing Firms

In their study, Hsu, Tan, and Zailani, (2016) pointed out that strategic sourcing is the ultimate goal for every firm because there is a lot of pressure and competition in the market today. A survey by Mor, Bhardwaj, & Singh, (2018) postulated that significant development in purchasing would help to deal with dairy changes and help dairy firms become competitive, thus improving their performance. Strategic sourcing will consider the establishment of a supply base with an efficient network of communication and material flow in order to achieve set organizational objectives, as pointed out by Kim & Chai (2017). The practice of strategic sourcing will involve the acquisition of goods from the right source with consideration of profit and risk issues, thus added benefits as highlighted by Kilonzo, (2014). The quality of products and services acquired, according to a study by Kihanya, Wafula, Onditi & Munene, (2015), plays a critical role in influencing performance. The right source for dairy inputs such as raw milk, pasteurizers, machinery, and cooling plants has to be identified from the start through collaboration with the organization and suppliers. Supplier relationships will improve information sharing and thus maintain a reasonable material quality and product cost and, therefore, financial strength and better firm performance, as concluded in a study by Arani, Mukulu, Waiganjo, Wambui, Wambua, and Wambua.J., (2016).

Wanjiku & Mwangangi, (2019) researched the influence of procurement best practices on the performance of food and beverage manufacturing firms in Kenya. They found out that best practices influence organizational performance positively. The study looked into strategic sourcing through supplier relationships and strategic alliances. The study found a definite positive link between supplier relationships and the performance of beverage manufacturing firms in Kenya. The study pointed out that through strategic sourcing and supplier relationships, firms can gain competitive advantages and entry to new markets, thus improving their performance. The study concluded that through supplier relationships, organizations could achieve enhanced benefits through resource sharing, risk spreading, and profit enhancement. A study by Gitau, (2016) pointed out that technology use in inventory management is crucial. According to the study, technology can be used to review inventory levels, determine maximum and minimum inventory levels, and determine the appropriate reorder level of stocks. The use of technology help reduces costs that could have otherwise been incurred on paper use and helps a firm maintain flexibility in operations.

2.3.2 Lean Inventory Management and Performance of Milk Processing Firms in Kenya.

According to iCepts Technology Group (2020), firms implement lean techniques in inventory management to reduce costs improve flexibility, and have better focus time on customers. Lean inventory practice helps enhance firm profitability and efficiency as the firm seeks to reduce waste, increase inventory. A study by Krar (2020), concluded that being lean involves having inventory as close to zero as possible. Further, being lean concern doing things cheaply while providing superior quality service. A study by Green (2018), found out that lean inventory management leads to a reduction in costs and lead times and increases on-time deliveries. The study by Green, (2018) argued that firms are making their suppliers leaner since inventory leanness by a firm can affect the leanness of suppliers. Therefore, higher productivity can be achieved if the buying organization work well with suppliers. A study by Ahmed (2016), incorporated JIT which is a major characteristic of inventory leanness. According to the study JIT helps to obtain commodities as and when they are required. The practice of JIT helps to reduce non-value-added costs and long-run costs. A study by Achuora &Arasa (2020), on supermarkets in Kenya, found a positive relationship between lean inventory management and firm performance. Lean practices such as JIT,

back-ordering, and drop shipping help improve capacity utilization and therefore improved operational performance. A study by Achuora and Arasa, (2020) concluded that for JIT and inventory leanness to work, the procured materials should be of high quality to reduce defects and wastes. Leanness in inventory helps to improve profitability, reduce production cost and time in organizations (Odhiambo & Kihara, 2018).

2.3.3 Green Procurement practices and Performance of Milk Processing Firms in Kenya.

Green procurement practices are organization-wide practice (Chiarini &Vagnoni, 2017). Green initiatives invite responsibility for a firm towards several stakeholders, including employees, customers, and society, all in an aim to maximize profit (Hernández-Murillo & Martinek, 2009). Green efforts require the collaborative efforts of all members in a supply chain since green procurement will help in the optimization of all supply chain members (Green Jr, Zelbst, Meacham & Bhadauria, 2012). Green procurement is practiced throughout the firm and in its relationships with suppliers, customers, and the environment. Green procurement practices will enable a firm to have a better market-oriented performance. A green organization will procure commodities in light of the situation, and such goods tend to be cost-effective (Mutarelli et al., 2018). Greening the entire chain calls for collaboration along with the players of the entire supply chain. Green procurement practices and policies are rampant in company annual reports, and this exerts pressures on firms to adopt the practices.

A study by Nderitu, (2016) on green supply chain management and organizational performance of food and beverage manufacturing firms in Kenya used the stakeholder theory, diffusion theory, and resource dependence theory. The study used a descriptive survey research design and found out that there exists a positive relationship between green supply chain management and organizational performance. The study recommends the adoption of green practices by all manufacturing firms in Kenya. The current study will look into the dairy industry and will be informed by resource orchestration theory, lean theory, and stakeholder theories. The study will be quantitative and will adopt a census research design. The study will cover different study variables, which are inventory management and strategic sourcing, in addition to the variable of green procurement addressed by the previous research.

2.4 Conceptual Framework

Strategic sourcing comprises of supplier relationships and technology use. The practice enhances performance through timely and quality product delivery, reduced inventory costs, and timely supplies. Inventory Management has capacity utilization and JIT inventory. The practice improves performance through increased sales, timely product delivery, and timely supplies payment. The green procurement practices concept comprises environmentally friendly purchasing, packaging, green initiatives, supply chain collaboration, and green supplier specifications. The practice enhances performance through reduced waste, timely supplies payment, and reduced costs of inventory. The practices of inventory management, strategic sourcing, and green procurement will help reduce stakeholder complaints, enhance compliments, and customer loyalty hence the growth in market share. The dependent variable is firm performance, while the independent variables are strategic sourcing, inventory management, and green procurement practices.

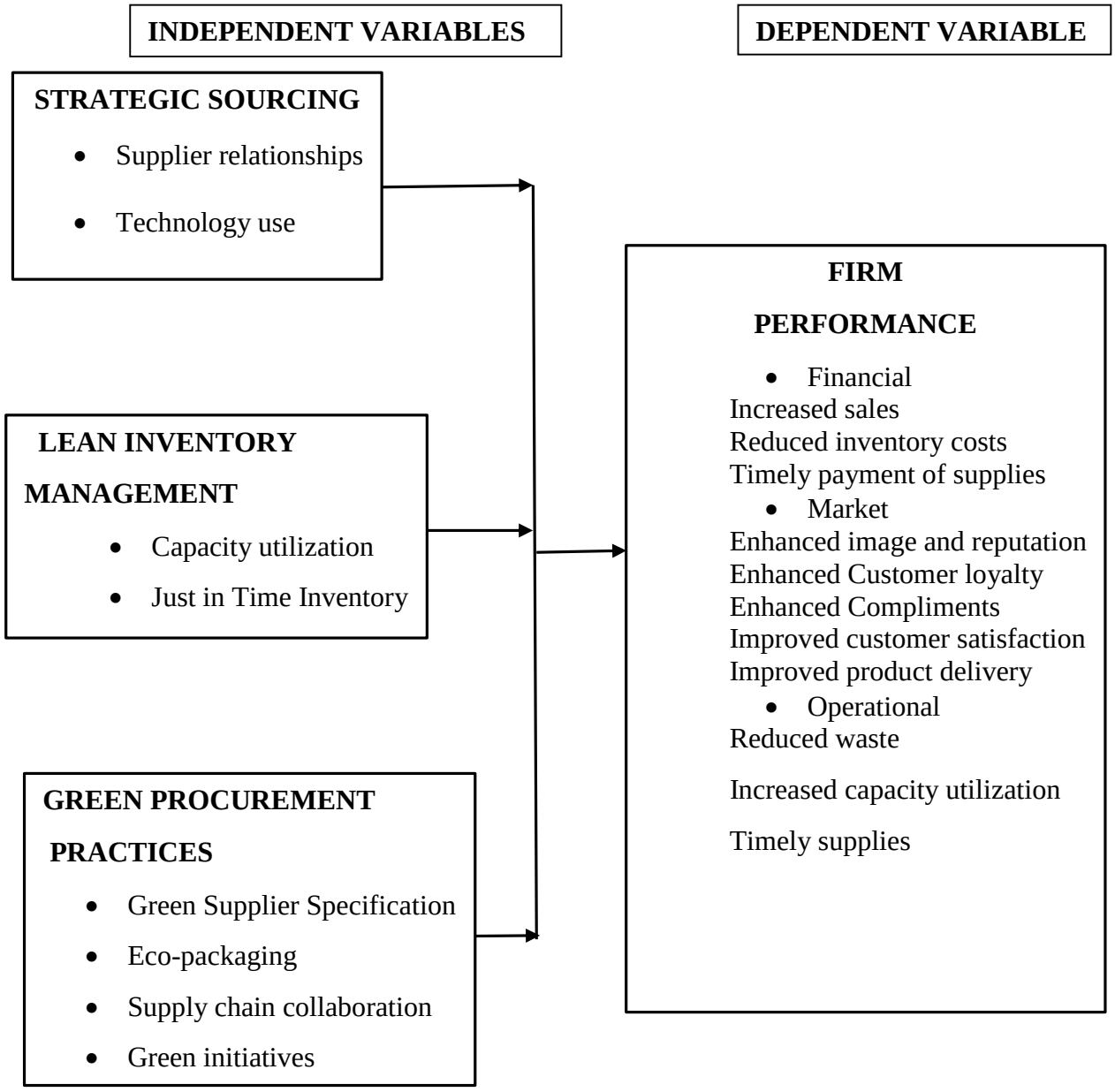

Figure2.1: Conceptual framework

2.5 Summary of Reviewed Literature

Many studies have been done in the area of procurement and supply chain management (Surajit, 2012; Kioko, 2015; Kilonzo, 2014; Nderitu, 2014, & 2016). This study focuses on SCM practices and their influence on the performance of milk processing firms in Kenya. The researcher uses green procurement practices, inventory management, and strategic sourcing as SCM practices. The research is informed by the resource orchestration theory, lean theory, and stakeholder theory. A conceptual framework

reporting on both independent and dependent variables is included. From the literature reviewed, SCM practices have concluded to improve performance in organizations. Through the study, the adoption of SCM practices in organizations will be enhanced. This improvement will be by giving insights to managers on how to adopt SCM practices to improve performance. As a nation, we shall advance towards value addition and manufacturing as supported by Kenya Vision 2030 and thus be able to compete globally.

2.6 Research Gaps

Studies have been conducted in the area of SCM practices and how they impact performance. Most reviews are anchored towards the manufacturing sector in Kenya (Surajit, 2012; Kioko, 2015; Kilonzo, 2014; Nderitu, 2014 and 2016; Wanjiku & Mwangangi, 2018) and globally (Agu, Ozioma & Nuate, 2016). The studies have mostly focused only on financial performance and have failed to look at overall firm performance. Among the studies conducted, very few have focused on milk processing firms. A study conducted in India by Khadar and Sandesha, (2016) was a case study. Matopolous et al., (2016) did research in Greece and focused on agri-food chains and failed to focus on the dairy sector. Most of the studies conducted have adopted a descriptive case study research design. Therefore, the current study will look into supply chain management practices and how they influence the performance of milk processing firms in Kenya. The performance will be overall performance and will look into the market, operational and financial performance that most previous studies have failed to address. The study will adopt a census survey design that will be quantitative. The resource orchestration will inform the research, among other theories. The theory has failed to be used in many studies as concluded by Hitt, Carnes & Xu, (2015),

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter delves into the research design, the population of the study, data collection instruments, and data collection procedures. The operationalization and measurement of variables, together with pretesting of research variables, have been included in the third chapter. The chapter contains data processing and analysis.

3.2 Research Design

The study adopted a descriptive research design since it described supply chain management practices present in milk processing firms in Kenya. A quantitative research approach was used. A quantitative approach is used when there is a lack of adequate research on a particular topic since it is used to establish relationships between variables and outcomes (Rutberg & Bouikidis, 2018).

3.3 Population

The study population constituted all 34 milk processors in Kenya. The unit of analysis was all milk processing firms licensed by the KDB. The study involved a census; hence there was no sampling nor a sample frame. A census was adopted since the firms are few. The unit of observation was firm's operational/supply chain managers and relevant individuals involved in daily dairy operations.

3.4 Data Collection Instruments

The study used primary data which was collected through the use of questionnaires. The questionnaire had both open questions that allowed respondents to provide new insights and ideas and close-ended questions that restricted respondents to certain categories in their responses. The close-ended questions had a 5-point Likert scale. A questionnaire is a critical tool which provides an efficient and effective way of data collection in a short time (Anoke, 2018).

3.5 Data Collection Procedures

To be able to collect data conveniently, an approved letter from the University of Embu was obtained. The questionnaires were delivered by the researcher. The researcher was able to clarify the entire process of answering to the respondents in case of queries.

Answering of the questions in the questionnaire was done after the completion of a pilot study.

3.6 Operationalization and Measurement of Study Variables

The study sought to establish the effect of supply chain management practices on the performance of milk processors in Kenya. The supply chain management practices included strategic sourcing, lean inventory management, and green procurement practices which were the independent variables. Firm performance was the dependent variable. For each variable, there were sub-variables which were operationalized to enable measurement (See Appendices).

3.7 Pretesting of Research Instruments

Validity was checked through the help of supervisors using face content validity. The content validity ensured the instrument met the study objectives while face validity was used to check if the questions to be asked were clear and not vague. The check was made easier through the operationalization of the variables used in the study.

Reliability was tested through test-retest reliability. A pilot study of 10 respondents from 2 firms; Superior Highland and Zawadi Dairy was used to test the questionnaire's reliability. The 10 respondents were chosen with regard to familiarity with supply chain practices in their organizations. Firms have different designations for supply chain heads and personnel. With respect to the aforementioned, the study used respondents aware of what happens in their firm’s supply chains and operations to mention a few supply operations manager and. The Cronbach Alpha coefficient was used to measure the consistency of variables where a threshold of 0.8, which is closer to 1, was set. Vaske, Beaman & Sponarski (2016), explain that a threshold of 0.7-0.9 indicates that there is internal consistency between the study variables. Reliability was achieved through correlating scores of each question per variable. Those questions that do not meet the criteria were removed and made questionnaires effective.

3.8 Data Processing and Analysis

Data in the form of qualitative and quantitative collected using the questionnaires was classified according to similar characteristics and then fed into a computer for presentation using Statistical Packaging for Social Sciences (SPSS version 25). The study utilized a multiple regression equation using standard OLS procedure. All

assumptions of linear regression were tested; multicollinearity, autocorrelation, and heteroscedasticity. Violation of the assumption would lead to model misspecification making the study findings to be flawed. Multicollinearity is said to exist if the independent variables are mutually linearly dependent. The variance inflation factor was used to test for multicollinearity between the variables. Heteroskedasticity is said to exist when the error terms have a non-constant variance. The study used Breusch-Pagan Test for heteroskedasticity. Autocorrelation was tested using the Durbin-Watson statistic.

The multivariate regression equation adopted was.

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where

Y is Firm performance (Market, operational and market performance)

β_0 is constant

β is slope

$x1$ is Strategic sourcing

$x2$ is Lean Inventory management

$x3$ is green procurement

x4 is milk volume

x5 is company age

ε is Error Term

A multivariate regression analysis involves the simultaneous analysis of more than one dependent variable (Pripp, 2012).

CHAPTER FOUR

RESULTS

4.1 Introduction

The chapter discusses presentations and interpretation of the field findings. The background information of the milk processors is presented together with findings that have used both descriptive and inferential statistics.

4.2 Response Rate

A total of 34 questionnaires were distributed to all the 34 KDB licensed milk processors in Kenya. Among the 34, the dully filled questionnaires were 33 which is a response rate of 91.7%.

Table 4.1; Response Rate of Respondents

Response	**Frequency**	**Percentage**
Actual response	33	94.3%
Non response	1	5.7 %
Total	**34**	**100%**

4.3 Pilot Study

The Cronbach's alpha was computed based on average inter-correlations between variables. Cronbach is the most used coefficient of internal consistency and stability (Nzovila, 2019). According to Nzovila, (2019), the rule of thumb for Cronbach alpha is that the closer it is to 1 the higher the reliability. The reliability results establish that all study variables were reliable.

Table 4.2; Reliability Results

Variable	**No of items**	**Alpha**	**Comment**
Strategic sourcing	13	0.840	Reliable
Lean Inventory Management	11	0.917	Reliable
Green procurement practices	12	0.852	Reliable

4.4 Diagnostic tests

Before the regression was run, diagnostic tests were performed to check the assumptions of linear regression.

Table 4.3 Diagnostic Tests

Assumption	Test	Strategic sourcing	Lean inventory management	Green Procurement
Multicollinearity	VIF	2.015	2.015	2.015
Heteroscedasticity	Breusch-Pagan	0.5	0.5	0.5
Autocorrelation	Durbin-Warton test	2.552	2.552	2.552

The variance inflation factors for all variables do not exceed the critical value of 10. This indicates the absence of multicollinearity (Gatimbu, Ogada, Budambula and Kariuki, 2018).

The Breusch-Pagan indicate absence of heteroscedasticity since the test statistic is insignificant for all the study variables (Williams, 2020).

The Durbin Watson test for autocorrelation is at 2.552 indicating absence of autocorrelation (Karadimitriou & Marshall, 2021; Shalabh, 2021).

4.5 Correlation Analysis

Correlation analysis was conducted to ascertain the strength of the relationship between SCM practices and performance of milk processors in Kenya. Pearson correlation coefficient was used to determine the relationship strength. The results are presented in Table 4.4

Table 4.4 Correlation between SCM practices and firm performance

Variable	Financial performance	Market performance	Operational performance	Overall firm performance
Strategic sourcing	P value .780** Sig .004	P value .843** Sig .002	P value .693** Sig .002	P value .667** Sig .002
Green procurement practices	P value .658** Sig .002	Pvalue .752** Sig .001	P value .667** Sig .004	P value .564** Sig .003
Lean inventory management	P. value .684** Sig .003	P Value .701** Sig .004	P value .734** Sig .001	P value .729** Sig .004
Milk Volume	P value. 470** Sig .001	P value .603** Sig .003	P value .561** Sig .004	P value .543** Sig .002
Company Age	P Value .863** Sig .002	P Value .546** Sig .000	P Value .703** Sig .001	P Value .783** Sig .001
	.N=33			

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

The results in Table 4.4, depicts the correlation analysis that determine the relationship between strategic sourcing and firm performance. The Pearson correlation coefficient was computed and tested at a significance level of 1%. The results showed that there exists a significant positive relationship at 78%, 84.3% and 69.3% between strategic sourcing and financial, market and operational performance respectively. The researcher in addition found the coefficients of all constructs was significant at a significance level of 1%. The study findings are consistent with Adams, Khoja and Kauffman, (2012) who did an empirical study on buyer-supplier relationships and found out that organizations engage in supplier relationships so as to attain competitive positions in the marketplace and become successful.

Of the same school of thought are Inayatullah, Naraian and Singh, (2012) who conclude that supplier relationships improve organizational performance. Further Kilonzo, (2014) add that strategic sourcing create value through efficiencies in costs, reduced risks and improved market share. Supplier identification is a crucial component in purchasing and manufacturing, however decision-making process is desirable. Supplier development improves performance of suppliers which in turn improve performance of organizations (Park, Shin & Chang, 2010).

A study by Maina et al., (2020) alluded that through supplier relationships, dairy firms can minimize costs and provide improved customer value. Further the study incorporates supplier involvement and development, technology use as key drivers of organizational performance in dairy firms.

The findings in Table 4.4 shows the correlation analysis that determine the relationship between lean inventory management and firm performance. The Pearson correlation coefficient was computed and tested at a significance level of 1%. The results showed that there exists a positive relationship at 68.4%, 70.1% and 73.4% between lean inventory management and financial, market and operational firm performance respectively. The researcher in addition found the coefficient was significant at 1%.

The findings are of the same school of thought with Kimani, (2018) who argue that lean production principle reduces inventory costs, wastages and overall improves organization performance. Further Atnafu and Balda, (2018), found out that higher inventory management practices help a firm attain competitive advantage and further improve performance. They add that competitive advantage has a direct positive effect to organizational performance. In addition, Ogenu and Ikegwuru, (2016) argue that lean inventory management when undertaken properly, the practice help improves customer satisfaction and loyalty. When a customer is happy, they are willing to spend on your commodity thus better firm performance (Atnafu & Balda, 2018).

The findings in Table 4.4 shows the correlation analysis that determine the relationship between green procurement practices and firm performance. The Pearson correlation coefficient was computed and tested at a significance level of 1%. The results showed that there exists a positive relationship at 65.6%, 75.2% and 66.7% between green procurement practices and financial, market and operational firm performance respectively. The researcher in addition found the coefficient was significant at 1%.

Greening a firm procurement practices help in waste reduction and cost benefits in a firm (Khisa, 2011). A study done by Omusebe, (2018) concluded that green procurement practices enhance performance of energy related and petroleum state corporations in Kenya. Further Sarhaye & Mulendi, (2017) propose adoption of green supply chain management practices as they come along with economic benefits. To achieve economic, financial, market and operational excellence, there is a need for green procurement practices adoption (Nderitu & Ngugi, 2014).

4.6 Background information of the respondents

The section presents the details of the milk processor companies in Kenya. The study sought to establish the number of years the companies have been operational. The location of the company's suppliers' and customers are also included in this section**.** The section also incorporates the turnover and milk volume handled anually by milk processors.

4.6.1 Period which the company has been operational

The study sought to establish how long the firms have been operational. The respondents were requested to indicate the number of years they have been operational.

Table 4.5: Years of operation

Age	**Frequency**	**Percent (%)**	**Cumulative percent (%)**
Less than 5 years	2	6.1	6.1
Between 5 and 10 years	2	6.1	12.2
Between 10 and 20 years	17	51.5	63.7
More than 20 years	12	36.3	100

The findings from table 4.5 indicate that 6.1% of the milk processors in Kenya have been operational for a period of less than 5 years. 6.1% of the Kenyan milk processors indicated that they have been operational for a period between 5 and 10 years. Most of the milk processors have been operational for a period between 10 and 20 years and they represent 51.5%. 36.3% of the milk processors in Kenya have been in existence

for more than 20 years. The findings show that firms have been operational for both a longer and shorter period of years.

4.6.2 Locality of customers

The study sought to establish the outreach of milk processors products to their customers. The respondents were required to indicate the locality of the customers they serve.

Table 4.6: Locality of customers

Place	Frequency	Percentage	Cumulative percentage
Specific towns	1	3	3
Specific regions	1	3	6
National	29	87.9	93.9
International	2	6.1	100

According to the findings in table 4.6, 3% of the milk processors sell their products to specific towns.3% of the milk processors reach customers in specific regions.87.9% of the milk processors reach out the national market. From the study 6.1% of the milk processors sell their products in the international market. The findings show that milk processors sell to a wider group of customers ranging from local to international.

4.6.3 Locality of suppliers

The study sought to establish the location of milk processors' suppliers. The respondents were required to indicate the location of their suppliers.

Table 4.7: Locality of Suppliers

Place	Frequency	Percentage	Cumulative percentage
Specific towns	2	6.1	6.1
Specific regions	26	78.8	84.9
National	3	9.1	94
International	2	6.1	100

According to table 4.7, 6.1% of the milk processors receive milk from suppliers located in specific towns.78.8% of the milk processors in Kenya receive milk from specific regions. Milk processors that receive milk from national suppliers are represented by 9.1%.6.1% of the milk processors receive their milk supplies from international suppliers. It is evident that milk processors in Kenya have varied sources of supply.

4.6.4 Annual Turnover of Milk Processors in Kenya

The study sought to establish the annual profitability of milk processors in Kenya. The respondents were required to indicate the amount of turnover they achieve anually.

Table 4.8: Turnover of Milk Processors

Turnover	**Frequency**	**Percentage**	**Cumulative percentage**
1,000,000 shillings	0	0	0
1,000,000-5,000,000 shillings	0	0	0
0ver 5,000,000 shillings	33	100	100

According to table 4.8, all the 33 milk processors in Kenya have an annual turnover of over 5,000,000 Million shillings.

4.6.5 Milk Volume Handled Anually

The study sought to establish the amount of milk in liters the milk processors handle anually. The respondents were required to indicate the volume of milk they handle anually in liters.

Table 4.9: Annual Milk Volume

Milk Volume	**Frequency**	**Percentage**	**Cumulative percentage**
500,000 liters	**0**	**0**	**0**
1,000,000 liters	**1**	**3**	**3**
Over 1,000,000 liters	**32**	**97**	**100**

From the findings in Table 4.9, 3% of the milk processors in Kenya handle 1,000,000 liters of milk anually.97% of the milk processors handle over 1,000,000 liters of milk anually.

4.7 Performance of Milk Processors in Kenya

This is the analysis of the dependent variable of the study to assess the status of performance of milk processors in Kenya. The study sought to establish the type of performance that milk processors achieve when they adopt SCM practices. The results are as depicted in Table 4.10.

Table 4.10: Status of Performance of Milk Processors in Kenya

Statements	VGE	GE	ME	LE	NE	Mean	Std.
1.Financial Performance							
Increased sales	84.8%	12.1%	0%	3.08%	0%	4.79	.600
Reduced inventory costs	69.7%	9.1%	15.2%	6.1%	0.0%	4.42	.969
Timely payment of supplies	69.7%	15.2%	15.2%	0%	0.0%	4.55	.754
2.Operational Performance							
Timely supplies	84.8%	12.1%	0.0%	3.08%	0.0%	4.79	.600
Reduced wastes	81.8%	12.1%	3%	3.0%	0.0%	4.73	.674
Increased Capacity Utilization	63.6%	12.1%	24.2%	0.0%	0.0%	4.39	.864
3.Market Performance							
Enhanced compliments	48.5%	39.4%	9.1%	3.0%	0%	4.33	.777
Enhanced customer loyalty	69.7%	27.3%	3.0%	0%	0.0%	4.67	.640
Enhanced Image and Reputation	69.7%	27.3%	0%	3%	0.0%	4.36	.699
Improved customer satisfaction	75.8%	21.2%	0%	3%	0.0%	4.70	.637
Improved product delivery	78.8%	18.2%	3%	0.0%	0.0%	4.73	.626

NOTE: VGE-Very Great Extent, GE-Great Extent, ME-Moderate Extent, LE-Less Extent, NE-No Extent

The findings in Table 4.10 shows that 84.8% and 12.1% of the respondents agreed with the statements that they achieve increased sales and timely supplies to a very great extent and a great extent respectively through adopting SCM practices (Mean 4.79, Std=.600). It was also evident that 30.3% and 60.6% of the respondents agreed that they achieve reduced inventory costs and timely payment of supplies to a very great and a great extent respectively when they adopt SCM practices (Mean=4.42, Std=.969, Mean=4.45, Std=.754). It was agreed to a very great extent and a great extent with 81.8% and 12.1% respectively that milk processors achieve reduced wastes (Mean=4.73, Std=.674). Further increased capacity utilization was highly achieved as 63.6% and 12.1% of the respondents agreed to a very great extent and a great extent respectively (Mean=4.39, Std=.864). 48.5% and 39.4% of the milk processors in Kenya agreed that they achieve enhanced compliments to a very great extent and a great extent respectively as a result of SCM practices (Mean=4.33, Std=.777).

More so, 69.7% and 27.3% of the milk processors agreed that they achieve enhanced customer loyalty through SCM practices to a very great extent and a great extent respectively (Mean=4.67, Std=.640). Further it is evident that 69.7% and 27.3% of the Kenyan milk processors agreed that they achieve enhanced image and reputation to a very great extent and great extent respectively when they adopt SCM practices (Mean=4.36, Std=.699). Moreover,75.8% and 21.2% of the milk processors agreed that they achieve improved customer satisfaction to a very great extent and a great extent respectively through SCM practices (Mean=4.70, Std=.637). In addition, 78.8% and 18.2% of the milk processors in Kenya agreed that they achieve improved product delivery to a very great extent and a great extent respectively (Mean=4.73, Std=.626).

The results are in tandem with Maina et al., (2020) who found out that SCM practices are a source of competitive advantage that help firms enhance profitability in the marketplace. Moreover, Kilonzo, (2014) pointed out that SCM practices improve the functioning of departments in organizations thus leads to better organization performance. A study by Wanjiku and Mwangangi, (2019) on beverage firms found out that adoption of SCM practices help improve operational performance. The results from market performance agree with Atnafu and Balda, (2018), who studied micro and small enterprises in Ethiopia. They found out that SCM practices enhance competitiveness in the market place thus improved market performance.

Overall, the findings imply that milk processors in Kenya have improved firm performance as most of the milk processors agreed with the suggested indicators.

4.8 Strategic Sourcing

This section presents the findings of strategic sourcing, which was one of the independent variables of the study. The study sought to assess the effect of strategic sourcing on firm performance of milk processors in Kenya. The study sought to examine the extent to which the respondents agreed with the various statements regarding strategic sourcing in their firms. Strategic sourcing was measured by looking at supplier relationships and technology use in milk processing firms. The findings are presented in Table 4.11

Table 4.11; Strategic Sourcing

Statements	VGE	GE	ME	LE	NE	Mean	Std
Develop long-term supplier relationships	39.4%	18.2%	42.4%	0%	0%	3.97	.918
Receive commodities of high quality always	39.4%	18.2%	42.4%	0%	0%	3.97	.918
Supplier involvement and development	57.6%	42.4%	0%	0%	0%	4.58	.502
Efficient communication with suppliers	72.7%	21.2%	6.1%	0%	0%	4.55	.506
Strategic supplier identification	57.6%	36.4%	24.2%	18.2%	0%	3.76	1.15
Collaboration with suppliers	51.5%	48.5%	0%	0%	0%	4.52	.508
Use technology to set maximum and minimum inventory levels	72.7%	0%	27.3%	0%	0%	4.45	.905
Use technology to order inventory	39.4%	18.2%	42.4%	0%	0%	3.97	.918
Use technology to set reorder levels and inform about stockouts	39.4%	18.2%	42.4%	0%	0%	3.97	.918
Mutual problem solving and decision making with suppliers	18.2%	39.4%	42.4%	0%	0%	3.97	.784
Receiving orders before competitors	39.4%	18.2%	42.4%	0%	0%	3.97	.918
Receiving supplies when there are shortages	39.4%	21.2%	39.4%	0%	0%	4.00	.901
Engage supplier's assistance to improve product quality	39.4%	21.2%	39.4%	0%	0%	4.00	.901

The results in table 4.11 revealed that 39.4% and 18.2% of the milk processors agreed with the statements develop long term supplier relationships, receive high quality commodities, use technology to order inventory, receiving orders before competitors, use technology to set reorder levels and inform about stockouts to a very great extent and great extent respectively (Mean=3.97, Std=.918). The results indicated that milk processors engage in supplier involvement and development as 57.6% agreed to a very great extent while 42.4% agreed to a great extent with the statement (Mean=4.58, Std=.502).

In addition, the results showed that milk processors engage in efficient communication with suppliers as 72.7% agreed to a very great extent while 21.2% agreed to a great extent with the statement (Mean=4.55, Std=.506). Further, milk processors undertake strategic supplier identification as 57.6% agreed to a very great extent while 36.4% agreed to a great extent with the statement (Mean=4.82, Std=.392). 72.7% of milk processors agreed to a great extent with the statement, use technology to set maximum and minimum inventory levels (Mean=4.45, Std.905). More so the results indicated that milk processors collaborate with suppliers as 51.5% agreed to a very great extent and 48.5% agreed to a great extent with the statement (Mean=4.82, Std=.392).

The results revealed that 39.4% and 18.2% of the milk processors agreed to a very great extent and a great extent respectively with the statements receive supplies when there are shortages and engage supplier assistance to improve product quality (Mean=4.00, Std=.901). the results indicate that milk processors engage in mutual problem solving and decision making with suppliers as 18.2% and 39.4% agreed to a very great extent and a great extent respectively. Thew calculated mean of 3.97 is a clear indication that majority of the milk processors engage in mutual problem solving and decision making with suppliers to a great extent.

The results are in line with Adams, Khoja and Kauffman, (2012), who concluded that supplier relationships improve a firm position in the market place and help a firm become successful. Greater adoption of supplier relationships builds up strategic supplier partnerships and thus strategic sourcing (Kilonzo, 2014). Collaboration with suppliers is basic critical issue in firms because a firm acquire high quality inputs and deliver quality requirements in the marketplace. Price variances are often removed in

the long run as better negotiations are built (Truong, Sameiro, Fernandes, Sampaio, Duong & Vilhenac, 2015). Inayatullah,

Narain and Singh, (2012) are of the same school of thought as they recognize that long term supplier relationships can only be built on trust. Where long term supplier relationships exist, communication is necessary and through communication suppliers can be assisted either financial or non-financially. They further explain that the efficient and strategic identification of suppliers will help improve customer satisfaction, product quality and variety, service delivery and help in competitive pricing. The aforementioned improvements result to improved organizational performance. Further, the use of technology in firms can result to receiving orders before competitors and when there are shortages as it facilitates on time payment to suppliers (Inayatullah et al., 2012). Kaaria, (2020) alludes that proper and strategic partnerships are a critical organizational issue that need to be looked at keenly. Strategic sourcing claims adoption of strategic relationships which create potential benefits between buyers and sellers.

4.8.1 Lean Inventory Management

This section presents the findings of lean inventory management, which was one of the independent variables of the study, which was to assess the effect of lean inventory management on the firm performance of milk processors in Kenya. The study sought to examine the extent to which the respondents agreed with the various statements regarding lean inventory management in their firms. The findings are presented in Table 4.12

Table 4.12; Lean Inventory Management

Statements	VGE	GE	ME	LE	NE	Mean	Std
Maintain zero inventory levels	57.6%	24.2%	19.2%	0%	0%	4.33	.693
Use technology to order commodities and maintain no inventory	57.6%	42.4%	0%	0%	0%	4.58	.502
Reduce non-value-added costs in production	54.6%	45.4%	0%	0%	0%	4.52	.508
Order inventory when the need arises	57.6%	30.3%	12.1%	0%	0%	4.45	.711
Collaborate with suppliers and members in a supply chain	51.5%	45.5%	3.03%	0%	0%	4.52	.566
Use more than 60% of company processing capacity annually	54.5%	42.4%	3.03%	0%	0%	4.52	.566
Floor space use maximization	42.4%	42.4%	0%	0%	0%	4.58	.502
Disposing of obsolete supplies	57.6%	0%	42,4%	0%	0%	4.58	.502
Communicate with suppliers on inventory levels	57.6%	42.4%	0%	0%	0%	4.58	.502

According to Table 4.12, it is evident that milk processors maintain zero inventory at a very great extent as shown by the mean (Mean=4.33, Std=.693). Further milk processors agreed with the statement where 57.6% agreed to a very great extent while 24.2% agreed to a great extent. It is clear that milk processors use technology to order commodities and maintain no inventory as 57.6% and 42.4% agreed to a very great extent and a great extent respectively with the statement (Mean=4.58, Std=.502). In addition, the results explain that milk processors reduce non-value-added costs on

production as 54.6% agreed to a very great extent while 45.4% agreed to a great extent with the statement (Mean=4.52, Std=.508).

In addition, the results show that milk processors order inventory when need arises as 57.6% and 30.3% agree with the statement (Mean=4.45, Std=.711). More so it is evident that there is collaboration between milk processors, suppliers and members in a supply chain as 51.5% and 45.5% agree to a very great extent and great extent respectively with the statement (Mean=4.52, Std=.566). Moreover, the results are an indication that 60% of the milk processors capacities is utilized anually as 54.5% and 42.5% agree with the statement (Mean=4.52, Std=.566). Maximization of floor space by milk processors is done to a very great extent at 42.4% and at a great extent of 42.4% as shown by the results (Mean=4.52, Std=5.66). Disposal of obsolete supplies is done at a very great extent at 57.6% and a moderate extent at 42.2% as shown by the results (Mean=4.58, Std=.502). Further the results are an indication that communication with suppliers on inventories is done to a very great extent and a great extent at 57.6% and 42.4% respectively (Mean=4.58, Std=.502).

The findings agree with Musau, Namusonge, Makokha and Ngeno, (2017) who postulate that adoption of inventory management practices improve performance in organizations. Lean is the ultimate goal for every firm. Leanness is critical to the success of a firm in the current dynamic market. Lean inventory management is a critical issue in management that needs be looked at keenly (Agu, Anike, Ozioma & Nnate, 2016). By being lean and performing lean inventory management practices, organizations achieve cost reductions across the entire chain, (Mulumba, 2016). Odhiambo and Kihara, (2018) outline that lean inventory management helps firms keep track of supplies as this enhance replenishments and reduces loss. The findings agree with Kimani, (2018), who outline that inventory leanness is a tool in inventory management that is highly adopted by warehousing organizations in Kenya as it enhances performance and helps a firm exceed customer satisfaction (Mulandi & Ismail, 2019).

4.8.2 Green Procurement Practices

This section presents the findings of green procurement practices, one of the independent variables of the study, which was to assess the effect of green procurement practices on the firm performance of milk processors in Kenya.

The study sought to examine the extent to which the respondents agreed with the various statements regarding green procurement practices in their firms. The findings are presented in Table 4.13

Table 4.13 Green procurement Practices

Statements	VGE	GE	ME	LE	NE	Mean	Std
Timely delivery of green supplies and products	45.5%	54.5%	0%	0%	0%	4.55	.506
Procurement of environmentally friendly supplies	45.5%	54.5%	3.03%	0%	0%	4.55	.506
Collaborate with members in a supply chain to enhance the development of a green supply chain	57.6%	42.4%	3.0%	0%	0%	4.58	.502
Constant communication with supply chain members towards the advancement of a green supply chain	48.4%	45.5%	6.06%	0%	0%	4.42	.614
Reduction of waste through green purchases	48.5%	42.4%	9.09%	0%	0%	4.39	.659
Packaging in an environmentally friendly manner	51.5%	42.4%	6.06%	0%	0%	4.39	.659
End of use of products conducted in an environmentally friendly manner	54.6%	33.3%	12.1%	0%	0%	4.42	.708
Involvement of society in green initiatives	60.6%	33.3%	6.06%	0%	0%	4.61	.609
Involvement of suppliers in green raw material specifications	48.5%	45.5%	6.06%	3%	0%	4.42	.614
Organization design products for reduced consumption of materials and energy	6.06%	30.3%	63.6%	0%	0%	3.42	.614
Organization cooperates with customers for cleaner processing and greener packaging	18.2%	48.5%	33.3%	0%	0%	3.85	.712
The organization provide specifications to suppliers to include environmental requirements for purchased items	39.4%	60.6%	0%	0%	0%	4.33	.645

NOTE: VGE-Very Great Extent, GE-Great Extent, ME-Moderate Extent, LE-Less Extent, NE-No Extent

From the results in Table 4.13, it is evident that there is timely delivery of green supplies as 45.5% and 54.5% of the respondents agreed to a very great extent and a great extent respectively with the statement (Mean=4.55, Std=.506). Procurement of environmentally friendly supplies is done to a very great extent at 45.5% and a great extent at 54.5% as shown by the results (Mean=4.55, Std=.506). The results show that there is collaboration between milk processors and members in a supply chain to develop green supply chain as 57.6% agreed to a very great extent and 42.4% agreed to a great extent with the statement (Mean=4.58, Std=.502).

Further the results indicate that there is constant communication with supply chain members towards advancement of a green supply chain as 48.4% of the respondents agreed to a very great extent while 45.5% agreed to a great extent with the statement (Mean=4.42, Std=.614). In addition, the results show that there is reduction of waste through green purchases as 48.5% of the respondents agreed to a very great extent while 42.4% of the respondents agreed to a great extent with the statement (Mean=4.39, Std=.659). Packaging is done in an environmentally friendly manner as 51.5% of the respondents agreed to a very great extent and 42.4% agreed to a great extent with the statement (Mean=4.39, Std=.659).

54.6% and 33.3% of the respondents agreed to a very great extent and a great extent respectively with the statement that end of use of products is done in an environmentally friendly manner (Mean=4.42, Std=.708). More so the results show that the society is involved in green initiatives as 60.6% agreed to a very great extent and 33.3% agreed to a great extent with the statement (Mean=4.61, Std=.609). Moreover, the results indicate that 48.5% of the respondents and agreed to a very great extent and 45.5% agreed to a great extent that suppliers are involved in green raw material specifications (Mean=4.42, Std=.614).

Organizations design products for reduced consumption of energy and materials minimally as the results show that 6.06% of the respondents agreed to a very great extent while 30.3% agreed to a great extent with the statement (Mean=43.42, Std=.614). The findings also indicated that 18.2% of the respondents agreed to a very great extent and 48.5% agreed to a great extent with the statement that organizations cooperate with the customers for greener processing and packaging (Mean=3.85, Std=.712). Finally, on whether the organization provide specifications to suppliers to include

environmental requirements for purchased items, 39.4% of the respondents agreed to a very great extent while 60.6% agreed to a great extent (Mean=4.33, Std=.645).

Milk processors in Kenya practice green management practices as they have timely delivery of green supplies, they carry out procurement of environmentally friendly supplies and collaborate with members in a supply chain to enhance the development of a green supply chain as evidenced by an average mean of 4.55. Corporate environmentalism has become commonplace in the supply chain as proactive green procurement creates competitive advantages to a firm (Schmidt, Foerstl & Schaltenbrand, (2017). Sustainable business practices and development is a trend for firms to join (Khisa, 2011). The study findings are consistent with Kilonzo, (2016) who established that green initiatives result to greater benefits. Green procurement is a prudent practice that results to improved image, increased sales and strategy support in organization (Kilonzo, 2016; Fang & Zhang, 2017).

4.9; Multivariate Regression Analysis

The study adopted a multivariate regression analysis in the determination of the significance of the relationship between the dependent variable (firm performance) and all the independent variables (strategic sourcing, lean inventory management and green procurement) pooled together. The regression analysis was performed to find the proportion in the dependent variable that can be predicted from the independent variables.

The multivariate regression model equation;

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where; $\boldsymbol{Y}$ is Firm performance divided into financial, market and operational performance,$\boldsymbol{\beta_0}$ is constant,$\boldsymbol{\beta}$ is slope,$\boldsymbol{x1}$ is Strategic sourcing,$\boldsymbol{x2}$ is Lean Inventory management,$\boldsymbol{x3}$ is green procurement, $\boldsymbol{x4}$ is milk volume, $\boldsymbol{x5}$ is company age,$\boldsymbol{\varepsilon}$ is Error Term

4.9.1 Analysis of Variance

Analysis of variance was conducted and results are given in Table 4.16. ANOVA is used to determines the reliability of the model that is developed in examining the relationship between the variables of the study.

The analysis of variance (ANOVA) results presented in Table 4.14 section 1 indicate an F -statistic of 5.091 and a P-value of 0. 004.The significance value is less than 0.1. The significance value shows that the regression model is statistically significant in predicting how strategic sourcing, lean inventory management and green procurement, milk volume and company age influence firm financial performance. The study establishes therefore that strategic sourcing, lean inventory management and green procurement are acceptable statistically as useful in predicting firm financial performance.

The analysis of variance (ANOVA) results presented in Table 4.14 section 2 indicate an F -statistic of 5.274 and a P-value of 0. 002.The significance value is less than 0.1. The significance value shows that the regression model is statistically significant in predicting how strategic sourcing, lean inventory management and green procurement, milk volume and company age influence firm financial performance. The study establishes therefore that strategic sourcing, lean inventory management and green procurement are acceptable statistically as useful in predicting a firm operational performance.

The analysis of variance (ANOVA) results presented in Table 4.14 section 3 indicate an F -statistic of 8.326 and a P-value of 0. 000.The significance value is less than 0.1. The significance value shows that the regression model is statistically significant in predicting how strategic sourcing, lean inventory management and green procurement, milk volume and company age influence firm financial performance. The study establishes therefore that strategic sourcing, lean inventory management and green procurement are acceptable statistically as useful in predicting a firm market performance.

Table 4.14: Analysis of Variance (ANOVA)

Financial performance Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig. F**
Regression	4.224	5	.845	5.091	**.**002[b]
Residual	4.481	27	.166		
Total	8.705	33			
Operational performance Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig. F**
Regression	5.883	5	1.167	5.274	**.**002[b]
Residual	5.972	27	.221		
Total	11.805	33			
Market performance Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig. F**
Regression	6.939	5	1.388	8.326	**.**000[b]
Residual	4.500	27	.167		
Total	11.439	33			

4.9.2 Model Summary

The coefficient of determination (R^2) results is presented in Table 4.17. R square which is 1 minus the residual variability ratio is a common statistic used in model fit evaluation. The R^2 also known as the coefficient of determination in financial operational and market performance was 0.789,0.703 and 0.779 respectively. The R2 value of 0.789, 0.703 and 0.779 means that 79%. 70% and 78% of the corresponding variation in firm financial, operational and market performance respectively can be explained or predicted by strategic sourcing, lean inventory management and green procurement. This indicated that the model was fit for the study.

Table 4.15; Coefficient of Determination

Financial performance Model	**R**	**R Square**	**Adjusted Square**	**R**	**Significance**
1	0.789[a]	0.713	0.390		0.002
Operational performance Model	**R**	**R Square**	**Adjusted Square**	**R**	
1	0.703[a]	0.698	0.294		0.002
Market performance Model	**R**	**R Square**	**Adjusted Square**	**R**	
1	0.779[a]	0.607	0.534		0.000
Overall firm performance Model	**R**	**R Square**	**Adjusted Square**	**R**	
1	0.629[a]	0.597	0.342		0.001

a) Predictors: (Constant), Strategic sourcing, lean inventory management, green procurement

b) Dependent Variable: Firm Performance

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Table 4.18 Regression Coefficients

Regression coefficients of the study variables are presented in Table 4.18.

	Financial performance		**Operational Performance**		**Market performance**		**Overall Firm performance**	
	Coeff	**P**	**Coef**	**P**	**Coeff**	**P**	**Coeff**	**P**
(Constant)	.560	.000	1.32	.005	1.121	.002	4.85	0.005
Strategic Sourcing	.217	.003	.288	.003	.353	.003	2.079	0.004
Lean Inventory Management	1.428	.002	.210	.004	.437	.001	2.073	0.002
Green Procurement	1.590	.000	.299	.000	.139	.000	.685	0.000
Milk volume	.271	.005	1.50	.003	1.086	.000	.765	0.006
Company Age	.603	.004	.345	.004	.435	.004	.432	0.003
Obs=33								

a. Dependent Variable: Firm Performance, financial performance, operational performance and market performance

b. Predictors: (Constant), strategic sourcing, lean inventory management, green procurement, milk volume and age

c. Significance level is at 10%

The results in Table 4.18 gives the regression coefficients that answered the proposed regression model equation shown below.

$$\boldsymbol{Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon}$$

By substituting the coefficients in the model,

Overall firm performance will be:

$$\boldsymbol{Y = 4.85 + 2.079 X_1 + 2.073 X_2 + .685 X_3 + .765 X_4 + .432 X_5 + \varepsilon}$$

Financial performance will be:

$$\boldsymbol{Y = .560 + .217X_1 + 1.428X_2 + 1.590X_3 + .271X_4 + .603X_5 + \varepsilon}$$

Operational performance will be:

$$\boldsymbol{Y = 1.32 + .288X_1 + .210X_2 + .299X_3 + 1.50X_4 + .345X_5 + \varepsilon}$$

Market performance will be:

$$\boldsymbol{Y = 1.21 + .353X_1 + .437X_2 + .139X_3 + 1.086X_4 + .435X_5 + \varepsilon}$$

From the model and the results in Table 4.18 it is evident that overall firm, financial. operational and market performance are statistically significant.

It was noted that the coefficients of strategic sourcing, lean inventory management, green procurement management, milk volume and company age are positively related to overall firm performance, financial, operational and market performance and were statistically significant (P=0.10).

The findings agree with Mungai, (2019) who did a study on strategic sourcing on performance of commercial banks in Kenya and found a positive significant relationship (P=.001). Harb, Antoun, Kassem and Baena (2019), recognize that sourcing is capturing the interests of many and is receiving attention at the strategic desk. The key element of buyer supplier relationships is communication and should be adopted across industries to enhance performance (Najib, Kartini, Suryana & Namuri, 2017).

Among the assets considered import in organizations, strategic sourcing ids one of them. The sourcing function receives higher expectations relating to its contribution to firm performance (Heikkila, Kaipia & Ojala, 2018). Good strategic sourcing practices in a dairy firm will translate to the efficient transportation of the right quantities of milk, which is a perishable product; thus, the firm will not have excess obsolete/poor quality stock. This practice brings to better operational financial and financial firm performance (Atnafu & Balda, 2018; Zhang, Lettice, Chan & Nguyen, 2018; Clauss & Spieth, 2016). Better performance is only obtained through better supplier relationship management as collaboration and supplier relationship offer productive opportunities (Patrucco, Luzzini, Moretto & Ronchi, 2017).

The study also agrees with Odhiambo and Kihara, (2018) who found out a positive and significant relationship between lean inventory management and performance.

Inventory leanness is a goal for every firm. The practice of being lean reduces operational costs, improve effectiveness and reduces delivery time both in products and raw materials. By being lean, you adopt just in time approaches towards management of inventory. Components of Just in time are supplier relationships, information flow, waste reduction and customer focus. Compounded together, they create better firm performance (Marodin, Frank, Tortorella, & Fettterman, 2019: Nimeh, Abdallah & Sweis, 2018)

In regard to green procurement the study findings agree with Kilonzo, (2014) who did a case study on Cadbury Kenya Limited and found out a positive significant relationship (P=0.001) between green procurement and firm performance. Cousins, Lawson, Petersen & Fugate, (2019) recognize that firms are now more aware of environmental issues than before. They include that green supply practices reduce operation costs while enhancing firm performance. Green practices in a supply chain are a source of competitive advantage (Vijayvargy, Thakkar & Agarwal, 2017).

Logically, when milk volume increases milk processors perform better. Hitt, (2011) agree that one major source of competitive advantage in a firm is resources. Milk is the dominant resource for milk processors and the results suggest that an increase in milk volume results to an increase in financial, market, operational and overall firm performance. SCM building blocks are resources and when utilized well, resources bring about positive influences to a firm performance (Peusher, 2016).

There exists a positive relationship between company age and firm performance. Cappasso, Gallucci, and Rossi (2015) argue that the longevity factor explains a lot of changes in performance. The younger firms are likely to be outperformed by the oldest firms in any industry. As a firm age, better firm performance can be reaped. As a firm grows older her performance improves (Lucas, 2017). In milk processors, this can be attributed to the increase in milk volume handled per year. The longer existing firms can obtain more milk as a result of an established relationship between them and farmers. The milk can be processed and thus an improvement in overall, financial, operational and market performance

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter a summary of key findings discussed in chapter 4 is presented. Conclusions and recommendations are also included in this chapter together with suggestions for further research.

5.2 Summary of findings

The study first objective was to investigate the effect of strategic sourcing on performance of milk processors in Kenya. The study revealed that most milk processors agreed that strategic sourcing affects firm performance. The findings revealed a positive relationship between strategic sourcing and firm performance with a correlation coefficient value of 78%. The regression coefficient value was .217 with a P-value of 0.003. This revealed a positive significant relationship between strategic sourcing and firm financial performance. The regression coefficient value was .288 with a P-value of 0.003. This revealed a positive significant relationship between strategic sourcing and firm operational performance. The regression coefficient value was .353 with a P-value of 0.003. This revealed a positive significant relationship between strategic sourcing and firm market performance. The regression coefficient value was .208 with a P-value of 0.004. This revealed a positive significant relationship between strategic sourcing and overall firm performance

The study second objective was to evaluate the effect of lean inventory management on performance of milk processors in Kenya. The study revealed that most milk processors agreed that lean inventory management affects firm performance. The findings revealed a positive relationship between lean inventory management and firm performance with a correlation coefficient value of 84.3%, a regression coefficient value of 4.85 and a P-value of 0.002. This revealed a positive significant relationship between lean inventory management and firm overall performance. The regression coefficient value was 1.428 with a P-value of 0.004. This revealed a positive significant relationship between lean inventory management and firm financial performance. The regression coefficient value was .210 with a P-value of 0.001. This revealed a positive significant relationship between lean inventory management and firm operational performance. The regression

coefficient value was .437 with a P-value of 0.003. This revealed a positive significant relationship between lean inventory management and firm market performance. The regression coefficient value was 2.073 with a P-value of 0.002. This revealed a positive significant relationship between lean inventory management and overall firm performance

The study third objective was to establish the effect of green procurement on performance of milk processors in Kenya. The study revealed that most of the respondents agreed that green procurement influences firm performance. The findings established a positive relationship between green procurement and firm performance with a correlation coefficient of 69.3%. The regression coefficient value was .685 and the P-value was 0.000. This revealed a significant positive relationship between green procurement and overall firm performance.

Milk volume and age of the company have a positive influence of firm performance, as the amount of milk handled anually increases, a firm performs better in terms of operational, financial, market and overall firm performance.

The regression coefficient for overall firm performance value with strategic sourcing was 2.079 with a P-value of 0.004. This revealed a positive significant relationship between strategic sourcing and firm overall performance. The regression coefficient value of overall firm performance with lean inventory management was 2.73 with a P-value of 0.002. This revealed a positive significant relationship between lean inventory management and firm overall performance. The regression coefficient value was .685 with a P-value of 0.000. This revealed a positive significant relationship between green procurement management and firm overall performance.

The study general objective was to establish the effect of supply chain management practices on performance of milk processors in Kenya. A coefficient of determination R^2 value of 0.629 was shown in the regression analysis. This implies that corresponding variation of 63% in performance of milk processors in Kenya could be explained by strategic sourcing, lean inventory management and green procurement practices. This further indicated that the model was fit for the study. Other factors outside the study model can be used to explain the remaining variation of 37%.

Lean inventory management was ranked first and had a very strong correlation coefficient of 0.729 followed by strategic sourcing and then green procurement which had 0.667 and 0.564 respectively.

5.3 Study Conclusions

In regard to strategic sourcing, the regression coefficient was significant. This implies that strategic sourcing causes changes in firm performance when all factors are held constant. This can be attributed to the existence and development of strategic supplier relationships between milk processors and farmers who are their main suppliers. In addition, this can be attributed to better capacity utilization by milk processors. Milk processors are recognizing farmers as partners and are engaging in supplier development and this fosters capacity utilization.

A significant relationship was reported in lean inventory management. An implication that lean inventory management does cause changes in firm performance when all other factors are held constant. This can be attributed to the ability to hold minimum stock by milk processors whereby they end up ordering on need basis. This is common in surge periods. More so post-harvest losses experienced by farmers have led to the transition by farmers to modern ways of business operations. Technology is now a new norm. Milk processors were traditionally transactional, less open and engaged in minimal communication with the farmers. In most cases there existed middlemen who acted as a barrier to efficient trade between milk processors and farmers. Nowadays open communication and collaboration is adamant. Issues o stock is shared easily and order is now regularized. The study established that milk processors are creating accounts for farmers that will help then engage in transactions easily. Supplier development is key towards inventory leanness.

The regression coefficient of green procurement was significant indicating that firm performance might be changed by green procurement when all other factors are held constant. This can be attributed to adherence by milk processors to legislations and environmental laws. Consumers are identifying with green products more than ever.

In conclusion the variables of strategic sourcing, lean inventory management and green procurement practices had positive and significant regression coefficients. This implies the variables can improve firm performance and firm performance cannot stand alone without other study factors.

5.4 Study Recommendations

The study recommends the establishment of strategic supplier relationships between milk processors and farmers who are the major suppliers. Strategic supplier relationships can be established on the foundations of efficient communication, mutual -problem solving and decision making and collaboration. Strategic supplier relationships will ensure there is reception of quality raw milk and easier supplier payment. Farmers will be able to give feedback and do so in a timely manner. Supplier involvement and development will be easily undertaken when strategic supplier relationships are established. Milk processors should create a close relationship with farmers so as to receive timely quality supplies thus better capacity utilization.

Regarding lean inventory management milk processors should create a just in time policy of order. This can be through ordering on a need basis so as to avoid surpluses that results to losses. There is a need to balance inventory held in firms. Milk processors should avoid investing their resources in capacities that are not fully utilized and focus on a need basis. Too much stock holds up financial resources while too little results in stock outs. Therefore, milk processors should maintain adequate inventory records that will help them obtain adequate supplies when need arises. In the advent of technology milk processors should intensively use available technology to order and maintain inventory as this will improve performance. Minimum inventory levels need to be set by milk processors to avoid surpluses or shortages. Milk processors have been receiving raw quality milk that rarely make it to the processing plant. To avoid such situations there is a need to establish procurement guidelines that will be followed by suppliers.

Green is the new normal. Milk processors need to intensively look into sustainable management practices and incorporate members in the entire supply chain. Milk processors need to keep abreast of changes in environmental laws and business operating procedures so as to perform better. Customers determine the performance of firms. Recently customers desire green products that are sustainable. Milk processors should process with the customer requirements in mind as this will improve their performance. Societal concerns need be upheld as they will influence the performance of milk processors.

Further research ought to be done in the area of integration between value addition and practices involved in management of supply chains. This can be in a different industry

other than dairy. Resource orchestration theory was first mentioned in literature in 2011 and has remained underutilized. The theory has areas of potential exploitation. Future research can look into the theory and its applicability in other areas of SCM and in a different industry other than the dairy sector. Lean main focus is on waste elimination, a key focus in other studies can be on waste reduction incorporated fully in supply chain management. Strategic sourcing as a concept has remained unexploited. The study has tried to uncover the concept but future research can consider a different approach other than supplier relationship and technology use. In addition, the strategic sourcing concept can be looked into in a different sector other than dairy.

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APPENDICES

APPENDIX I: Introductory letter

Hellen Njeri Ndung'u

University of Embu

P.O.BOX 6-60100

EMBU

February 2020

Dear Sir/Madam

REF: DATA COLLECTION

Thank you for your time.

I am a student at the University of Embu, pursuing a degree in Master of Business Administration degree (MBA Procurement). As a requirement for my degree is research and therefore am conducting one on ***Supply Chain Management Practices on Performance of milk processors in Kenya.***

To be able to collect data, I will use a NACOSTI. License and a questionnaire that is therefore attached. The data collected will be treated with the utmost confidentiality it deserves, and the findings of the study will be solely for academic purposes.

Your participation in this process of data collection is highly regarded and is essential for the accomplishment of the study. Please respond honestly and objectively as possible.

Yours Faithfully

Njeri Ndung' u

APPENDIX II: Questionnaire

INSTRUCTIONS

Below are questions focusing on supply chain management best practices and firm performance in your organization. The information that will be obtained through the questions will be used solely for academic purposes and not any other purpose. Kindly cooperate and please answer honestly and objectively as possible.

Where you feel the need to give more information, kindly do not hesitate.

SECTION A: DEMOGRAPHICS

Instruction

Complete the following section by filling in where appropriate.

1.Organization _____

2.Department _____

Instructions

For the following five questions (4,5,6,7 and 8), Kindly tick where appropriate.

4. How long has the company been operational?

Less than 5 years	
Between 5 and 10 years	
Between 10 and 20 years	
More than 20 years	

5. Which best suits the locality of your customers?

Specific regions	
Specific towns	

National	
International	

6. Which best suits the locality of your suppliers?

Specific regions	
Specific towns	
National	
International	

7. Which category does your organization fall in terms of annual turnover?

1,000,000 shillings	
1,000,000-5,000,000 shillings	
0ver 5,000,000 shillings	

8. Which category does your organization fall in terms of the volume of milk handled annually?

500,000 liters	
1,000,000 liters	
Over 1,000,000 liters	

SECTION B: SPECIFIC SUPPLY CHAIN MANAGEMENT PRACTICES

Instructions

Below are supply chain management practices. They are found both in procurement and supply. Under each subheading. Kindly tick where you feel the activity is appropriate.

A. STRATEGIC SOURCING

9.) To what extent does your organization undertake the following activities?

Strategic sourcing activities	**Very great extent**	**Great extent**	**Moderate extent**	**Less extent**	**No extent**
	5	**4**	**3**	**2**	**1**
Develop long-term supplier relationships					
Receive commodities of high quality always					
Supplier involvement and development					
Efficient communication with suppliers					
Strategic supplier identification					
Collaboration with suppliers					
Use technology to set maximum and minimum inventory levels					
Use technology to order inventory					
Use the inventory to set reorder levels and inform about stockouts					
Mutual problem solving and decision making with suppliers					
Receiving orders before competitors					

Receiving supplies when there are shortages					
Engage supplier's assistance to improve product quality					

Q 10. LEAN INVENTORY MANAGEMENT

To what extent does your organization perform the following activities?

Inventory management activities	**Very great extent**	**Great extent**	**Moderate extent**	**Less extent**	**No extent**
	5	**4**	**3**	**2**	**1**
Maintain zero inventory levels					
Use technology to order commodities and maintain no inventory					
Reduce non-value-added costs in production					
Order inventory when the need arises					
Collaborate with suppliers and members in a supply chain					
Use more than 60% of company processing capacity annually					

Floor space use maximization					
Disposing of obsolete supplies					
Communicate with suppliers on inventory levels					
Reducing time to market					
Reducing time to receive timely deliveries					

Q 11: GREEN PROCUREMENT PRACTICES

To what extent does your organization perform the following activities?

Green procurement activities	**Very great extent**	**Great extent**	**Moderate extent**	**Less extent**	**No extent**
	5	**4**	**3**	**2**	**1**
Timely delivery of green supplies and products					
Procurement of environmentally friendly supplies					
Collaborate with members in a supply chain to enhance the development of a green supply chain					
Constant communication					

with supply chain members towards the advancement of a green supply chain					
Reduction of waste through green purchases					
Packaging in an environmentally friendly manner					
End of use of products conducted in an environmentally friendly manner					
Involvement of society in green initiatives					
Involvement of suppliers in green raw material specifications					
Organization design products for reduced consumption of materials and energy					
Organization cooperates with customers for cleaner processing					

and greener packaging					
The organization provide specifications to suppliers to include environmental requirements for purchased items					

SECTION D: ORGANIZATIONAL PERFORMANCE

Instruction

Tick where appropriate, kindly.

Q 12.) Through supply chain management practices which performance measure do you achieve?

Performance measure	**Very great extent**	**Great extent**	**Moderate extent**	**Little extent**	**No extent**
	5	**4**	**3**	**2**	**1**
1.Financial Performance					
Increased Profitability					
Increased sales					
Reduced inventory costs					
Timely payment of supplies					

2, Operational Performance					
Timely supplies					
Reduced wastes					
Increased Capacity Utilization					
3.Market Performance					
Enhanced compliments					
Enhanced customer loyalty					
Enhanced Image and Reputation					
Improved customer satisfaction					
Improved product delivery					

APPENDIX III: Kenya Dairy Board Licensed Milk Processors

	Company Name	**Postal Address**	**Physical Location**
001	Afrodane Industry	46336-Nairobi	Kinale off Nairobi-Naivasha Highway
002	Pascha Uplands Premium Dairies	479-00502	Nairobi Central
003	Bio Foods Ltd	27623-00506	Nairobi South
004	Brookside Dairy	236	Ruiru
005	Kiambaa DFCS Ltd		Nairobi West
006	Eldoville Farm Dairy	24390	Nairobi
007	Githunguri Dairies	3	Githunguri Town
008	Kinangop Dairy	54954-00620	Nairobi
009	New KCC	30131-00100	Dakar Road-Industrial Area
010	New Sameer A&L	30429-00100	Lunga-Lunga Road-Clesoi Nairobi South
011	Palm House Dairies	10001-00400	Githunguri
012	Pamside Dairies/Lantana	745-00100	Garissa Road-Thika
013	Stanley & Sons	18889-00500	Enterprise Road, Nairobi
014	Sunpower Products	4111-00100	St. Georges Road, Tigoni
015	Uplands Premium Dairies	479 – 00502	Kagwe Town, Kiambu
016	Wimssy Fresh Dairy	00505	Cianda Road Nairobi
017	Aspendos Dairy Limited		Kangema-Murang' a

018	Mukurwe-ini Wakulima Dairy Ltd		Nyeri
019	Mogawat Enterprises		Nairobi
020	Doinyo Lessos Creameries Ltd		Eldoret-Kenyatta Street
021	Meru Dairy Union		Meru
022	HappyCow Dairy		Nakuru
023	Lucky Dairies		Ol Kalou
024	Superior Highland Dairy		Embu
025	Agro Processors Ltd		Bahati-Nakuru
026	Sameer Ag & Livestock Ltd		Nakuru
027	Highland Creamers and Foods Ltd		Kisii
028	Suka Farmers co-operative Society Ltd		Nakuru
029	Countryside Dairy		Nyahururu
030	Organo Milk Limited		Nairobi West
031	Countryside Dairy		Lugari-Kakamega
032	Egerton University		Njoro, Nakuru
033	Kabianga Dairy		Kericho
034	Zawadi Dairies Limited		Embu

APPENDIX VI; Operationalization of Study Variables

Variable	Type of Variable	Operationalization	Measurement
1.Strategic Sourcing	Independent	• Supplier records • Technological capacities	• Supplier relationships • Technology use
2. Lean Inventory Management	Independent	• Capacity use • Supplier records	• Just in Time inventory • Capacity utilization
3.Green procurement practices	Independent	• Supplier relationships • Fund Management	• Packaging • Green supplier specifications • Green initiatives • Supply chain collaboration
4.Firm Performance	Dependent	• Increased sales • Enhanced image and reputation • Customer satisfaction • Product delivery • Reduced wastes • Reduced inventory costs • Return on equity • Return on investments • Improved capacity utilization • Return on assets	• Operational performance • Financial performance • Market/customer performance

APPENDIX IV; Research Gaps

Study	Authors	Findings	Gaps
EFFECT OF INVENTORY MANAGEMENT PRACTICES ON PERFORMANCE OF COMMERCIAL STATE CORPORATIONS IN KENYA	**Mulandi & Ismail, (2019)**	The study found out that just in time inventory together with materials planning influence performance in a firm positively. The study concluded that management of inventory enhances relationships and performance of commercial parastatals.	The study failed to address the concept of inventory leanness which breeds Just in Time inventory practices in a firm.
INFLUENCE OF SCM PRACTICES ON BEVERAGE MANUFACTURING FIRMS IN THE CASE OF CADBURY LIMITED	**Wanjiku and Mwangangi, (2019)**	Adoption of supply chain management practices improve operational performance of beverage manufacturing firms in Kenya.	The study failed to address the firm overall performance which the current study does. Strategic sourcing has not been addressed in the previous study together with inventory leanness. The current study addresses both.

INFLUENCE OF INVENTORY MANAGEMENT ON THE PERFORMANCE OF THE ENERGY SECTOR IN KENYA: A CASE OF KENYA POWER LIMITED	**Muiruri and Mwangangi, (2017)**	Inventory control enhances the performance of Kenya Power Limited.	Inventory control is important in a firm but the study does not address the method of control which can include lean management of inventory.
The Effect of Inventory Management on Organizational Performance Among Textile Manufacturing Firms in Kenya	**Musau, Namusonge, Makokha and Ngeno, (2017)**	The study concluded that inventory management influences positively the performance of Textile firms	The study fails to address inventory leanness which is a major aspect to consider in both manufacturing and processing sectors.
PROCUREMENT BEST PRACTICES AND ORGANIZATIONAL PERFORMANCE: CASE STUDY OF CADBURY'S KENYA LIMITED	**Kilonzo, (2014)**	Procurement best practices help achieve price variations and promote utilization of contracts effectively thus better performance.	The study focused on procurement risk management, planning and supply performance. The current study focuses on strategic sourcing, lean inventory management and green procurement practices as SCM practices. The

			study focuses on entire supply chain management practices unlike the previous study that focused on procurement practices only.