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Procurement Automation and Performance of Milk Processing Companies in Kiambu County, Kenya

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ABSTRACT

Purpose: The general objective of the study is to assess the effect of procurement automation on performance of milk processing companies in Kiambu County, Kenya. Specifically, the study sought to explore the effect of e-tendering on performance of milk processing companies in Kiambu County, Kenya and to determine the effect of e-invoicing on performance of milk processing companies in Kiambu County, Kenya. This study was guided by Technology Acceptance Model (TAM) and Resource-Based View (RBV) Theory.

Methodology: This study adopted a descriptive research design. The population consisted of 21 milk processing firms in Kiambu County. Kiambu County was selected as it hosts some of the largest dairy processing firms in Kenya such as Brookside and Fresha Dairies. The study targeted management employees thus forming a target population of 189 respondents. The study adopted Yamane (1957) to determine the appropriate sample size of 129 respondents. The study used questionnaires to collect primary data. Data analysis was done through use of descriptive and inferential statistics with the help of SPSS version 25. The study results were presented through tables and figures.

Findings: The study concludes that e-tendering has a positive and significant effect on performance of milk processing companies in Kiambu County, Kenya. Further, the study concludes that e-invoicing has a positive and significant effect on performance of milk processing companies in Kiambu County, Kenya.

Unique Contribution to Theory, Practice and Policy: Based on the findings, the study recommends that milk processing companies in Kenya should strengthen the adoption of e-invoicing systems by training employees, integrating electronic invoicing platforms with accounting systems, and ensuring timely processing and verification of supplier invoices.

Key Words: *Procurement Automation, E-Tendering, E-Invoicing, Milk Processing Companies*

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Background of the Study

Agriculture remains one of the most essential pillars of the global economy, providing livelihoods for over 2.5 billion people worldwide and contributing approximately 4% to global GDP, with higher proportions in developing regions (World Bank, 2023). Beyond direct economic contributions, agriculture underpins global food security, supplying the primary source of food and nutrition for the world's population, which is projected to reach 9.7 billion by 2050 (United Nations, 2022). Within this broad sector, the livestock industry plays a particularly critical role, accounting for nearly 40% of the global agricultural output value. Dairy farming, as part of this industry, is indispensable, with milk ranked as the world's third most valuable agricultural product after rice and wheat. In 2021, global milk production stood at approximately 930 million tonnes, marking a steady increase from 700 million tonnes two decades ago (FAO, 2022). This growth reflects both rising population demands and shifts in dietary preferences toward animal-sourced proteins.

Dairy farming is not only an important source of food security but also a major contributor to global trade and industrial development. The dairy sector generates employment for an estimated 240 million people globally, with women comprising a significant proportion of smallholder dairy producers (FAO, 2020). Furthermore, milk and dairy products represent a crucial component of international agribusiness, with the global dairy market valued at over USD 893 billion in 2022 and projected to reach USD 1.2 trillion by 2030, growing at a CAGR of 4.2% (Fortune Business Insights, 2023). This growth trajectory is driven by increasing consumer demand for value-added products such as yogurt, cheese, and milk powders, alongside rising urbanization and disposable incomes across the world. The efficiency and competitiveness of milk processing companies have therefore become vital in sustaining this demand, necessitating innovative solutions such as procurement automation to streamline operations, reduce costs, and enhance performance in an increasingly globalized and technology-driven marketplace.

Procurement automation refers to the use of digital systems and technologies to manage and streamline the procurement process, encompassing activities such as requisitioning, purchasing, supplier management, and payment processing (Chimtengo, Hanif & Mvonye, 2021). It involves replacing manual, paper-based tasks with automated workflows that enhance efficiency, reduce errors, ensure compliance with organizational policies, and provide real-time visibility into procurement activities (Teklu, 2020). By integrating data, standardizing procedures, and enabling faster decision-making, procurement automation contributes to more effective resource utilization and overall organizational performance (Kangethe & Namusonge, 2024). Procurement automation in milk processing companies often involves digital tools such as e-tendering, e-ordering, e-invoicing, and e-payment, which collectively enhance efficiency and transparency (Muchai & Lambaino, 2022). E-tendering allows organizations to manage the tendering process electronically, streamlining bid submissions, supplier evaluation, and selection while increasing

transparency and competitiveness (Nyagosia & Nyile, 2025). E-invoicing ensures that invoices are accurate, standardized, and processed promptly, reducing disputes and errors while enhancing record-keeping and reporting. This study sought to assess the effect of procurement automation on performance of milk processing companies in Kiambu County, Kenya.

Kiambu County, located in central Kenya, is a key player in the country's dairy industry. The county benefits from a favorable climate, fertile soils, and abundant rainfall, which create ideal conditions for dairy farming (Kangethe & Namusonge, 2024). Its proximity to Nairobi, Kenya's largest consumer market, further enhances the potential for dairy production and distribution (Muchai & Lambaino, 2022). These factors have contributed to the growth of numerous milk processing companies in the region, ranging from large-scale commercial enterprises to smallholder farmer cooperatives. The dairy sector in Kiambu not only supports local farmers by providing a reliable market for their milk but also contributes significantly to the county's economy and Kenya's overall food security (Nyagosia & Nyile, 2025).

The milk processing companies in Kiambu County play a crucial role in transforming raw milk into a variety of products, including fresh milk, yogurt, butter, and cheese. Large companies, such as Brookside Dairy Limited and Githunguri Dairy Farmers Cooperative Society, dominate the market by handling high volumes of milk and ensuring consistent product quality (Barasa, Namusonge & Okwaro, 2023). These companies provide structured supply chains, support services to farmers, and employment opportunities for local communities (Obiero & Ngugi, 2024). In addition, small and medium-sized cooperatives have emerged to empower smallholder farmers by offering collection, processing, and marketing services. These organizations are instrumental in ensuring fair pricing, reducing post-harvest losses, and enhancing the overall productivity of the dairy sector in the county (Kangethe & Namusonge, 2024).

Despite its growth, the dairy industry in Kiambu faces challenges that affect milk processing companies. Fluctuating milk prices, limited access to modern processing technologies, and occasional shortages in quality feed for livestock are some of the issues that hinder optimal performance (Muchai & Lambaino, 2022). Additionally, competition among processors and the need to meet increasingly strict quality standards require continuous investment in technology and training. However, these challenges also present opportunities for innovation, improved farm management, and the development of value-added products that can increase profitability for both processors and farmers (Nyagosia & Nyile, 2025).

Statement of the Problem

Milk processing companies play a crucial role in Kenya's economy by transforming raw milk into value-added products such as pasteurized milk, cheese, yogurt, and butter (Barasa, Namusonge & Okwaro, 2023). These companies not only provide a consistent supply of safe and nutritious dairy products to meet domestic demand but also create employment opportunities for

thousands of Kenyans across the value chain, including farmers, transporters, and retail vendors (Obiero & Ngugi, 2024). Additionally, milk processing companies contribute significantly to the agricultural sector by providing a reliable market for smallholder dairy farmers, which in turn supports rural livelihoods and enhances food security. Their operations also generate revenue through taxes and exports, thereby strengthening the country's economic growth and industrial development (Kangethe & Namusonge, 2024).

Milk processing companies in Kiambu County, Kenya, encounter several challenges that significantly affect their profitability. A major issue is the high operational costs, particularly in procurement and supply chain management (Muchai & Lambaino, 2022). According to a 2025 study, procurement-related expenses constitute nearly 60% of total operational costs among agro-processing firms in the county. Moreover, over 25% of milk processed in Kiambu is lost or wasted due to delayed procurement of packaging materials, machine breakdowns, and inconsistencies in raw milk supply (Nyagosia & Nyile, 2025). These inefficiencies lead to underutilization of processing capacities, with some firms operating at only 40% to 60% capacity (Barasa, Namusonge & Okwaro, 2023). Additionally, the dairy industry's performance reportedly declined by 6.7% in 2019, attributed to factors such as declining consumption of processed milk products, inadequate service delivery, and failure to implement sustainable marketing strategies (Obiero & Ngugi, 2024).

In terms of market share, milk processing companies in Kiambu County face stiff competition from larger dairy manufacturers, which control approximately 85% of milk sales through formal channels, leaving smallholder firms with limited market access (Kangethe & Namusonge, 2024). This concentration of market share among a few large players poses significant challenges for smaller processors. Furthermore, a constant decline in the consumption of processed milk products, coupled with a failure to create and carry out sustainable marketing strategies and poor service delivery, has accelerated the poor performance of milk processing firms in Kiambu (Muchai & Lambaino, 2022). Regarding customer satisfaction, the challenge is compounded by rising expectations from consumers, who are increasingly concerned about product quality, health considerations, and environmental impact (Nyagosia & Nyile, 2025). According to a 2023 survey by the Kenya Bureau of Standards (KEBS), 32% of food and beverage manufacturers in Kiambu County reported that they fail to meet international food safety standards due to inadequate quality control infrastructure and lack of skilled labor. Additionally, 28% of manufacturers admitted to facing challenges in achieving product consistency, a significant issue affecting customer satisfaction (Barasa, Namusonge & Okwaro, 2023).

Procurement automation has a significant effect on performance by streamlining and digitizing the procurement process. Automated procurement systems enable organizations to manage supplier interactions, track orders, and control inventory more efficiently, reducing manual errors and operational delays (Obiero & Ngugi, 2024). Various studies have been conducted in

different parts of the world on procurement automation and organization performance. For instance, Kangethe and Namusonge (2024) investigated on procurement automation and performance of government agencies. Muchai and Lambaino (2022) researched on automated procurement systems on organizational performance supermarkets and Nyagosia and Nyile (2025) examined on the influence of automated procurement on performance of county governments. However, none of these studies focused on e-tendering and e-invoicing on performance of milk processing companies in Kiambu County, Kenya. To fill the highlighted gaps, the current study sought to assess the effect of procurement automation (e-tendering and e-invoicing) on performance of milk processing companies in Kiambu County, Kenya.

Objectives of the Study

General Objective

The general objective of the study is to assess the effect of procurement automation on performance of milk processing companies in Kiambu County, Kenya

Specific Objectives

i. To explore the effect of e-tendering on performance of milk processing companies in Kiambu County, Kenya
ii. To determine the effect of e-invoicing on performance of milk processing companies in Kiambu County, Kenya

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theoretical framework developed to understand and predict how users adopt and use new information technology (Funlade and Yusuf, 2020). Initially proposed by Fred Davis (1986), TAM suggests that the adoption of technology is primarily driven by two main factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their job performance or productivity. This perception hinges on whether the technology is perceived as valuable and beneficial in achieving specific goals or tasks. For instance, if employees believe that adopting a new software system will streamline their workflow, increase efficiency, or improve decision-making, they are more likely to view it as useful and consequently more inclined to adopt it (Laryea & Eziyi, 2020).

Perceived ease of use, on the other hand, pertains to the extent to which a person believes that using the technology will be effortless and uncomplicated (Rotich, Muma & Waruguru, 2021). It considers factors such as the simplicity of the interface, the ease of learning how to use the technology, and the clarity of its functions. If potential users perceive that the technology is easy to understand and integrate into their work routines without requiring significant effort or

training, they are more likely to perceive it as easy to use and thus more likely to adopt it (Gichuhi & Waruguru, 2020). According to TAM, these two perceptions, usefulness and ease of use directly influence users' attitudes towards adopting technology. These attitudes, in turn, shape their behavioral intentions to adopt the technology. In other words, if individuals believe that a technology is both useful and easy to use, they are more likely to develop a positive attitude towards using it and subsequently intend to adopt it. This intention then leads to actual adoption behavior (Gathima & Njoroge, 2020). This theory was used to explore the effect of e-tendering on performance of milk processing companies in Kiambu County, Kenya.

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory founded by Barney (1991) is a strategic management framework that focuses on the internal resources and capabilities of a firm as sources of competitive advantage (Neupane *et al*, 2020). At its core, RBV posits that a firm's unique bundle of resources and capabilities can enable it to achieve sustainable competitive advantage and superior performance in the marketplace. Unlike traditional strategic management approaches that primarily focus on external factors such as market dynamics and industry structure, RBV emphasizes the importance of internal factors in determining a firm's success. RBV theory entails identifying and leveraging a firm's distinctive resources and capabilities to create value and achieve strategic objectives (Marcilianus, 2023). Resources can include tangible assets such as physical infrastructure, financial capital, and technology, as well as intangible assets such as human capital, intellectual property, organizational culture, and reputation. These resources are considered valuable if they enable the firm to exploit opportunities or neutralize threats in the external environment. Capabilities, on the other hand, refer to the firm's ability to effectively deploy and utilize its resources to perform specific activities and achieve desired outcomes (Murugami, 2023). This theory is relevant in determining the effect of e-invoicing on performance of milk processing companies in Kiambu County, Kenya.

Conceptual Framework

A conceptual framework is an assumed model that aids in the identification of study concepts as well as their interactions with one another (Mugenda & Mugenda, 2019). In this study, the independent variables are e-tendering and e-invoicing while the dependent variable is performance of milk processing companies in Kiambu County, Kenya.

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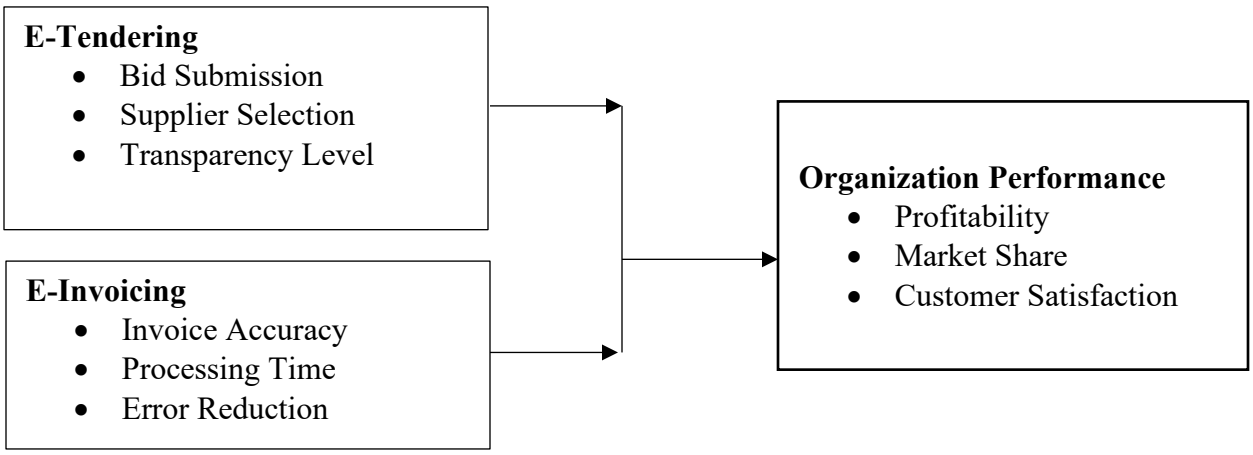


Figure 1: Conceptual Framework

E-Tendering

E-Tendering refers to the process of conducting procurement tenders electronically through an online platform, allowing organizations to solicit, receive, and evaluate bids from suppliers in a digital environment (Funlade and Yusuf, 2020). This system enhances transparency by ensuring that all tender-related information is accessible to eligible participants in real-time, reducing the risk of favoritism or manipulation. It streamlines the tendering workflow by automating tasks such as bid submission, documentation management, and evaluation, thereby minimizing manual errors and administrative delays. E-Tendering also promotes efficiency by enabling faster communication between procuring entities and suppliers, supporting compliance with regulatory requirements, and facilitating structured data analysis for informed decision-making (Laryea & Eziyi, 2020). Bid submission involves suppliers electronically submitting their proposals through a secure online platform within a specified timeframe. This process ensures that all bids are received in a standardized format, reducing errors that commonly occur with manual submissions. The digital submission system often includes features such as automated acknowledgment of receipt, deadlines enforcement, and validation checks, which help maintain the integrity of the process. By streamlining bid submission, organizations can efficiently manage large volumes of bids, minimize delays, and ensure that all suppliers have an equal opportunity to participate (Rotich, Muma & Waruguru, 2021).

Supplier selection in an automated procurement environment is conducted through systematic evaluation of submitted bids based on predefined criteria such as cost, quality, delivery timelines, and compliance with technical specifications (Gichuhi & Waruguru, 2020). The use of digital tools allows for objective scoring and comparison, reducing subjective bias in the decision-

making process. Automation can also facilitate integration with supplier performance databases, enabling organizations to consider past performance and reliability during selection. This structured approach enhances the likelihood of choosing suppliers who best align with the company's strategic and operational goals. Transparency is achieved by making the procurement process open, traceable, and auditable for all stakeholders (Gathima & Njoroge, 2020). Every stage, from tender announcement to bid evaluation and award, is recorded digitally, creating a permanent and accessible audit trail. This level of transparency minimizes opportunities for corruption or favoritism, builds trust among suppliers, and ensures compliance with regulatory and organizational policies. By providing clear visibility into procurement activities, organizations foster accountability, promote fair competition, and enhance the credibility of the procurement process (Funlade & Yusuf, 2020).

E-Invoicing

E-Invoicing is the electronic generation, transmission, and processing of invoices between a buyer and a supplier using a digital platform (Neupane *et al*, 2020). This system replaces traditional paper-based invoicing by enabling automated creation, validation, and delivery of invoices in a standardized electronic format. E-Invoicing ensures greater accuracy by reducing manual entry errors, speeds up the approval and payment processes, and provides real-time tracking of invoice status. It also enhances compliance with tax and regulatory requirements by maintaining an auditable digital record of all transactions (Marcilianus, 2023). Invoice accuracy in e-invoicing is achieved through automation that ensures the details on invoices—such as quantities, prices, taxes, and payment terms—are correctly captured and matched against purchase orders and delivery receipts. By eliminating manual data entry, the system minimizes discrepancies and ensures that both buyers and suppliers have a consistent and reliable record of transactions. Accurate invoicing strengthens financial control, reduces disputes, and fosters trust between business partners (Murugami, 2023).

E-invoicing significantly reduces processing time by automating the submission, approval, and payment cycles. Invoices can be sent and verified electronically in real-time, eliminating delays associated with physical document handling, postal delivery, or manual approvals (Mwangi & Kagiri, 2020). Faster processing accelerates cash flow management, improves supplier satisfaction through timely payments, and enhances overall operational efficiency within the organization. Error reduction is a key advantage of e-invoicing, as the digital system automatically validates invoice information against predefined rules and procurement data. This minimizes common mistakes such as duplicate entries, incorrect amounts, or mismatched purchase orders. By reducing errors, organizations avoid costly disputes, prevent payment delays, and maintain a clean financial record, ultimately improving the reliability and efficiency of the procurement and accounting processes (Ndei & Mutuku, 2021).

Empirical Review

E-Tendering and Organization Performance

Funlade and Yusuf (2020) conducted a case study on performance features of electronic tendering systems, in Greece. The approach taken in this study was as follows: compile a list of E-Tendering features found in brochures of existing E-Tendering platforms and supplement by those adapted from the literature , consolidate the compiled list of features using a panel of experts to review the list, and apply Kano model to classify the features with particular emphasis on performance features. Four experts were consulted, two procurement specialists from the industry and two academics from higher education institution. Collectively the experts have an average experience of 25 years. From the results of the Kano analysis, the performance features of an E-Tendering system were identified. These performance features will have a higher impact on the customer satisfaction of E-Tendering system users when they are implemented. The study concluded that majority of the features were classified as performance features whilst none is deemed as Must-be features.

Laryea and Eziyi (2020) conducted a study on the effect of E-tendering in the South African construction industry. Therefore, this research investigated the state of e-tendering in the South African construction industry using data derived from an online questionnaire survey involving 593 respondents, and oral interviews with selected construction clients, professional consultants, contractors and supply chain managers conducted in 2014 in South Africa. The findings revealed that the main benefits were reduction in transaction cost, and turnaround time of the tendering process, while the barriers to e-tendering in construction were slow Internet connectivity; resistance to change; expensive Internet services; and the inability of small-, medium- and micro-sized enterprises to afford the technology, training and skills needed to engage in e-tendering. The report concluded by suggesting ways for ensuring a critical mass uptake of e-tendering and maximizing its benefits in the South African construction industry.

Rotich, Muma and Waruguru (2021) conducted a study on the effect of relationship between e-tendering and procurement performance among county governments in Kenya. The study adopted a correlational research design. The target population for this study was employees of Kericho County while the sample frame was purposively selected to constitute 120 employees working in procurement, finance and accounts and IT departments of Kericho County. Stratified sampling was used to determine the sample size after while the sample elements were selected through simple random sampling. Data was collected by use of structured questionnaires that were issued by the researcher and collected later for analysis. The results revealed that e-tendering is positively related with performance of supply chain function of County Governments in Kenya. The test found that there was a significant association between E-Tendering and the Procurement Performance of county governments in Kenya, hence, suggesting that E-Tendering was crucial to the success of the Procurement Performance of county

governments in Kenya. These findings concluded that e-tendering has remarkably improved the tendering process through its merits such as efficiency, transparency and cost effectiveness.

Gichuhi and Waruguru (2020) conducted a study on the Influence of E-Tendering process on procurement performance in geothermal development company in Nakuru, Kenya. A descriptive research design was adopted in this study. The target population of this study was the procurement and logistics department's staff in GDC Nakuru region which was 170 in total. Multi-stage sampling method was used where 97 respondents were selected as the study respondents. This study relied on primary data collected by use of questionnaires. The study established that e-tendering had positive significant relationship with procurement performance in geothermal development company and therefore concluded that it has a significant influence on procurement performance. Regression analysis indicated that e-tendering did not have a significant contribution on the variation in procurement performance in geothermal development company. The study concluded that, in order to enhance procurement performance, e-tendering is not a major consideration.

Gathima and Njoroge (2020) conducted a study on the effects of e-tendering on organization performance in public sector: a case of Nairobi city county government. The study utilized the descriptive research design and explanatory design. The target population comprised 750 respondents drawn from the finance, payment and information technology department. The study sample comprised 75 respondents selected from the three departments using stratified random sampling technique. The data was collected through the administration of the questionnaires to the selected sample. The study established that E-tendering practices at the Nairobi City Government involved suppliers posting their bids electronically, tender specification and documents sent online, receipt of tender responses electronically, and tender notices conveyed to the public electronically The study concluded that E-tendering practices adopted by the Nairobi City County Government such as suppliers posting their bids electronically, tender specification and documents sent online, receipt of tender responses electronically, and tender notices conveyed to the public electronically had positive and significant relationship with the performance.

policy that makes it mandatory for all bidders to adopt e-procurement.

E-Invoicing and Organization Performance

Neupane *et al* (2020) conducted a study on the role of public e- invoicing technology to reduce corruption in government procurement This study used a literature survey of public e-procurement anti-corruption factors based on previous books, academic publications, and countries‟ public procurement assessments reports. This research used fifty countries‟ as cases to report on the role of public e-procurement technology for reducing corruption in public procurement. Results have confirmed that making consistency in government procurement is

another important anti-corruption factor of e-procurement that provides equal opportunities to all bidders so that they can attend to public institutions, regardless the company size. Bidders can have access to government bid information at their suitable time via a 24/7 service that bidders do not have to travel any more to submit a bid in paper, avoid physical attacks on bidder on their way to submit the paper bid, and save a lot of time. In conclusion, public e- invoicing is the best anti-corruption tool to minimize corruption in public and private organization and internationally recognized important instrument for checking corruption and misuse of power

Marcilianus (2023) conducted a study on the effect of electronic invoicing on the procurement performance in public organization: a case of TANESCO headquarters Dar es Salaam. A descriptive research design was used. The population of the study comprised of 90 TANESCO employees of the finance and procurement staff where 73 of them were purposely sampled. The study found that e-tendering has significant improvements in the speed and efficiency of the procurement process, reduced administrative burden, and enhanced transparency. In this study, e-awarding demonstrated positive outcomes in consistency, reliability in vendor selection, and improvements in contract compliance, while reduced time requirements for awarding contracts showed statistical significance. Also, e-ordering unveiled positive effects on reducing processing times, improving accuracy, enhancing communication with suppliers, and increasing stakeholder satisfaction. For e-invoicing, the study found substantial improvements in reducing errors, expediting payments, increasing transparency, and improving overall financial management. The study concluded that electronic tendering has a significantly positive effect on procurement performance at TANESCO HQ Dar es Salaam.

Murugami (2023) conducted a study on the effect of e- invoicing and performance of Telkom Kenya limited in Nairobi city county, Kenya. The research design for this study was a descriptive survey. Telkom Kenya limited in Nairobi City County was the target population. The 79 people who took part in the study came from six departments: departments of finance, procurement, logistics, quality, information and communications technology, and operations 79 respondents were selected using a census sampling method. All of the respondents to this study completed a questionnaire for the purpose of data collection. The study revealed that the performance of Telkom Kenya limited in Nairobi County, Kenya, was appreciatively impacted by data transmission. The study found that the performance was positively affected by billing management. customer value-based pricing strategy has a direct and positive influence on organizational performance, and billing management ensures the smooth process of generating an invoice to recover sales price from the 32 customer the study came to the conclusion that a well-managed system makes it easier to improve the organization's overall procurement process, and billing management provides fast and efficient invoicing that reduces errors compared to manually processing invoices

Mwangi and Kagiri (2020) conducted a study on the effects of e- invoicing on procurement performance in hospitality industry in Kenya: case of Sarova chain of hotels. This research adopted a descriptive research design. The study population comprises of 112 members of staff in different managerial levels currently working in the procurement department at Sarova Chain of Hotels. Random sampling technique was used to select 68 respondents. The study revealed that through e- invoicing, compliance to procurement policy has improved; e-sourcing provides a means to better understand competition and creates competitive intelligence. It was clear that enterprise resource planning ensures that the products are on the shelf in just the right quantity. Electronic procurement has the potential to reduce the total cost of acquisition. Further, the results obtained from descriptive statistics affirmed that that E- invoicing influences procurement performance at Sarova Chain of Hotels to great extent. E- Invoicing streamline the bidding process, E- invoicing enables suppliers from anywhere in the world to compete for a buyer's business. Thus the study concludes that adoption of e-tendering, e-sourcing, enterprise resource planning, E-informing were positively related to procurement performance.

Ndei and Mutuku (2021) conducted a study on the effect of electronic invoicing and performance of non-governmental organizations in Kenya. The study adopted descriptive research design. The target population for the study was 135 participants. Census survey was employed whereby the entire population of 135 procurement staff was required to participate. Both open ended and close ended questionnaires were used to collect primary data. Census survey was employed whereby the entire population of 135 procurement staff was required to participate. Both open ended and close ended questionnaires were used to collect primary data. The study collected data through drop and pick method. The study revealed that there was a strong significant correlation between e-sourcing and performance, a medium significant correlation between e-ordering and performance, a strong significant correlation between e-invoicing and performance and a strong significant correlation between e-payment and performance. The study concluded that electronic procurement and performance of organizations was indeed related and it was recommended that all procurement systems be made mandatory and that the procurement teams be well trained on all systems used to ensure efficiency is achieved through use of e-procurement.

RESEARCH METHODOLOGY

Research Design

A research design refers to the overall plan that integrates various components of a study in a logical and coherent manner to ensure that the research problem is effectively addressed. It outlines the approach to data collection, the measurement of variables, and the strategy for data analysis. Common research designs include descriptive, experimental, correlational, explanatory, exploratory, and case study designs (Williamson & Johanson, 2019).

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This study adopted a descriptive research design. A descriptive design is concerned with obtaining information about the current status of a phenomenon and systematically describing "what exists" with respect to conditions, practices, or variables under investigation (Greener, 2018). According to Creswell (2019), descriptive research typically involves the collection of data through instruments such as questionnaires and interviews, focusing on capturing the views and experiences of respondents. This design is considered suitable for the present study as it allows for an accurate, detailed, and feasible evaluation of the research variables and their interrelationships.

Target Population

The target population is a collection of research components that refers to all members of an actual or imaginary group of people, events, or objects to whom the findings should be applied (Prabhat &Meenu, 2015). It can also be described as the set of sampling units or cases that the researcher is interested in. The target population, according to Kothari (2019), is a physical representation that contains all the units that could be members of the sample. A population can alternatively be thought of as the whole collection of elements from which the study wants to draw conclusions.

The population consisted of 21 milk processing firms in Kiambu County. Kiambu County was selected as it hosts some of the largest dairy processing firms in Kenya such as Brookside and Fresha Dairies. The target population was all the 21 milk processing plants in Kiambu County (Kenya Dairy Board report, 2024). The processing plant formed the unit of analysis while the management staff formed the unit of observation. Managers were targeted as they are the people mandated in procurement automation and organization performance. The study targeted management employees thus forming a target population of 189 respondents.

Table 1: Target Population

Category	Target Population
Top Managers	21
Middle Managers	63
Lower Level Managers	105
Target Population	189

Sample Size and Sampling Technique

A sample is a representative of certain known percentage, frequency distributions of elements' characteristics similar to the corresponding distributions within the whole population (Kasomo, 2017). Kothari (2014) explains that a sample size refers to the number of items to be selected from the universe to constitute a sample while sampling procedures refers to the technique used

in selecting the items of the sample. The study adopted Yamane (1957) to determine the appropriate sample size. The sample size was as follows;

Where: $n = \frac{N}{1+Ne^2}$

n= Sample size N= Population size e= margin of error 5%

Hence the sample size will be as follows:

$n= \frac{189}{1+189(0.05)^2}$

$n=\frac{189}{1.47}$

n= 129

Hence, the sample size of the study was 129 respondents. Sampling technique is the method used to select a sample from study population (Cooper & Schindler, 2017). In this study, simple random sampling was adopted to select study sample. The advantage of simple random sampling is that it ensures every member of the population has an equal chance of being selected for the study (Yamane, 1967). Additionally, simple random sampling reduces sampling bias and produces representative samples that can be used to make inferences about the population (Kothari, 2019).

Table 2: Sample Size

Category	Target Population	Sample Size
Top Managers	21	14
Middle Managers	63	43
Lower Level Managers	105	72
Target Population	189	129

Data Collection Instruments

This study used primary. Primacy data as explained by Kultar (2019) is fresh data collected for the very first time. Secondary data on the other hand is the data that has been previously collected and has undergone a statistical process. Greener (2018) explains that different methods that can be used to collect primary data include focus group discussions, observation, structured and semi-structured questionnaires, structured and semi-structured interviews (personal and telephone interviews) and mailed questionnaires.

To collect primary data, this study used semi-structured questionnaires are commonly used for cases where the respondents willingly cooperate and are within reach. This kind of data

collection method is convenient as it can be used to reach many people provided such persons can independently read and write. The questionnaires encompassed both closed ended or open ended questions so as to enable the respondent to express their view without being affected by the researcher.

Pilot Study

Pilot study comprised of 10% of the sample size (13 respondents). The pilot test respondents did not participate in the main study. A pilot study was conducted prior to the main data collection in order to test the adequacy, clarity, and reliability of the research instrument. The pilot involved a small sample of respondents drawn from the target population but excluded from the final study to avoid bias. The purpose of the pilot test is to identify ambiguous, irrelevant, or redundant questions and to ensure that the instrument captures the intended data effectively (Saunders, Lewis, & Thornhill, 2019). Feedback from the pilot guided necessary revisions and adjustments to improve validity, while the data obtained will be analyzed using SPSS Version 25 to assess the reliability of the questionnaire through Cronbach's Alpha and construct validity through factor analysis (Creswell & Creswell, 2018; Bryman, 2016).

Data Analysis and Presentation

Data analysis in this study involved organizing and interpreting the collected information so that the findings can be clearly understood and effectively communicated (Creswell, 2018). The analysis was conducted using the Statistical Package for Social Sciences (SPSS, Version 25), which facilitated both descriptive and inferential statistical procedures. A coding framework was first developed to guide the entry and structuring of responses from the questionnaires. After verifying the accuracy of the entered data, analysis proceeded in two main stages.

The first stage employed descriptive statistics to summarize and present the basic characteristics of the dataset. This included frequency distributions and percentages for categorical variables, as well as measures of central tendency (mean) and measures of dispersion (standard deviation) for continuous variables. The results were presented in tables and graphs to provide a clear overview of the distribution patterns within the data. Such descriptive summaries offered initial insights into the nature of the responses and highlight key trends (Bryman, 2019).

The second stage involved inferential statistics to draw conclusions and test hypotheses about relationships among variables. Correlation analysis was used to determine the strength and direction of associations, while regression analysis was applied to assess predictive relationships between the dependent and independent variables. These inferential techniques enabled the researcher to generalize findings from the sample to the wider population with an acceptable degree of confidence.

Statistical Model

The multiple regression equation model is illustrated below: -

$Y= \beta_0+ \beta_1X_1+\beta_2X_2+ e$

Where:

Y is the dependent variable (performance of milk processing companies in Kiambu County, Kenya),

β_0 is the constant (Co-efficient of intercept)

β_1, and β_2 are beta coefficients,

X_1 is e-tendering,

X_2 is e-invoicing while

e is an error term

RESEARCH FINDINGS AND DISCUSSIONS

Response Rate

The researcher distributed 116 questionnaires which remained after pilot exercise to the respondents during the main data collection process, of which 104 were fully completed and returned, resulting in a response rate of 89.7%. Kothari (2019) argues that a response rate which is more than 50% is considered adequate while excellent response rate is usually above 70%. This implies that the response rate in this research is good for making conclusions as well as recommendations.

Descriptive Statistics

E-Tendering and Organization Performance

The first specific objective of the study was to explore the effect of e-tendering on performance of milk processing companies in Kiambu County, Kenya. The respondents were requested to indicate their level of agreement on various statements related to e-tendering and performance of milk processing companies in Kiambu County, Kenya. The results were as shown Table 3.

Table 3: E-Tendering and Organization Performance

	Mean	Std. Deviation
The e-tendering system allows for easy and timely submission of bids.	3.860	0.676
The bid submission process through the electronic platform is user-friendly and efficient.	3.796	0.806
Supplier selection through the e-tendering platform is based on clear criteria.	3.785	0.566
The system helps in identifying the most suitable suppliers for our needs.	3.772	0.746
All participants have equal access to information during the tendering process.	3.756	0.711
The system minimizes opportunities for bias or unfair practices in awarding contracts.	3.718	0.518
Aggregate	**3.781**	**0.671**

From the results, the respondents agreed that the e-tendering system allows for easy and timely submission of bids (M=3.860, SD= 0.676). In addition, the respondents agreed that the bid submission process through the electronic platform is user-friendly and efficient (M=3.796, SD= 0.806). Further, the respondents agreed that supplier selection through the e-tendering platform is based on clear criteria (M=3.785, SD= 0.566).

From the results, the respondents agreed that the system helps in identifying the most suitable suppliers for their needs (M=3.772, SD= 0.746). In addition, the respondents agreed that all participants have equal access to information during the tendering process (M=3.756, SD= 0.711). Further, the respondents agreed that the system minimizes opportunities for bias or unfair practices in awarding contracts (M=3.718, SD= 0.518).

E-Invoicing and Organization Performance

The second specific objective of the study was to determine the effect of e-invoicing on performance of milk processing companies in Kiambu County, Kenya. The respondents were requested to indicate their level of agreement on various statements related to e-invoicing and performance of milk processing companies in Kiambu County, Kenya. The results were as shown Table 4.

Table 4: E-Invoicing and Organization Performance

	Mean	Std. Deviation
The e-invoicing system generates invoices that match the goods and services received.	3.865	0.743
Errors in invoicing are minimal when using the electronic invoicing platform.	3.845	0.698
The e-invoicing system reduces the time taken to generate and send invoices.	3.836	0.793
Invoices are processed faster compared to traditional paper-based methods.	3.810	0.578
Discrepancies between purchase orders and invoices are significantly reduced.	3.751	0.620
The platform improves overall accuracy and reliability in financial documentation.	3.740	0.847
Aggregate	**3.808**	**0.713**

From the results, the respondents agreed that the e-invoicing system generates invoices that match the goods and services received (M=3.865, SD= 0.743). In addition, the respondents agreed that errors in invoicing are minimal when using the electronic invoicing platform (M=3.845, SD= 0.698). Further, the respondents agreed that the e-invoicing system reduces the time taken to generate and send invoices (M=3.836, SD= 0.793).

From the results, the respondents agreed that invoices are processed faster compared to traditional paper-based methods (M=3.810, SD= 0.578). In addition, the respondents agreed that discrepancies between purchase orders and invoices are significantly reduced (M=3.751, SD= 0.620). Further, the respondents agreed that the platform improves overall accuracy and reliability in financial documentation (M=3.740, SD= 0.847).

Organization Performance

The respondents were requested to indicate their level of agreement on various statements related to performance of milk processing companies in Kiambu County, Kenya. The results were as shown Table 5.

Table 5: Organization Performance

	Mean	Std. Deviation
The company consistently achieves positive profit margins from its operations.	3.828	0.720
The company effectively manages costs to maximize profitability.	3.791	0.868
The company has a significant share of the milk processing market in its operating region.	3.753	0.870
The company's products are widely recognized and preferred over competitors' products.	3.717	0.609
Customers are generally satisfied with the quality of the company's milk products.	3.698	0.814
The company responds promptly and effectively to customer complaints and inquiries.	3.667	0.575
Aggregate	**3.742**	**0.743**

From the results, the respondents agreed that the company consistently achieves positive profit margins from its operations (M=3.828, SD= 0.720). In addition, the respondents agreed that the company effectively manages costs to maximize profitability (M=3.791, SD= 0.868). Further, the respondents agreed that the company has a significant share of the milk processing market in its operating region (M=3.753, SD= 0.870).

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Inferential Statistics

Inferential statistics such as correlation analysis and regression analysis were used to assess the relationships between the independent variables (e-tendering and e-invoicing) and the dependent variable (performance of milk processing companies in Kiambu County, Kenya).

Correlation Analysis

This research adopted Pearson correlation analysis determine how the dependent variable (performance of milk processing companies in Kiambu County, Kenya) relates with the independent variables (e-tendering and e-invoicing).

Table 6: Correlation Coefficients

		Organization Performance	E-Tendering	E-Invoicing
Organization Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	104		
E-Tendering	Pearson Correlation	.820**	1	
	Sig. (2-tailed)	.001		
	N	104	104	
E-Invoicing	Sig. (2-tailed)	.003	.077	
	N	104	104	
	Pearson Correlation	.836**	.231	1
	Sig. (2-tailed)	.000	.088	
	N	104	104	104
	Sig. (2-tailed)	.002	.024	.098
	N	104	104	104

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

From the results, there was a very strong relationship between e-tendering and performance of milk processing companies in Kiambu County, Kenya (r = 0.820, p value =0.001). The relationship was significant since the p value 0.001 was less than 0.05 (significant level). The findings are in line with the findings of Funlade and Yusuf (2020) who indicated that there is a very strong relationship between e-tendering and organization performance.

Further, there was a very strong relationship between e-invoicing and performance of milk processing companies in Kiambu County, Kenya (r = 0.836, p value =0.000). The relationship was significant since the p value 0.000 was less than 0.05 (significant level). The findings are in line with the findings of Neupane *et al* (2020) who indicated that there is a very strong relationship between e-invoicing and organization performance.

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (e-tendering and e-invoicing) and the dependent variable (performance of milk processing companies in Kiambu County, Kenya).

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.800	.639	.638	.10428

a. Predictors: (Constant), e-tendering and e-invoicing

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r-squared for the relationship between the independent variables and the dependent variable was 0.639. This implied that 63.9% of the variation in the dependent variable (performance of milk processing companies in Kiambu County, Kenya) could be explained by independent variables (e-tendering and e-invoicing).

Table 8: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.612	2	21.306	89.521	.002[b]
	Residual	24.051	101	.238		
	Total	66.663	103			

a. Dependent Variable: performance of milk processing companies in Kiambu County, Kenya

b. Predictors: (Constant), e-tendering and e-invoicing

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 89.521while the F critical was 3.086. The p value was 0.002. Since the F-calculated was greater than the F-critical and the p value 0.002 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of e-tendering and e-invoicing on performance of milk processing companies in Kiambu County, Kenya.

Table 9: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.276	0.072		3.833	0.000
	e-tendering	0.330	0.085	0.331	3.882	0.001
	e-invoicing	0.346	0.090	0.347	3.844	0.000

a Dependent Variable performance of milk processing companies in Kiambu County, Kenya

The regression model was as follows:

$$\mathbf{Y = 0.276 + 0.330X_1 + 0.346X_2 + \varepsilon}$$

According to the results, e-tendering has a significant effect on performance of milk processing companies in Kiambu County, Kenya β_1=0.330, p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant level of 0.05. The findings are in line with the findings of Funlade and Yusuf (2020) who indicated that there is a very strong relationship between e-tendering and organization performance

Furthermore, the results revealed that e-invoicing has a significant effect on performance of milk processing companies in Kiambu County, Kenya β1=0.346, p value= 0.000). The relationship was considered significant since the p value 0.000 was less than the significant level of 0.05. The findings are in line with the findings of Neupane *et al* (2020) who indicated that there is a very strong relationship between e-invoicing and organization performance.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The study concludes that e-tendering has a positive and significant effect on performance of milk processing companies in Kiambu County, Kenya. Findings revealed that bid submission, supplier selection and transparency level influence performance of milk processing companies in Kiambu County, Kenya. Further, the study concludes that e-invoicing has a positive and significant effect on performance of milk processing companies in Kiambu County, Kenya. Findings revealed that invoice accuracy, processing time and error reduction influence performance of milk processing companies in Kiambu County, Kenya

Recommendations

The study recommends that milk processing companies in Kenya should strengthen the adoption of e-tendering systems by digitizing procurement processes, training procurement staff, and ensuring transparent electronic evaluation and supplier selection. This would enhance procurement efficiency, reduce administrative costs, minimize procurement delays, and improve supplier competition, thereby contributing to improved operational efficiency, cost savings, and overall organizational performance. Further, the study recommends that milk processing companies in Kenya should strengthen the adoption of e-invoicing systems by training employees, integrating electronic invoicing platforms with accounting systems, and ensuring timely processing and verification of supplier invoices. This would reduce billing errors, minimize payment delays, improve financial transparency, and enhance cash flow management, thereby lowering administrative costs and improving overall organizational performance.

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