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Strategic Innovation and Performance of State-Owned Sugar Processing Firms in Nyanza Region, Kenya

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ABSTRACT

Purpose: The general objective of this study was to examine the influence of strategic innovation on the performance of state-owned sugar processing companies in Nyanza, Kenya. Specifically, the study aimed to investigate the impact of the innovative processes, technological innovation and innovative product development and market innovation against the performance of state-owned sugar factories in the Nyanza region.

Methodology: The study used a descriptive approach. The target population was 300 respondents, and the researcher used the Yamane formula to arrive at the best sample size of 171 respondents. Data was collected using structured questionnaires. Collected data was cleaned, sorted and coded in ordinal scale using numerical numbers and entered in SPSS software version 29 and presented in form of tables and figures.

Findings: The study revealed that the current innovation strategies adopted by the manufacturing firms under study were impactful with 96% of the respondents indicating from moderately to very high impact. The regression analysis confirms that strategic innovation significantly enhances the performance of state-owned sugar firms. Technological innovation ($\beta = 0.412$, $p = 0.001$) had the strongest impact, followed by innovative processes ($\beta = 0.381$, $p = 0.004$), showing that firms that modernize operations and optimize workflows achieve better efficiency and cost reductions. Innovative product development ($\beta = 0.298$, $p = 0.015$) and market innovation ($\beta = 0.275$, $p = 0.022$) also contribute positively, emphasizing the need for continuous product differentiation and adaptive marketing strategies.

Unique Contribution to Theory, Policy and Practice: Strategic innovation is critical for improving efficiency, competitiveness, and sustainability in state-owned sugar firms. Technological advancements and process optimization have the greatest impact, while product and market innovation enhance differentiation and customer engagement. Firms must integrate all four dimensions to maximize performance gains. Firms should invest in modern technology, automation, and data-driven decision-making, enhance process efficiency, diversify product offerings, and adopt digital marketing strategies. Government support, policy reforms, and industry partnerships are key to ensuring long-term sustainability and competitiveness.

Keywords: *Product Development, Market Innovation, Organizational Performance, State-Owned Enterprises (SOEs), Strategic Innovation, Technological Innovation*

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INTRODUCTION

Background of the Study

Strategic innovation refers to redefining an organization's corporate strategy to drive business growth, enhance value creation, and establish a competitive advantage (Kijkasiwat & Phuensane, 2020). Organizations worldwide rely on strategic innovations to adapt to changing market dynamics, increase operational efficiency, and improve customer satisfaction. Leadership plays a crucial role in promoting strategic innovation in products and services to enhance competitiveness (Moretti & Biancardi, 2020). Strategic innovations drive quality improvements and elevate an organization's position in the competitive business landscape (Latifi, Nikou, & Bouwman, 2021).

According to AlQershi (2024), strategic innovation is a key instrument for organizational growth, allowing firms to penetrate new markets, increase their market share, and sustain a competitive edge. With increasing global competition and rapid technological changes, companies now prioritize strategic innovation to sustain business relevance. Strategic innovation sets the direction for an organization, ensuring strategic alignment across departments, fostering coordination, and simplifying communication (Kiss, Cortes, & Herrmann, 2022). Industries characterized by intense competition, such as the sugar sector, require continuous innovation to maintain profitability and sustainability.

Organizations strive for success by maintaining a competitive position that reflects in their overall performance. Regardless of the industry, businesses seek sustainable growth by leveraging strategic innovation to enhance financial and operational efficiency (Chege, Wang, & Suntu, 2020). Organizational performance is recognized as a key outcome variable in business and management research, with innovation playing a critical role in shaping competitive performance (Bogetoft et al., 2024). Wickham (2019) posits that an organization’s performance is dependent on its ability to maximize resources, reduce inefficiencies, and optimize profits. Business organizations measure performance using financial metrics such as profitability, return on investment, revenue growth, and operational efficiency, alongside non-financial indicators like employee engagement, customer satisfaction, and service quality.

Globally, sugar is an economically and socially significant commodity, benefiting from trade protection policies and special contracts under the World Trade Organization (WTO). The increasing demand for sugar has driven firms to innovate in production and market expansion. The sugar industry remains an attractive investment sector due to its continuous growth in demand and periodic production shortages.

According to Monitoring African Food and Agriculture Policies (MAFAP, 2023), the increasing demand for sugar is attributed to population growth and the expansion of industries utilizing sugar in products such as soft drinks, biscuits, and beverages. To remain competitive,

sugar-producing firms must adopt strategic cost leadership, market focus, and product differentiation strategies. By reducing production costs, improving efficiency, and leveraging advanced technologies, firms can enhance their overall performance (Hanelt, Firk, & Hildebrandt, 2021). Countries like Brazil, Australia, Thailand, China, and Guatemala are among the world's lowest-cost sugar producers due to efficient irrigation systems, lower labor costs, and high-capacity processing plants (Rahman et al., 2023).

In Kenya, the agriculture sector is a key economic driver, contributing 33% of the Gross Domestic Product (GDP) and indirectly supporting 27% of GDP through linkages with other industries. The sector employs over 40% of Kenya's population, with more than 70% of rural livelihoods relying on agriculture. Additionally, agriculture accounts for 65% of Kenya's export earnings and supplies inputs to the manufacturing sector (Obadha, 2023).

The Kenyan sugar industry holds significant economic importance, with its roots tracing back to colonial times. The first sugarcane factory in Kenya was established in 1922 at Miwani in present-day Kisumu County, followed by government-led expansions in Muhoroni (1966), Chemelil (1968), Mumias (1971), Nzoia (1978), and SONY Sugar (1979) (Obadha, 2023). However, increased competition from Eastern Africa, particularly from Sudan and Madagascar, has posed challenges to Kenya's sugar industry. The introduction of high-yielding sugarcane varieties in competitor nations has intensified market rivalry. Currently, the sugar industry contributes 15% to Kenya's agricultural GDP, with 25% of the population depending directly or indirectly on the sector for their livelihood (Obadha, 2023). Given its economic significance, the success and sustainability of the sugar industry are critical to Kenya's development.

Statement of the Problem

According to the 2018 World Bank economic update, the agricultural and manufacturing sector recorded a significant drop in growth from 4.7% to 1.6% and 2.7% to 0.2% respectively. This is unfortunate as the food and beverage manufacturing sector contribute heavily to the economy having the largest market share in the manufacturing sector as well as providing countless job opportunities to the city residents (Muthoni, 2018). The cost of sugar production in Kenya remains significantly higher compared to other sugar-producing nations, making it difficult for Kenyan sugar firms to compete effectively. A report by Shiamwama, Otieno, & Elijah (2022) found that Kenya's sugar production costs range between $750 and $950 per ton, nearly twice as high as the global average of $400–$550 per ton. The high cost of production stems from inefficient processing, outdated milling technology, high labor costs, and poor agricultural practices. These structural inefficiencies have led to frequent shortages, increased reliance on sugar imports, and declining profitability among state-owned sugar firms.

Moreover, Okenyoru (2024) highlights that the Kenyan sugar industry continues to operate below optimal levels due to inconsistent raw material supply, aging machinery, and

mismanagement. The sector has witnessed a decline in production, with total sugar output falling from 638,340 tons in 2015 to 377,126 tons in 2021, representing a 41% decrease in local production, while demand surged beyond 1.0 million tons annually. This production deficit has exacerbated reliance on sugar imports, creating an unstable market environment for local manufacturers.

State-owned sugar firms in Kenya were expected to contribute significantly to the economy through employment creation, affordable sugar supply, and GDP growth. However, these firms continue to struggle against stiff competition from private millers and international producers, with public sugar factories operating at an average of 40% capacity utilization (Orwa, Akuku, & Kimutai, 2022). This underperformance has resulted in financial instability, mounting debts, and calling for privatization. Additionally, Kenya's inability to meet international quality standards and high production costs has hindered its ability to export sugar competitively within COMESA and other global markets (Kabeyi & Olanrewaju, 2022). This has left the sector highly dependent on government interventions, subsidies, and tariff protections to sustain operations. Despite these efforts, the industry remains uncompetitive, inefficient, and financially unsustainable.

To address these challenges, Kenyan sugar firms must embrace strategic innovations that enhance operational efficiency, reduce costs, and improve competitiveness. Implementing new technological solutions, modernizing production processes, and improving supply chain management are critical to reviving the sector (Nanjala *et al.*, 2022). Strategic innovation has been widely recognized as a key driver of business success, enabling firms to increase their market position, productivity, and profitability. This study examined the influence of strategic innovation on the performance of state-owned sugar firms in Kenya, with a focus on identifying solutions to enhance their competitiveness and sustainability.

General Objective

This study focused on assessing the influence of strategic innovation on the performance of state-owned sugar processing companies in the Nyanza region, Kenya.

Specific Objectives

The focus of this study was on the following specific objectives; -

i. To examine the influence of innovative processes on the performance of state-owned sugar processing companies in the Nyanza region.
ii. To assess the influence of technological innovation on the performance of state-owned sugar processing companies in the Nyanza region.
iii. To establish the influence of the product development process on the performance of state-owned sugar processing companies in the Nyanza region.

iv. To evaluate the influence of market innovation on the performance of state-owned sugar processing companies in the Nyanza region.

LITERATURE REVIEW

Theoretical Review

Knowledge-Based Theory

Grant (1996) argues that strategic innovation is the bedrock of the conception of the firm's knowledge base. Organizational knowledge is crucial to a company's ability to innovate (Subramaniam & Youndt, 2005). The frequency with which a company engages in R&D activities is correlated with its ability to generate new information and ideas. When it comes to innovation, companies have adopted the "Open Innovation" method, which involves disclosing their work to the outside world in order to get access to and capitalize on the work of others, even as they direct their attention and resources toward their internal resources for their core activities (Chesbrough, 2003). If the innovation is used effectively, the knowledge-based strategy will influence performance and cost. In addition, the direction of subsequent efforts in innovation is guided by the newly gained information (Guadamillas & Forcadell, 2002). When a company's approach to innovation is sound, Kim and Mauborgne (1997) argue that it can introduce new, targeted product knowledge and technologies, accumulating tacit expertise.

Resource-Based Theory

The theory originates from the work of Penrose (1959), though inadvertently the view was formerly presented by Wernerfelt (1984). He assessed the firm using resource-market matrices instead of the market share-growth combination of the competitive position view presented by the Boston Consulting Group (1972). Instead of emphasizing market entry barriers to gain a competitive advantage and increase returns, the resource-based theory stressed 'resource positioning barriers' as a means of increasing profits (Wernerfelt, 1984 & Barney, 1986). A resource-based view (RBV) emphasizes the firm's resources as the fundamental competitive advantage and performance determinants. The model assumes that firms within an industry (or within a strategic group) may be heterogeneous concerning the bundle of resources they control (Bridoux, 1997). The second assumption is that resource heterogeneity may persist because the resources used to implement a firm's strategies must be more perfectly mobile across firms. A resource-based view (RBV) is one of the most widely accepted strategic management theories (Powell, 2001). In terms of performance, resources may increase the firm's capacity to charge high prices and thus contribute to performance by helping the firm to appropriate value linked to competitive advantage.

Furthermore, resources may be used to erect entry barriers and so increase performance at the industry level (Newbert, 2007). The resource-based view has been instrumental due to its

emphasis on the importance of resources and subsequent implications for firm performance. New organizational resources may increase flexibility in strategic choices by allowing firms to benefit from new opportunities (Rangone, 1999). The RBV could be considered as an "inside-out" process of strategy formulation: starting from the internal resources of the firm, their potential for value generation has to be assessed in order to define a strategy allowing the firm to achieve the maximum value sustainably (Grant, 1991; Barney, 1986). In this way, the firm choice strategy is determined by the resources available and the capability to deploy them in the best way to obtain a good performance.

Disruptive Theory

According to disruptive theory, businesses that do not adapt to changing technological landscapes may fail (Christensen,1997). Companies need to constantly climb the corporate ladder in order to maintain their profitability. Downward trends can damage the process and any potential profits it would have produced. It has been attacked for being too simplistic, lacking convincing reasoning, and detached from reality. In order to survive, businesses need to constantly innovate by creating new products and fostering a competitive advantage for their industry. This idea is relevant to the present analysis because it can utilize some of the three methods of innovation: market, process, and product innovation. In order to gather evidence in favour of a chosen strategy, it will be necessary to employ comprehensive techniques to persuade influential members of the sugar processing industry to agree. Stakeholder involvement is critical to ensure that benefits associated with innovation strategy are attained.

Innovation Diffusion Theory

Everett Rogers, an American sociologist, formulated this idea in 1962. This theory examines what causes people to accept an idea and how quickly they do so within a particular culture or group. Communication methods, new technologies, the passage of time, and the social structure are all factors he cites as facilitating the spread of ideas (Naqshbandi *et al.*, 2015). Diffusion theory posits that the mere presence of an innovation introduces doubt into the minds of would-be adopters, with the connotation of a lack of predictability and information. Diffusion is "the process by which information is disseminated among the nodes of a communicating social network to lessen apprehension" (Rogers, 1995). Uncertainty can be defined as the degree to which multiple options for the occurrence of a specific event are perceived, along with the relative probability of each option. People who have a stake in deciding whether to accept the invention are Page-driven to collect data to achieve just that.

According to the diffusion hypothesis, there is less room for error when adopting new technology (Silva *et al*., 2018). Since this theory describes the connection between process and market innovation and the success of sugar companies, it is relevant. The philosophy promotes a collaborative, cross-departmental approach to innovation inside an organization. Thus, the company can boost efficiency and sales by applying the theory's ideas to incorporate new,

innovative procedures to automate processes, markets, and product creation. This theory anchors the influence of process and market innovation on the organizational performance.

Conceptual Framework

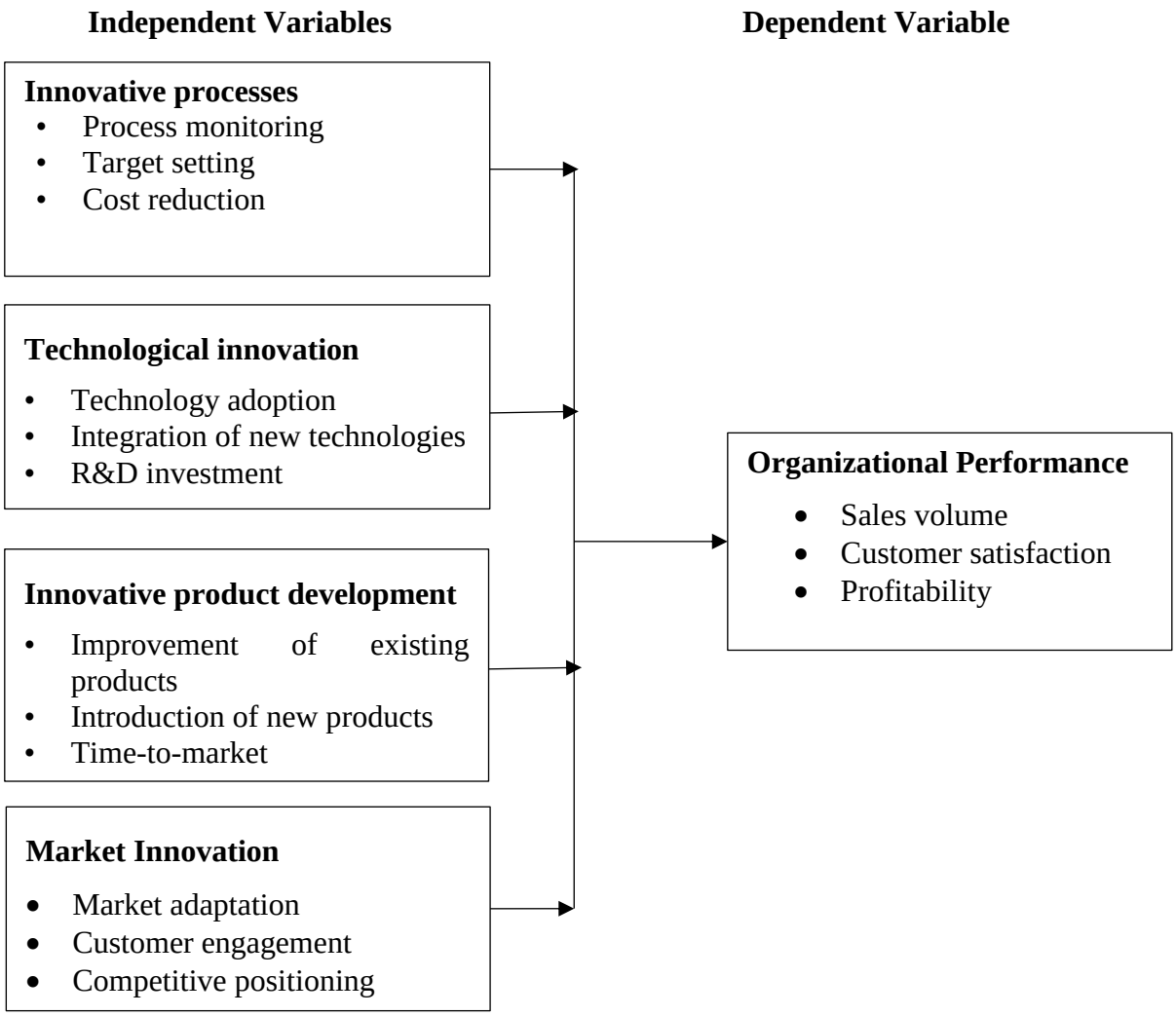

Figure 1: Conceptual framework

Source: Researcher 2023

Empirical Review

Research on innovative processes, such as that by Radicic and Petković (2023), highlights their role in improving competitiveness through advanced production techniques. Similarly, Taques et al. (2021) emphasize that process innovation reduces costs and enhances efficiency, particularly in manufacturing firms. However, these studies primarily focus on developed economies, limiting their applicability to African contexts like Kenya, where infrastructural challenges and regulatory constraints hinder innovation adoption. Additionally, most studies

rely on qualitative approaches, reducing their generalizability to large-scale, resource-constrained state-owned enterprises (SOEs) in developing economies.

The positive relationship between new product development and profitability is well-supported by Blichfeldt and Faullant (2021) and Chen and Wang (2021), who argue that continuous product innovation leads to long-term market sustainability. However, these studies often overlook the short-term financial risks associated with new product development, particularly for SOEs in Kenya's sugar sector, which operate under tight budget constraints. Furthermore, Nanjala et al. (2022) highlight that many firms focus on product rebranding rather than true product innovation, limiting the sector's long-term growth potential.

Studies by Edeh, Obodoechi, and Ramos-Hidalgo (2020) and Li et al. (2021) emphasize that technological innovation improves operational efficiency and ensures organizational sustainability. However, these studies largely focus on well-funded private firms, leaving a gap in understanding the technological adoption challenges faced by state-owned enterprises. In Kenya's sugar sector, limited capital investment, outdated machinery, and policy inconsistencies hinder technological innovation, making existing findings less applicable to firms operating in financially constrained environments.

Market innovation is widely recognized as a key driver of competitive advantage. Rahman and Rahim (2021) and Kabeyi and Olanrewaju (2022) demonstrate that strategic market adaptation and digital customer engagement significantly enhance sales and brand positioning. However, much of the literature focuses on digitally advanced markets, making it less relevant to regions with limited digital infrastructure, such as rural Kenya. Additionally, many studies fail to differentiate between industrial buyers and individual consumers, a critical gap for sugar processing firms that serve both segments differently.

A common limitation across these studies is the heavy reliance on cross-sectional research designs, which fail to capture the long-term impact of innovation (Chege, Wang, & Suntu, 2020). Additionally, self-reported data from managers, which dominates much of the research, introduces bias and reduces objectivity (Opazo-Basáez & Vendrell-Herrero, 2022). Future research should employ longitudinal methodologies and utilize objective performance data to provide a more comprehensive understanding of the role of strategic innovation in emerging markets like Kenya.

RESEARCH METHODOLOGY

The study used a descriptive research design. The target population was 300 senior and middle level employees drawn from Chemelil, Sony and Muhoroni sugar Companies. The researcher used the Yamane formula (n = 300 / (1 + 300 * (0.05^2) = 171) to arrive at the best sample size of respondents drawn from all ranks to provide vital information for fulfilling the research objectives. Data was collected using structured questionnaires and distributed using the drop-

and-collect later method. To test validity of the instrument, the researcher conducted a pilot test on 34 respondents who were subsequently excluded in the primary study, and this represented a 20% threshold of the target population. The reliability of the research instruments was ascertained using Cronbach's alpha and all the variables met the threshold of 0.7; thus, the research instrument was not edited for that purpose. Collected data was cleaned, sorted and coded in ordinal scale using numerical numbers and entered Statistical Package for the Social Sciences (SPSS) software version 29 and presented in form of percentages, tables and figure. The researcher analyzed the data using descriptive analysis. Descriptive statistics included frequencies, percentages and means to summarize and relate variables under study.

PRESENTATION AND DISCUSSION OF FINDINGS

Response Rate

Out of the 171 questionnaires distributed to selected employees from Chemelil, Muhoroni, and Sony Sugar Companies, a total of 156 were completed and returned, representing a 91.2% response rate. This is considered an excellent response rate, as a 70% response rate is generally regarded as sufficient for research analysis (Mugenda & Mugenda, 2003). The high response rate was achieved due to proper follow-up, clear instructions, and adequate time provided to respondents to complete the questionnaires.

Table 1: Response Rate

Category	Number of Questionnaires	Percentage (%)
Distributed	171	100%
Returned & Usable	156	91.2%
Not Returned	15	8.8%

Descriptive Analysis

This section presents the descriptive analysis of the study variables. The responses were measured on a five-point Likert scale, where 1 = Not at all, 2 = Little extent, 3 = Moderate, 4 = Great extent, and 5 = Very great extent.

The findings from the descriptive analysis indicate that all strategic innovation factors—innovative processes, technological innovation, product development, and market innovation—positively influence the performance of state-owned sugar firms. The highest mean scores were recorded in technology adoption, process monitoring, and market research, emphasizing their critical role in enhancing organizational success. The variations in standard deviations suggest that while most respondents agreed with the statements, some differences in opinion exist, possibly due to differences in firm strategies, operational challenges, or

varying levels of innovation adoption. To further validate these findings, the study computed correlation analysis to examine the strength and direction of relationships between strategic innovation factors and firm performance.

Correlation Analysis

Correlation analysis was conducted to determine the strength and direction of the relationship between strategic innovation variables (innovative processes, technological innovation, innovative product development, and market innovation) and the performance of state-owned sugar firms. Pearson's correlation coefficient (r) was used to measure the association between these variables. The correlation values range from -1 to 1, where: +1 indicates a perfect positive correlation; 0 indicates no correlation; -1 indicates a perfect negative correlation. A higher positive correlation suggests that an increase in innovation activities leads to improved firm performance.

Table 2: Correlation Matrix

Variables		Firm Performance	Innovative Processes	Technological Innovation	Innovative Product Development	Market Innovation
Firm Performance	Pearson Correlation	1				
	Sig. (1-tailed)					
	N	156				
Innovative Processes	Pearson Correlation	0.731*	1			
	Sig. (1-tailed)	0.000				
	N	156	156			
Technological Innovation	Pearson Correlation	0.678*	0.421	1		
	Sig. (1-tailed)	0.000	0.078			
	N	156	156	156		
Innovative Product Development	Pearson Correlation	0.712*	0.093	0.048	1	
	Sig. (1-tailed)	0.000	0.612	0.067		
	N	156	156	156	156	
Market Innovation	Pearson Correlation	0.765*	0.701	0.683	0.702	1
	Sig. (1-tailed)	0.000	0.126	0.079	0.102	
	N	156	156	156	156	156

*. Correlation is significant at the 0.05 level (1-tailed).

Innovative Processes and Firm Performance ($r = 0.731$, $p < 0.05$). This means there is a strong positive correlation between innovative processes and firm performance, indicating that firms that improve process efficiency, monitoring, and evaluation tend to experience better overall performance.

Technological Innovation and Firm Performance ($r = 0.678$, $p < 0.05$). The study found a moderate to strong positive correlation between technological innovation and firm performance. This suggests that firms that adopt new technologies, automation, and digital solutions tend to achieve higher efficiency and cost reductions, which enhances performance.

Innovative Product Development and Firm Performance ($r = 0.712$, $p < 0.05$). The findings suggest that there is a strong positive relationship between product innovation and firm performance, showing that firms that continuously develop new products and improve existing ones experience better market positioning and profitability.

Market Innovation and Firm Performance ($r = 0.765$, $p < 0.05$). The highest correlation was observed between market innovation and firm performance, suggesting that firms that adapt their marketing strategies, engage customers, and conduct market research experience significant improvements in market share and profitability.

Regression Analysis

Regression analysis was conducted to examine the extent to which Innovative Processes, Technological Innovation, Innovative Product Development, and Market Innovation influence Firm Performance in state-owned sugar firms in Kenya. The results are presented in three subsections: Model Summary, Analysis of Variance (ANOVA), and Regression Coefficients, providing insights into the predictive power of these variables.

Model Summary

The model summary in Table 3 presents statistical measures that evaluate the overall fit of the regression model.

Table 3: Model Summary

Model	R	R-Squared	Adjusted R-Squared	Std. Error of the Estimate
1	0.851[a]	0.725	0.710	0.312

a. Predictors: (Constant), Innovative Processes, Technological Innovation, Innovative Product Development, and Market Innovation

The R-Squared value (0.725) suggests that 72.5% of the variation in Firm Performance is explained by Innovative Processes, Technological Innovation, Innovative Product

Development, and Market Innovation. This indicates a strong predictive ability of the model. The Adjusted R-Squared (0.710) further confirms that even after adjusting for the number of predictors, the model retains a high explanatory power. These findings align with Wang et al. (2023), who found that strategic innovation contributes significantly to manufacturing sector performance, particularly in competitive markets.

Analysis of Variance (ANOVA)

ANOVA was conducted to determine whether the regression model significantly explains variations in Firm Performance.

Table 4: Analysis of Variance (ANOVA)

Model	Source	Sum of Squares (SS)	df	Mean Square (MS)	F	p-Value
1	Regression	12.476	4	3.119	62.631	0.000
	Residual	7.520	151	0.0498		
	Total	19.996	155			

a. Dependent Variable: Performance of State-Owned Sugar Firms

b. Predictors: (Constant), Innovative Processes, Technological Innovation, Innovative Product Development, and Market Innovation

The F-statistic (15.820, p = 0.000) suggests that the regression model is statistically significant, meaning that Innovative Processes, Technological Innovation, Product Development, and Market Innovation collectively have a meaningful impact on firm performance. These results are consistent with Liao et al. (2023), who found that innovation-driven firms achieve higher operational efficiencies and market success when supported by structured innovation strategies.

Regression Coefficients

The regression coefficients in Table 5 provide detailed insights into the influence of each variable on Firm Performance. The magnitude, direction, and statistical significance of these coefficients help determine which factors have the most substantial impact.

Table 5: Regression Coefficients

Variable	Unstandardized B	Std. Error	Standardized Beta	t-Statistic	p-Value
Constant	1.452	0.312	-	4.654	0.001
Innovative Processes	0.381	0.074	0.362	5.149	0.004
Technological Innovation	0.412	0.081	0.421	5.086	0.001
Innovative Product Development	0.298	0.069	0.389	4.319	0.015
Market Innovation	0.275	0.076	0.278	3.618	0.022

The regression equation based on the unstandardized coefficients from the table is:

Firm Performance = 1.452 + 0.381 (Innovative Processes) + 0.412 (Technological Innovation) + 0.298 (Innovative Product Development) + 0.275 (Market Innovation)

Constant ($\beta = 1.452$, $p = 0.001$): Represents the baseline level of firm performance when no innovation factors are introduced. This suggests that, even in the absence of strategic innovation, firms maintain a certain level of operational output, though significantly lower than when innovation is incorporated.

Innovative Processes ($\beta = 0.381$, $p = 0.004$): A unit increase in innovative processes leads to a 0.381 improvement in firm performance, highlighting the importance of streamlining workflows, optimizing production, and enhancing efficiency. This relationship is statistically significant ($p < 0.05$), confirming that firms that invest in structured process innovation experience substantial performance improvements. Kamal et al. (2023) support this finding, demonstrating that well-implemented process innovations enhance firm efficiency in emerging economies by reducing waste and improving resource utilization.

Technological Innovation ($\beta = 0.412$, $p = 0.001$): Exhibits the strongest positive impact on firm performance, indicating that firms that adopt advanced technologies experience significant cost reductions and productivity gains. This aligns with findings by Martínez et al. (2023), who demonstrated that integrating AI-driven automation and data analytics enhances supply chain efficiency and operational effectiveness. The statistical significance ($p < 0.01$) underscores the critical role of technology in driving competitive advantage.

Innovative Product Development ($\beta = 0.298$, $p = 0.015$): Positively influences firm performance, confirming that firms that invest in continuous product development are more likely to achieve market growth, customer satisfaction, and brand differentiation. The

significance of this relationship ($p < 0.05$) suggests that product innovation remains a key driver of sustained competitiveness. This finding is consistent with Chen & Zhang (2023), who assert that customer-driven product innovation enhances market adaptability and long-term business sustainability.

Market Innovation ($\beta = 0.275$, $p = 0.022$): Demonstrates a statistically significant effect on firm performance, reinforcing the notion that firms that effectively adapt marketing strategies and leverage digital innovations gain a competitive advantage. While its impact is slightly lower than that of technological or process innovation, it remains an essential factor for sustaining growth. Rahman et al. (2023) found that market innovation—particularly through digital marketing and consumer engagement strategies—directly influences firm profitability by expanding market reach and improving customer retention.

The regression analysis suggests that all four strategic innovation factors significantly predict firm performance in state-owned sugar firms. Technological Innovation ($\beta = 0.412$, $p = 0.001$) had the strongest impact, suggesting that state-owned sugar firms should prioritize digital transformation and automation. Innovative Processes ($\beta = 0.381$, $p = 0.004$) also had a significant influence, reinforcing the importance of continuous process improvement. Product Development ($\beta = 0.298$, $p = 0.015$) and Market Innovation ($\beta = 0.275$, $p = 0.022$) were also statistically significant, confirming that firms that focus on product differentiation and market responsiveness achieve higher performance levels. The model explains 72.5% of the variation in firm performance, indicating that innovation strategies are critical for enhancing the competitiveness of state-owned sugar firms.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The study concludes that innovative processes significantly enhance the performance of state-owned sugar firms by improving operational efficiency, resource utilization, and production effectiveness. Firms that implement structured monitoring, evaluation, and continuous improvement strategies achieve better productivity and cost management. Technological innovation was found to have the strongest impact on firm performance, emphasizing the role of modern technology in enhancing productivity, cost efficiency, and decision-making. Firms that integrate automation, artificial intelligence, and digital transformation achieve higher levels of competitiveness and sustainability.

The study concludes that investing in innovative product development enhances a firm's market position, customer satisfaction, and overall competitiveness. Firms that engage in continuous product research, differentiation, and customer-driven innovation perform better in dynamic market conditions. The study established that market innovation positively impacts firm performance by enhancing brand positioning, customer engagement, and revenue growth.

Firms that adapt their marketing strategies, leverage digital platforms, and conduct regular market research gain a competitive advantage.

Recommendations

The study highlights the importance of innovation for improving the performance of state-owned sugar firms. It emphasizes the need for process innovation through modern technologies like AI-driven optimization and automated systems to boost efficiency. Technological innovation is crucial for reducing costs and enhancing competitiveness, with government support recommended for digital transformation. Product innovation should focus on diversifying offerings, such as organic sugar and low-calorie sweeteners, beyond traditional sugar. The study also advocates for market innovation by adopting digital marketing and e-commerce strategies to improve consumer engagement and market penetration.

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