

Operational Value Determinants on the Financial Performance of Kenya Tea Development Agency-Managed Factories in Kericho County, Kenya

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ABSTRACT

The study investigates the effect on financial performance by the value determinants considered necessary for improved financial performance at Kenyan tea plantations that are controlled by the Kenya Tea Development Agency (KTDA) in Kericho County, Kenya, in the context of continued falling profits. The rationale behind the study was based on sustained reductions in profits as well as inequality in bonuses paid to regional divisions and an upward trend in production cost which highlighted an empirical void of research and knowledge transfer on whether green leaf supply steadiness, tea quality controls, capacity utilization and energy cost controls can contribute to improved factory profit levels together. The study was anchored on four theories namely: Modern Portfolio Theory and Modigliani and Miller Capital Structure Theory. Correlational research design was employed. The study philosophy was based on the positivism paradigm. Primary data was obtained from 36 purposively selected staff from management and operational staff in six KTDA-controlled factories through use of Likert-scaled questionnaires. Data analysis was done through descriptive statistics and multiple regression analysis with the use of SPSS version 27. The result of the multiple regression analysis showed that the four independent variables together explained 67.1% ($R^2 = 0.671$, $F = 14.810$, $p < 0.001$) of financial performance. Tea green leaf supply stability ($\beta = 0.276$, $p < 0.001$) was found to be the most positive predictor of financial performance. The order of predictors on the model by standardized betas was: tea green leaf supply stability ($\beta = 0.276$, $p < 0.001$), energy cost management ($\beta = 0.177$, $p = 0.007$), capacity utilization ($\beta = 0.161$, $p = 0.041$) and tea quality management ($\beta = 0.108$, $p = 0.036$), thus contributing to the rejection of all four null hypotheses. The study concludes that integrated operational value management is key for revenue growth and profitability. The study recommends that the plantation should make strategic energy investment, consolidate supply from the farmer-level, implement vigorous quality control and make production scheduling at the maximum state.

INTRODUCTION

Background of Study

The ability of agro-processing industries to maintain their operations, draw in investment, provide value to their owners and accelerate the expansion of the larger agricultural sector depends critically on their financial performance (Grau & Reig, 2021). These performance of processing firms operating within agricultural value chains is not shaped by a single determinant combination of market, operational and regulatory determinants with performance indicators like the profitability, return on assets, cost-to-revenue ratios and even surplus available for distribution to producers annually (Vuković et al., 2022).

In Kenya, tea is the most significant agricultural exports with a contribution of approximately 26% of total export earnings and additionally supporting the livelihoods more than 600,000 smallholder farmers (KTDA, 2024). The Kenya Tea Development Agency manages 71 tea factories within the country thus playing a vital role in coordination of green leaf collection, processing and marketing on behalf of Kenyan tea farmers (KTDA, 2024).

Globally, the tea processing industry illustrates these key dynamics. Tea is a widely traded agricultural commodity with its revenue generation in excess of USD 7 billion annually. It additionally supports livelihoods in more than thirty producing countries where combined Kenya, China and India account for more than 50% of global output. Empirical studies on the high-quality development of the tea export sector in China, the world's largest producer of tea with about 40% of the world's output, reveal that financial and competitive outcomes vary greatly by region, with some tea-growing areas experiencing stagnation while others registered some renewed competitiveness despite operating under similar market conditions. This variation was greatly attributed to a very small extent to external demand and to a greater extent to differences in the governance quality, agricultural innovation and compliance to international quality benchmarks among processing firms (Qin & Zhou, 2024).

In Kenya, the performance of tea factories managed by KTDA has attracted imminent policy attention as the sector navigates persistent challenges of high energy costs, fluctuation in supply of green leaf, export price volatility and competition in global tea markets (Tea Board of Kenya, 2023). KTDA factories are majorly dependent on electricity and biomass fuel for processing operations and energy costs constituting a significant proportion of total operational expenditure. Similarly, the consistency of green leaf supply has been found to be heavily influenced by seasonal weather variations and individual farmer productivity thereby directly determining factory throughput and capacity utilization levels (Tea Board of Kenya, 2023).

Tea quality management has emerged as an equally critical determinant of financial performance, given that premium teas command significantly higher auction prices at the Mombasa Tea Auction, the principal pricing mechanism for Kenyan tea (Thiro et al., 2023). It entails systems, processes and standards applied from the point of green leaf intake through to the classification and grading of made tea for sale. Premium teas like the PF1 (Pekoe Fanning 1) and BP1 (Broken Pekoe 1) fetch far higher prices than lower-grade teas, indicating that quality is the main factor influencing tea prices at auction (Thiro et al., 2023).

The utilization of capacity compares the actual production output to the highest possible output that installed machinery and plants can produce. In tea processing, capacity utilization is a key operational value determinant since tea factories entail substantial fixed capital investment in terms of infrastructure, machinery and buildings. The high-capacity utilization in factories the higher the spread fixed costs over a larger volume of production leading to reduction in the per-unit cost of processing and thus enhanced overall profitability (Nyaoga et al., 2015).

The financial performance of KTDA factories is uniquely measured by the value distributed to farmers through two payment mechanisms: the monthly green leaf payment and the annual bonus (second payment). The monthly payment provides farmers with regular income for their green leaf deliveries, while the annual bonus represents the factory's profit distribution to farmers as shareholders (KTDA, 2024). Since the incentive payments to farmers represent the surplus left over after all operating expenses and reinvestment obligations are met, they are frequently used as a gauge of factory financial performance. In the FY2024/25 season, the substantial gap between East-of-Rift bonuses (KSh 26-57 per kilogram) and West-of-Rift bonuses (KSh 10-32 per kilogram) highlighted the financial performance disparities across KTDA factories, with quality management and operational efficiency identified as primary contributing factors (Kenya News Agency, 2025).

Statement of Problem

With a major impact on employment, rural livelihoods and foreign exchange revenues, the Kenya Tea Development Agency holds a strategic role in Kenya's agricultural industry. Nevertheless, the KTDA-managed tea factories have persistently experienced challenges in relation to operational constraints at factory level, governance inefficiencies, price volatility and equitable distribution of benefits to farmers (KTDA, 2024). Despite KTDA's strategic importance, the existing empirical studies have had major concentration on the general agricultural value chains thereby offering limited context-specific analysis with high level grounding in the operational dynamics within KTDA-managed factories. This thus resulted in an insufficient

understanding of how the integration of operational practices, management decisions and value chain interact as to influence productivity and financial outcomes in the tea sector.

Research Objectives

- To evaluate the effect of tea quality management on the financial performance of KTDA-managed tea factories in Kericho County, Kenya.
- To examine the influence of capacity utilization on the financial performance of KTDA-managed tea factories in Kericho County, Kenya.

Scope and Delimitation

The study looked at the effect of operational value drivers on the financial performance of KTDA-managed tea plants in Kericho County, Kenya. Kericho County, one of Kenya's top tea-producing counties with a significant concentration of KTDA-managed tea factories and vast tea plantations, would be the exclusive focus of the study. Kericho County offers a suitable setting for analyzing how operational procedures affect the profitability of tea processing companies.

The research was limited to the tea industry for its significant contribution to Kenya's export earnings and rural economic development. The study period was July 2026 to August 2026.

Significance of Study

The findings will inform policymakers and stakeholders within the tea sector including KTDA, the Tea Board of Kenya and government departments. Empirical evidence from the study will form the groundwork for policy formulation and strategy development to improve the efficiency, competitive position and sustainability of tea production within Kenya. Insights to the study's findings on energy cost management, green leaf availability, green leaf quality control and capacity usage in the performance of KTDA managed tea factories will also provide stakeholders with more informed operational decisions resulting in greater productivity, profitability and long-term institutional performance.

THEORETICAL FRAMEWORK

Modern Portfolio Theory (MPT)

The Modern Portfolio was developed by Harry Markowitz in 1952 provides a foundational framework in financial economics for optimal resource allocation by balancing of risk and expected return. (Soliman, 2025). MPT is highly grounded in the positivist and rationalist philosophical school of thought to emphasize on objective measurement and quantitative analysis under the environment of decision-making under uncertainty. In the finance field the MPT is applied in portfolio construction, resource allocation, risk management and investment strategy formulation thus underpinning the development of the efficient frontier representing optimal portfolios that yield the maximum expected return for a given level of risk (Soliman, 2025).

Modigliani and Miller Capital Structure Theory

The M&M Theorem, developed by economists Modigliani and Miller introduced in 1958 through their articles on The Cost of Capital, Theory of Investment and Corporation Finance. The theory was later got an extension to incorporate the effects of corporate taxation in 1963 thus refining its applicability to real-world financial environments. The scholarly work received global recognition for its contribution with both Modigliani and Miller receiving the Nobel peace prizes honor in 1985 and 1990 respectively (Bodie et al, 2018).

This theory is also grounded in the Neoclassical School of Economics specifically the field of Financial Economics. At the core the framework is built on several key principles of capital structure irrelevance that

states that in a perfect capital market the organizational value is independent of its financing mix between debt and equity, the concept of arbitrage where investors exploit pricing differences between equivalent securities until such differences disappear, the risk-return trade-off that illustrates that as firms increase leverage, equity holders bear higher financial risk and therefore demand higher returns and the assumption of market efficiency posits that asset prices fully incorporate all available information (Bodie et al, 2018).

LITERATURE REVIEW

Tea Quality Management and Financial Performance

Tea quality management is widely recognized as a strategic determinant of financial performance in the tea processing industry due to its direct influence on product quality, market competitiveness, production efficiency and firm profitability. Prior literature has consistently demonstrated that total quality management is an effective framework for improvement of organizational performance by enhancing product quality and process efficiency. Nyaribo and Kariuki (2022) established that TQM practices of employee involvement, continuous improvement, customer focus and quality assurance systems have been found to significantly enhance market position of tea factories in Kenya. They highlighted that factories that implement robust quality management systems have consistently produced higher-quality tea that attract premium auction prices leading to improvement in revenue generation and that influence the overall financial performance. Similarly, Lakmali (2022) found out that integration of TQM principles throughout the tea supply chain process starting with green leaf procurement, processing and final product delivery led to customer satisfaction and improved product consistency that influence the firm performance positively. These findings suggest that quality management extends beyond production activities into the entire value chain thus creation of sustainable financial benefits enhances factories operational efficiency and stronger market positioning.

Mbae and Muli (2025) established that effective process control mechanisms of standardized withering, fermentation, drying and sorting procedures having a significant improvement on financial performance of tea factories in Meru and Tharaka Nithi Counties. The findings highlighted that factories that maintained rigorous process control consistently produced superior tea grades commanding higher prices at the Mombasa Tea Auction while also reducing reprocessing, inventory costs and production waste. These findings indicate that tea quality management has high positive correlation on financial performance through two complementary pathways of cost reduction achieved through greater production efficiency and revenue enhancement resulting from improved product quality.

Munyua (2022), similarly presents factory-level evidence further reinforces the significance of structured quality management systems towards improvement of performance in an organization. The study established that tea factories that implemented formal quality management systems showed significant improvements in operational efficiency and product consistency that led to enhanced organizational performance. The study concluded that quality management should be viewed as both as compliance requirement and strategic management practice for enhanced financial sustainability in order to minimize quality defects and reducing operational inefficiencies that lead to strengthened organizational competitiveness. These findings indicate that effective tea quality management enables factories to optimize on resource utilization while improving the financial outcomes.

The reviewed literature collectively affirms a well-established and consistent positive association between tea quality management and financial performance from global to local contexts of tea processing. Nyaribo and Kariuki (2022) and Lakmali (2022) established the TQM-competitive advantage-financial performance pathway, Mbae and Muli (2025) and Munyua (2022) provided Kenyan factory-specific process control and quality systems evidence and Yawen (2023) and Psomas and Antony (2019) contributed to the broader organizational performance and quality improvement frameworks. Nevertheless, there is existence of important empirical gaps. Most Kenyan studies have been conducted outside Kericho County thereby limiting the generalizability of their findings. In addition, no known empirical study has examined tea quality management alongside energy cost management, green leaf supply stability and capacity utilization as integrated operational value determinants of the financial performance of KTDA factories in Kericho County.

Capacity Utilization and Financial Performance

Lin et al. (2022) found that better capacity utilization considerably improved financial performance by raising efficiency in production and lowering operational costs. The study demonstrated that effective information sharing in supply chains strengthened this relationship through improvement in production planning, scheduling and resource coordination. Sdiri (2024) discovered that capacity utilization had a major impact on financial performance at key manufacturing enterprises in North Africa and the Middle East. They identified instability in input supplies, unreliable energy sources and fluctuations in market demand as limitations of capacity utilization and key contributor to declining profitability. These findings demonstrate that effective coordination of production resources and operational inputs is vital towards achievement of optimal capacity utilization and enhanced financial performance.

Nyaoga et al. (2015) investigated how constraint management affects capacity utilization among Kenyan tea processing enterprises. Their results established that management effectiveness of production constraints such as green leaf planning, machinery maintenance and production bottleneck elimination had a significant improvement on capacity utilization. The study established that factories that operated at higher capacity utilization levels achieved lower production costs and improved operational efficiency that consequently led to stronger financial performance than factories that experienced persistent production constraints. These findings provide empirical evidence that efficient utilization of installed processing capacity contributed significantly to the financial performance of Kericho's tea factories.

Nangulu et al. (2020) found that capacity management strategies such as production scheduling, effective input management and preventive maintenance significantly improved the operational performance among sugar manufacturing firms. The study found out that organizations actively managed their production capacity enhanced their operational efficiency and stronger financial performance than those that adopted reactive production approaches. Although conducted within the sugar industry the operational similarities between cooperative sugar factories and KTDA-managed tea factories highlighting high relevance to the tea processing sector.

Larsen (2016) discovered that tea manufacturers that received coordinated value chain interventions maintained greater capacity utilization, stronger financial performance and improved sustainability over the long run. The study argued that capacity utilization within smallholder processing systems is majorly determined by institutional arrangements that influence green leaf availability and production coordination. This perspective is applicable to KTDA-managed tea factories requires farmer registration, factory zoning and extension support having direct influence on green leaf supply volumes and factory throughput.

Khan and Siddiqui (2019) established that efficient inventory control substantially improved organizational efficiency and financial performance through ensured timely availability of production inputs and minimized operational disruptions. The findings are relevant to tea processing since effective coordination of green leaf collection, transportation and processing schedules lead to minimized production delays, reduced idle processing time and enhanced installed factory capacity utilization. Consequently, effective inventory and input management complement capacity utilization by improving operational efficiency and reducing production costs.

The reviewed literature has consistent demonstration of capacity utilization been a positive influencer of financial performance through elements of reduced production costs, improved operational efficiency, enhanced resource utilization and increased profitability. The findings further highlight that optimal capacity utilization is dependent on stable raw material supply, machinery maintenance, effective production planning, efficient inventory management and coordinated supply chain operations. Nonetheless, there is important empirical gap that remain. Although Nyaoga et al. (2015) examined capacity utilization within Kenyan tea factories they focused primarily on constraints management rather than modelling capacity utilization as independent variable of financial performance measured through indicators of return on investment and return on equity. The present study addresses these gaps by examining capacity utilization as an independent

operational value determinant of the financial performance of factories managed by KTDA in Kericho County using objective financial performance indicators and robust inferential statistical analysis.

RESEARCH METHODOLOGY

Research Design

The study adopted a correlational research design as the investigation sought to determine the relationships between the selected independent variables and the dependent variable of financial performance of KTDA-owned factories in Kericho County.

Target Population

A target population is basically the subjects in the study that possess the attributes of interest to a study that can be analyzed with the data collected (Mugenda & Mugenda, 2003). A total of 6 factories in Kericho County were targeted in this study as they matched the selection inclusion criteria. Kericho County is one of Kenya's leading tea-producing regions that host several KTDA factories that process green leaf supplied by local smallholder farmers. The study targeted respondents directly involved in factory operations; factory managers, assistant factory managers, production supervisors, factory accountants and finance officers, factory engineers and quality control officers.

Sample and Sampling Technique

The study adopted purposive sampling method for respondents' selection because by applying this type of sampling the researcher can purposely identify and select respondents based on their knowledge and expertise on the subjects of study. This selected those who are most informative to discuss the topic, they were; the factory manager, the heads of the company/factory that included financial, engineering and maintenance, production department as well as the head of field services and the quality assurance and maintenance head. These members are purposely selected due to the fact that they have information in respect to the activities carried out by the company as well as its income. There were six members per each factory for the KTDA-owned tea factories, meaning that the sample size of 36 was taken from the six factories. In that case no sample size had to be determined in the study as all members were selected purposively. (Saunders et al. 2023).

Validity and Reliability

In this study, the pilot study involved getting response from one factory representing 17% of the targeted respondents and for this case 6 respondents would take part in the pilot study. The 6 respondents selected to take part in this study were from Kapkoros Tea factory, a KTDA managed factory in Bomet County with similar ecological and geographical similarities to Kericho County (Mugenda & Mugenda, 2003). This is because the 6 respondents would be from similar respondent categories as those that would be used for the main study. This implies that these respondents would include factory managers, production heads, finance officers, engineers, quality assurance officers and head of field services. After coding the responses of these 6 respondents and entering into a statistical package (SPSS version 27), separate Cronbach's Alpha would be calculated for the variables operational value determinants energy cost management, green leaf supply stability, tea quality management, capacity utilization and financial performance.

Data Collection

The data was collected using structured close-ended questionnaires. Questionnaires are widely used to obtain standardized data from a clearly defined number of participants systematically and objectively (Mugenda & Mugenda, 2003). In quantitative studies, close-ended questionnaires are used as they make coding easy and provide room for statistical analysis and comparative study of the response. Five section structured questionnaire was utilized. Information on the Demographics of the respondents have been recorded on section A. Energy cost control, green leaf supply stability, tea quality control and capacity utilization have been asked

under Likert scale method at section B, C, D and E respectively while the financial performance have been captured in section F and the all above mentioned questions were asked on five-point Likert scale, to enable the use of parametric statistical analyses.

Data Analysis

Data analysis involved descriptive and inferential statistics with the help of SPSS version 27 statistical software. Specifically, descriptive statistics including frequencies, percentages, means and standard deviations will be generated and reported to give a comprehensive overview of the study variables. In addition, multiple linear regression analysis will be used to estimate the relationship between the independent variables and the dependent variable. The results of the study will be presented in percentages, graphs and tables. The regression model was shown in Equation 3.2.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \dots \dots \dots (3.2)$$

Where y = Financial Performance of KTDA-managed tea factories

β_0 = constant term;

$\beta_1, \beta_2, \beta_3$ and β_4 = regression coefficients for the independent variables

X_1 = Energy Cost Management

X_2 = Green Leaf Supply Stability

X_3 = Tea Quality Management

X_4 = Capacity Utilization

ε = error term.

FINDINGS

Tea Quality Management

The study gathered the influence of tea quality management on the financial performance of KTDA-managed tea factories. Table 1 shows the results.

Table 1: Descriptive Statistics on Tea Quality Management

Statements	SD	D	N	A	SA	Mean	Std. Dev.
Strict quality inspection at intake has reduced reprocessing costs for the factory.	2 (5.9%)	5 (14.7%)	9 (26.5%)	5 (14.7%)	13 (38.2%)	3.65	1.300
Premium tea grades consistently achieve higher price realizations at auction.	2 (5.9%)	5 (14.7%)	6 (17.6%)	11 (32.4%)	10 (29.4%)	3.65	1.228

The cost of quality control per kilogram of made tea is justified by price premiums earned.	3 (8.8%)	7 (20.6%)	10 (29.4%)	5 (14.7%)	9 (26.5%)	3.29	1.315
Rejected or downgraded tea batches create minimal financial loss to the factory.	2 (5.9%)	3 (8.8%)	11 (32.4%)	9 (26.5%)	9 (26.5%)	3.59	1.158
Farmer training on quality standards has reduced leaf rejection rates and associated costs.	3 (8.8%)	4 (11.8%)	7 (20.6%)	9 (26.5%)	11 (32.4%)	3.62	1.303
Internal quality audits help the factory avoid costly processing errors and waste.	1 (2.9%)	3 (8.8%)	12 (35.3%)	7 (20.6%)	11 (32.4%)	3.71	1.115
Investment in quality testing equipment has improved cost-efficiency in quality assurance.	2 (5.9%)	4 (11.8%)	12 (35.3%)	11 (32.4%)	5 (14.7%)	3.38	1.074
Feedback to farmers on quality performance protects the factory from price discounts.	5 (14.7%)	3 (8.8%)	7 (20.6%)	3 (8.8%)	16 (47.1%)	3.65	1.515
						3.57	1.25

Source: Research Data (2026)

The results obtained present mixed results with regard to tea quality management practices in the sampled factories. Among the highest-rated indicators, 52.9% of respondents agreed that internal quality audits help the factory avoid costly processing errors and waste ($M = 3.71$, $SD = 1.115$), the highest mean recorded for this construct, suggesting that audit-based controls are the most consistently effective cost-containment practice in quality management. A similar proportion, 52.9%, agreed that strict quality inspection at intake has reduced reprocessing costs for the factory ($M = 3.65$, $SD = 1.3$), reinforcing the view that upstream inspection contributes meaningfully to cost avoidance later in processing.

Price-realization and loss-avoidance indicators were also positively but more moderately assessed. About 61.8% of respondents agreed that premium tea grades consistently achieve higher price realizations at auction ($M = 3.65$, $SD = 1.228$), while 55.9% agreed that feedback to farmers on quality performance protects the factory from price discounts ($M = 3.65$, $SD = 1.515$) tied for the highest mean among all eight items but carrying by far the highest dispersion recorded for this construct, indicating starkly differing views among respondents on how effectively feedback loops actually shield the factory from price penalties. A related indicator, that rejected or downgraded tea batches create minimal financial loss to the factory, drew agreement from 52.9% of respondents ($M = 3.59$, $SD = 1.158$) and farmer training on quality standards reducing leaf

rejection rates and associated costs was endorsed by 58.8% ($M = 3.62$, $SD = 1.303$), suggesting rejection-related cost exposure is being moderately but not decisively managed through farmer-facing interventions.

The lowest-rated aspects concerned the direct cost-efficiency of quality investment. Only 47.1% of respondents agreed that investment in quality testing equipment has improved cost-efficiency in quality assurance ($M = 3.38$, $SD = 1.074$) and the statement drawing the least agreement of all just 41.2% was that the cost of quality control per kilogram of made tea is justified by the price premiums earned ($M = 3.29$, $SD = 1.315$), the lowest mean recorded across the construct. Together these two results suggest that while factories are willing to invest in quality control infrastructure and personnel, respondents are the least convinced that this spending is actually paying for itself through price premiums at auction.

The tea quality management construct had an overall mean of 3.57 and a standard deviation of 1.25, the lowest composite mean among the four operational value determinants reviewed. These findings suggest that while audit-based and intake-level cost controls are functioning reasonably well, the factories have not clearly established that their quality-related spending particularly on testing equipment and per-kilogram quality control costs is being recovered through the price premiums that quality tea is expected to command, which is the weakest link in the cost-to-revenue chain for this construct.

When viewed through the lens of the Efficient Market Hypothesis, these results suggest that the information on the quality of tea production, encapsulated in the quality management practices undertaken, impacts the premiums applicable to the given asset the tea grades produced by the factory. The grades with the highest quality are typically sold at higher prices at auction and as such, the quality of tea production directly impacts the financial performance of the KTDA-managed factories. The mixed results, particularly in regard to the last two indicators discussed, suggest that the producers do not generate consistent signals of high quality which consequently limits their ability to command higher prices and achieve better financial performance.

The findings in regard to tea quality management in KTDA-managed factories are consistent with those of Nyaribo and Kariuki (2022) and Munyua (2022), who also find generally moderate levels of quality management, although with mixed results on the implementation of quality inspection and feedback to farmers. In regard to the former, the findings are comparable to those of Lakmali (2022) and Mbae and Muli (2025), who find that the tea processing sector generally struggles to meet quality control standards, whereas in regard to the latter, they are consistent with Psomas and Antony (2019), who find that quality management procedures are poorly implemented within the KTDA network of factories, particularly in terms of auditing and quality inspection despite adequate documentation of the procedures.

Capacity Utilization

Finally, the study sought to establish the level to which the impact of capacity utilization on the financial performance of KTDA-managed tea factories, the results of which are presented in Table 2.

Table 2: Descriptive Statistics on Capacity Utilization

Statement	SD	D	N	A	SA	Mean	SD
Operating near capacity reduces fixed cost per kg.	0 (0.0%)	1 (2.9%)	5 (14.7%)	22 (64.7%)	6 (17.6%)	3.97	0.674
Production scheduling minimizes idle-time costs.	0 (0.0%)	2 (5.9%)	14 (41.2%)	13 (38.2%)	5 (14.7%)	3.62	0.817
Preventive maintenance reduces costs.	1 (2.9%)	2 (5.9%)	4 (11.8%)	20 (58.8%)	7 (20.6%)	3.88	0.913

Equipment breakdowns rarely cause costly delays.	0 (0.0%)	0 (0.0%)	17 (50.0%)	11 (32.4%)	6 (17.6%)	3.68	0.768
Operations consistently exceed break-even capacity.	0 (0.0%)	3 (8.8%)	3 (8.8%)	22 (64.7%)	6 (17.6%)	3.91	0.793
Peak-season production avoids excessive cost increases.	1 (2.9%)	1 (2.9%)	18 (52.9%)	8 (23.5%)	6 (17.6%)	3.50	0.929
Capacity expansion is based on cost-benefit analysis.	0 (0.0%)	2 (5.9%)	4 (11.8%)	21 (61.8%)	7 (20.6%)	3.97	0.758
Equipment investment lowers unit production costs.	0 (0.0%)	2 (5.9%)	13 (38.2%)	13 (38.2%)	6 (17.6%)	3.68	0.843
Composite Mean and SD						3.78	0.81

Source: Research Data (2026)

The results show that 82.4% of respondents agreed that operating close to installed capacity has reduced the fixed cost per kilogram of made tea ($M = 3.97$, $SD = 0.674$), tied for the highest mean recorded for this construct and with the lowest dispersion of any item in the table, indicating strong and consistent agreement that near-full capacity operation is delivering fixed-cost efficiencies. An equally high proportion, 82.4%, agreed that capacity expansion plans are based on cost-benefit analysis and return projections ($M = 3.97$, $SD = 0.758$), suggesting that expansion decisions in these factories are being approached as disciplined financial decisions rather than ad hoc responses to demand.

Cost-avoidance related to break-even operation and maintenance was also positively evaluated. About 82.4% of respondents agreed that the factory consistently operates above its break-even capacity utilization level ($M = 3.91$, $SD = 0.793$) and 79.4% agreed that preventive maintenance is viewed as a cost-saving investment rather than an expense ($M = 3.88$, $SD = 0.913$), pointing to a generally proactive, cost-conscious orientation toward both throughput and equipment upkeep. Investments in processing equipment lowering the unit cost of production drew agreement from 55.9% of respondents ($M = 3.68$, $SD = 0.843$), while exactly half of respondents (50.0%) agreed that equipment breakdowns rarely cause costly production delays or emergency repairs ($M = 3.68$, $SD = 0.768$) a comparatively lower level of agreement suggesting breakdown-related cost exposure remains a live concern for roughly half the sample.

Production scheduling and peak-season cost management were assessed as the weaker aspects of this construct. Only 52.9% of respondents agreed that production scheduling minimizes idle-time costs and maximizes throughput value ($M = 3.62$, $SD = 0.817$) and the lowest-rated item overall was that peak-season production volumes are handled without disproportionate cost escalation, with just 41.2% agreement ($M = 3.5$, $SD = 0.929$) the lowest mean in the table, indicating that cost control during periods of peak demand is the least consistently achieved aspect of capacity management.

Overall, capacity utilization had the highest composite mean (3.78) and the lowest variance (0.81) among all four constructs explored in the study, meaning respondents were both more positive and more consistent in their assessment of this construct than of energy cost management, green leaf supply stability, or tea quality management. This suggests capacity-related cost efficiencies particularly fixed-cost absorption near full capacity and disciplined, cost-benefit-driven expansion planning are the most reliably realized operational value determinant across the sampled factories, while peak-season cost escalation stands out as the one area within this construct still generating cost pressure.

These results align with the general idea of the Capital Asset Pricing Model discussed earlier in the paper, which implies that the value of an asset is determined by its yield. Specifically, the factories that operated at or near-full capacity with little downtime and reliable equipment could be said to have maximized their yield per asset, which in turn enhanced their value. The only item that did not receive a consistently positive score was related to peak-season capacity, which suggests that the factories experienced some difficulty in increasing their output during peak seasons. Thus, their ability to maximize yield was limited during these periods, which in turn reduced their value according to the CAPM framework.

The findings were also consistent with the sources reviewed in Chapter Two. In particular, the positive assessment of equipment reliability and minimizing idle time aligned with Larsen's (2016) findings that linked capacity utilization to reduced production costs and increased profit. Similarly, the positive assessment of the capacity review process and investment in processing equipment aligned with Sdiri's (2024) findings that related capacity planning to operational and financial performance. At the same time, the difficulties experienced by the factories in terms of peak-season capacity were consistent with Khan and Siddiqui's (2019) findings that related increased demand to higher utilization and, consequently, increased costs. As such, the findings related to capacity utilization were generally positive but suggested that the factories still had some issues in this area, specifically in terms of demand forecasting and planning.

Correlation Analysis

Table 3: Correlation Results

		Energy Cost Management	Green Leaf Supply Stability	Tea Quality Management	Capacity Utilization	Financial Performance
Energy Cost Management	Pearson Correlation	1	.205	-.043	-.379*	.371*
	Sig. (2-tailed)		.245	.809	.027	.031
Green Leaf Supply Stability	Pearson Correlation	.205	1	.014	-.039	.708**
	Sig. (2-tailed)	.245		.936	.829	.000
Tea Quality Management	Pearson Correlation	-.043	.014	1	.100	.254
	Sig. (2-tailed)	.809	.936		.573	.147
Capacity Utilization	Pearson Correlation	-.379*	-.039	.100	1	.115
	Sig. (2-tailed)	.027	.829	.573		.515
Financial Performance	Pearson Correlation	.371*	.708**	.254	.115	1

	Sig. (2-tailed)	.031	.000	.147	.515	
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						
c. Listwise N=34						

Source: Research Data (2026)

The Pearson correlation test findings for the association between operational value drivers and the financial performance of tea factories under KTDA management are displayed in Table 3. According to the association analysis results, there was a positive (0.371) and significant ($p = 0.031 < 0.05$) correlation between the financial performance of tea factories under KTDA administration and energy cost management. The outcome shows that controlling energy costs has a major impact on financial performance. Similarly, there was a positive (0.708) and significant ($p = 0.000 < 0.05$) correlation between the stability of the green leaf supply and financial performance. The outcome also shows that the financial performance of the tea manufacturers under KTDA's administration is largely predicted by the stability of the green leaf supply. Nevertheless, the analysis showed that the financial performance of the tea factories under KTDA's administration had a positive (0.254) but negligible link with tea quality management ($p = 0.147 > 0.05$). According to the findings, financial performance is not significantly influenced by tea quality management. Similarly, there is a weak but positive (0.115) correlation between the financial success of tea manufacturers and their capacity utilization ($p = 0.515 > 0.05$). Similarly, financial success cannot be substantially predicted or explained by capacity use.

Regression Analysis

The objective of this analysis process was to determine whether the dependent variable the financial performance of KTDA-managed tea factories and the independent variables operational value determinants, energy cost management, green leaf supply stability, tea quality management and capacity utilization have a linear relationship.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.819 ^a	.671	.626	.25502	1.590
a. Predictors: (Constant), Capacity Utilization, Green Leaf Supply Stability, Tea Quality Management, Energy Cost Management					
b. Dependent Variable: Financial Performance					

Source: Research Data (2026)

The variables taken into consideration energy cost management, green leaf supply stability, tea quality management and capacity utilization account for 67.1% of the total variations in the financial performance of the KTDA tea factories examined, according to the estimated model's results. Other variables not covered in this study account for the remaining 32.9%. Thus, it can be said that the explanatory factors taken into account are important indicators of the tea factories' financial performance.

Table 5: Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.853	4	.963	14.810	.000 ^b
	Residual	1.886	29	.065		
	Total	5.739	33			
a. Dependent Variable: Financial Performance						
b. Predictors: (Constant), Capacity Utilization, Green Leaf Supply Stability, Tea Quality Management, Energy Cost Management						

Source: Research Data (2026)

The regression model yielded an F-statistic of 14.810 with a p-value of 0.000 based on the results, which is below the significance level of 0.05. This shows that the total regression model was statistically significant, indicating that the financial success of KTDA-managed tea factories is significantly predicted by energy cost management, capacity utilization, green leaf supply stability and tea quality management taken together. As a result, the model fits the data well and may be used to explain differences in financial performance based on the four operational value drivers this study looked explored.

Table 6: Multiple Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.075	.452		2.375	.024
	Energy Cost Management	.177	.061	.343	2.917	.007
	Green Leaf Supply Stability	.276	.047	.644	5.913	.000
	Tea Quality Management	.108	.049	.235	2.194	.036
	Capacity Utilization	.161	.075	.247	2.134	.041
a. Dependent Variable: Financial Performance						

Source: Research Data (2026)

Multiple regression coefficients for the variables affecting the financial performance of tea factories under KTDA management are shown in Table 6. The following regression formula was produced using the regression model:

$$Y = 1.075 + 0.177X_1 + 0.276X_2 + 0.108X_3 + 0.161X_4$$

y = Financial Performance of KTDA-managed tea factories

X_1 = Energy Cost Management

X_2 = Green Leaf Supply Stability

X_3 = Tea Quality Management

X_4 = Capacity Utilization

At the 5% level, the constant term ($\beta = 1.075$, $t = 2.375$, $p = 0.024$) was statistically significant and positive. This suggests that, for KTDA-managed tea factories, a unit change in energy cost management, green leaf supply stability, tea quality management and capacity utilization while holding the other three variables at zero would result in a 1.075 value for the financial performance. In addition to the four operational value determinants included in the study, the importance of the intercept reveals that its value is not random, indicating the presence of other factors influencing the financial performance of KTDA-managed tea plants. The magnitude of the unexplained variance was large (32.9%), as shown by the R^2 of 0.671. The findings highlight the significance of additional variables that affect the financial success of KTDA-managed tea plants, such as exchange rates, the price of tea globally and other macroeconomic issues.

The tea quality management coefficient was statistically significant ($p = 0.036 < 0.05$) and positive ($\beta = 0.108$). According to this finding, KTDA-managed tea factories will have a 0.108 rise in financial performance for every unit change in tea quality management while keeping the other factors constant. The study comes to the conclusion that KTDA-managed tea manufacturers' financial performance is significantly influenced by tea quality management.

The findings align with those of Nyaribo and Kariuki (2022), who discovered that the market competitiveness of Kenyan tea manufacturers was greatly impacted by tea quality management strategies, such as employee involvement and quality assurance. According to Nyaribo and Kariuki (2022), tea factories that adopted quality management practices were able to produce higher quality tea that commanded better prices in the auction markets. By adopting tea quality management practices, tea factories were able to realize better prices for their tea while also reducing costs associated with reprocessing and rejection of lower quality tea. According to Mbae and Muli (2025), process control measures during withering, fermentation, drying and sorting enabled tea factories to produce high quality tea that fetched better prices at the auction markets while also reducing costs associated with reprocessing and rejection. Munyua (2022) found that tea factories that adopted formal quality management systems registered significant improvement in their operational performance and concluded that quality management systems played a critical role in quality assurance that result to the improvement of the financial performance of tea factories.

The capacity utilization coefficient was statistically significant ($t = 2.3750$) and positive ($\beta = 0.161$). According to this finding, KTDA-managed tea plants will see a 0.161 gain in financial performance for every unit change in capacity utilization while keeping the other factors constant. The study comes to the conclusion that KTDA-managed tea factories' financial performance is significantly influenced by capacity utilization.

Results are in line with Larsen's (2016) findings, which showed that capacity utilization and financial performance significantly improved in tea manufacturers that received assistance in the form of coordinated value chain interventions. Larsen (2016) asserts that enhanced institutional coordination of green leaf supply and production processes was the primary factor in the better financial performance. Sdiri (2024) discovered that the financial performance of manufacturing companies in the Middle East and North Africa was highly impacted by capacity utilization. Sdiri (2024) claims that a significant capacity utilization limitation that negatively affected the financial performance of manufacturing companies was the difficulty to maintain a steady input supply and market demand. By guaranteeing a steady supply of manufacturing inputs and lowering inventory management expenses, Khan and Siddiqui (2019) discovered that efficient inventory management greatly improved organizational performance. The findings of Khan and Siddiqui (2019) are critical to understanding the role of inventory management in KTDA-managed tea factories as a means of improving capacity utilization and, by extension, their financial performance.

CONCLUSION

Tea Quality Management and Financial Performance

Tea quality management had a positive and statistically significant relationship with the financial performance of KTDA-managed tea factories. Based on the indicators of premium tea grades achieving higher price realizations at auction and the cost of quality control per kilogram being justified by price premiums earned, the findings indicate that improved tea quality management enhances financial performance by increasing price realization while ensuring that quality-control investments generate commensurate financial benefits. Effective quality inspection, farmer training, quality testing, internal quality audits and adherence to appropriate processing standards enable factories to minimize quality-related losses and consistently produce higher-value tea grades. Consequently, effective tea quality management contributes to higher profit margins and sustained revenue growth among KTDA-managed tea factories.

Capacity Utilization and Financial Performance

Capacity utilization had a positive and statistically significant relationship with the financial performance of KTDA-managed tea factories. Based on the indicators of reduction in fixed cost per kilogram through operation close to installed capacity and consistent operation above the break-even capacity utilization level, the findings indicate that improved capacity utilization enhances financial performance by spreading fixed costs over higher production volumes and enabling factories to benefit from economies of scale. Effective production scheduling, preventive equipment maintenance, proper volume management, capacity planning and timely investment in processing equipment enable factories to minimize idle capacity, reduce unit production costs and sustain efficient operations. Consequently, higher and efficient capacity utilization contributes to improved profit margins and sustained revenue growth among KTDA-managed tea factories.

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