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Process Control as a Total Quality Management System and Performance of Selected Tea Processing Firms in Meru and Tharaka Nithi Counties of Kenya

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Abstract

The tea sector is considered a key pillar of the national economy accounting for 25 percent of total export earnings. However, the general performance of the sector as reflected in the incomes attributable to farmers, cost of production, conversion factors, and total yields has been declining. Informed by the deteriorating performance indicators, tea processing firms have been pursuing quality initiatives to enhance performance as represented in theory. The investigation wanted to prove the effect of process control as a total quality management system on the performance of tea processing firms. The investigation chose a descriptive research design and the target population comprised eight tea processing firms managed by Kenya Tea Development Agency. Descriptive and inferential statistics were adopted in the analysis of data. The Pearson correlation analysis output showed that process control as a total quality management system has a positive and statistically notable relationship with performance of tea processing firms. Despite the findings that general performance of the tea processing firms was fairly good, it was established that the tea processing firms was operating with a significantly high average cost of production occasioning need to pursue containment measures. It is recommended that the tea processing firms should explore further cost containment initiatives to check escalation which dilutes the ultimate returns attributable to shareholders. To improve on process control as a total quality dimension, the study recommends heightened pursuit of this dimension of the total quality management system as results indicated great benefits towards enhancement of organizational performance. The study recommends enhanced appreciation and acknowledgment of the quality management system as a process that requires enhanced empowerment of stakeholders to positively contribute to improvement.

Keywords: *Total Quality Management System, Process Control, Organizational Performance, Tea Processing Firms*

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1. Introduction

Globally, the tea trade has been facing major challenges from multiple sources including oversupply, increased competition, proliferation of tea alternatives (declining demand), market weaknesses, and climate change (World Bank, 2022). There have been mixed results in the global scene with regard to performance of tea processing firms. In India, there has been a general outcry of declining growth of the tea industry with authorities putting the average

decline at 6.5 percent over the past half a decade from 2016 to 2020. The decline in the Indian context was both in terms of production levels as well as the export capacity of tea processors. The Indian Tea Exporters Association (ITEA) reports that the aggregate tea exports by Indian tea processors declined to 185 m.kg in 2020 from 252 million kilos (m.kg) in 2019. This represented a whopping 28 percent reduction. Sri Lanka has also registered a marked decline in performance of tea processing firms on metrics of general prices, production, and export capacity (Sri Lanka Tea Board, 2020). Notably, for the period between 2016 and 2020, many Sri Lankan tea factories closed down on account of increased inefficiencies and declining performance.

In recent times, tea processing firms in Kenya have been experiencing some challenges in achieving the set goals and objectives due to declining performances. The predominant aim of tea processing firms, like every other business enterprise is making profits. The realization of growth in profits has been an uphill task for the KTDA-managed tea processing firms. A review of financial reports indicates that the profitability significantly declined in the recent past. Group financial reports indicated that profit for the year 2020 decreased to Kshs 1.78 billion from Kshs 2.07 billion in 2019. The gross profits increased by one percent from 24 percent in 2019 to 25 percent in 2020. The operating profits however declined from 12.4 percent in 2019 to 11.7 percent in 2020. The return on assets declined from 6 percent in 2019 to 5 percent in 2020. Between 2018 and 2019, the return on assets increased again by one percent from 5 percent in 2018 to 6 percent in 2019. In contrast, the same ratio had improved from 4 percent in 2017 to 5 percent in 2018 (KTDA, 2021).

Annual reports by the Kenya Tea Development Agency (2021) indicated a sluggish growth of revenues generated by the tea processing firms in Kenya. The Group revenues for KTDA registered an improvement of a mere 2.8 percent between 2019 and 2020 although previous years had seen a marked trend of decline in the same. Nonetheless, the payments to farmers declined significantly from Kshs 41.27 per Kg paid in 2019 to an average of Kshs 35.42 per Kg in 2020. Through the same reference period, the average cost of production declined by a notable 6.6 percent. The average proportion of net income paid to farmers stood at 66 percent across all KTDA-managed factories. The Kenya Tea Development Agency (2018) indicates that the cost of production has been escalating, a reality that threatens not only the firm's competitive position but also the sustainable growth of the sector. Major dimensions of production, auction sales, and exports have been negatively affected. Only local sales by the tea processors have posted a slight improvement (Agriculture and Food Authority, 2021). Aggregate production declined to 48.89 Kilograms in January of 2021 down from 53.63 million Kgs in the same period of 2020. The Agency has come up with programs to caution the tea grower from performance inefficiencies, improve their well-being, and ensure the sustainability of tea farming. Key among the areas being addressed include emphasis on the implementation of quality management systems.

Organizational performance refers to the actual results of the key performance indicators (achieved output) compared to the targeted results of the key performance indicators (expected output). According to Singh, Darwish, and Potočnik (2016), organizational performance may be viewed from three key dimensions: shareholder return, market performance, and financial performance. Ansoff, Helm-Stevens, Kipley, and Lewis (2019) describe organizational performance as an objective analysis of achieved results as compared to the goals and objectives of the organization. As Buckingham and Goodall (2015) posit, broadly speaking, firm-level performance can be categorized as financial and non-financial performance. Financial performance represents the act of performing a financial activity and pursuing

financial objectives of the firm. On this, the profit maximization and shareholder wealth maximization goals would be appraised. Profitability is one of the key indicators used to demonstrate the state of financial performance of tea processing firms. Key profitability indicators include return on assets, gross profit margins, and net profit margins. It entails a monetary measurement and appraisal of results of the organization's activities and engagements (Chatzoglou et al., 2015).

Non-financial metrics, as Kaplan and Atkinson (2015) put it, are metrics that go beyond an analysis of how financial objectives are being realized to reflect more on sustainability. Balkenhol (2007) asserts that non-financial performance has a long-term orientation. There are a range of other performance indicators that are effectively and commonly used by tea processing firms to evaluate their performance. These include the Average Conversion Factor, Average Tea Yield, Average Cost of Production, Market Ranking, and Tea Returns to Farmers. The average conversion factor is the rate at which the firm gets the desired end product from the raw green leaves collected from tea farmers. It is ideally, the rate at which the raw tea leaves are converted to the end product for consumption. Tea yields are the average tea production levels attributable to smallholder tea growers in the factory. The cost of production entails the budget incurred in producing a kilo of the final product. The tea returns to farmers are the incomes that tea farmers get for delivery of the product to the tea factories for processing (KTDA, 2019). The current study adopted four levels of performance indicators to assess the performance of tea processing firms. These are profitability (return on assets), production and processing indicators, average cost of production, and tea returns to farmers.

Dale (2015) clarifies that a total Quality Management System (TQM) is a management approach to doing business by application of new, enhanced processes that deliver superior value to clients and satisfy stakeholders. As an organizational-wide focused management strategy, total quality management systems aim at instilling knowingness of quality in all organizational processes and activities. Logan, Padgett, Thyer, and Royse (2006) assert that the principle motive behind the adoption of TQM systems is the need to reduce variation from every process to achieve greater consistency of effort. As observed by Dahlgaard, Khanji, and Kristensen (2008), the philosophical foundation of the total quality management system advanced as a build-up to the continual improvement approach, with the quality facet of the approach receiving a wider emphasis. In contrast to the narrowly focused statistical process controls, the total quality management system encompasses a wider scope of management activities as regards the management of people and organizations with a focus on the entire process away from just simple measurements (Goetsch & Davis, 2006).

According to ISO (2015), the quality management system aims at providing firms with the necessary information to build success over the long term and to create the conditions for sustainable development. The principles of ISO 9001:2015 quality management system are outlined as customer focus, improvement, evidence-based decision making, prudent leadership, stakeholder engagement, process approach, and symbiotic supplier interactions and relationship management. José (2005) outlines quality management systems (TQMs) as management commitment, customer focus, continual improvement, process control, and employee engagement. The current study focused on process control as a total quality management system.

Process control entails a quality approach that involves consistent monitoring and control of a process to ensure it operates efficiently and produces more defect-free products or services (Chang, 2016). The process approach implies that a firm manages its business as a system of processes as opposed to departments, people, or products. According to Chvala and Johnson

(2017), many processes inform the organizational processes that need to be controlled; design, review, evaluation, innovation, monitoring, production, distribution, resource management, and performance evaluation process. PDCA is a tool that can be used to manage processes and systems. The PDCA cycle or framework can be used to demystify the process approach or process control dimension of the quality management system. Planning involves the process of defining the goals to efficiently and effectively deliver results. Doing the process of implementation and control of planned activities. Checking involves monitoring and measuring the courses and results against policies, objectives, and requirements and reporting results. Finally, acting is about undertaking corrective action to improve the performance of processes (Harrington, 2016).

1.1 Problem Statement

Despite recording a consistent increase in revenues, the general performance of the tea sector as reflected in the profitability, production levels, incomes attributable to farmers, and cost of production has been declining. The realization of growth in profits has been an uphill task for the KTDA-managed tea processing firms. Group financial reports indicated that profit for the year 2020 decreased to Kshs 1.78 billion from Kshs 2.07 billion in 2019. The payments to farmers declined significantly from Kshs 41.27 per Kg paid in 2019 to an average of Kshs 35.42 per Kg in 2020. Through the same reference period, the average cost of production declined by a notable 6.6 percent. Aggregate production declined to 48.89 million Kilograms in January of 2021 down from 53.63 Million Kgs in the same period of 2020 (Agriculture and Food Authority, 2021). The performance woes have greatly affected Meru and Tharaka Nithi counties where tea factories are on the spot over inefficiencies and poor returns (KTDA, 2020). In 2020, farmers in Meru and Thraka Nithi regions boycotted tea picking in protest to the poor performance of their tea processing firms which ultimately translated to poor returns (Kimanthi, 2020).

Informed by the deteriorating performance indicators, tea processing firms nationally have been pursuing quality initiatives intending to enhance performance as represented in theory. While considerable studies have been done, key empirical, conceptual, and methodological gaps remain. In context, very few studies have tried to provide empirical evidence to tea processing firms on whether their quality management considerations were enhancing performance as expected. Ngambi and Nkemkiafu (2015) investigated TQM and the performance of Cameroonian manufacturers. The investigation results indicated that process control as a TQM system does not significantly affect the level of organizational performance. Empirical gaps emerge in that the results conflict with other studies such as Shahdadnejad and Alroaia (2013) and Pattanayak and Punyatoya (2015) who indicated that process control as a TQM system positively influenced organizational performance. Thus, to effectively deal with the gaps highlighted, the current study focused on the total quality management system and performance of tea processing firms in Meru and Tharaka Nithi Counties, Kenya.

1.2 Objective of the Study

The study sought to assess the effect of process control on the performance of tea processing firms.

2. Literature Review

2.1 Theoretical Review

2.1.1 Juran's Theory of Quality Management

The theory was advanced by Juran (1964) and presents approaches to enhance quality management process and deliver superior organizational performance. The most notable contributions of the theoretical perspective are Juran's Trilology, Juran's Ten Points of Quality Improvement, and Juran's Three Steps to Progress. Advanced by Juran (1986), the Quality Trilogy Theory presents that quality management is made of three fundamental courses that emphasize quality. These processes include quality planning, control, and improvement. Thus, process control determines achievement of quality objectives and overall organizational performance (Beckford, 2016). Quality planning is presented as the genesis of quality management in the firm. It involves the formulation of processes that positively contribute to the potentiality of attaining the predefined goals and objectives set by the firm within the framework of existing conditions (Kiran, 2016). Owing to insufficiencies in the original planning, the process is never wholly perfect and operates at a high level of chronic waste (Ross, 2017). As observed by Beckford (2016), quality control therefore comes about as the system tries to ensure that wastes don't get worse. Variations and causes of under-optimality in the system's ability to deliver on set objectives are identified. This is then followed by the application of corrective action aimed at making remedies to the shortcomings identified (Langabeer, 2018). The continuous application of quality control initiatives leads to the reduction of waste and defects, which is the basis of quality improvement. In conclusion, therefore, quality planning entails the process of setting quality goals. This results in the establishment of a process that can meet quality goals under operative conditions (Kiran, 2016).

Quality control ensures operations are affected in accordance with the quality plan. As for quality improvement, the process is about realization of unparalleled levels of performance (Chang, 2016). Quality improvement ensures operations are carried out at levels of quality markedly higher than premeditated performance (Neyestani, 2017). The theorists also present the Three Steps to Progress that organizations need to implement to achieve and sustain high quality and superior performance (Goetsch & Davis, 2014). First, the organization should devise improvements, which are habitually structured with a sense of commitment and urgency. Secondly, the management should develop an all-embracing training program and finally inculcate commitment and leadership at the higher echelons of management. The approach therefore underlines customer focus, employee engagement, continual process control, and management commitment as the critical pillars of TQM and superior performance (Beckford, 2016).

The theorists further introduced new approaches to the management field by demystifying the functions of planning, organizing, and controlling with an emphasis on the role that managers must play to enhance quality (Juran, Gryna, & Bingham, 1951). Quality is presented as the fitness for usage as reflected in the design, conformance, availability, safety, and field use. Juran presented ten steps of quality improvement, which are widely applied in organizational quality improvement. The management constantly builds awareness of opportunities to

improve, sets goals, organizes, trains, and pursues projects to solve problems (Langabeer, 2018). The management team then reports progress, gives recognition, conveys results, and keeps the score. Finally, the annual improvements are integrated into regular systems and processes to sustain the momentum of superior performance (De Feo, 2014). The ten points of quality improvement further underline the need to involve stakeholders, especially employees to ensure the success of the quality improvement initiatives. According to Beckford (2016), quality-centric firms should first recognize their customers, establish their needs then device ways to meet those needs. The firm should then develop objective quality measures and drive the system towards consistently accomplishing the set standards. The processes created should also be able to fit and apply in real-life conditions. The theory posits that the top-level management must demonstrate a genuine commitment to quality initiatives or else the whole process fails.

2.1.2 Crosby's Theory

The theory is linked with Crosby (1984) and is premised on the foundational principle of Doing Everything Right the First Time to promote a culture of zero defects. The theory presents quality as faultless conformity to requirements (Goetsch & Davis, 2014). Thus, customer focus stands at the apex of Crosby's proposition and is highly regarded as a key contributor to TQM's success and organizational performance. Crosby presented the Four Absolutes of Quality Management. Further, the theorist clarified other Basic Elements of Improvement. The theory also introduces Crosby's Zero Defects principle which is essentially a performance tool that requires people to demonstrate commitment to watchfully monitor particulars and avoid errors (Beckford, 2016). As presented by Androniceanu (2017), the theory further presents Crosby's Fourteen Steps to Quality Improvement as a guide to effective quality improvement. First, management's commitment to long-term quality should be demonstrated. There should also be establishment of cross-departmental quality improvement teams (Gupta et al., 2017). The areas where present and potential problems exist should be determined. The management should also evaluate the cost of quality and work towards promoting quality awareness and personal commitment by employees. The management should also be swift in taking corrective action (Langabeer, 2018).

A zero-defect program should also be devised. Supervisors should also be empowered and trained on implementation of the quality initiatives. The management should also consider holding a Zero Defects Day to ensure the entire workforce perceives and acknowledges the new order. Individuals as well as teams should also be motivated to create both personal and team improvements (McGrath & Bates, 2017). The system should also encourage feedback from employees regarding hindrances to the achievement of quality objectives. Recognition should also be enhanced for employees who participate. The management should also entrench quality controls to promote continual communication. Lastly, repetition should be encouraged to foster quality improvement which is a continuous or never-ending process (Kenyon & Sen, 2015). The theory was therefore critical in the evaluation of the role of customer focus, process control, management commitment, and employee engagement in enhancing performance of organizations.

2.1.3 Deming Quality Improvement Theory

This approach was put forward by Deming (1986) who argued that quality management philosophy is best executed when acknowledged as a prime obligation of top management. Thus, as Anderson, Rungtusanatham, and Schroeder (1994) argue, if ideas to improve quality standards and performance are not fully backed by top management then advancing the same would be futile. The success of institutional systems wholly leans on whether they perceive them as important to organizational success or not (Boaden, Harvey, Moxham & Proudlove, 2008). According to Kiran (2016), the theory argues that there are certain quality management guidelines that firms can use to enhance quality and minimize costs. To achieve quality objectives, the firm should embrace continual improvement of products and services offered. Advocates of this theoretical framework contend for top management commitment to involving and empowering employees to handle quality interventions. The management should promote favourable working atmosphere and enhance active communication (Antony & Preece, 2002).

The theorists also present the Deming Cycle or the PDCA cycle (Harrington, 2016). The cycle is outlined as; Plan, Do, Check, and Act. Planning involves developing a customer research methodology to inform the business process components. Doing entails the implementation of the plans and establishing its performance. Checking involves evaluating the measurements and reporting the outcomes to decision-makers. Acting or adjusting entails concluding the changes that require to be effected to improve the system and offer improved products (Kulak & Li, 2017). The theorist further presents a range of total quality guidelines, popularly known as Deming's fourteen points of quality management (Chvala & Johnson, 2017). The fourteen points represent a set of guidelines that can be adopted by managers who wish to transform business effectiveness (Kiran, 2016). To start with, managers should develop a sense of consistency and dependability. In addition, a new approach should be devised and followed while dependence on mass inspection should be discouraged. The organization should also cease focusing on cost reduction and dwell more on upgrading the quality of products and services rendered (Ross, 2017).

Management should also enhance employees' training and establish modern methods of supervision (Beckford, 2016). The stakeholders should be continually engaged while fear should be dispelled. Barriers among staff areas should be abolished and static numerical goals imposed on the workforce. Obstacles that overburden the workers should be expunged (Smith, 2015). The management should then introduce an extensive education and training program. Lastly, and most importantly, the organizations should bring on board a top management team that is committed to and strives toward these goals (Langabeer, 2018). In conclusion, therefore, Deming's Quality Improvement Theory presents that management commitment, continual improvement, process control, employee empowerment and engagement, and customer focus are the vital pillars for the favourable outcome of TQM interventions.

2.2 Empirical Review

Androwis, Sweis, Tarhini, Moarefi and Hosseini (2018) considered the outcome of TQM approaches on the performance of Jordanian construction chemical companies. The population was made up of 28 construction chemical firms. Results demonstrated that generally, all TQM

practices had a favourable result on the performance of the aforementioned firms. In particular, it was established that process control was a sstatistically notable determinant of organizational performance. Contextually, gaps appear as the bulk of studies on the current subject are situated in foreign settings. This creates the need to enhance the scope of studies targeting the local sectors.

Soltani and Lai (2007) examined process control and total quality management through a qualitative study of three manufacturing firms in the United Kingdom. The study appraised the management's conceptual perception of process control in their implementation of TQM in the firms. Results demonstrated that managers at various organizational levels rarely distinguished the concept of TQM and process control. The study noted that failure to distinguish process control as a facet of TQM posed the threat of management bias towards process control and disregard for the wider TQM function leading to the ultimate failure of the system. Contextually, gaps emerge on a need to understand whether this is the case in the local companies' management arena.

Karani and Bichanga (2012) assessed the influence of TQM on the business performance of service-oriented establishments where they considered Kenya Wildlife Services as the subject of study. The assessment was informed by the significance of tourism to the Kenyan economy. It was also informed by the numerous challenges facing the robust sector such as reduction in the number of international tourists and human-wildlife conflict. As a result of the investigation, it was concluded that the process approach being a dimension of TQM was implemented only to a fair degree it was also noted that the process approach was a statistically notable determinant of organizational performance. Methodologically, gaps arise necessitating a shift of focus to the manufacturing industry where studies are declining and need to employ more objective indicators of how well the organization is doing.

3. Methodology

A descriptive research design was chosen. Jackson (2015) explains that a descriptive examination seeks to establish the prevailing conditions concerning established circumstances of scrutiny to a research endeavor hence describing them as they are. Bulmberg, Cooper, & Schindler (2011) explains that descriptive survey design is a scientific method encompassing observation and description of factor behaviors and does not have an effect on them at all. Creswell and Creswell (2017) depict the target population to be the total number of elements or objects that possess the same notable attributes. The target population comprised eight (8) tea processing firms in Meru and Tharaka Nithi Counties of Kenya as per the Kenya Tea Development Agency (2019) demarcations. The respondents comprised of Factory Unit Manager, Head of Finance, Head of Production, Head of Logistics and Transport, Head of Quality Assurance, and 3 Supervisors. Therefore, a total number of 64 respondents were targeted. A census study approach was used because the elements of the study were not many.

Ott and Longnecker (2015) describe a census study as the selection of the entire set of units or elements with observable similar characteristics for study. All eight (8) tea processing firms were targeted in the study with all the 64 purposely identified respondents participating. Purposive sampling allows the researcher to employ individual judgment in choosing a sample (Oso & Onen, 2005). Primary data resources were used for the current study. A semi-structured questionnaire was used for data collection. Questionnaires as data collection tools carry the potential to organize feedback in a homogeneous way giving objective data (Mugenda &

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Mugenda, 2003). The validity and reliability status of the study instrument was tested. Descriptive and inferential methods of analysis were considered. Means and standard deviations were the key descriptive statistics while inferential methods applied were the regression analysis and Pearson correlation analysis. It was imperative for descriptive statistics to be supplemented by inferential statistics as they, on their own, do not allow generalizations to be made.

4. Results and Discussion

4.1 Descriptive Analysis

Outcomes of the descriptive analysis i.e. mean and standard deviation are presented in this section. The statistics cover process control as a total quality management system and performance of tea processing firms. The descriptive statistics are contained in Table 1.

Table 1: Process Control as a Total Quality Management System

	N	Mean	Std. Dev
The organization appreciates and acknowledges the quality management system as a process and effectively empowers all stakeholders to positively contribute to improvement.	49	3.4004	.24243
The quality planning process is given key attention to ensure that the right design is adopted for products and services offered by the factory.	49	3.7687	.69042
The organizational team is committed to sound implementation and control of planned activities	49	3.9426	.57425
The results of quality improvement initiatives are regularly monitored, and measured, and feedback is provided.	49	3.6063	.30635
The organizational management undertakes measures for system correction and improvement given the deficiencies highlighted.	49	3.8843	.28428
The tea factory has a well-established set of quality system objectives to guide the implementation process.	49	3.9960	.36530
Average	**49**	**3.7664**	**.41051**

The aggregate mean score (3.77) demonstrates that process control as a total quality management system was to a large extent entrenched in the tea processing firms. The average standard deviation (0.41) affirms this condition. The result (M=3.77, SD=0.69) showed that the quality planning process was to a large extent given key attention to ensure that the right design was adopted for products and services offered by the tea processing firm. The output (M=3.94, SD=0.57) revealed that the organizational team was largely committed to sound implementation and control of planned activities. From the results (M=3.61, SD=0.31) it is clear that the results of quality improvement initiatives were largely and regularly monitored, measured, and feedback provided. More so, the output (M=3.88, SD=0.28) indicated that the organizational management to a larger extent undertook measures on system correction and improvement given the deficiencies highlighted. Further, the output (M=3.99, SD=0.37) indicated that the tea processing firms, to a large extent had well-established sets of quality

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system objectives to guide the implementation process. Nevertheless, the output (M=3.40, SD=0.24) indicated that the organizations only to a small extent appreciated and acknowledged the quality management system as a process and just moderately empowered stakeholders to positively contribute to improvement.

Descriptive analysis (means and standard deviation) regarding the dependent variable (performance of tea processing firms). Performance is indicated by Production and Processing indicators, Average Cost of Production, Tea Returns to Farmers, and Profitability (Return on Assets). The results are presented in Table 2.

Table 2: Production and Processing as Indicators of Performance

		Average Yield Per Bush (Kgs)	Average Conversion Factor %
N	Valid	49	49
	Missing	0	0
Mean		1.5689	24.2704
Max		1.9754	33.2101
Min		0.8543	16.6432

The results show that on average the yield per bush for all the tea processing firms was 1.57 Kgs. The highest yield per bush stood at 1.97 Kgs while the least was 0.85 Kgs. On processing, the average conversion factor stood at 24.27 percent. This meant that, on average, a unit of green leaf produced 0.2427 units of the final product. The highest conversion factor reported by the tea factories was 33.21 percent while the least was 16.64 percent. Thus, the tea processing firms had a fairly good performance on account of production and processing.

Table 3 presents statistics on the cost of production as an indicator of the performance of tea processing firms.

Table 3: Cost of Production as an Indicator of Performance

		Average Cost of Production
N	Valid	49
	Missing	0
Mean		32.7753
Max		38.6001
Min		24.6432

The average cost of production for the tea processing firms stood at 32.77 percent. The highest cost of production reported was 38.60 percent while the lowest cost of production reported by

the tea factories was 24.64 percent. The implication is that the tea factories were operating with significantly high cost of production.

Table 4 presents statistics on profitability as an indicator of the performance of tea processing firms. The resting on assets (ROA) ratio was considered.

Table 4: Profitability (Return on Assets) as an Indicator of Performance

		Return on Assets %
N	Valid	49
	Missing	0
Mean		5.9864
Max		7.6021
Min		4.2123

The average return on assets for the tea processing firms stood at 5.99 percent. The highest return on assets reported by the firms was 7.60 percent while the lowest was 4.21 percent. The conclusion is that the profitability of the tea factories was fairly good, though better results can be achieved with contained costs.

Table 5 presents statistics on Tea Returns to Farmers as an indicator of the performance of tea processing firms. This is represented by the income in Kshs per Kg.

Table 5: Tea Returns to Farmers as an Indicator of Performance

		Income to Farmers Per Kg (Kshs)
N	Valid	49
	Missing	0
Mean		39.6432
Max		52.1101
Min		21.0022

The results show that the average tea returns to farmers by the processing firms was Kshs 39.64 per Kg. The maximum earnings to farmers was Kshs 52.11 while the least stood at 21.00. The implication is that the returns to farmers were fairly good.

4.2 Correlation Analysis

To compute the strength and direction of the connection between the total quality management system and the performance of tea processing firms in Tharaka Nithi and Meru counties of Kenya, Pearson correlation analysis was adopted. Table 6 tabulates the results.

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Table 6: Pearson Correlation Analysis

		Performance of Tea Processing Firms
	N	49
Process Control	Pearson Correlation	.673**
	Sig. (2-tailed)	.002
	N	49

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

Pearson correlation analysis output showed that Process Control as a total quality management system has a positive and statistically significant relationship with performance of tea processing firms. Process control has a Pearson correlation coefficient of 0.673 which demonstrates a strong and positive relationship with the performance of tea processing firms. The relationship is statistically significant since the p-value (0.002) is below the 5% threshold mark. Findings supported past studies by Androwis, Sweis, Tarhini, Moarefi, and Hosseini (2018) and Karani and Bichanga (2012) who showed that process control has a significant positive relationship with organizational performance.

4.3 Regression Analysis

The regression analysis also helps in attaining meaningful relationships between variables thus generating answers to research question on process control as a total quality management system and the performance of tea processing firms. Table 7 shows the coefficients of the multiple linear regression.

Table 7: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	4.705	.102	3.654	46.127	.024
Process Control	**.615**	**.186**	**.601**	**3.307**	**.021**

a. Dependent Variable: Performance of Tea Processing Firms

The multiple regression analysis output provides evidence that process control as a total quality management system is a useful determinant of the performance of tea processing firms. In addition, process control has a positive effect on performance.

The coefficient for process control (0.615) has an associated p–p-value of 0.021 which is within the 5% level of significance. As such, process control as a total quality management system

has a statistically significant effect on the performance of tea processing firms. Therefore, a unit of positive change in process control could lead to a 0.615-unit improvement in the performance of tea processing firms. Findings supported past studies by Androwis, Sweis, Tarhini, Moarefi, and Hosseini (2018) and Karani and Bichanga (2012) who showed that process control was a notable predictor of how well an organization can achieve the set goals.

5. Conclusion

Given the findings, the study made some important conclusions regarding process control as a total quality management system and the performance of tea processing firms. The conclusions are majorly anchored on the inferential statistics that allow generalizations or inferences on the wider population.

The multiple regression analysis results informed a conclusion that process control as a total quality management system is a useful positive predictor of the performance of tea processing firms. Therefore, an increase in process control would result in an improvement in the performance of tea processing firms. In addition, it was concluded that although process control as a total quality management system was largely entrenched in the tea processing firms, the organizations only moderately appreciated and acknowledged the quality management system as a process and just moderately empowered stakeholders to positively contribute to improvement.

6. Recommendations

Although the general performance of the tea processing firms was found to be fairly good, the results established that the tea factories were operating with a significantly high average cost of production occasioning need to pursue containment measures. It is recommended that the tea processing firms should pursue further cost containment measures to check escalation which dilutes the ultimate returns attributable to shareholders. The study recommends heightened investment in cheaper energy options such as green energy because energy-related overheads account for close to a third of total operational costs in tea processing firms.

The Kenya Tea Development Agency should also heighten their investment in the establishment of factory-specific hydroelectric energy plants that have had tremendous positive impacts on cost reduction in tea processing firms that have already implemented. Other recommended measures for cost reduction include; enhancement of internal capacity, prudent cost management, and adoption of new technology in production, processing, marketing, and distribution. The study recommends heightened pursuit of this dimension of total quality management system as results indicated great benefits towards enhancement of organizational performance. The study recommends enhanced appreciation and acknowledgment of the quality management system as a process that requires enhanced empowerment of stakeholders to positively contribute to improvement.

7. Contribution to Knowledge

The research adds to the growth of quality management as a branch of knowledge. In particular, the study develops the strategic management practice and theory by making major contributions to knowledge of the subject matter; process control as a total quality management system, and organizational performance. The study provides critical evidence in support of Juran's Theory of Quality Management, Crosby’s Theory, and Deming's Quality Improvement Theory which underline process control as a critical pillar of TQM and superior performance.

While past studies have over-concentrated profitability and market-based ratios, the current study uses a balanced mix of indicators that best fit a processing firm's context. Specifically, and as a major shift from the approach of past studies, the study applies the Balance Score Card to inform the adoption of a variety of indicators that reflect customer, financial, learning, and internal business process outlooks. The study therefore provides largely original and indispensable empirical evidence to guide decision-making on process control as a total quality management system in the context of an agricultural processing firm's context.

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