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# Quality Management as a Strategic Capability in Certification-Based Agricultural Projects: Evidence from Smallholder Coffee Systems

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## Abstract

Despite the growing institutionalization of quality management within certification-based agricultural systems, its strategic impact on project implementation performance in smallholder settings remains insufficiently examined. This study investigates quality management as a strategic organizational capability and its effect on the implementation performance of certification-based coffee projects in Kiambu County, Kenya. Grounded in the Resource-Based View (RBV), the study adopted a positivist, cross-sectional research design. Data were collected from stakeholders engaged in certification-based coffee projects and analyzed using descriptive statistics and multiple linear regression. The findings revealed a strong positive and statistically significant relationship between quality management and project implementation performance ( $R = 0.704$ ,  $p < 0.001$ ), with quality management accounting for approximately 49.5% of the variance in implementation outcomes. Quality mechanisms including process efficiency, adherence to industry standards, and buyer satisfaction systems function as performance-enhancing strategic assets rather than mere compliance mandates. These results contribute to the project management and agricultural governance literature by empirically establishing quality management as a strategic capability in smallholder certification systems. The study recommends greater institutionalization of quality governance structures among certification bodies and cooperatives to enhance implementation reliability and sector competitiveness.

**Keywords:** *Quality Management; Project Implementation Performance; Resource-Based View; Certification Systems; Smallholder Agriculture; Coffee Sector; Strategic Capability; Agricultural Governance.*

### 1.1 Background to the Study

Quality management is a managerial reaction to the growing requirements of uniformity, productivity, and accountability of stakeholders in the era of competitive markets (Shafiq et al., 2019). Originally developed in the manufacturing industries as inspection and defect control, it transformed into a wider organizational ideology of process standardization, ongoing enhancement, and systematic management (Kaluyu et al., 2022). This transformation is an indicator of a change in responsive quality rectification towards proactive performance enhancing systems that are inbuilt in organizational structures.

The globalization of trade accelerated the institutionalization of quality management through the proliferation of certification regimes and standardized compliance frameworks (Hammed et al.,

2023). Organizations operating in regulated industries have increasingly adopted formalized quality systems not merely as operational tools, but as markers of credibility and consistency (Stelton et al., 2017). As a result, quality management has evolved beyond its traditional role as an operational instrument to become a strategic asset that shapes organizational legitimacy and sustains long-term performance (Shafiq et al., 2019).

This evolution is well-supported by empirical evidence. Kaluyu et al. (2022) demonstrate that structured quality systems significantly improve operational efficiency and service consistency, while Hamed et al. (2023) establish that quality management enhances project-level outcomes by reducing process variability and strengthening stakeholder confidence. Collectively, these findings reposition quality management as a proactive performance governance mechanism rather than a mere compliance obligation.

Quality management can be defined as a complex of policies, standard procedures, monitoring systems, and constant improvement strategies aimed at making sure that the outputs correspond to pre-established standards (Shafiq et al., 2019). In the context of Total Quality Management (TQM), the conceptualization of quality entails being organization-wide and leadership-oriented and impacting both strategic decision-making and operational discipline (Stelton et al., 2017). It thus goes further than technical inspection, and becomes part of governance systems.

Such aspects of quality management as the standardization of procedures, performance control, documentation control, corrective and preventive action systems, and integrating stakeholder feedback are key components (Kaluyu et al., 2022). All these factors result in decreased inefficiencies of operations and greater traceability within production systems (Hamed et al., 2023). The mechanisms of continuous improvement also enhance the adaptability and resilience in dynamic environments (Shafiq et al., 2019).

According to academic sources, companies that have implemented systematic quality systems exhibit a greater stability of performance and a lower risk of execution (Stelton et al., 2017). Specifically, Hamed et al. (2023) observe that quality management increases coordination and accountability in a project-based setting. As a result, quality management may be interpreted as an organization ability that organizes conduct, and governs the variability of performance.

Projects are short-term and formalized undertakings that seek to generate certain outputs under a set of constraints in terms of time, cost, and scope (Akwabi et al., 2021). Project implementation is the implementation period when the planned activities are converted into quantifiable deliverables (Thomo, 2021). To be successful in its implementation, a rigorous coordination, disciplinary oversight, and organized mechanisms of accountability are needed (Dubois & Silvius, 2020).

Studies continuously show that the governance systems are highly significant determinants of project success as opposed to technical contributions (Akwabi et al., 2021). Thomo (2021) demonstrates how systematic management systems mitigate inefficiency in implementation and enhance performance of execution. Dubois and Silvius (2020) also posit that the performance of long-term projects is improved by the presence of sustainability-oriented governance structures through the inclusion of well-organized compliance mechanisms.

These results imply that the effectiveness of implementation is directly related to the existence of organized management. Quality management in this aspect offers the procedural discipline that is

needed to execute it consistently (Hammed et al., 2023). Projects with institutionalized quality systems have a higher degree of predictability and reliability of performance (Kaluyu et al., 2022).

Coffee industry worldwide exists in certification-based market systems, with strong quality gradation, traceability, and sustainability standards (Gitau & Sang, 2022). Certification systems institutionalize production procedures, implement documentation guidelines, and incorporate surveillance systems in agricultural value chains (Chow et al., 2021). These mechanisms are effective in institutionalizing quality management principles in the smallholder production environments.

Coffee production in Kenya relies mainly on cooperative structures and certification regimes that govern compliance levels and audit practices (Gitau and Sang, 2022). The condition of participation in certification presupposes well-organized operational principles, record-keeping systems, and quality benchmarking systems (Chow et al., 2021). These conditions bring formalized quality governance arrangements to otherwise decentralized agricultural systems.

In practice, empirical studies indicate that organized certification systems lead to better agricultural project performance by increasing the discipline and accountability of processes (Gitau & Sang, 2022). Chow et al. (2021) shows that a positive relationship between structured governance and sustainability compliance mechanisms and outcomes of implementation can be shown. The systems of certification are thus institutional means by which the quality management is incorporated into the agricultural projects.

In certification-based coffee systems, quality management is a formalized governance system that controls the behavior of operations (Hammed et al., 2023). Quality management minimizes fluctuation in performance and promotes discipline in its execution by standardizing processes and integrating monitoring tools (Kaluyu et al., 2022). These are the main features of successful project implementation (Akwabi et al., 2021).

Stelson et al. (2017) stress that continuous improvement systems reinforce the success of the organization and project. Using them in the context of certification-based agriculture, these systems help align the production processes with the market expectations and compliance standards (Gitau & Sang, 2022). Such alignment promotes the realization of milestones, efficiency in the utilization of resources, and confidence among stakeholders (Thomo, 2021).

As a result, quality management may be thought of as a strategic competency that organizes implementation conduct in certification-founded agriculture initiatives (Shafiq et al., 2019). Its application does not limit to compliance and performance optimization and execution reliability (Hammed et al., 2023). Structured quality systems bring the institutional discipline to smallholder coffee systems to ensure the success of the project over time when coordination problems are high and environmental uncertainties exist (Chow et al., 2021).

## **1.2 Statement of the Problem**

Certification-based coffee projects in Kenya have faced persistent implementation challenges despite the adoption of structured compliance frameworks. Studies indicate that smallholder farmers operating within certification schemes such as UTZ, Rainforest Alliance, and Fairtrade continue to report inconsistent output quality, poor traceability of production processes, and weak coordination among project stakeholders (Gitau & Sang, 2022; Chow et al., 2021). In Kiambu County specifically, where coffee certification has been promoted as a pathway to market access and improved livelihoods, project implementation performance remains variable, with

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documented gaps in process adherence, stakeholder accountability, and delivery of expected project outcomes (Gitau & Sang, 2022). These challenges point to a critical but underexplored dimension: the degree to which embedded quality management practices actually drive implementation performance, as opposed to serving merely as certification formalities.

Existing literature has established quality management as a significant performance driver in manufacturing, construction, and service sectors (Shafiq et al., 2019; Kaluyu et al., 2022; Stelson et al., 2017). However, these studies are largely drawn from industrialized, large-scale organizational contexts and do not adequately account for the structural realities of smallholder agricultural systems namely decentralized production, environmental uncertainty, and community-based governance (Dubois & Silvius, 2020; Hamed et al., 2023). The few studies that do examine quality management in agricultural settings tend to focus on certification compliance outcomes such as audit scores or market access, rather than on how quality management elements specifically influence the implementation performance of agricultural projects (Chow et al., 2021; Kaluyu et al., 2022). This leaves a measurable empirical gap: no study has isolated and quantitatively tested quality management as a strategic construct within certification-based smallholder coffee systems in the Kenyan context.

Furthermore, while project management literature acknowledges the importance of governance systems in determining implementation success (Akwabi et al., 2021; Thomo, 2021), the integration of quality management theory into smallholder agricultural project frameworks remains largely absent. The absence of empirical evidence on this relationship limits the ability of certification bodies, cooperatives, and policymakers to make informed, evidence-based decisions about investing in quality governance systems beyond minimum compliance requirements.

This study therefore addresses this empirical gap by quantitatively examining the extent to which quality management practices determine project implementation performance in certification-based smallholder coffee schemes in Kiambu County, Kenya. By positioning quality management as a strategic organizational capability within the Resource-Based View framework, the study contributes both to the project management literature and to the empirical base on agricultural certification governance in sub-Saharan Africa.

### **1.3 Purpose of the Study**

The purpose of this study was to examine the effect of quality management practices on project implementation performance within certification-based smallholder coffee systems. Specifically, the study sought to determine the extent to which structured quality management mechanisms—such as procedural standardization, continuous monitoring, compliance systems, and process improvement practices—contributed to measurable implementation outcomes.

Although prior studies have established the performance benefits of quality management in manufacturing and construction contexts (Shafiq et al., 2019; Hamed et al., 2023), limited empirical attention has been given to its role within certification-driven agricultural projects (Gitau & Sang, 2022). Certification frameworks embed structured governance and compliance systems into smallholder production environments (Chow et al., 2021), yet the magnitude of their influence on project-level implementation performance has remained underexamined.

This study therefore isolated quality management as a strategic capability within certification-based agricultural systems and empirically tested its influence on implementation outcomes. By focusing specifically on quality management rather than broader certification constructs, the study

provided a more precise understanding of how structured governance mechanisms translate into measurable project performance improvements.

#### **1.4 Significance of the Study**

##### **1.4.1 Theoretical Significance**

The research work is relevant to the literature on the integration of the quality management theory and project implementation in the agricultural setting. The current body of knowledge has focused mostly on the role of quality management in industrial and service industries (Shafiq et al., 2019; Kaluyu et al., 2022), and theoretical application to certification-based smallholder agricultural systems has been scarce. Conceptualizing quality management as one of the strategic capabilities that affect the performance of project implementation, the study reinforces the theoretical gap between the systematic governance systems and the performance of project implementation (Stelson et al., 2017; Akwabi et al., 2021).

Besides, the research expands the field of project management by placing quality management as a facilitating implementation instrument and not an external compliance aid. This view is in line with the arguments that have been put forward by Dubois and Silvius (2020) who demonstrate that governance structures play a critical role in determining sustainable project outcomes.

##### **1.4.2 Empirical Significance**

Empirically, the research gives quantitative data regarding the extent to which quality management has an impact on the performance of the implementation in certification-based coffee projects. Although literature has already analyzed certification performance in a general manner (Gitau & Sang, 2022), few publications have addressed quality management factors as independent variables that affect project performance. In that way, this study can provide quantifiable evidence on the impact of structured quality systems on the reliability of output, milestones reached, or operational efficiency.

The results hence give evidence-based support to the need to enhance quality management systems in smallholder agricultural certification programs.

#### **2.0 Theoretical Framework**

The theoretical basis of the current research is the Resource-Based View (RBV), which suggests that the performance of an organization is an outcome of its internally acquired capabilities instead of its positioning on the market only. As a development of the scholarship in strategic management, RBV alters analytical focus to firm-specific resources and competencies as main factors in continuous performance (Barney, 1991). According to this paradigm, companies are not only viewed as production units, but as a set of heterogeneous, path-dependent capabilities that predisposes their capacity to produce better results.

RBV is based on two assumptions at its philosophical basis; resource heterogeneity and resource immobility. Resource heterogeneity implies that organizations have different setups of tangible and intangible assets, whereas resource immobility means that some capabilities cannot be easily moved or copied across companies. The origin of performance differentials, however, are not uniformity of the environment, but internally developed structures that are valuable, rare, inimitable, and organized (VRIO). Such qualities turn resources into strategic capabilities that are able to produce sustained advantage.

In the theoretical perspective, quality management goes beyond its pragmatic definition as a compliance tool to a strategic ability that is part of organizational practices. Having such a governance architecture is a collection of structured documentation systems, ongoing monitoring procedures, standardization procedures, corrective actions mechanisms, and institutionalized improvement cycles that define organizational behavior (Shafiq et al., 2019; Hammed et al., 2023). The said elements do not constitute episodic interventions but permanent structural characteristics that govern process discipline and performance reliability.

RBV points out that capabilities do not acquire a strategic value only because they are possessed, but because they are embedded into the organizational processes. When institutionalized, quality management systems affect logic of decision-making, resource allocation pattern, and implementation disciplines (Kaluyu et al., 2022). These systems overtime get to be path-dependent, that is, their performance is indicative of cumulative learning, organizational culture and procedural refinement. This makes it hard to imitate such embedded capabilities mainly due to the fact that they are socially constructed and operationally integrated.

Structured governance mechanisms serve as enabling capabilities in project-based settings where the implementation success of a project relies on coordination, predictability, and disciplined execution (Akwabi et al., 2021). The implementation of projects is prone to variability, inefficiencies, and slippage in the implementation (Thomo, 2021). According to RBV, organizations with strong internal governance facilities are in a better position to handle such uncertainties. Quality management is then an implementation enabling mechanism because it minimizes process variability and enhances accountability structures (Hammed et al., 2023).

In agricultural systems, which are based on certification, the topicality of RBV is especially acute. The smallholder coffee production mode is defined by decentralization in its operations, environmental instability, and institutional compliance conditions (Gitau & Sang, 2022). Certification systems incorporate structured systems of quality standards and quality controls in the production setting (Chow et al., 2021). Nonetheless, the existence of the certification requirements does not necessarily translate into the performance improvement. RBV explains that performance benefits emerge as a result of organizational acquisition of these quality systems as an organizational capability as opposed to a procedural obligation.

Therefore, one could view quality management in certification-based coffee projects as a useful and systematic ability to improve performance of implementation based on coordinated structure and discipline in implementation. This is because it can decrease operational inefficiencies and increase the reliability of output; the fact that it is not widespread across projects occurs due to the presence of different degrees of institutionalization; it is unable to be imitated since it is rooted in routines and learning processes; and it is structured because it aligns with the governance and monitoring systems (Shafiq et al., 2019; Kaluyu et al., 2022).

The study, having been based on RBV, puts quality management not in the framework of a peripheral administrative role but that of a strategic capability that predisposes the end results of project implementation. The theory thus offers a rational explanatory model of connection between structured systems of quality to quantifiable performance gains within certification-based agricultural settings.

## 2.1 Empirical Review

Empirical research evidence has shown that systemized quality management techniques would positively improve organizational performance by increasing process control, standardization, and accountability systems (Shafiq et al., 2019; Hamed et al., 2023). Research carried out in manufacturing and service fields show that quality management lowers the variability of operations and enhances performance discipline, which increases consistency of output and consistency of performance (Kaluyu et al., 2022). Project-specific quality systems are demonstrated to increase efficiency in project coordination and compliance with milestones within complex, multi-stakeholder environments (Stelson et al., 2017; Akwabi et al., 2021). These results suggest that quality management as a structural implementer of implementation performance, and not as a peripheral administrative device.

Empirical studies have indicated that the combination of quality assurance systems yields better schedule conformity and cost management deliverables in project management situations (Akwabi et al., 2021). Thomo (2021) discovered that the ability of governance systems to focus on quality monitoring and correctional feedbacks loops has greatly enhanced the effectiveness of project implementation. Likewise, Dubois and Silvius (2020) posit that well-organized governing frameworks enhance the sustainability performance since they instill accountability and improvement habits in the project life cycles. Overall, these studies prove the quality management to be a contributor to the success of implementation as it institutionalizes the discipline in the processes and decreases the uncertainty of the execution.

In addition to industrial and infrastructure projects, quality management systems were also associated with performance improvement in the agricultural and agribusiness industries (Gitau & Sang, 2022). Agricultural systems with certification necessitate conformity to standard practices and documentation conduct, and audit compliance, as the organized quality systems are founded in the production processes (Chow et al., 2021). It is also empirically evaluated that certification initiatives have improved traceability, product consistency, and market competitiveness (Gitau & Sang, 2022). Nevertheless, although the results of certification are frequently recorded, not many studies report quality management factors as independent predictors of the performance of project implementation.

According to Hamed et al. (2023), the efficacy of quality systems is determined by the internalization level in the organizational routines. Little gains in performance can be realized with only superficial compliance, but long-lasting operational advantages can be achieved with quality governance structures with deep entrenchment. A similar report on continuous monitoring and corrective action systems by Shafiq et al. (2019) indicates that the systems are effective in enhancing performance metrics where institutionalized as the normal work processes. Such results agree with the fact that quality management should not be applied as an externality, but rather as a built-in capability.

The decentralized nature of production systems creates more variability in small holder agricultural settings that can be moderated with the help of structured quality systems (Gitau & Sang, 2022). The certification requirements introduce the uniform production guidelines and monitoring systems, which, in theory, improve coordination and minimize process deviations (Chow et al., 2021). However, there has been limited empirical studies on the direct statistical impact on such quality mechanisms on project implementation measures, including output performance, completion of milestones and use of resources. The available literature is inclined to

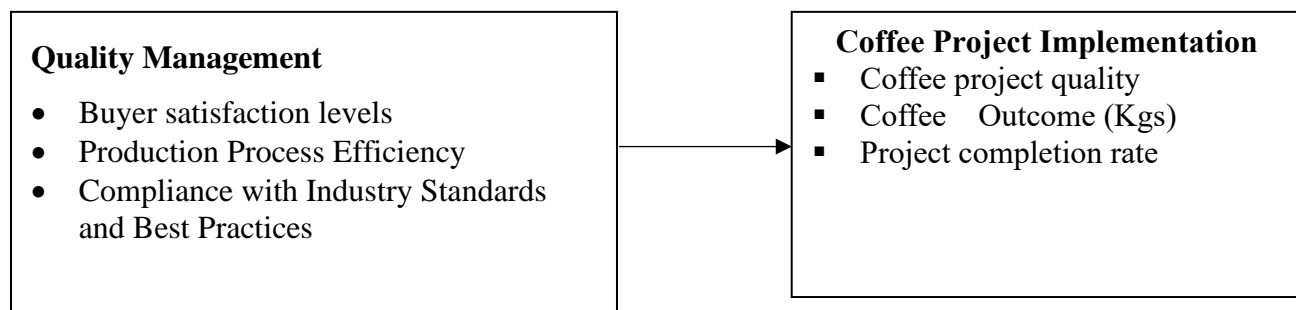
assess certification at a high level of aggregation of sectors, and quantifies implementation-specific results are not done (Kaluyu et al., 2022).

Additionally, the vast majority of the researches that investigate the idea of quality management within agricultural frameworks proceed descriptively instead of explanatory models that investigate the direct impact of performance (Hammed et al., 2023). This creates an objective gap in terms of the extent of impact that the organized quality systems have on the performance of project implementation in the context of certification-based coffee systems. Lack of strong regression evidence restrains theoretical incorporation of quality management scholarship with project performance literature (Akwabi et al., 2021).

Thus, although there is an overwhelming amount of empirical data indicating that well-developed quality management systems positively affect operational performance in various industries (Shafiq et al., 2019; Stelson et al., 2017), little research has measured this association rigorously in the context of certification-based smallholder agricultural initiatives. The gap in the empirical literature is bridged in this paper where quality management as a strategic construct is isolated and its direct impact on the performance of project implementation in the coffee industry examined.

## 2.2 Conceptual Framework

The conceptual framework of this study positions quality management as the independent construct influencing coffee project implementation performance. Grounded in the Resource-Based View (Barney, 1991), quality management is conceptualized as a strategic organizational capability embedded within structured governance systems that regulate operational processes and performance discipline. Empirical literature suggests that structured quality systems enhance execution reliability and output consistency by institutionalizing standardized procedures and corrective mechanisms (Shafiq et al., 2019; Hammed et al., 2023). Within certification-based agricultural systems, these structured practices become central to implementation performance (Gitau & Sang, 2022).



**Figure 1: Conceptual Framework**

Quality management in this study is operationalized through three core dimensions: buyer satisfaction levels, production process efficiency, and compliance with industry standards and best practices. Buyer satisfaction reflects the external validation of quality performance and signals output reliability within market systems (Kaluyu et al., 2022). Production process efficiency captures the internal operational discipline embedded within quality governance structures, particularly the ability to minimize waste, reduce process variability, and enhance coordination (Hammed et al., 2023). Compliance with industry standards and best practices reflects the extent

to which certification protocols and structured quality requirements are internalized within project operations (Chow et al., 2021). Collectively, these dimensions represent both the market-facing and operational aspects of quality capability.

The dependent variable, coffee project implementation performance, is conceptualized as the measurable effectiveness of project execution within certification-driven coffee systems. It is captured through coffee project quality, coffee output (kilograms), and project completion rate. Project quality reflects adherence to predefined implementation benchmarks and product grading standards (Gitau & Sang, 2022). Coffee output represents a quantifiable productivity outcome aligned with operational efficiency and resource utilization. Project completion rate captures milestone adherence and execution discipline, which are central indicators of implementation success in project management literature (Akwabi et al., 2021; Thomo, 2021).

The conceptual relationship between quality management and project implementation performance is directional and capability-based. RBV posits that organizations possessing structured, valuable, and well-organized capabilities are better positioned to achieve superior performance outcomes (Barney, 1991). When quality management systems are institutionalized, they reduce operational uncertainty, enhance coordination efficiency, and improve accountability mechanisms (Shafiq et al., 2019). In certification-based coffee projects characterized by decentralized smallholder operations and compliance requirements, such governance discipline becomes particularly critical (Chow et al., 2021). Consequently, stronger quality management capability is expected to positively influence project implementation performance.

This framework therefore advances the proposition that quality management functions not merely as a procedural compliance requirement but as a strategic capability that enhances implementation reliability, output consistency, and milestone achievement within certification-based coffee systems.

### **3.0 Methodology**

This section describes the research philosophy, design, target population, sampling strategy, data collection instruments, operationalization of study variables, and the procedures used to establish the validity and reliability of the research instruments.

#### **3.1 Research Design**

This study adopted a positivist research philosophy, premised on the assumption that the relationship between quality management and project implementation performance can be objectively measured and statistically tested. A descriptive and explanatory cross-sectional survey design was employed, which is appropriate for studies seeking to establish the nature and magnitude of relationships among variables at a single point in time (Creswell, 2014). The quantitative approach facilitated the systematic collection and statistical analysis of data from a representative sample of stakeholders engaged in certification-based coffee projects in Kiambu County, Kenya.

#### **3.2 Target Population and Sampling**

The target population comprised all stakeholders involved in three operational certification-based coffee projects in Kiambu County, including project managers, supervisors, ward agricultural officers, and certified coffee farmers. The total target population was 256 respondents. Given the small and manageable number of project managers and supervisors, census sampling was applied

to these sub-groups to ensure complete coverage. Ward agricultural officers were selected using purposive sampling on account of their specialized knowledge of certification project operations. Simple random sampling was applied to certified coffee farmers to ensure equal probability of selection and to minimize sampling bias.

The sample size for the farmer sub-group was determined using Yamane's (1967) formula for finite populations:

$$n = N / (1 + N(e)^2)$$

Where  $n$  = required sample size,  $N$  = target population (256), and  $e$  = margin of error (0.05). This yielded a sample size of 156 respondents, which formed the basis of data collection. A response rate of 100% was achieved following follow-up visits to non-responding participants.

### 3.3 Data Collection Instruments

Primary data were collected using structured questionnaires administered to all sampled respondents. The questionnaire was organized into two main sections corresponding to the study variables: quality management practices and project implementation performance. All items were measured using a five-point Likert scale anchored at 1 (*Strongly Disagree*) and 5 (*Strongly Agree*), which allowed for the quantification of respondents' perceptions and facilitated parametric statistical analysis. Key informant interview guides were additionally used with project managers and ward agricultural officers to provide contextual clarification of quantitative findings.

### 3.4 Operationalization of Study Variables

*Quality management* (independent variable) was operationalized through six indicators reflecting three core dimensions: buyer satisfaction (e.g., receipt of positive buyer feedback, customer satisfaction through certification), process efficiency (e.g., improvement in farming processes, enhanced production implementation), and standards adherence (e.g., alignment with industry best practices, certification-driven quality improvements). These dimensions were derived from the Total Quality Management framework and adapted to the smallholder agricultural context (Shafiq et al., 2019; Kaluyi et al., 2022).

*Project implementation performance* (dependent variable) was operationalized through indicators reflecting timely delivery of project outputs, adherence to planned activities, stakeholder satisfaction, resource utilization efficiency, and achievement of project objectives within certification guidelines (Akwabi et al., 2021; Thomo, 2021).

### 3.5 Validity and Reliability

Content validity was established through expert review, whereby the questionnaire was submitted to two academic supervisors and two practitioners in agricultural project management for critique and revision prior to data collection. Their feedback informed the refinement of item wording and the alignment of indicators with the study's conceptual framework.

A pilot study was conducted with 15 respondents drawn from outside the main study sample to pre-test the instrument. Internal consistency reliability was assessed using Cronbach's alpha coefficient. The quality management scale returned a Cronbach's alpha of 0.82, while the project implementation performance scale returned 0.79, both exceeding the minimum acceptable threshold of 0.70 (Nunnally, 1978), confirming adequate reliability of the instruments.

### **3.6 Data Analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS Version 25). Descriptive statistics, including means and standard deviations, were computed to summarize respondents' perceptions of each variable. Pearson correlation analysis was conducted to assess the strength and direction of the relationship between quality management and project implementation performance. Multiple linear regression analysis was employed to test the direct and predictive effect of quality management on implementation performance. Prior to regression, diagnostic tests for normality, homoscedasticity, and multicollinearity (Variance Inflation Factor) were conducted to confirm that the assumptions of linear regression were satisfied. All statistical tests were evaluated at a 95% confidence level ( $p < 0.05$ ).

### **4.0 Findings**

This section presents the findings of the study based on data collected from 156 respondents engaged in certification-based coffee projects in Kiambu County, Kenya. The findings are organized into two parts: descriptive analysis, which summarizes respondents' perceptions of quality management and project implementation performance, and inferential analysis, which tests the statistical relationship between the two variables.

#### **4.1 Descriptive Analysis**

This sub-section presents descriptive statistics for the study variables, including means and standard deviations derived from the Likert-scale responses. The analysis provides a summary of respondents' perceptions across the key dimensions of quality management and project implementation performance.

##### **4.1.1 Descriptive Statistics for Quality Management**

Quality management was assessed using six indicators capturing buyer satisfaction, production process efficiency, and compliance with industry standards. The overall mean score of 4.21 (Std. Dev. = 0.77) indicates strong agreement among respondents that quality management practices are embedded within certification-based coffee projects in Kiambu County. The relatively moderate dispersion suggests consistency in perceptions across respondents, implying structured adoption of quality-oriented practices.

**Table 1: Descriptive Statistics for Quality Management**

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std. Dev
I regularly receive positive feedback from buyers about the quality of my coffee.	0.00%	7.70%	16.00%	47.30%	29.00%	3.98	0.87
My participation in certification programs has significantly improved customer satisfaction with my coffee.	0.00%	11.00%	12.70%	37.70%	38.70%	4.04	0.98
Implementing certification practices has notably increased the efficiency of my farming processes.	0.00%	0.00%	7.30%	45.70%	47.00%	4.4	0.62
The adoption of certified farming techniques has greatly enhanced the implementation of my coffee production.	0.00%	0.30%	14.00%	46.00%	39.70%	4.25	0.7
I consistently update my farming practices to align with current industry standards and best practices.	0.00%	1.30%	13.00%	46.30%	39.30%	4.24	0.72
Adhering to certification standards has substantially improved the quality of my coffee production.	0.00%	0.00%	13.30%	40.00%	46.70%	4.33	0.7
<b>Average</b>						<b>4.21</b>	<b>0.77</b>

Buyer satisfaction dimensions recorded high levels of agreement. Positive feedback from buyers yielded a mean of 3.98 (Std. Dev. = 0.87), while the contribution of certification programs to improved customer satisfaction recorded a mean of 4.04 (Std. Dev. = 0.98). These findings suggest that certification-linked quality mechanisms are perceived to enhance market acceptance and external validation. Similar observations have been reported by Hamed et al. (2023), who found that structured quality systems strengthen customer confidence and product competitiveness across regulated sectors. The alignment between descriptive outcomes and prior empirical evidence indicates that quality certification mechanisms may contribute to perceived market responsiveness.

Production process efficiency recorded the strongest levels of agreement. The statement assessing whether certification practices improved farming efficiency yielded the highest mean score of 4.40 (Std. Dev. = 0.62), while the adoption of certified farming techniques enhancing implementation

recorded a mean of 4.25 (Std. Dev. = 0.70). These results reflect strong consensus that structured quality practices contribute to operational discipline and productivity gains. Kaluyu et al. (2022) similarly reported that standardized quality mechanisms reduce process variability and enhance operational efficiency. The low dispersion across these indicators suggests that efficiency gains are widely experienced rather than isolated occurrences.

Compliance with industry standards and best practices also demonstrated strong agreement. Updating farming practices to align with evolving standards recorded a mean of 4.24 (Std. Dev. = 0.72), while adherence to certification standards improving production quality yielded a mean of 4.33 (Std. Dev. = 0.70). These findings indicate institutionalized conformity to structured quality requirements. Shafiq et al. (2019) observed that continuous improvement and compliance systems form the backbone of sustained quality performance in regulated environments. Within agricultural certification contexts, Chow et al. (2021) further noted that formalized standards strengthen production consistency and accountability structures.

Overall, the descriptive findings demonstrate that quality management practices are strongly institutionalized within certification-based coffee projects. High mean values across efficiency, compliance, and buyer satisfaction dimensions suggest that respondents perceive quality systems as integral to structured project execution. The consistency in responses supports the argument advanced in prior empirical studies that embedded quality governance mechanisms enhance operational stability and implementation reliability (Hammed et al., 2023; Kaluyu et al., 2022).

#### 4.2 Inferential Analysis

This sub-section presents the results of the regression analysis conducted to test the direct effect of quality management on project implementation performance in certification-based smallholder coffee systems in Kiambu County, Kenya.

##### Model Summary

The regression model returned a correlation coefficient (R) of 0.704 and a coefficient of determination (R<sup>2</sup>) of 0.495, indicating that quality management accounts for 49.5% of the variance in project implementation performance. The adjusted R<sup>2</sup> of 0.493 confirms that this explanatory power holds after adjusting for model complexity. These results establish quality management as a strong single predictor of implementation performance in smallholder certification systems.

**Table 2: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.704	.495	.493	.41109

##### a. Predictors: (Constant), Quality Management

From a practical standpoint, these results suggest that nearly half of the variation in how well certification-based coffee projects are implemented can be directly attributed to the strength of quality management practices in place. For certification bodies and cooperative managers in Kiambu County, this implies that deliberate investment in structured quality systems — beyond

minimum compliance requirements — yields measurable improvements in project delivery outcomes.

The ANOVA results confirm the overall statistical significance of the regression model ( $F = 292.113$ ,  $p < 0.001$ ), indicating that quality management is a significant predictor of implementation performance and that the model fit is not attributable to chance.

**Table 3: ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	49.365	1	49.365	292.113	.000
Residual	50.360	298	.169		
Total	99.726	299			

*a. Dependent Variable: Coffee Project Implementation b. Predictors: (Constant), Quality Management*

Practically, the near-equal split between explained (49.365) and unexplained variance (50.360) signals that while quality management is a dominant driver of implementation performance, other contextual factors such as farmer capacity, institutional support, and resource availability — also contribute to project outcomes. This finding should inform a broader, multi-dimensional approach to project governance in certification systems rather than a sole focus on compliance audits.

The unstandardized coefficient ( $B = 0.670$ ,  $p < 0.001$ ) indicates that a one-unit improvement in quality management practice is associated with a 0.670-unit increase in project implementation performance. The standardized beta coefficient ( $\beta = 0.704$ ,  $p < 0.001$ ) confirms a strong effect size, while the t-value of 17.091 reflects high reliability of the estimate across respondents.

**Table 4: Regression Coefficients**

Model	B	Std. Error	Beta	t	Sig.
(Constant)	1.184	.133		8.909	.000
Quality Management	.670	.039	.704	17.091	.000

*a. Dependent Variable: Coffee Project Implementation*

These coefficients carry important practical implications for smallholder coffee systems. A beta of 0.704 indicates that quality management is not a peripheral compliance exercise but a substantive performance driver embedded within project execution. For project managers and certification officers, this means that strengthening quality mechanisms — such as process documentation, buyer feedback systems, and standards adherence monitoring — directly and significantly improves implementation reliability. This aligns with RBV theory, which positions embedded governance capabilities as strategic assets that enhance organizational performance (Barney, 1991; Hammed et al., 2023).

## 5.0 Conclusion

This paper has investigated how quality management influences the performance of the coffee project implementation using certification-based system of smallholders. The results indicate that quality management has a statistically significant impact on the implementation outcomes with a substantial and significant positive impact. The outcomes verify that well-organized governance systems are the key to consistency of execution and stability of productivity with quality management explaining almost half the variation in the performance of the project implementation.

The research defines that the quality management practices, especially those involving process efficiency, conformity to the industry requirements, and buyer satisfaction, are not peripheral procedural requirements but operationally entrenched capabilities. The high level of standardized coefficient also supports the fact that quality management is one of the main drivers of performance in certification-based farming projects. These results support the view that the structured quality systems improve the coordination discipline and process variability, as well as achievement of milestones.

Theoretically, the findings have empirical evidence supporting the Resource-Based View. The evidence shows that quality management is a useful and structured organizational capability that improves on the performance of projects by means of institutionalized routines and governance structures. Such capabilities are especially important in certification-based coffee systems that feature decentralized production and compliance requirements so that performance can be maintained.

On the whole, the paper finds that quality management is a strategic capability that significantly contributes to the performance of project implementation in certification based coffee project. It has an impact that goes beyond compliance to actual effects of operational efficiency and execution effectiveness.

## 6.0 Recommendations

Based on the finding that quality management significantly predicts project implementation performance ( $\beta = 0.704$ ,  $p < 0.001$ ) in certification-based smallholder coffee systems, the following recommendations are proposed at three distinct levels: operational, institutional, and policy.

### 6.1 Operational-Level Recommendations

*For project managers, supervisors, and certified farmers*

First, project managers should establish structured quality monitoring cycles within each certification project — specifically, monthly internal process audits that track adherence to documented production workflows, with audit results reviewed in quarterly stakeholder meetings. This moves quality management from a once-per-certification-cycle exercise to a continuous operational discipline.

Second, given that process efficiency recorded the highest mean score ( $M = 4.40$ ) among quality management indicators, cooperatives should develop standardized farming procedure manuals tailored to the specific certification scheme in use (e.g., Rainforest Alliance, UTZ). These manuals should include step-by-step protocols for harvesting, processing, and record-keeping, and be reviewed annually against updated certification requirements.

Third, buyer feedback mechanisms which recorded relatively lower agreement ( $M = 3.98$ ) compared to other quality indicators should be formalized. Each certification project should maintain a buyer feedback register that is reviewed at the end of every production season and used to inform corrective actions in the subsequent cycle.

## 6.2 Institutional-Level Recommendations

*For certification bodies and cooperatives*

Certification bodies should move beyond compliance verification towards capability-building partnerships with cooperatives. Concretely, this means embedding quality management training modules into the annual farmer onboarding programmes for certification renewal — with specific competencies in process documentation, non-conformance reporting, and corrective action planning.

Cooperatives should appoint dedicated Quality Management Officers at the project level, responsible for overseeing process standardization, maintaining documentation systems, and coordinating internal quality audits. Given the 49.5% variance in implementation performance explained by quality management alone, institutionalizing this role is likely to produce measurable improvements in project delivery consistency.

Additionally, cooperatives should establish inter-project quality benchmarking systems — sharing performance data across certification projects within the county to identify best practices and underperforming areas. This creates accountability structures and enables performance-based resource allocation decisions.

## 6.3 Policy-Level Recommendations

*For government agencies and agricultural development bodies*

The national government and county agricultural departments should integrate quality management capacity building into the mandates of agricultural extension officers. Extension officers visiting certification-based coffee projects should be trained to assess not only agronomic practices but also the quality governance systems in place, using a standardized assessment tool aligned with certification requirements.

Policymakers should invest in digital traceability infrastructure for smallholder coffee systems — specifically, mobile-based data collection tools that allow real-time tracking of production inputs, processing stages, and output quality at the farm level. Such systems reduce documentation burdens on farmers while strengthening the evidence base for quality performance assessment.

Finally, given the strong performance implications demonstrated in this study, the government should consider incentivizing quality governance adoption through targeted subsidies or preferential market linkages for cooperatives that demonstrate measurable improvements in structured quality management systems. This creates a performance-based policy environment that rewards quality as a strategic capability rather than a compliance formality.

## 6.4 Recommendations for Future Research

Future studies should incorporate additional variables — such as leadership quality, farmer literacy levels, and cooperative governance structures — to examine moderating or mediating effects on the quality management–implementation performance relationship. Comparative studies across different certification schemes and counties would strengthen external validity. Longitudinal

designs tracking the same cooperatives over multiple certification cycles would further illuminate how sustained quality capability development translates into long-term performance trajectories.

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