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QUALITY MANAGEMENT SYSTEMS AND CUSTOMER SATISFACTION AT KENYA BUREAU OF STANDARDS

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Abstract: The main objective of the study was to establish the effect of quality management standards on customer satisfaction at Kenya Bureau of standards. The specific objectives of the study were to; examine the effect of quality planning on customer satisfaction, determine the effect of quality control on customer satisfaction, analyze the effect of quality assurance on customer satisfaction and assess the effect of continuous improvement on customer satisfaction at Kenya Bureau of standards. The study was guided by Total Quality Management (TQM) Theory, Systems Theory and Expectancy Theory. This study adopted the positivist research philosophy and correlation research design. This study targeted a total of 612 respondents comprising 92 quality assurance officers, 110 quality control inspectors, 80 quality planning/strategy officers, 120 customer service officers, and 210 customers of KEBS. Purposive sampling was employed. Closed questions were used to collect data. Data was presented using Tables. The study inferential statistics indicated that quality planning, quality control, quality assurance and continuous improvement have positive and statistically significant effect on customer satisfaction at Kenya Bureau of Standards. The study established that all quality management practices have a positive and statistically significant effect on customer satisfaction at the Kenya Bureau of Standards. Specifically, quality planning had a positive and significant effect ($\beta = 0.459$, $p < 0.001$), indicating that improved planning practices enhance customer satisfaction. Quality control recorded the strongest influence ($\beta = 0.582$, $p < 0.001$), suggesting that effective monitoring and compliance mechanisms play a critical role in improving service outcomes. Quality assurance also showed a positive and significant effect ($\beta = 0.394$, $p < 0.01$), highlighting the importance of consistency and reliability in service delivery. Additionally, continuous improvement demonstrated a positive and significant effect ($\beta = 0.464$, $p < 0.001$), implying that ongoing enhancements in processes and services contribute substantially to higher customer satisfaction. Overall, the findings indicate that strengthening all dimensions of quality management significantly improves customer satisfaction, with quality control having the greatest impact. The study findings provided insight into how its quality management practices such as quality planning, control, assurance, and continuous improvement impact customer satisfaction. The study may also help identify gaps between customer expectations and the actual services provided.

I. Introduction

The increasing global emphasis on quality in service delivery has made Quality Management Systems (QMS) an essential component in public and private institutions. Originally rooted in industrial manufacturing, QMS has evolved into a core management tool that ensures consistency, accountability, and customer satisfaction across sectors (Lopez-Lemus, 2023). As economies become more integrated and competition intensifies, especially within the frameworks of globalization and regional trade agreements, organizations are under pressure to improve the quality of their services and products. For institutions like the Kenya Bureau of Standards (KEBS), whose mandate is to ensure compliance with national and international standards, implementing and maintaining an effective QMS is not only vital for operational efficiency but also for stakeholder confidence and national economic competitiveness (Girmanova, Solc, & Blasko, 2022).

KEBS was established under the Standards Act (Cap 496) to promote standardization in industry and commerce. Its functions span standards development, product testing, metrology, certification, and inspection. As a regulatory agency, KEBS plays a critical role in ensuring the safety, reliability, and quality of goods and services consumed within and outside Kenya. It interfaces with diverse stakeholders, including manufacturers, importers, exporters, government agencies, and consumers. These stakeholders expect KEBS to operate with high levels of professionalism, efficiency, and transparency. Given its central position in trade facilitation and consumer protection, KEBS must consistently meet and exceed customer expectations, which directly relates to the effectiveness of its quality management system (Vundi, 2024).

Over the past decade, KEBS has taken steps to align its operations with internationally recognized standards such as ISO 9001. These efforts were aimed at enhancing service delivery, minimizing bureaucratic inefficiencies, and improving customer satisfaction. However, recent performance indicators and customer feedback suggest that despite the adoption of QMS frameworks, KEBS continues to experience significant service delivery

challenges (Ndisi, Otieno, & Koech, 2024). Key concerns from clients include delays in certification processes, inconsistency in testing and inspection outcomes, lack of timely communication, and opaque complaint resolution procedures. These challenges point to possible gaps in the implementation and effectiveness of various QMS components (Vundi, 2024).

Australia has made significant strides in QMS implementation across public agencies, often showcasing improvements in service delivery and customer satisfaction. Australian National Audit Office Report, (2023) revealed that approximately 70% of agencies demonstrated enhanced operational efficiency following ISO 9001 adoption (ANAO, 2021). However, challenges remain regarding over-standardization, which sometimes leads to bureaucratic rigidity and slower responsiveness to client needs. The knowledge gap here lies in understanding how QMS can be adapted to balance standard compliance with organizational agility. For KEBS, this raises questions about how quality planning can be made flexible enough to meet evolving customer expectations without compromising on standards.

Canada presents a mixed scenario where federal agencies have achieved positive results in QMS certification, improving accountability and service consistency. Nonetheless, Canadian Audit Office Report, (2022) pointed out that about 25% of these agencies struggled to sustain continuous improvement due to inconsistent leadership and training gaps (CAO, 2022). This highlights a knowledge gap related to maintaining the momentum of QMS initiatives over time. For KEBS, this suggests the importance of examining how continuous improvement mechanisms are institutionalized and their actual influence on customer satisfaction.

In the United States, QMS adoption is widespread in both public and private sectors, with many agencies reporting gains in service quality and compliance. Yet, the 2023 Government Accountability Office (GAO) report found that 35% of federal agencies experienced deficiencies in quality audits and uneven application of quality assurance processes (GAO, 2023). This inconsistency points to a knowledge gap on how to ensure uniform implementation of quality control and assurance components across diverse organizational units. KEBS might face similar challenges, making it crucial to analyze the consistency of its quality control and assurance practices.

South Africa has seen incremental improvements in public sector service delivery attributed to QMS, with citizen satisfaction increasing by 15% from 2019 to 2024 in some departments (Public Service Commission, 2023). Nevertheless, many government agencies face resistance to change and capacity shortages that hinder full quality assurance implementation, resulting in incomplete audit processes and unreliable service outcomes. This points to a gap in knowledge about how organizational culture and human resource factors affect quality assurance and continuous improvement. KEBS may similarly benefit from investigating staff engagement and capacity-building as drivers of quality performance.

Uganda's National Water and Sewerage Corporation (NWSC) exemplifies a positive case where effective QMS adoption led to a 25% reduction in service interruptions and increased customer satisfaction (Uganda Ministry of Public Service, 2022). However, other public agencies in Uganda still face fragmented quality control processes and ineffective feedback mechanisms, causing delays in corrective actions. This discrepancy highlights a knowledge gap in scaling QMS benefits beyond isolated successes to the broader public sector. KEBS's study could therefore explore how continuous improvement processes and stakeholder feedback systems are integrated institution-wide.

Kenya's experience with KEBS underscores significant challenges in operationalizing QMS components effectively. Customer satisfaction declined from 78% in 2020 to 63% in 2024, and turnaround times for testing services doubled in the same period (KEBS Internal Report, 2024). Unresolved complaints and implementation gaps in audit recommendations persist, indicating weaknesses in quality planning, control, assurance, and continuous improvement. The critical knowledge gap lies in dissecting the specific effects of these individual QMS elements on customer satisfaction and understanding how to tailor interventions to KEBS's unique context.

One of the core components of QMS is quality planning, which at the Kenya Bureau of Standards (KEBS) involves setting clear quality objectives, defining operational processes, and allocating necessary resources to ensure efficient and consistent service delivery. Despite these intentions, KEBS has faced challenges such as delays in laboratory testing and certification processes, with turnaround times frequently exceeding planned targets, indicating inefficiencies in planning and resource coordination (Cook, Hooijberg, & Freeman, 2021).

Quality control mechanisms at KEBS include rigorous testing, calibration, and verification activities aimed at maintaining compliance with standards; however, client reports of inconsistent test results and repeated sample submissions suggest weaknesses that undermine the reliability of these controls (Mathangani & Sile, 2020). Quality assurance activities such as internal audits, performance monitoring, and implementation of corrective actions are designed to uphold service quality and accountability, but audit reports and stakeholder feedback highlight delays in resolving identified issues and insufficient responsiveness to customer complaints, pointing to gaps in assurance processes (Abbas, 2020).

Furthermore, continuous improvement practices, which should foster ongoing enhancement through stakeholder engagement, staff training, and effective feedback integration, appear underdeveloped at KEBS, as evidenced by a perceived disconnect between customer feedback and actual improvements in service delivery (Wickramasinghe & Chathurani, 2021).

The consequences of these challenges are far-reaching. For exporters, delays in product certification can lead to missed shipment deadlines and lost market opportunities. For local manufacturers, uncertainty in KEBS processes increases production costs and planning inefficiencies. Consumers may be exposed to substandard products if quality verification processes are inconsistent. Regulatory agencies relying on KEBS for enforcement may also find it difficult to act decisively without timely and credible data. Ultimately, the erosion of confidence in KEBS undermines the broader regulatory framework and poses risks to national development objectives (Kiogora & Ngeno, 2024).

The operational inefficiencies at KEBS not only reflect internal challenges but also raise broader questions about the extent to which QMS frameworks are influencing actual service outcomes. It becomes essential to examine how specific components such as quality planning, quality control, quality assurance, and continuous improvement are integrated into daily operations and their individual and combined effects on customer satisfaction. Understanding these dynamics can inform targeted interventions and policy reforms that enhance service quality across the institution (Mathangani & Sile, 2020).

Moreover, while KEBS has made public commitments to improving customer satisfaction, the lack of systematic evaluation of QMS components limits its ability to implement evidence-based improvements. There is a clear knowledge gap in terms of how each QMS element contributes to overall service quality and stakeholder satisfaction. Without such insights, the institution risks investing in generalized reforms that may not address root causes of inefficiencies (Mutinda, 2020).

Given the strategic role that KEBS plays in supporting Kenya's industrialization agenda and Vision 2030, ensuring that it delivers high-quality services is not just a managerial concern but a national imperative. Improved customer satisfaction can lead to higher compliance rates, enhanced public-private partnerships, and better outcomes in consumer protection and trade facilitation. Conversely, unresolved quality issues can have compounding effects on economic growth and public trust (Engdaw, 2020).

Therefore, the background to this study is grounded in the interplay between institutional performance, stakeholder expectations, and national development priorities. It is informed by real-time challenges facing KEBS, as evidenced by both statistical indicators and stakeholder feedback. By focusing on the specific QMS components and their influence on customer satisfaction, this study seeks to generate actionable knowledge that can help KEBS fulfill its mandate more effectively in a rapidly evolving socio-economic environment.

1.2 General Objectives of the study

The main objective of the study was to establish the effect of quality management standards on customer satisfaction at Kenya Bureau of standards.

1.2.1 Specific Objectives of the study

The specific objectives of the study are to;

i. Examine the effect of Quality planning on customer satisfaction at Kenya Bureau of standards.
ii. Determine the effect of Quality control on customer satisfaction at Kenya Bureau of standards.
iii. Analyze the effect of Quality assurance on customer satisfaction at Kenya Bureau of standards.
iv. Assess the effect of Continuous improvement on customer satisfaction at Kenya Bureau of standards.

1.3 Hypotheses of the study

H_{01}: Quality planning has no significant effect on customer satisfaction at Kenya Bureau of standards.
H_{02}: Quality control has no significant effect on customer satisfaction at Kenya Bureau of standards.
H_{03}: Quality assurance has no significant effect on customer satisfaction at Kenya Bureau of standards.
H_{04}: Continuous improvement has no significant effect on customer satisfaction at Kenya Bureau of standards.

II. Literature Review

2.1 Theoretical Literature Review

This study was guided by the Total Quality Management (TQM) Theory, Systems Theory and Expectancy Theory.

2.1.1 Total Quality Management (TQM) Theory

The Total Quality Management (TQM) theory was first propounded by Feigenbaum, (1951). Feigenbaum introduced the concept of "total quality control," which he defined as an organization-wide effort to instill quality into every process, function, and level of the company. He argued that quality is not just the responsibility of the quality control department but involves everyone in the organization working together toward continuous

improvement and customer satisfaction. Feigenbaum's pioneering work emphasized that quality should be integrated into every operational aspect, creating a culture of shared responsibility and accountability.

Deming (1986) made significant contributions that expanded the foundational ideas of TQM. Deming introduced the concept of statistical process control and advocated for a systemic approach where management takes responsibility for quality improvements. He emphasized the importance of leadership, the Plan-Do-Check-Act (PDCA) cycle, and reducing variation in processes to improve quality consistently. Meanwhile, Juran introduced the "Quality Trilogy," which includes quality planning, quality control, and quality improvement, highlighting the need for structured processes to achieve desired quality levels. Deming stressed that management's role was crucial in setting quality goals and mobilizing resources to achieve them.

Soltani and Javadeen (2008) further developed TQM principles by promoting employee involvement through quality circles small groups of workers who voluntarily meet to discuss and solve quality problems. Ishikawa's work placed significant emphasis on training, communication, and customer focus. He popularized tools such as the fishbone diagram (cause-and-effect diagram) to facilitate root cause analysis, which became central to TQM initiatives worldwide.

Dahlgaard-Park, Reyes, and Chen (2018) developed more formal frameworks for the practical implementation of TQM in various organizations. They explored how TQM principles could be embedded into organizational culture, emphasizing measurable outcomes such as improved customer satisfaction, reduced waste, and higher operational efficiency. Their work helped translate TQM from theory to actionable management practices, particularly in service organizations and public institutions.

Permana, Purba and Rizkiyah (2021) underscored the strategic and cultural dimensions of TQM, arguing that for quality management systems to be successful, they must be aligned with organizational goals, leadership commitment, and continuous employee development. They highlighted that TQM is not a one-time effort but a long-term philosophy requiring an embedded culture of quality and learning.

TQM theory is profoundly relevant to the study at the Kenya Bureau of Standards (KEBS) because it provides a comprehensive framework for understanding how quality management standards quality planning, control, assurance, and continuous improvement can be integrated across the organization. By applying TQM, KEBS can foster a culture that emphasizes customer satisfaction as a priority, ensuring that quality is embedded in every aspect of service delivery, which directly aligns with the study's objectives.

2.1.2 Systems Theory

Systems Theory was first introduced by Von Bertalanffy, (1951) as a way to understand complex, interconnected phenomena through a holistic perspective. Bertalanffy proposed that organizations should be viewed as open systems that continuously interact with their environment, exchanging inputs and outputs and adjusting internally through feedback mechanisms. This theory was groundbreaking because it shifted the focus from isolated parts of an organization to understanding the relationships and dependencies between different components and their environment.

Whitchurch and Constantine (1993) expanded the scope of Systems Theory by applying it to social and organizational systems. Boulding classified systems according to their complexity and highlighted the importance of communication, feedback, and adaptation for system survival. His work emphasized that organizations are living entities that must adapt to changing environments by processing information and adjusting behaviors.

Dennett (2009) extended Systems Theory through the development of management cybernetics, which focused on the use of feedback loops to regulate organizational performance. Beer's work underscored the idea that effective organizations are those capable of self-regulation, learning, and continuous adaptation through the monitoring of their internal processes and external environment. His Viable System Model (VSM) provided a practical tool for diagnosing and improving organizational health by ensuring that all subsystems communicate effectively and contribute to the whole.

Lai and Lin (2017) through his book The Fifth Discipline brought Systems Theory into mainstream management practice by introducing the concept of a learning organization. Organizations must develop systems thinking capabilities understanding how different parts interact dynamically and influence one another over time. He emphasized that recognizing feedback loops and interdependencies enables better decision-making and organizational learning, leading to sustainable improvement.

Teece (2018) applied Systems Theory specifically to public organizations and complex institutions, emphasizing that inputs, throughputs (processes), and outputs must be aligned and responsive to environmental demands. They argued that organizations like KEBS operate as complex systems where changes in one area (e.g., quality planning or control) impact the entire system's ability to satisfy customers.

Systems Theory was crucial to this study because it offers a comprehensive framework to analyze KEBS as an interconnected entity. The theory helps in understanding how the various quality management elements planning, control, assurance, and continuous improvement do not operate in isolation but influence one another and collectively impact customer satisfaction. By viewing KEBS through a systems lens, management can identify leverage points for improving quality and overall organizational performance.

2.1.3 Expectancy Theory

Expectancy Theory was first formulated by Vroom, (1964) to explain individual motivation within organizations. Vroom proposed that motivation is the result of rational calculation, where an individual's effort depends on the expectation that their effort will lead to desired performance (expectancy), that this performance will be rewarded (instrumentality), and that the reward holds personal value (valence). This theory highlights how perceived relationships between effort, performance, and outcomes drive motivation and behavior.

Geiger and Cooper (1996) expanded on Vroom's work by emphasizing the role of reward systems and job design in shaping employee motivation. Lawler argued that for expectancy to be effective, organizations must ensure that employees clearly understand the connection between their efforts and performance, and that valued rewards follow performance. He further suggested that employee satisfaction and motivation improve when rewards are perceived as fair and attainable.

Chiang and Jang (2008) integrated Expectancy Theory into broader organizational behavior models, underscoring the importance of managerial support, resource availability, and clear performance standards to strengthen the expectancy link. They emphasized that without these supports, employees may not believe that their effort will lead to performance or that performance will be rewarded.

Vroom, Porter and Lawler (2015) connected Expectancy Theory with goal-setting theory, demonstrating that setting specific and challenging goals improves motivation by clarifying performance expectations and linking effort to outcomes. Their research showed that clear feedback and attainable goals reinforce employees' belief in the effort-performance-outcome relationship.

Mehboob and Othman (2020) provided empirical evidence supporting the theory's role in employee engagement and organizational commitment. They found that transparent reward structures, fair appraisal systems, and clear communication significantly enhance expectancy components, leading to better job performance and satisfaction.

Expectancy Theory is relevant to this study because the motivation of employees at KEBS plays a crucial role in implementing quality management standards effectively. If employees believe that their efforts in quality planning, control, assurance, and continuous improvement will be recognized and rewarded, they are more likely to be engaged and perform at higher levels. This, in turn, positively influences the quality-of-service delivery and customer satisfaction, directly linking employee motivation to organizational success.

2.2 Conceptual Framework

A conceptual framework is a structured model that illustrates the relationship between the key variables: the independent variables; quality planning, quality control, quality assurance, and continuous improvement and the dependent variable, customer satisfaction at KEBS. This is shown in Figure 1

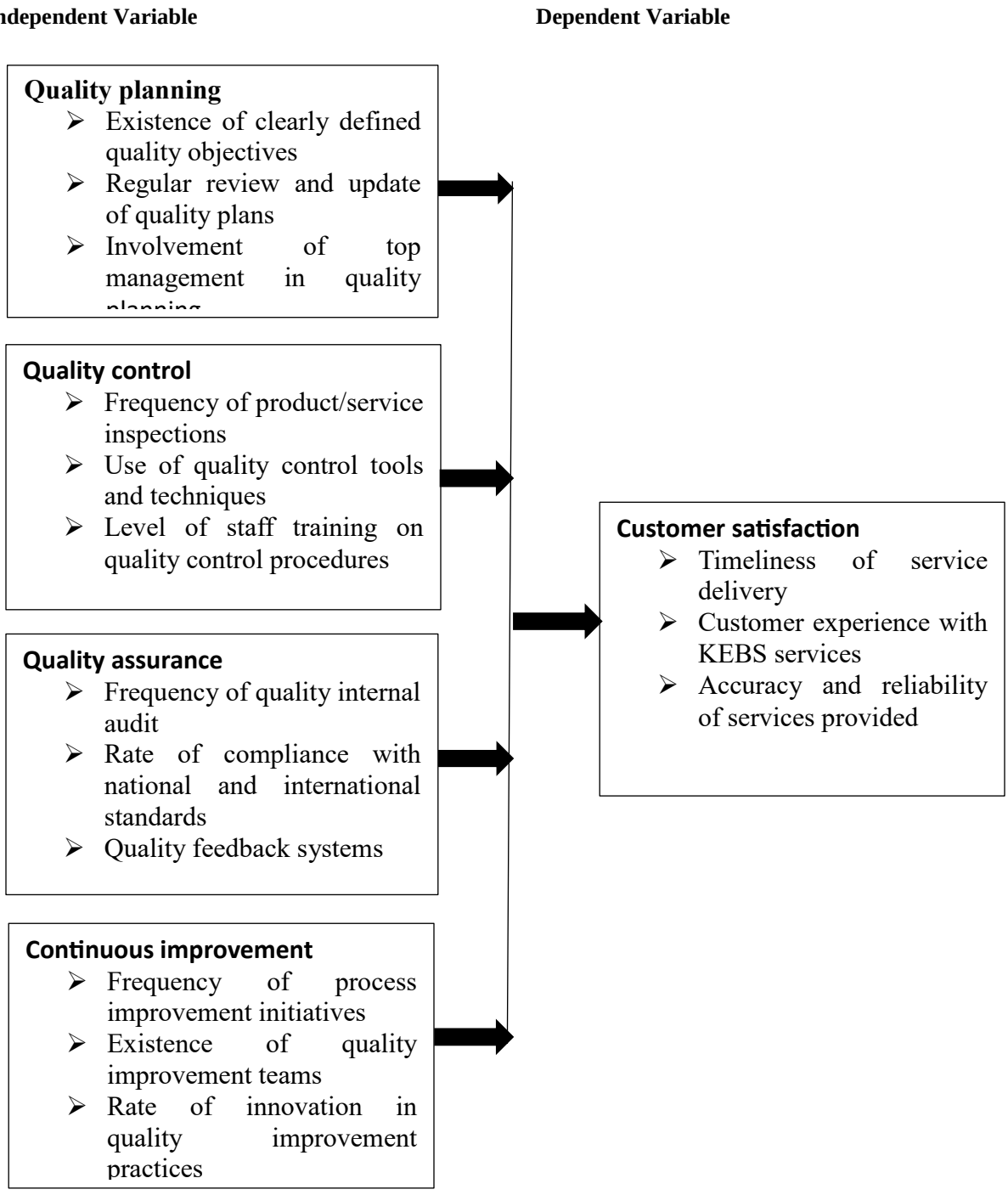

Figure 1: Conceptual framework
Source: Researchers own conceptualization

2.3 Empirical Literature Review

This section reviews the previous studies on quality management standards and customer satisfaction at Kenya Bureau of standards.

2.3.1 Quality planning and customer satisfaction at Kenya Bureau of standards

Alsaqer, Katar, & Abdelhadi (2024) did a study on the role of total quality management in enhancing customer satisfaction in Gulf Cooperation Council (GCC) countries. The study collected Secondary quantitative data

from quarterly reports (2019–2023). Data were analyzed using descriptive such as mean, frequencies, percentages and standard deviations. The study also used inferential statistics such as correlation, and regression methods with the help of STATA software. Data was presented using Tables and Figures. The findings indicated quality planning had a positive and significant effect on the customer satisfaction in Gulf Cooperation Council (GCC) countries. The study relied solely on secondary data, which may not capture the nuanced, real-time customer experiences or internal organizational practices specific to individual firms. Additionally, the findings are geographically limited to the GCC context, which may differ significantly from the Kenyan setting due to cultural, economic, and institutional differences. Thus, there is a knowledge gap in how quality planning directly influences customer satisfaction in public regulatory bodies like the Kenya Bureau of Standards, which operate under different conditions.

Cheirkhanova, Juman, and Yezhebekov, (2025) carried a study on the impact of Customer-Centered Quality Management Systems on Profit and Satisfaction in Construction Companies. This study analyzed data from 23 Kazakhstani construction companies. The methodology combines regression analysis, multivariate analysis, and k-means clustering to assess the impact of QMSs on customer satisfaction. Regression analysis revealed that Customer-Centered Quality Management Systems had a positive and significant effect on Profit and Satisfaction in Construction Companies. There is a gap in the application of these findings to public institutions, which may prioritize regulatory compliance and service quality over profitability. Furthermore, the study did not isolate quality planning as a distinct variable, leaving a gap in understanding its individual contribution to customer satisfaction in non-commercial, standards-based environments like KEBS.

Ahmad, Zulkifli and Abd Rawi (2024) did a study on Service Quality and Customer Satisfaction in Restaurant in Shah Alam, Malaysia. Utilizing the survey approach, this study consisted of 162 respondents. This study has conducted correlation and multiple regression analysis to ascertain the determinants of service quality that impact customer satisfaction at the restaurant. The strategic tool of Competitive Profile Matrix (CPM) has been used in determining the competitive position of the restaurant relative to key competitive restaurants in Shah Alam. Besides, SWOT analysis also has been used as the basis to formulate strategies to improve the service quality and customer satisfaction. From the findings, it has been found that quality service planning had a positive and significant relationship on Customer Satisfaction in Restaurant in Shah Alam. The reliance on CPM and SWOT tools provides strategic insight, but may not translate effectively to bureaucratic institutions like KEBS, where processes are more standardized and regulatory-driven. This presents a knowledge gap in contextualizing quality planning in sectors where customer satisfaction is derived more from compliance assurance and process efficiency rather than personalized service.

Achieng and Gitonga, (2020) conducted a study on the influence of total quality management practices on customer satisfaction of Safaricom Public Limited Company (Public Limited Company). The research employed a descriptive study design. The research focused on 70 respondents within the customer experience department. A census was used in this study since the population was small. Primary data was collected by use of structured questionnaires. The questionnaires were self-administered. The reliability and validity of the instrument was then be determined. The quantitative data gathered in the actual study was analyzed utilizing descriptive statistics and multiple linear regressions with the help of Statistical Package for Social Sciences (SPSS) version 21. The results were presented in form of tables, frequencies, and percentages. Results show that quality planning had a positive significant effect on customer satisfaction of Safaricom public limited company. However, the organizational structure and customer expectations in a telecom company differ from those of a government standards agency. While the positive effect of quality planning is notable, the study's limitation to one department within a single private entity reduces the generalizability of findings to public institutions like KEBS. There remains a gap in understanding how quality planning impacts customer satisfaction within regulatory agencies, particularly considering the broader scope of stakeholders and compliance-focused service delivery typical of such bodies.

2.3.2 Quality control and customer satisfaction at Kenya Bureau of standards

Zaki and Lasi (2020) conducted a study on the effect of service quality on customer satisfaction towards loyalty and happiness in shared service company in Malaysia. The researchers employed a quantitative research design using structured questionnaires distributed to employees and clients of a global business service hub. The study focused on SERVQUAL dimensions reliability, assurance, tangibles, empathy, and responsiveness as predictors of customer satisfaction. Data were analyzed using descriptive statistics, correlation analysis, and regression analysis. The findings revealed that quality control had a significant and positive influence on customer satisfaction, which in turn positively impacted customer loyalty and happiness. While the study concluded that quality control significantly influenced customer satisfaction, its focus was largely on private service-based organizations and a commercial environment. The nature of customers and their expectations in a business hub differ from those of public service users. This presents a gap in understanding how quality control operates within

regulatory public institutions like the Kenya Bureau of Standards (KEBS), where the goal is not profit or customer happiness, but compliance, safety, and public trust.

Maharsi, Njotoprajitno, and Hadianto (2021) examined the effect of service quality on customer satisfaction and purchasing intention. Using simple random sampling and the Slovin formula, the study collected data from 106 lecturers through an online survey. Variance-based Structural Equation Modeling (SEM-PLS) was applied for analysis. The findings showed that service quality had a positive and significant effect on customer satisfaction, which subsequently influenced purchasing intention. Although the study confirms the positive relationship between service quality and customer satisfaction, it has conceptual and contextual limitations. Service quality was treated as a broad construct without disaggregating it into specific operational components such as quality control. The study did not examine structured mechanisms like inspections, audits, or compliance checks that operationalize quality in institutions. Consequently, the processes through which quality control systems influence customer satisfaction remain unclear. Furthermore, the study was conducted in an academic setting, limiting its applicability to regulatory public institutions. In organizations such as KEBS, formal quality control systems are central to service delivery and public trust. This creates a gap in understanding how specific quality control practices directly influence customer satisfaction in regulatory contexts..

Kimwaki (2023) examined the influence of quality control and certifications on the performance of manufacturing firms in Kenya. Using a descriptive research design, the study surveyed 160 respondents through structured questionnaires. The findings indicated that quality control and certification were critical in enhancing firm performance by enabling companies to meet required standards and demonstrate quality assurance to customers. The study concluded that failure to adopt quality certification negatively affected company image, competitiveness, and overall performance. Although the study offers valuable insights within the Kenyan context, its focus was primarily on internal organizational outcomes such as profitability, competitiveness, and compliance with standards. Customer satisfaction was not examined as a distinct outcome variable. The emphasis remained on how quality control improves firm performance rather than how it shapes customer perceptions and experiences. This leaves a significant gap in understanding the external dimension of quality control, particularly how structured quality control practices influence customer satisfaction in service-oriented and regulatory institutions such as KEBS. Unlike manufacturing firms that focus on market competitiveness, KEBS operates within a public service and consumer protection framework where stakeholder trust and satisfaction are central performance indicators.

Gachina and Mbataru (2022) examined the effect of implementing a Quality Management System (QMS) through customer training on customer satisfaction in higher learning institutions. Guided by systems theory, the study adopted a descriptive research design. From a target population of approximately 7,000 individuals, a sample of 378 respondents was selected. The findings revealed that customer training significantly influenced customer satisfaction, leading to the conclusion that QMS implementation and quality control practices have a direct positive effect on customer satisfaction. Despite confirming the positive relationship between QMS and customer satisfaction, the study primarily emphasized training as the main driver of satisfaction. Quality control was not examined in terms of its operational processes but rather as part of broader QMS implementation through training initiatives. Moreover, the higher education context differs considerably from that of a regulatory authority in terms of service structure, customer expectations, and operational complexity. Consequently, a gap remains in understanding how routine quality control practices, such as monitoring, inspections, compliance verification, and corrective actions, directly influence customer satisfaction in a standards and regulatory body like KEBS, where services are largely technical and compliance-driven..

2.4.3 Quality assurance and customer satisfaction at Kenya Bureau of standards

Zygiaris, Hameed and Ayidh Alsubaie (2022) did a study on the service quality assurance and customer satisfaction in the post pandemic world in Saudi Arabia. Using the SERVQUAL model covering tangibles, reliability, responsiveness, assurance, and empathy a structured questionnaire was administered to customers, and data were analyzed using SEM techniques. Results showed quality assurance significantly influenced satisfaction, with responsiveness and assurance having the strongest effects. Personalized attention, effective online communication, prompt service, and staff courtesy were key drivers. The study emphasizes the need for customer-centric strategies and quality assurance in service delivery to maintain competitiveness post-COVID. While the study highlights the significance of quality assurance in enhancing customer satisfaction, it was conducted in a private sector setting and under post-COVID recovery conditions, which differ from the regulatory and compliance-driven context of KEBS. The focus on customer-centric strategies and online communication, although relevant, may not fully translate to a standards agency with different operational priorities and service delivery structures. This creates a knowledge gap in understanding how quality assurance functions in a public regulatory agency like KEBS, especially in areas related to technical standard enforcement and stakeholder trust.

Ogbeide, Adesuyi, and Adeoye (2023) examined service quality assurance and customer satisfaction in selected insurance firms in Akure Metropolis, Nigeria. The study adopted survey and correlational research designs, targeting customers of insurance firms. A random sample of 100 respondents was selected, and data were collected using a four-point Likert-type questionnaire. Analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through Smart PLS-3. The findings revealed that service quality assurance had a significant positive effect on customer satisfaction. Although the study confirms a positive relationship between quality assurance and satisfaction, it was conducted in a commercial insurance context where service assurance often involves financial guarantees and personal risk coverage. In contrast, KEBS provides regulatory and compliance-driven services where customer satisfaction is more closely linked to efficiency, transparency, credibility of testing, and enforcement of standards. Therefore, while the methodology and findings are informative, a contextual gap exists in applying these concepts to a public regulatory body with different accountability structures and service mechanisms. Similarly, Boiyon, Manduku, and Rotumoi (2020) investigated the relationship between QMS audits and customer satisfaction in ISO-certified public universities in Kenya. Using a mixed-methods correlational design, data were collected through questionnaires and interviews and analyzed using descriptive and inferential statistics. The study found that QMS audits had a positive and significant effect on customer satisfaction. However, the focus was on internal academic processes and student satisfaction. In universities, audits largely assess curriculum delivery and administrative processes, whereas at KEBS, audits emphasize regulatory compliance and industry standards monitoring. This highlights a gap in understanding how broader quality assurance practices, beyond internal audits, influence external stakeholder satisfaction within a standards-setting and enforcement agency like KEBS.

Chege, (2022) did a study on the influence of service assurance on customer satisfaction across Kenyan insurance companies. A descriptive research design was adopted and a multi-stage sampling technique was used to sample 400 policyholders from 19 composite insurance companies in Kenya. Primary data was collected using a structured questionnaire. A pilot test was conducted to check the reliability and validity of the questionnaire. Data analysis was performed using inferential statistics. R-Gui was the leading statistical software. The study applied linear mixed-effect models of structural equation modeling (SEM) considering the multi-level structure of the data collected. Multi-level analysis was adopted to determine whether service assurance contributed to the variation in levels of customer satisfaction across insurance companies. The study concluded that a client who perceives Service Assurance from their insurer is bound to have higher satisfaction than a customer who does not perceive it. Employee Assurance, however, was found not to significantly affect the variations in customer satisfaction across the insurance companies. Although the findings emphasize the importance of perceived service assurance, the study centers on insurance services where assurance is tied to risk mitigation and policy fulfillment. KEBS, on the other hand, operates in a compliance-heavy, technically complex environment where quality assurance entails standard verification, inspections, and certification processes. The distinction in service type and customer expectations presents a knowledge gap in applying these findings to KEBS's operational framework, where technical service assurance is more critical than perception-based satisfaction alone.

2.4.4 Continuous improvement and customer satisfaction at Kenya Bureau of standards

Mezher and Mdlool, (2022) conducted a study on the impact of continuous improvement on customer orientation in Iraq. The research adopted resolution as a basic measurement tool for collecting data from the eye in question, which reached 141 out of approximately 150 members of the cyber security department of the Iraqi National Security Service, where it was employed to test the main and sub-research assumptions by using a number of statistical methods, most notably (SPSS VR). 24, AMOS VR. The results of the research have proved that most of the hypotheses are valid, and the research has reached a series of conclusions, most notably that there is an important role for continuous improvement in the principle of customer orientation in the NSS/CSS. While the study highlights the strategic importance of CI in aligning services with customer needs, the focus was more on internal government staff perceptions rather than external customer satisfaction. Additionally, the context of a security agency is quite distinct from that of a standards organization like KEBS, where public-facing service quality, testing reliability, and regulatory compliance play a major role. This creates a gap in understanding how CI directly affects the satisfaction of external customers in a standards-setting public agency.

Mosimanegape, Jaiyeoba and Iwu (2020) did a study on the relationship between service quality and customer satisfaction in the public service in Botswana. With the aid of a questionnaire, data were collected from 135 respondents located at 27 basic education sites (secondary and primary schools) in the Tonota Sub Region. Descriptive and inferential statistics were used for data analysis. The findings reveal that service quality dimensions of continuous improvement impact customer satisfaction positively. While the study establishes a positive relationship between CI and customer satisfaction, the focus was limited to schools, which differ from technical

service institutions like KEBS in terms of processes, deliverables, and types of customers. The education sector emphasizes service delivery through teaching, whereas KEBS focuses on technical standardization and inspection. This presents a gap in applying these findings to a compliance-driven agency serving both industrial clients and the general public.

Enyinna (2024) carried a study on aligning Total Quality Management, Continuous Improvement for Process Performance in Nigeria. Using a qualitative empirical review methodology, the study conducts an extensive content analysis of previous scholarly works across various industries and countries, synthesizing trends, approaches, and outcomes related to quality management practices. The author organizes prior research into a structured summary table highlighting the authors, research focus, countries, methods, and key findings. Key findings reveal that aligning TQM with CI significantly contributes to reducing waste, improving product quality, and boosting operational efficiency across sectors, thereby reinforcing the value of continuous quality-focused strategies in modern business environments. Although the study presents broad insights across sectors, it does not focus on a specific organizational context or collect primary data. The synthesized findings show that CI improves efficiency and reduces waste, which are important outcomes for KEBS. However, since the study lacks direct evidence from regulatory bodies or Kenyan institutions, there is a gap in understanding how these improvements influence customer satisfaction specifically within KEBS, which handles regulatory functions, certification, and public trust.

Maina (2021) did a study on the Continuous Improvement Practices and Organizational Performance of Nairobi Bottlers Limited, Kenya. Grounded in Stakeholder Theory, Systems Theory, and the Resource-Based View, the research adopted a descriptive design targeting a population of 308 management staff, with 93 respondents selected through stratified random sampling. Data were collected using semi-structured questionnaires and analyzed using SPSS, with results presented in tables and charts. The findings revealed high levels of implementation of Continuous improvement practices such as product standardization. The study concluded that adopting structured Continuous improvement initiatives significantly enhances operational efficiency and organizational performance. The research demonstrated that structured CI initiatives enhance operational efficiency and organizational performance. While this local study is relevant contextually, its findings pertain to manufacturing operations focused on profitability and product delivery. KEBS, being a government agency, differs in its goals, customer expectations, and performance indicators. Therefore, the study does not fully address how CI affects external customer satisfaction within a public standards institution, creating a gap in translating private-sector efficiency improvements to public-sector service quality.

III. Study Methodology

3.1 Research Philosophy

This study adopted the positivist research philosophy, which is defined as a philosophical approach that advocates for the use of scientific methods to study observable and measurable phenomena, with the aim of uncovering objective truths through empirical evidence. Positivism emphasized objectivity, quantifiable observations, and statistical analysis in testing hypotheses and drawing conclusions (Park, Konge, & Artino, 2020). This philosophy was most appropriate for the study, as it aligned with the correlational research design and the focus on establishing relationships between clearly defined variables: quality planning, quality control, quality assurance, continuous improvement, and customer satisfaction. By relying on observable data and structured methodologies, the positivist approach ensured that the findings were reliable, valid, and generalizable, providing a sound basis for decision-making and policy formulation at the Kenya Bureau of Standards.

3.2 Research Design

The study employed a correlational research design, which was appropriate for examining the relationships between various components of a quality management system, namely, quality planning, quality control, quality assurance, and continuous improvement, and customer satisfaction at the Kenya Bureau of Standards. This design was suitable because it enabled the researcher to measure and analyze the extent to which variations in quality management practices were associated with changes in customer satisfaction levels (Selviana, Afgani, & Siroj, 2024). By using statistical techniques such as Pearson correlation and regression analysis, the study was able to identify significant patterns and associations without manipulating the variables, thereby preserving the authenticity of the organizational environment.

3.3 Target Population

The study targeted a total of 612 respondents, comprising 92 Quality Assurance Officers, 110 Quality Control Inspectors, 80 Quality Planning/Strategy Officers, 120 Customer Service Officers, and 210 customers of KEBS across the Nairobi, Coast, North Eastern, Mt. Kenya, North Rift, and South Rift regions. These respondents

were strategically selected because they represented key stakeholders in the implementation, monitoring, and evaluation of the quality management system at KEBS. The internal staff members were directly involved in planning, controlling, assuring, and communicating quality standards and processes, making them well-positioned to provide informed insights into the organization's quality management practices. Conversely, customers were included to provide an external perspective on service satisfaction and the perceived effectiveness of KEBS's quality management efforts. The target population is illustrated in Table 1

Table 1: Target Population

Respondents	Numbers	Percentages (%)
Quality Assurance Officers	92	15.0
Quality Control Inspectors	110	18.0
Quality Planning/Strategy Officers	80	13.1
Customer Service Officers	120	19.6
Customers of KEBS	210	34.3
TOTAL	**612**	**100.0**

Source: KEBS registry

3.4 Sample sampling techniques

The study adopted Yamane's formula to determine the appropriate sample size for the research at KEBS. The following formula was used to calculate the number of respondents.

$$n = \frac{N}{1+N(e)^2} \quad \ldots\ldots(3.1)$$

Where: n = required sample size

e = level of significance taken to be 0.05

N= the population size

1= constant

N = 612

e = 0.05

$$n = \frac{612}{1+612(0.05)^2}$$

=242 respondents

The sample size for each category will be obtained as follows;

Quality Assurance Officers= $\frac{92}{612} X\ 242$= 36

Quality Control Inspectors= $\frac{110}{612} X\ 242$= 44

Quality Planning/Strategy Officers= $\frac{80}{612} X\ 242$=32

Customer Service Officers= $\frac{120}{612} X\ 242$=47

Customers of KEBS= $\frac{210}{612} X\ 242$=83

The sample size is presented in Table 3.2;

Table 2: Sample Population

Respondents	Numbers	Percentages (%)
Quality Assurance Officers	36	14.9
Quality Control Inspectors	44	18.2
Quality Planning/Strategy Officers	32	13.2
Customer Service Officers	47	19.4
Customers of KEBS	83	34.3
TOTAL	**242**	**100.0**

The study employed a combination of purposive sampling and simple random sampling techniques to select a total of 242 respondents, including 36 Quality Assurance Officers, 44 Quality Control Inspectors, 32 Quality Planning/Strategy Officers, 47 Customer Service Officers, and 83 customers of KEBS across various regions. Purposive sampling was used to select the internal staff categories based on their specific roles and expertise in quality management processes, ensuring that the study captured informed and relevant insights. Simple random sampling was applied to select the 83 customers, giving each an equal chance of participation and minimizing selection bias. This blended approach was appropriate for achieving a balanced representation of both

knowledgeable internal stakeholders and diverse external customers, thereby enhancing the credibility and comprehensiveness of the study findings.

3.5 Data collection instruments

The study collected primary data using both open-ended and closed-ended questions to ensure a comprehensive assessment of the effect of quality management systems on customer satisfaction at KEBS. Closed-ended questions were structured using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree," which was appropriate for measuring respondents' levels of agreement with statements related to quality planning, control, assurance, and continuous improvement. This format facilitated easy quantification and statistical analysis of responses, enabling the identification of patterns and correlations among variables. Open-ended questions, in contrast, provided respondents, particularly customers, with the opportunity to elaborate on their experiences, perceptions, and suggestions in their own words, capturing richer qualitative insights that structured questions may overlook. The use of both question types was appropriate as it combined the reliability and comparability of quantitative data with the depth and context of qualitative feedback, resulting in a more robust and well-rounded understanding of the research problem.

3.6 Data analysis and presentation

The study collected and analyzed primary data using both descriptive and inferential statistical techniques. Upon collection, the data were sorted, edited, cleaned, and coded to ensure completeness and consistency before being entered into SPSS (Statistical Package for the Social Sciences) for analysis. Descriptive statistics, including means, frequencies, percentages, and standard deviations, were used to summarize responses and provide an overview of the distribution and central tendencies of the data. Inferential statistics were employed to establish relationships and make predictions, with Pearson Product-Moment Correlation analysis determining the strength and direction of relationships between components of the quality management system and customer satisfaction. Additionally, multiple linear regression analysis was conducted to assess the influence of the independent variables, quality planning, quality control, quality assurance, and continuous improvement, on the dependent variable, customer satisfaction. The results were presented using tables and charts for clarity and ease of interpretation. To ensure the accuracy and credibility of the regression model, all necessary assumptions, including normality, multicollinearity, autocorrelation, and heteroscedasticity, were tested and satisfied prior to performing the regression analysis. The multiple linear regression model that guided the analysis is expressed as:

$$Y=\beta 0+\beta_1 QP+\beta_2 QC+\beta_3 QA+\beta_4 CI+\epsilon \quad \ldots\ldots 3.1$$

Where:

- Y= Customer Satisfaction
- $\beta 0$ = Intercept (constant)
- QP = Quality Planning
- QC= Quality Control
- QA= Quality Assurance
- CI= Continuous Improvement
- β_1, β_2, β_3, β_4 = Coefficients of the predictors
- ϵ= Error term

IV. Data Analysis, Presentation, Interpretation and Analysis

4.1 Inferential Statistics

The effect of quality planning, quality control, quality assurance, and continuous improvement on customer satisfaction at the Kenya Bureau of Standards was determined using inferential statistical analysis.

4.1.1 Correlational Analysis

The study employed the Pearson product–moment correlation coefficient to examine the direction and strength of the relationship between quality planning, quality control, quality assurance, and continuous improvement and customer satisfaction at the Kenya Bureau of Standards (KEBS). The correlation coefficient values range from −1 to +1, where values closer to ±1 indicate a stronger relationship between the variables. The analysis was conducted at a 95% confidence level using a two-tailed test. Accordingly, a significance level of 0.05 was adopted, such that p-values less than 0.05 were considered statistically significant, while p-values greater than 0.05 were regarded as statistically insignificant. The results of the correlation analysis are presented in the table 3

Table 3: Correlation analysis

	QP	QC	QA	CI	Y
QP	1				
QC	0.321	1			
	(0.128)				
QA	0.347	0.529	1		
	(0.329)	(0.325)			
C	0.589	0.532	0.239	1	
	(0.229)	(0.338)	(0.249)		
Y	0.527*	0.506*	0.641*	0.568*	1
	(0.001)	(0.001)	(0.008)	(0.001)	

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Study data 2026

The correlation analysis in Table 3 reveals the relationships between the key dimensions of quality management standards, quality planning (QP), quality control (QC), quality assurance (QA), and continuous improvement (CI), and customer satisfaction (Y) at the Kenya Bureau of Standards (KEBS). The results show that all four quality management practices have positive and statistically significant relationships with customer satisfaction, indicating that improvements in these areas are associated with higher levels of customer satisfaction.

Specifically, quality planning has a positive and significant correlation with customer satisfaction ($r = 0.527$, $p = 0.001$), suggesting that effective planning of quality initiatives plays an important role in shaping customer experiences. This aligns with the study's objective of examining the effect of quality planning on customer satisfaction, indicating that when KEBS plans its services strategically and sets clear quality targets, customers perceive the services more positively.

Quality control also demonstrated a positive and significant relationship with customer satisfaction ($r = 0.506$, $p = 0.001$). This indicates that monitoring processes, ensuring compliance with standards, and maintaining service reliability contribute significantly to customer satisfaction. The finding supports the objective of determining the effect of quality control, highlighting that robust control measures enhance customer confidence in KEBS' services.

Among the variables, quality assurance exhibits the positive and significant correlation with customer satisfaction ($r = 0.641$, $p = 0.008$). This suggests that ensuring credibility, accuracy, and adherence to established standards has the most substantial impact on how customers perceive KEBS. This directly addresses the study objective of analyzing the effect of quality assurance, showing that customers are more satisfied when they trust the reliability and integrity of the services and certifications provided.

Finally, continuous improvement shows a positive and significant correlation with customer satisfaction ($r = 0.568$, $p = 0.001$). This implies that ongoing efforts to enhance processes, address customer feedback, and improve service delivery contribute meaningfully to customer satisfaction. The finding supports the objective of assessing the effect of continuous improvement, indicating that KEBS' commitment to evolving and refining its practices positively influences how customers evaluate its services.

In summary, the correlation analysis demonstrates that all four dimensions of quality management standards positively influence customer satisfaction at KEBS. Among them, quality assurance has the strongest relationship, followed by continuous improvement, quality planning, and quality control. These results highlight the importance of implementing comprehensive quality management practices to enhance customer satisfaction, emphasizing that efforts in planning, control, assurance, and continuous improvement collectively contribute to a better customer experience.

4.1.2 Model summary

The model summary provides information on the strength and direction of the relationship between the independent variables, quality planning, quality control, quality assurance, and continuous improvement, and the dependent variable, customer satisfaction. The correlation coefficient (R) measures the degree and direction of the linear relationship between the observed values and the predicted values of the dependent variable, indicating how well the independent variables collectively explain variations in customer satisfaction.

The coefficient of determination (R^2) indicates the proportion of variation in the dependent variable that can be explained by the independent variables. A higher R^2 value suggests that the model has a stronger explanatory

power. The results of the study's model summary, presented in Table 4.15, provide insights into the overall predictive capability of the regression model and the extent to which quality management standards collectively influence customer satisfaction at the Kenya Bureau of Standards.

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.783[a]	.613	.611	.43628

Source: Study Data 2026

Table 4 presents the model summary for the regression analysis examining the effect of quality management standards on customer satisfaction at the Kenya Bureau of Standards (KEBS). The correlation coefficient (R) is 0.783, indicating a strong positive linear relationship between the independent variables, quality planning, quality control, quality assurance, and continuous improvement, and customer satisfaction. This suggests that as quality management practices improve, customer satisfaction tends to increase.

The coefficient of determination (R^2) is 0.613, which implies that approximately 61.3% of the variation in customer satisfaction can be explained collectively by the four quality management standards. The adjusted R^2 of 0.611 accounts for the number of predictors in the model and confirms that the model provides a reliable estimate of the relationship. The standard error of the estimate is 0.436, indicating the average distance that the observed values deviate from the predicted values. Overall, these results demonstrate that the regression model has a strong explanatory power and that quality management standards are significant predictors of customer satisfaction at KEBS.

4.1.3 ANOVA

An analysis of variance (ANOVA) test was conducted to assess the overall significance of the regression model and determine whether the independent variables collectively explain variations in the dependent variable, customer satisfaction at the Kenya Bureau of Standards (KEBS). The ANOVA examines whether the regression model provides a better fit to the data compared to a model with no independent variables (the intercept-only model). The null hypothesis of the F-test states that the intercept-only model fits the data equally well as the full regression model, implying that all regression coefficients are zero. The alternative hypothesis posits that the regression model provides a superior fit, indicating that at least one independent variable significantly predicts customer satisfaction.

The F-test of overall significance evaluates the combined predictive power of all independent variables, quality planning, quality control, quality assurance, and continuous improvement, to determine whether it is unlikely that all coefficients are simultaneously zero. If the p-value is less than the significance level of 0.05, the null hypothesis is rejected, suggesting that the regression model offers better predictions than simply using the mean of the dependent variable. The ANOVA results, presented in Table 4.16, indicate whether the model's predictions are statistically significant and whether the independent variables collectively have a meaningful effect on customer satisfaction at KEBS.

Table 5: Analysis of Variance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.537	3	2.846	14.746	.000[b]
	Residual	5.389	28	0.193		
	Total	13.926	31			

Source: Study Data 2026

Table 5 presents the results of the ANOVA conducted to evaluate the overall significance of the regression model examining the effect of quality management standards on customer satisfaction at the Kenya Bureau of Standards (KEBS). The regression model produced an F-value of 14.746 with a corresponding p-value of 0.000, which is less than the significance level of 0.05. This indicates that the regression model is statistically significant and provides a better fit to the data than a model without any independent variables.

These results imply that the independent variables, quality planning, quality control, quality assurance, and continuous improvement, collectively have a significant effect on customer satisfaction at KEBS. The significance of the overall F-test confirms that the regression model is useful for predicting customer satisfaction, and that the explanatory power captured by the R^2 value (0.613) is meaningful. Therefore, the model demonstrates that the combined implementation of quality management standards positively influences customer satisfaction, validating the study's hypothesis that quality management practices are critical determinants of service delivery outcomes at KEBS.

4.1.3. Regression analysis

The study employed multiple linear regression analysis to examine the effect of quality management standards, including quality planning, quality control, quality assurance, and continuous improvement, on customer satisfaction at the Kenya Bureau of Standards (KEBS). This analytical method was chosen to determine both the individual and combined influence of the independent variables on the dependent variable, allowing the study to assess which quality management practices most significantly impact customer satisfaction.

The regression results, presented in Table 6, provide estimates of the coefficients, their statistical significance, and the strength of the relationship between each quality management standard and customer satisfaction. These results are essential for understanding how improvements in planning, control, assurance, and continuous improvement processes contribute to enhanced service delivery and higher customer satisfaction levels at KEBS.

Table 6: Regression coefficients

Variables	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	0.146	.041	3.56	.001
QP	0.459	.148	3.10	.000
QC	0.582	.143	4.07	.000
QA	0.394	.124	3.18	.001
CI	0.464	.106	4.38	.000

Source: Study Data (2025)

a. Predictors: (Constant), QP, QC, QA, CI
b. Dependent Variable: Customer Satisfaction

Table 4.17 regression results produced a regression model (4.1)

$Y= 0.146 + 0.459\ QP + 0.582\ QC + 0.394\ QA + 0.464\ CI$ ……. (4.1)

The value 0.146 in regression equation 4.1 represents the constant of the regression model in the study. The constant was found to be statistically significant, as its t-calculated value of 3.56 exceeded the critical t-value of 2.038, and the associated probability value was below the significance threshold of 0.005 ($p = 0.001 < 0.005$). This finding indicates that when the Kenya Bureau of Standards (KEBS) does not implement any quality management practices, the baseline level of customer satisfaction would be 0.146 units. The constant thus provides a reference point for assessing the additional contribution of each quality management standard, quality planning, quality control, quality assurance, and continuous improvement, towards enhancing customer satisfaction.

4.2 Interpretation and Discussion of Findings

The interpretation and discussion of the findings is presented in this section.

4.2.1 Quality planning and customer satisfaction at Kenya Bureau of standards

The first objective of this study was to assess the effect of quality planning on customer satisfaction at the Kenya Bureau of Standards (KEBS). The null hypothesis stated that quality planning has no significant effect on customer satisfaction at KEBS. The regression analysis in Table 6 shows that the quality planning had a regression coefficient of 0.459, with a p-value of 0.000. These results were further supported by a computed t-statistic of 3.10, which was higher than the t-critical value of 2.038. These findings indicate that quality planning has a positive and significant effect on customer satisfaction at KEBS. Consequently, the null hypothesis, which suggested that quality planning has no significant effect on customer satisfaction, was rejected. The results imply that effective quality planning enhances customer satisfaction by increasing it by 0.459 unit for every one-unit improvement in planning practices, highlighting the critical role of structured planning in improving service delivery.

The current study found that quality planning has a positive and significant effect on customer satisfaction at KEBS, with a regression coefficient of 0.459 (p value < 0.05). This aligns with the findings of Alsaqer, Katar, & Abdelhadi (2024), who reported that quality planning positively influenced customer satisfaction in GCC countries. Similarly, Ahmad, Zulkifli, and Abd Rawi (2024) found that strategic quality service planning enhanced customer satisfaction in Malaysian restaurants, and Achieng and Gitonga (2020) reported a positive effect of quality planning on Safaricom's customer satisfaction.

The study found that quality planning significantly influences customer satisfaction at KEBS, as shown by a positive and significant correlation and regression coefficient. This aligns with Total Quality Management (TQM) Theory, which emphasizes careful planning and design of processes to meet customer requirements. From a Systems Theory perspective, quality planning acts as a critical subsystem that sets the standards and procedures for all subsequent processes, ensuring that the organization functions cohesively. According to Expectancy Theory,

customers form expectations regarding the timeliness, accuracy, and reliability of services; effective quality planning ensures that these expectations are met, thereby enhancing satisfaction.

4.2.2 Quality control and customer satisfaction at Kenya Bureau of standards

The second objective of the study was to determine the effect of quality control on customer satisfaction at KEBS. The null hypothesis stated that quality control has no significant effect on customer satisfaction. The regression analysis in Table 6 indicates that the quality control (QC) variable had a regression coefficient of 0.582, with a p-value of 0.000. The computed t-statistic of 4.07 exceeded the critical t-value of 2.038, confirming statistical significance. These findings show that quality control has a positive and significant effect on customer satisfaction at KEBS. Therefore, the null hypothesis was rejected. The results suggest that improving quality control practices enhances customer satisfaction by 0.582 units for every one-unit improvement in quality control.

The study established that quality control significantly improves customer satisfaction at KEBS, with a regression coefficient of 0.582 (p value < 0.05), the highest among the independent variables. This finding is consistent with Zaki and Lasi (2020), who showed that quality control positively affects customer satisfaction in service companies, and Gachina and Mbataru (2022), who reported similar effects in higher education through quality management systems. Kimwaki (2023) also emphasized the importance of quality control and certification for performance in Kenyan manufacturing firms.

Quality control was also found to have a significant positive effect on customer satisfaction, indicating that KEBS's monitoring, inspections, and compliance checks ensure that services meet established standards. In line with TQM, quality control ensures consistency and minimizes defects in service delivery, directly contributing to customer satisfaction. Through Systems Theory, quality control is an essential feedback mechanism that detects deviations and enables corrective actions, maintaining the overall effectiveness of the system. Expectancy Theory explains that when customers perceive that outputs are accurate and reliable, their confidence in the organization is reinforced, increasing satisfaction.

4.2.3 Quality Assurance on Customer Satisfaction at KEBS

The third objective of the study was to analyze the effect of quality assurance on customer satisfaction at KEBS. The null hypothesis stated that quality assurance has no significant effect on customer satisfaction. Regression results in Table 6 reveal that the quality assurance (QA) variable had a regression coefficient of 0.394, with a p-value of 0.001, and a computed t-statistic of 3.18, which is greater than the critical t-value of 2.038. This indicates that quality assurance positively and significantly affects customer satisfaction. Accordingly, the null hypothesis was rejected. The findings imply that maintaining accuracy, reliability, and consistency in service delivery through quality assurance practices increases customer satisfaction by 0.394 units for every one-unit improvement in quality assurance.

The findings indicated that quality assurance positively influences customer satisfaction, with a coefficient of 0.394 (p value < 0.05). Zygiaris, Hameed, and Ayidh Alsubaie (2022) similarly found a positive impact of service quality assurance on customer satisfaction in the private Saudi sector, while Boiyon, Manduku, and Rotumoi (2020) observed that QMS audits increased satisfaction in public universities in Kenya. Ogbeide, Adesuyi, and Adeoye (2023) also confirmed that service quality assurance improves customer satisfaction in insurance firms.

The regression results demonstrated that quality assurance significantly improves customer satisfaction at KEBS. TQM emphasizes institutionalized quality practices, including audits, certifications, and verification, which reassure customers that standards are consistently maintained. Systems Theory frames quality assurance as a stabilizing subsystem that ensures all processes conform to predefined standards, contributing to reliable organizational outputs. Expectancy Theory suggests that customers' satisfaction is influenced by their belief that KEBS's processes will reliably deliver quality outcomes.

4.6.4 Continuous Improvement on Customer Satisfaction

The fourth objective of the study was to assess the effect of continuous improvement on customer satisfaction at KEBS. The null hypothesis stated that continuous improvement has no significant effect on customer satisfaction. Table 6 shows that the continuous improvement (CI) variable had a regression coefficient of 0.464, with a p-value of 0.000, and a computed t-statistic of 4.38, exceeding the critical t-value of 2.038. These results indicate that continuous improvement positively and significantly influences customer satisfaction. Therefore, the null hypothesis was rejected. The results suggest that implementing continuous improvement initiatives in processes and services increases customer satisfaction by 0.464 units for every one-unit enhancement in continuous improvement practices.

The study found that continuous improvement positively affects customer satisfaction, with a regression coefficient of 0.464 (p value < 0.05). This finding corroborates Mezher and Mdlool (2022), who highlighted continuous improvement as a driver for customer orientation in Iraqi security services, Mosimanegape, Jaiyeoba,

and Iwu (2020), who found positive effects in Botswana public services, and Enyinna (2024), who emphasized CI's role in operational efficiency. Maina (2021) also found CI improved organizational performance in manufacturing.

Finally, continuous improvement (CI) was shown to have a significant positive effect on customer satisfaction. TQM highlights CI as a core principle, emphasizing the ongoing refinement of processes to enhance quality. Systems Theory interprets CI as the feedback loop that adapts and strengthens the organizational system in response to performance outcomes and customer feedback. From the perspective of Expectancy Theory, continuous improvement ensures that customer expectations are not only met but exceeded over time, leading to higher satisfaction.

V. Conclusions and Recommendations

5.1 Conclusions

Based on the study findings.

Quality planning emerged as a critical driver of customer satisfaction at KEBS. The results indicate that proactive service design, clear quality objectives, and effective planning processes enable KEBS to anticipate customer needs and align service delivery with established standards. By systematically defining quality requirements and integrating them into operational processes, KEBS enhances efficiency and minimizes service gaps. This strategic alignment ensures that customers receive timely, predictable, and value-driven services, which significantly improves their overall satisfaction.

The study further established that quality control plays a vital role in ensuring reliability, accuracy, and consistency in KEBS service delivery. Effective inspection, monitoring, and evaluation mechanisms help detect deviations from established standards and facilitate timely corrective actions. These practices enhance service dependability and reduce errors, thereby strengthening customer trust. When customers consistently experience accurate and reliable services, their confidence in KEBS increases, leading to higher satisfaction levels.

Additionally, quality assurance practices, including certification, verification, and adherence to standardized procedures, were found to significantly enhance customer confidence in KEBS services. By embedding quality into every stage of service delivery, KEBS assures customers that its processes and outputs meet recognized standards. This assurance fosters credibility and transparency, which are essential in a regulatory institution. Customers are more satisfied when they trust that services are accurate, compliant, and delivered in accordance with established quality benchmarks.

Finally, the study revealed that continuous improvement significantly strengthens customer satisfaction by promoting adaptive and responsive service processes. KEBS initiatives aimed at process refinement, error reduction, and incorporation of customer feedback enable the organization to respond effectively to changing customer needs and regulatory requirements. Continuous improvement ensures that service delivery remains relevant and efficient over time, reinforcing customers' perceptions that KEBS is committed to excellence and responsiveness, which ultimately enhances satisfaction.

5.2 Recommendations

Based on the study findings, several recommendations are proposed to enhance customer satisfaction at KEBS through strengthened quality management practices.

First, KEBS should enhance quality planning by developing comprehensive and well-structured planning frameworks that proactively anticipate customer needs. This involves clearly defining quality objectives, aligning service processes across all departments, and integrating customer expectations into strategic and operational plans. Effective quality planning will ensure coherence in service delivery and minimize inefficiencies that negatively affect customer satisfaction.

Second, the organization should strengthen quality control mechanisms by implementing more robust monitoring, inspection, and evaluation systems. Regular audits, performance tracking, and corrective action procedures should be emphasized to ensure consistency, accuracy, and reliability in service delivery. Strong quality control will reduce errors and service variability, thereby increasing customer trust and confidence in KEBS services.

Third, KEBS should improve quality assurance practices by regularly updating certification, verification, and standardization procedures to reflect evolving regulatory requirements and best practices. Transparent communication of quality standards and compliance processes to customers will further reinforce trust and credibility. Effective quality assurance assures customers that services meet recognized standards, leading to higher satisfaction levels.

Fourth, the organization should promote continuous improvement by establishing formal feedback mechanisms that capture customer experiences and service performance data. Data-driven improvement initiatives should be used to

refine processes, eliminate inefficiencies, and address emerging customer concerns. Continuous improvement will enable KEBS to remain responsive and adaptable to changing customer expectations.

Finally, KEBS should invest in training and capacity building to equip staff with relevant skills in Total Quality Management (TQM), problem-solving, and customer engagement. Continuous professional development will empower employees to effectively implement quality management practices and deliver customer-focused services, thereby sustaining improvements in customer satisfaction.

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