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Supply Chain Resilience: The Role of Total Quality Management on the Performance of Kenya Medical Supplies Authority

Ndungu Wahome John
Stephen Makau Muathe
School of Business, Economics and Tourism,
Kenyatta University, Kenya

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Abstract

Managers are empowered to improve the quality of services and products by incorporating key total quality management principles. However, the Kenya Medical Supplies Authority (KEMSA) has faced scrutiny due to inefficiencies, which are hindering access to essential healthcare services. This aims to assess the Kenya Medical Supplies Authority's performance in the application of the four Total Quality Management principles. These are fact-based decisions, process-centric approaches, relationship management, and employee engagement. The study is grounded in four theoretical foundations: resource-based view, dynamic capabilities, stakeholder theories, and Deming's theory of quality management. A descriptive research design was used. The target population was 330 employees; however, a sample of 181 respondents was selected using proportionate stratified and simple random sampling techniques. Structured questionnaires were used to collect data, which was analyzed quantitatively using both descriptive and regression analysis, and SPSS version 25 was used to aid the data analysis. The findings indicate that the independent variables explain 58.5% of variables in the dependent variable, that is, the performance of KEMSA. Fact-based decisions had the highest impact and positive correlation with performance (B = 0.372, t = 5.239), followed by employee engagement (B = 0.348, t = 4.640), process-

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centric approach (B = 0.319, t = 4.691), and relationship management (B = 0.257, t = 3.134 all at p<0.01. The findings point to the importance of continuous staff training, participatory leadership, and integrated data systems to enhance performance. Additionally, the study recommends mentorship for junior staff, regular assessment of all resources, and a supportive organizational culture that sustains quality improvements.

Keywords: Fact-Based Decisions, Process Approach, Relationship Management, Healthcare Supply Chain

Introduction

Healthcare can be described as a dynamic field that requires crucial delivery of high-quality services. This is because it influences not only the health of patients but also the health of the general public. Healthcare agencies involved in the medical supply chain undertake a critical role in ensuring the availability of essential healthcare supplies, drugs, and medical equipment (Ajmal et al., 2020). Achieving high-quality and consistent supply chain performance across these agencies remains a problem globally, especially among developing countries such as Kenya (Shukla et al., 2018).

Solving these limitations requires clear frameworks within management, such as efficiency enhancement, waste reduction, and service delivery standards. TQM has therefore emerged as one of the most effective approaches for improving performance within organizations across different sectors. TQM is viewed as a holistic philosophy of management that stresses continuous improvement (Kaizen), customer satisfaction, employee involvement, and process augmentation (Talib *et al.,* 2023).

TQM within the healthcare sector promotes service quality through systematic identification and elimination of supply chain inefficiencies as well as ensuring that medical practitioners acquire the necessary resources for delivering quality healthcare (Firdaus & Irfan, 2023). According to Tenji and Foley (2019), adopting TQM practices leads to substantial improvements in operational efficacy, cost-effectiveness, and patient satisfaction. Customer needs and preferences are highly dynamic, thus requiring organizations to generate products and operations that meet higher quality standards and surpass customer expectations. Hence, the health sector is no exception. By delivering better products and operations, organizations position themselves competitively despite facing extreme uncertainty. Therefore, the desire for quality products and services contributes to the increased acceptance and recognition of the TQM concept (Ross, 2017). Total Quality Management currently enjoys wide awareness among scholars, particularly within the strategic management arena. According to Jaca and Psomas (2015), TQM as a practice today aims at continuous improvement, which contributes to the

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

performance of firms. One of the key drivers of performance in an organization is quality, especially in a globalized economy.

Organizational performance can be observed as a multidimensional facet measurable using both financial and non-financial metrics. Within an organization, key financial metrics include return on investment, return on assets, liquidity level, market share, and earnings per share. The non-financial metrics, on the other hand, include employee productivity, customer retention levels, employee satisfaction, new product design, and customer satisfaction (Gutterman, 2023).

Performance in the context of KEMSA as a healthcare authority can be described as efficiency, effectiveness, and quality of service delivery. Effective performance management requires that agencies in the healthcare sector consistently meet required service delivery standards, manage resources efficiently, and ensure high levels of satisfaction among both customers and patients (Githuku, 2015). Integrating practices aligned with quality management, such as those found in TQM, can significantly improve organizational performance through indicators such as customer satisfaction, efficiency, and cost management (Joseph *et al.*, 2024).

Performance metrics critical to healthcare supply chains include service quality, lead time, and inventory management (Alfina et al., 2024). In healthcare agencies, especially within supply chains, performance is also reflected by the organization's capacity to respond to the dynamic needs of patients. An efficient supply chain in the healthcare industry is vital for ensuring the availability of drugs, equipment, and technologies (Gatiti et al., 2021). According to Agarwal et al. (2018), healthcare logistics performance is tied to efficient procurement processes, distribution systems, and the warehousing concept - all of which are interdependent. Performance challenges at KEMSA often stem from inefficiencies at the manufacturing sites, operational processes, inventory management, and logistics bottlenecks, all of which hinder service delivery objectives. Inefficiencies within KEMSA contribute not only to financial loss but also lead to the unavailability of essential medical supplies, highlighting the need for total quality management. In the current study, performance indicators include productivity and operational efficiency. Productivity is the ability to maximize output, such as the distribution of medical supplies, while minimizing inputs such as resources and cost. Operational efficiency at KEMSA focuses on streamlining processes to deliver high-quality services at a minimized cost.

Total Quality Management is a framework of quality improvement methodologies that are service-oriented and customer-centered (Nigam, 2005). TQM originated in Japan before gaining widespread popularity. It is described as an organization-wide, logical method for the continuous improvement of processes, outputs, and services by focusing on customer

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

satisfaction, employee involvement, and data-based decision-making. It further emphasizes specific concepts like kaizen, customer focus, fact-based decisions, employee participation, and process orientation. Fact-based decisions involve the accurate use of data in assisting the organization's decision-making processes (Otieno et al., 2021). Although decision-making is placed in the hands of management, managers often face pressure and make decisions based on incomplete information. An overload of information may confront managers, compelling them to make decisions that are difficult to evaluate and may lack relevance in the organizational context (White et al., 2024). The process-centric approach refers to clearly emphasized and well-defined processes aimed at achieving consistency and effectiveness (Dogan, 2023).

Relationship management can be described as the quality of interactions with various stakeholders, aiming to draw them towards the organization and work towards a shared goal (Talib *et al.,* 2023). It is what an organization needs to do to foster strong connections with stakeholders, including suppliers, customers, and internal departments. According to Omore (2022), this is a win-win connection where both the organization and its stakeholders benefit. Building trust and encouraging effective communication with stakeholders is central to relationship management (Omore, 2022). Clarity and consistency in communication ensure that suppliers are updated and informed about procurement requirements, delivery schedules, and quality standards (Kiarie et al., 2024). Transparent leads to effective collaboration and supply chain efficiency. Top management's commitment - reflected through effective relationship management and proper communication - positively influences organizational performance (Kiarie et al., 2024). Relationship management indicators in this study include communication and suppliers' trust. Employee engagement plays a critical role in healthcare worker retention. It is widely recognized as a key management technique across institutions for addressing employees' needs (Gabra, Yousuf & Abood, 2019). TQM helps in identifying the target group before implementing changes to systems or processes, ensuring satisfaction (Li *et al.,* 2019).

The Kenya Medical Supplies Authority (KEMSA) is a government corporation established under the KEMSA Act (2013) within the Ministry of Health. Its functions include procurement, storage, and distribution of essential medical supplies for public healthcare. It also partners with county governments to create frameworks for service delivery, warehousing, and drug distribution. Since 1901, KEMSA has undergone several changes aimed at improving service delivery. Its goal is to ensure the consistent and timely supply of high-quality healthcare products, supporting Kenya's Universal Health Coverage (UHC) objectives.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

KEMSA faces deficiencies associated with TQM, such as procurement inefficiencies, inadequate inventory management, and distribution delays. These issues have resulted in the wastage of medical supplies, undermining KEMSA's mission to guarantee quality products to health facilities. According to Transparency International (2020), inefficiencies at KEMSA underscore the urgent need for improved TQM practices.

Statement of the Problem

The Kenya Medical Supplies Authority (KEMSA) plays a pivotal role in ensuring the efficient procurement, storage, and distribution of medical supplies across Kenya's healthcare system (Wakuthii, 2019). As a cornerstone of the nation's healthcare infrastructure, KEMSA is mandated to fulfill legislative obligations that guarantee the continuous availability of essential medical commodities in public health facilities (Kanyangi, 2018). Despite having this critical mandate, KEMSA has recently encountered persistent operational inefficiencies that have significantly hindered its performance (Kurgat & Deya, 2023). Reports of mismanagement, poor service delivery, and logistical challenges have repeatedly emerged, undermining access to essential healthcare services and eroding public confidence in the agency's ability to meet its core objectives (Salil et al., 2024). Although various reforms and structural adjustments have been implemented, these problems remain largely unresolved, signaling the need for a more holistic and sustainable performance management framework (Min & Oh, 2020).

This institutional underperformance has attracted extensive scrutiny from government bodies, including the Ministry of Health, the office of the President, and oversight task forces. External assessments by health development partners such as USAID, the Global Fund, and UNFPA have further exposed systemic weaknesses compromising KEMSA's ability to fulfill its statutory duties (UNFPA, 2021; Wamoto et al., 2023).

Although numerous studies have been conducted on the usefulness of Total Quality Management (TQM), these have primarily focused on the agriculture, manufacturing, hospitality, and education sectors, neglecting a critical area of TQM application in the medical supply chain. For example, Kithinji (2019) examined TQM management strategies but limited the scope to employee performance. The study also overlooked TQM principles such as fact-based decisions and process-centric approaches within referral hospitals, thereby leaving a gap in understanding how TQM influences such institutions. While KEMSA is not a healthcare institution per se, it functions as a vital conduit that supplies essential resources to healthcare facilities (Kurgat & Deya, 2023).

Nding'uri (2019), a study on strategic change management and KEMSA's performance, identified change management practices theorized as

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

strategic leadership, legal framework, and resource management. The study suggested that a broader study to determine the extent to which KEMSA's performance is influenced by the application of such management practices to be carried out. Therefore, the impact of Total Quality Management (TQM) on performance represents a critical area of inquiry, highlighting a significant gap that this study seeks to address.

Specific Objectives

This study sought to:

i. Establish the effect of fact-based decision on the performance of the Kenya Medical Supplies Authority.
ii. Determine the effect of a process-centric approach on the performance of the Kenya Medical Supplies Authority.
iii. Examine the effect of relationship management on the performance of the Kenya Medical Supplies Authority.
iv. Establish the effect of employee engagement on the performance of the Kenya Medical Supplies Authority.

Review of Literature

Theoretical Review

This study is grounded on four theories: the Resource-Based View (RBV), the Dynamic Capabilities Theory, the Stakeholder Theory, and Deming's Theory of Total Quality Management.

Resource-Based View

The Resource-based view (RBV) theory, initially developed by Penrose (2009), posits that differences in firm competitiveness stem from the heterogeneous distribution of resources among organizations operating within the same industry. According to recent RBV, resources - both tangible and intangible - are viewed as strategic assets that firms leverage to formulate and execute strategies suited to their internal capabilities and external conditions (Utami & Alamanos, 2025).

Moreover, Madhani (2010) conceptualizes two basic assumptions forming the basis of RBV: assets and capacities, which are under firm control and ownership. The diversity of resources holds the premise that various firms within an industry possess different resource capabilities, which can be either tangible or intangible. According to Barney (2007), the mobility of resources assumes that resources possessed within diverse entities are challenging to generate and relocate within the industry. Both the resource heterogeneity and mobility assumptions highlight firms' ability to organize, exploit, synchronize, and manage their properties to develop an edge over competitors and comparatively achieve improved outcomes (Halawi *et al.,* 2005).

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Additionally, Kinyua, Muathe, and Kilika (2015) emphasize that, across several sectors, enterprise achievement in a competitive environment - characterized by constantly evolving business conditions - is dependent upon strategy formulation and execution that make a firm distinguishable from its competitors. Nevertheless, value and delivery-based creation of strategic options should be conceived in a way that allows for amendments, ensuring there is constant fit with the firm's changing conditions (Madhani, 2010). RBV postulates that resource identification and acquisition foster a firm's capacity to generate and reserve organizational performance, edging out competitors (Alghamdi & Agag, 2024). Furthermore, it is observed that a firm distinguishes itself from its rivals when it possesses resources that are unique, valuable, and difficult to replace or replicate, hence shaping its competitive posture (Madhani et al., 2012). Various studies have incorporated RBV in diverse contexts (Njuguna & Muathe, 2020; Nyaboga & Muathe, 2024; Wandie & Muathe, 2022). The postulates of RBV underpin the competitiveness and performance of the authority.

Dynamic Capabilities Theory

The dynamic concept, as applied in this context, refers to the potential to revitalize capabilities for the sole purpose of achieving alignment with a regularly changing business environment (Teece et al., 1997). Accordingly, Chowdhury and Quaddus (2017) assert that the notion of dynamic capabilities refers to how a firm or an organization gains the ability to adapt, reconfigure, and integrate both intrinsic and extrinsic capabilities, provisions, and core skills in alignment with constantly evolving environmental prerequisites.

The focus of Dynamic Capabilities Theory is on capabilities within management, supported by resource distinctiveness from current fields such as process development, product innovation, human resources, and organizational learning. Jiang *et al.* (2018) advocate that Dynamic Capabilities Theory is explained by Resource-based theory, focusing on a specific subset of capabilities - otherwise known as competencies - that empower organizations to produce high-quality and innovative products and processes in response to evolving market conditions. Nevertheless, Gupta *et al.* (2014) argue that when Dynamic Capabilities Theory is used in conjunction with RBV, the former receives criticism due to limitations in determining whether either theory - individually or collectively - can consistently lead to operational performance and, ultimately, a competitive edge.

In the current study, Dynamic Capabilities Theory is adopted as it underscores the necessity of prioritizing internal capabilities within an organization and ultimately enhancing organizational performance. Furthermore, the theory assists in arguing how the Kenya Medical Supplies Authority allocates its resources toward advanced technology and innovation.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

The theory suggests that organizations possessing scarce resources encounter limited capability in adopting modern technology and innovation, supporting the process-centric approach and fact-based decision variables, as it emphasizes the organization's ability to seize and transform opportunities through process and data leveraging.

Stakeholder Theory

Stakeholder Theory remains influential in highlighting the role of stakeholder participation in organizational success. Stakeholders are described as entities or individuals affected in various ways by decisions formulated by an organization. Stakeholders are critical, especially when examining organizations at their peak performance or during emerging negative trends; their role is, therefore, geared toward contributing significantly to organizational success. Essential processes upheld by management include key stakeholder identification, engagement, and strategies for fostering their alignment with the organization.

Stakeholder theory recommends strong stakeholder engagement, involvement, and continuous communication to align them with the organization (Bridoux & Stoelhorst, 2022). Organizational stakeholders often express their concerns, whether consciously or unconsciously, and ignoring their influence is not feasible. Management should, therefore, ensure that stakeholders are consolidated, engaged, and encouraged to support the organization's objectives and goals (Ezeh et al., 2024). According to Foster and Jonker (2003), once a stakeholder gains comfort with an organization's processes, they are more likely to offer support, thereby increasing the likelihood of success, compared to when stakeholders refuse to support similar processes.

Employee involvement and customer focus remain key Total Quality Management (TQM) principles that significantly determine TQM effectiveness in enhancing a firm's performance. Employees and customers are among the major stakeholders who play a central role in achieving organizational success. Effective stakeholder consultation and involvement in matters concerning the organization are fundamental to enhancing firm performance, as projected by Stakeholder Theory (Oakley, 2011).

In the context of this study, Stakeholder Theory was useful in explaining the role of TQM in promoting operational performance through employee involvement and customer focus. Employees and customers are key stakeholders who must be actively engaged. Thus, the theory supports employee management and relationship management as independent variables.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Deming Theory of Total Quality Management

The Deming Theory was first developed by Deming (1982), considering the quality of a product as a vital indicator of an organization's performance, thereby strengthening organizational competitiveness. Deming's theory is widely used to emphasize the importance of quality as a means of improving effectiveness and performance. Deming's theory of quality management supports the role of Total Quality Management (TQM) in organizational success by proposing that quality reduces operational costs through the minimization of errors, defects, and waste, and by promoting efficient resource utilization and reduced delays. Deming emphasizes the necessity for employees to work closely with management to enhance output quality and eventually sustainable and collective organizational performance. This theory is relevant to the current study as it supports performance as a dependent variable, while fact-based decisions and the process-centric approach are considered independent variables. It underscores the importance of aligning internal processes, management, and employees toward a unified strategic direction by promoting a systems-based approach, data-driven decision-making, and continuous process improvement.

Empirical Review

Fact-Based Decisions and Performance

Bungei (2022) conducted a study examining the relevance of fact-based decision-making approaches on the operational performance of large manufacturing firms in Nairobi City County. The primary objective was to evaluate the extent to which these firms integrate data-driven strategies into their decision-making processes and the subsequent impact on organizational performance. The study revealed a significant positive relationship between the use of fact-based decisions and improved operational performance. However, this study focused on large manufacturing firms within Nairobi City County, implying that the results' generalizability does not extend to other sectors, such as the health sector, and institutions like KEMSA. Findings from Mkongoh and Kyalo (2023) indicated that poor system integration hinders the performance of public agencies. However, the study did not explicitly explore how fact-based decision impacts performance in specialized organizations like KEMSA, thereby indicating a contextual gap. The study also presents a conceptual gap in that it links management information systems with the performance of public agencies but fails to analyze fact-based decisions as a unique concept. Furthermore, the study lacks theoretical grounding, illustrating an empirical gap. Additionally, Mochanga (2020) pointed out that increased competition and improvements in real-time decision-making resulted from growing interdependence among management information systems. The need to enhance customer satisfaction and improve service

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

delivery timeliness led most organizations to adopt MIS dynamism in their operations. However, the study did not provide or differentiate the specific aspects of fact-based decisions relevant to organizations such as KEMSA.

H_{01} Fact-based decisions have no significant effect on the Performance of the Kenya Medical Supplies Authority

Process-Approach and Performance

Gombe *et al.,* (2024) investigated the effects of process analysis on the performance of Kenyan Huduma Centres. The study focused on various objectives, including resource utilization, cycle time, process-centric decision-making, and strategic alignment. It was grounded in organizational change theory, the balanced scorecard, goal-setting theory, and innovation theory. However, the study failed to adopt Deming's Theory of Quality Management, which is vital in such investigations. The data used in this study were derived from Huduma Centres, implying that the findings may not apply to the healthcare sector, particularly KEMSA. Mohammed (2022) examined large manufacturing firms in Kenya, focusing on the standardization of business processes and operational performance. Mohammed investigated the impact of process-centered approaches on businesses and the extent to which they affect performance within Kenyan manufacturing firms. Various theories provided the foundation for the study, including dynamic capabilities theory, resource-based view, and constraint theory. The research adopted a cross-sectional descriptive research design and collected primary data using semi-structured questionnaires. Stratified random sampling was employed, and descriptive statistics were used for data analysis. The study found that businesses need to identify the specific procedures that enable them to continually add value to customers and shareholders. However, the study explored process standardization without delving into the process-centric approach in the context of Total Quality Management (TQM).

H_{02} Process-centric approach has no significant effect on the Performance of the Kenya Medical Supplies Authority

Relationship Management and Performance

A study by Kiriinya (2021) investigated practices related to the impact of supply chain relationship management on the performance of Kenyan pharmaceutical firms. The study considered process alignment, transparency, collaborative planning, and resilience building. It was grounded in stakeholder theory, systems and network theory, and dynamic capabilities theory. Building future customer relationships is facilitated by attentively considering customer feedback to improve the customer experience. However, the study focused on supply chain relationships within pharmaceutical firms rather than on public health authorities such as KEMSA. The theories used in the study did not

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

explicitly integrate TQM principles, which are essential in managing supply chain relationships. The study also applied descriptive statistics, correlation coefficients, and regression analysis to illustrate a causal connection between relationship management and organizational performance. Oduro et al. (2020) examined the relationship management of suppliers and hospital performance in Ghana, an emerging economy. The study sought to integrate resource dependency theory and social exchange theory to examine dimensions of relationship management and the performance of both public and private hospitals. Establishing mutually beneficial partnerships with strategic supplier partners is crucial for achieving higher-level innovations and gaining a competitive edge. Collaboration with suppliers to enhance processes is essential, and they should be consistently involved in new product development.

H_{03}: Relationship Management has no significant effect on the performance of the Kenya Medical Supplies Authority

Employee Engagement and Performance

Koech and Cheboi (2018) examined the relationship between employee engagement and the performance of technical institutions in Kenya based on an empirical analysis. The study adopted regression analysis to illustrate the connection between variables, using a longitudinal approach. Findings from the study revealed a positive and significant relationship between employee engagement and performance. However, the study focused specifically on technical institutions, which differ significantly from the healthcare sector; hence, the findings cannot be replicated in the current study. Additionally, the study failed to incorporate both quantitative and qualitative approaches to understanding how different job categories evolve. It would have been beneficial if the researchers had introduced a mediating variable, as they focused only on one variable. A moderating variable, such as leadership style, could have been appropriate.

Ibua (2021) examined the impact of employee engagement on the performance of small and medium-sized enterprises (SMEs) in Mombasa County, Kenya. Ibua emphasized that employee engagement is a process that keeps employees involved in an organization and is fundamental to organizational competitiveness. The theoretical underpinnings of the study were the Resource-Based View (RBV) and Hertzberg's Two-Factor Theory of Motivation. The research design was descriptive, incorporating stratified random sampling. Primary data was collected through questionnaires, and hypothesis testing was conducted using Pearson's product-moment correlation. The study found that most SMEs have not yet embraced the concept of employee engagement. Recommendations from the study emphasized the need for thoughtful planning by management to improve

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

employee engagement. However, the research was centered on SMEs in Mombasa County, limiting the generalizability of its findings to other sectors such as healthcare. A conceptual gap also exists, as the study was anchored on only two theories - RBV and Hertzberg's - while neglecting other relevant frameworks such as Deming's Theory of Quality Management. Moreover, the study did not incorporate other regression models or inferential models to explain causality.

Abbas (2020) investigated the impact of TQM on organizational longevity in small and medium-sized enterprises in Pakistan. The study surveyed managers using questionnaires and applied a descriptive approach. Abbas found that TQM was pivotal in augmenting organizational longevity. The study concluded that elements such as information sharing are crucial in supporting TQM, enhancing its contribution to organizational sustainability. However, since the study was conducted in a foreign country, its findings are less applicable in the Kenyan context due to differing cultural, economic, and institutional frameworks. Additionally, the study focused primarily on TQM longevity and did not delve deeply into employee engagement as a key variable. The study also lacked the inclusion of a moderating variable, such as firm size, despite applying a descriptive approach and failing to compare findings with those from another country.

H_{04}: Employee engagement has no significant effect on the Performance of the Kenya Medical Supplies Authority

Methods

Research designs can be categorized as exploratory, descriptive, and explanatory (Saunders et al., 2019; Bell et al., 2015; Muathe, 2010; Creswell & Creswell, 2018). This study adopted a descriptive research design to examine how the implementation of TQM and organizational performance at KEMSA are related. The design was appropriate as it allowed for the quantitative assessment of perceptions and practices within the organization. Additionally, it enabled the generalization of findings across the target population while providing a structured framework that helps in current practices and performance analysis. Descriptive design is appropriate in research because it presents the current state of affairs and identifies areas that require improvement in the public sector. (Saunders et al., 2019).

The target population for this study comprised different levels of management from KEMSA headquarters in Nairobi City County. Management levels included top-level management - comprising the Chief Executive Officer, Directors in various departments, and board members - middle-level management comprising departmental managers, assistant managers, and senior officers, and operational-level officers, including those

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

in finance, logistics, IT, procurement, warehouse, and quality assurance departments.

Proportionate stratified and random sampling techniques were employed to ensure that key subgroups within the target population were proportionately represented in the sample. This approach is particularly appropriate when the population is heterogeneous, as it enhances the precision of estimates by ensuring that diverse characteristics - such as roles, experience levels, or departments - are adequately captured (Makwana, *et al.,* 2023). The population was divided into mutually exclusive strata, and random samples were drawn from each stratum based on their relative size. This method improves the representativeness and reliability of the sample compared to simple random sampling.

To determine the appropriate sample size, Yamane's (1967) formula was applied, which is suitable for large populations and when a known margin of error is considered. The formula is expressed as:

$$n= N/ [1+N (e) 2]$$
$$n= 330/ [1+330 (0.05)2]$$
$$330/ (1+330 (0.0025)$$
$$330/1.825$$
$$n= 181$$

The procedure for collecting data began with obtaining an authority and a research permit from Kenyatta University and the National Commission for Science, Technology and Innovation (NACOSTI), respectively. Primary data was collected using structured questionnaires.

The collected data was first cleaned and coded in Excel. Data analysis was conducted quantitatively, incorporating both descriptive statistical approaches (mean, median, mode, and standard deviation) and inferential statistical methods, including correlation and regression analysis, using SPSS version 25. The regression analysis aimed to illustrate the effect of TQM dimensions on performance, as outlined in the Model.

To ensure clarity in operationalization, the study used a structured questionnaire based on established literature. Each Total Quality Management (TQM) principle was represented by a set of five Likert-scale items adapted from empirical studies as presented in Appendix A. The questionnaire was validated through expert review and a pilot test conducted with 15 respondents from KEMSA, who were not included in the final sample. Reliability analysis was performed, and all constructs met the acceptable Cronbach's alpha threshold of 0.70.

The raw scores from individual items for each variable (e.g., X1 = Fact-Based Decisions) were averaged to generate a composite score, which was then used in inferential statistical analyses. These variables were then

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

entered into a multiple linear regression model to determine their effect on organizational performance (Y).

$$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\varepsilon\ldots\ldots\ldots\text{Model}$$

Where:

Y = Organizational performance (dependent variable)
X1 = Fact-based decisions
X2 = Process-centric approach
X3 = Relationship management
X4 = Employee engagement
β0, β1, β2, β3, β4 = Beta Coefficients
ε = Error term

Research Findings and Discussion

A total of 181 questionnaires were presented to the respondents. Out of these, 140 questionnaires were duly filled and returned, yielding a response rate of 77.3%, which was deemed sufficient for analysis, as per Mugenda and Mugenda (2019), who recommend a response rate of 70% and above.

Demographic Characteristics of Respondents

Understanding the demographic characteristics of respondents is essential in contextualizing the research findings and interpreting how personal and professional attributes may influence perceptions and behaviors regarding TQM practices. This section presents a summary of key demographic variables, including respondents' age, level of education, work experience, and management level. These characteristics help identify trends, draw comparisons, and explain variations in responses related to organizational performance. The demographic profile also ensures that the data collected is representative of the population under study, thereby enhancing the reliability and relevance of the research outcomes (Saunders, Lewis, & Thornhill, 2019).

Age distribution data was collected to assess how generational differences may influence perceptions and engagement with Total Quality Management (TQM) practices at KEMSA. Respondents were categorized into relevant age brackets to facilitate comparative analysis across different age groups. This variable, presented in Table 1, is important for understanding how factors such as experience, maturity, adaptability to change, and familiarity with digital systems might influence the adoption and effectiveness of quality management initiatives.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Table 1. Age Distribution

Years	**Frequency**	**Percent**
18-30	16	11.4
31-40 years	64	45.7
41-50 years	49	35.0
>50	11	7.9
Total	**140**	**100.0**

Source: Survey data, 2025

The study established that the majority of respondents were between 31-40 years (45.7%), followed by those aged 41-50 years (35.0%), 18-30 years (11.4%), and 50 years and above (7.9%). This indicates that most respondents were within the mature working-age bracket, indicating a workforce with potentially significant experience and responsibility levels. The study further outlined the age distribution of respondents by gender, offering additional context to demographic patterns across KEMSA.

Gender Distribution by Educational Level

An analysis of the educational qualifications of KEMSA staff by gender reveals both parity and variation in access to higher education between male and female employees. These insights are presented in Table 2.

Table 2. Gender Distribution by Educational Level

		Education				**Total**
		Certificate	Diploma	Degree	Masters	
Gender	Male	11	16	30	13	70
	Female	3	17	36	14	70
Total		14	33	66	27	140

Source: Survey data, 2025

Among male respondents, the highest proportion held a bachelor's degree (n = 30; 42.9%), followed by those with a diploma (n = 16; 22.9%) and a master's degree (n = 13; 18.6%). A smaller number had certificate-level qualifications (n = 11; 15.7%). Similarly, among female respondents, the largest group also held a bachelor's degree (n = 36; 51.4%), followed by diploma holders (n = 17; 24.3%) and those with a master's degree (n = 14; 20%). Only three female respondents (4.3%) possessed certificate-level qualifications, significantly fewer than their male counterparts. This distribution suggests a generally higher academic qualification among female employees, particularly at the degree level, where females outnumber males (36 vs. 30). Furthermore, the near parity in the number of master's degree holders (14 females vs. 13 males) reflects gender balance at the postgraduate level.

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Inferential Statistics

Inferential statistics was employed to infer the wider population based on the sample data in alignment with the study's objectives. Specifically, correlation analysis and regression analysis were conducted to determine the strength, direction, and significance of relationships among the study variables.

Correlation Analysis

In the context of public health supply chain organizations such as KEMSA, understanding the interplay between internal management practices and performance outcomes is crucial for institutional sustainability and the effectiveness of service delivery. Recent empirical studies emphasize that organizational performance is increasingly shaped by soft factors, including employee engagement, structured processes, data-informed decision-making, and relational dynamics (Mabey et al., 2023).

Table 3. Correlation Analysis

		1	2	3	4	5
Fact-Based Decisions	Pearson Correlation	1				
Process-Centric Approach	Pearson Correlation	.713**	1			
Relationship Management	Pearson Correlation	.399**	.465**	1		
Employee Engagement	Pearson Correlation	.454**	.558**	.451**	1	
Performance	Pearson Correlation	0.114	0.160	0.000	.169*	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey data, 2025

The correlation results in Table 3 highlight the relationships among the five key constructs within KEMSA. A strong, positive, and statistically significant correlation exists between Fact-Based Decisions and Process-Centric Approach ($r = .713$, $p < .01$), indicating that institutions relying on data-driven strategies are more likely to streamline their internal processes for efficiency. Similarly, Employee Engagement demonstrated moderate-to-strong positive correlations with both Process-Centric Approach ($r = .558$, $p < .01$) and Relationship Management ($r = .451$, $p < .01$). These findings suggest that higher levels of employee involvement are associated with improved collaboration and stronger adherence to structured procedures.

Interestingly, Employee Engagement is the only variable showing a statistically significant correlation with Organizational Performance ($r = .169$, $p = .046$), though the strength of this relationship is weak. This implies that employee morale and participation may have a modest but meaningful influence on organizational outcomes. On the other hand, Fact-Based Decisions ($r = .114$, $p = .182$) and Process-Centric Approach ($r = .160$, $p = .059$) exhibit positive but statistically insignificant correlations with

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

performance. This suggests that while these practices are crucial to institutional operations, their direct impact on performance may be mediated by other factors such as leadership dynamics, resource allocation, or external regulatory influences.

Surprisingly, Relationship Management showed no significant correlation with performance ($r = .000$, $p = .996$). This result implies that stakeholder relationships are not perceived to have a direct impact on organizational performance from the internal perspective of KEMSA staff. This finding contrasts with prior literature, such as Nguyen et al. (2023), which emphasized the importance of stakeholder engagement in public sector performance. Overall, these results underscore the importance of strengthening the performance linkages of strategic practices, particularly by leveraging employee engagement as a critical driver of institutional success.

Regression Analysis

To establish the effect of the independent variables on the dependent variable, multiple linear regression analysis was used to test the four hypotheses. The results are presented in Tables 4, 5, and 6 below.

Table 4 presents the model summary, which includes the four independent variables collectively explaining approximately 58.5% of the variance in organizational performance ($R^2 = 0.585$, Adjusted $R^2 = 0.572$), suggesting a strong model fit. The standard error of the estimate was relatively low at 0.458, reflecting a consistent and reliable prediction of performance outcomes based on the included TQM dimensions. The finding reinforces the model's robustness in explaining organizational performance within a public healthcare supply chain context, such as KEMSA

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.765	0.585	0.572	0.458

Source: Survey data, 2025

ANOVA Results

This analysis was significant in testing whether the combined effect of the independent variables on the dependent variable is statistically significant, as presented in Table 5.

Table 5. Anova

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	46.210	4	11.553	55.036	0.000
Residual	32.790	135	0.243		
Total	79.000	139			

Source: Survey data, 2025

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

The Sum of Squares for the regression (46.210) reflects the variation in performance explained by the four independent variables, while the Residual Sum of Squares (32.790) represents the variation that remains unexplained by the model. The Total Sum of Squares (79.000) captures the total variability in the dependent variable. The high F-statistic value and low significance level indicate a strong model fit, reinforcing the findings from the model summary, which demonstrated that the model accounts for approximately 58.5% of the variance in performance. This further supports the reliability of the identified predictors in explaining organizational performance. The significant results confirm that the combined effect of the predictors is meaningful, providing a robust foundation for strategic decision-making within the organization.

Table 6. Regression Coefficients

Variable	Unstandardized Coefficients (B)	Std. Error	Beta	T	Sig.
(Constant)	1.003	0.302		3.322	0.001
Fact-Based Decisions	0.372	0.071	0.338	5.239	0.000
Process-Centric Approach	0.319	0.068	0.298	4.691	0.000
Relationship Management	0.257	0.082	0.223	3.134	0.002
Employee Engagement	0.348	0.075	0.305	4.640	0.000

Source Survey Data, 2025

The following hypotheses, which were conceptualized in chapter two, were tested:

- H_{01} Fact-based decision has no significant effect on the Performance of the Kenya Medical Supplies Authority.
- H_{02} Process-centric approach has no significant effect on the Performance of the Kenya Medical Supplies Authority.
- H_{03} Relationship management has no significant effect on the performance of the Kenya Medical Supplies Authority.
- H_{04} Employee engagement has no significant effect on the Performance of the Kenya Medical Supplies Authority

The regression analysis results in Table 6 provide empirical evidence of how different Total Quality Management (TQM) practices influence organizational performance at KEMSA. The model shows that fact-based decisions significantly predicts performance outcomes ($B = 0.372$, $\beta = 0.338$, $p < 0.001$). This finding suggests that data-driven decisions enhance efficiency and strategic alignment - a result consistent with other studies that emphasize the integration of data into decision-making as a driver of organizational effectiveness (AlKetbi et al., 2020; Kopeć et al., 2022). These findings further

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

corroborate Bungei's (2022) conclusion that adopting a data-driven approach enhances operational performance in manufacturing firms. Additionally, Mkongoh and Kyalo (2023) found that poor data system integration hindered public agency performance, indirectly highlighting the need for a structured data-use system. However, their failure to isolate fact-based decisions introduces a conceptual gap, which the present study bridges by isolating and quantifying its contribution. Mochanga (2020) also emphasized real-time decision-making enabled by MIS, further supporting the significance of factual/data-based decisions in boosting organizational effectiveness and performance.

The results show that the process-centric approach also had a strong positive effect (B = 0.319, β = 0.298, $p < 0.001$). This underlines the importance of standardized, well-documented procedures in ensuring consistency and minimizing operational inefficiencies - an observation supported by Nguyen & Mohamed's (2021) study, which highlighted how process optimization leads to better service quality and operational resilience in public institutions. The findings also confirm Mohammed's (2022) conclusions that process standardization boosts client value and performance. Gombe et al. (2024) similarly reported that process-centric decisions and cycle time optimization improve public service delivery, aligning well with KEMSA's operational objectives. This study's findings demonstrate, within a healthcare distribution context, how TQM's process focus can significantly influence institutional performance.

Findings on employee engagement (B = 0.348, β = 0.305, $p < 0.001$) also emerged as another key predictor of performance. Organizations that promote participatory leadership and empower staff report higher performance levels, as employees are often motivated, productive, and committed to their work (Memon et al., 2020). This aligns with the study of Zaman et al. (2023), which indicated that engaged workforces drive innovation and adaptability, especially in dynamic environments. Other previous studies - Koech and Cheboi (2018) - also pointed to positive relationships in technical institutions and highlighted that engaged employees are critical to SME competitiveness, respectively.

Relationship management also significantly influenced performance (B = 0.257, β = 0.223, $p = 0.002$), confirming that strong collaborations with suppliers, partners, and stakeholders are essential for effective public service delivery. This finding echoes recent empirical research that links strategic stakeholder engagement with improved institutional trust and performance (Chen et al., 2022). The findings also support Kiriinya's (2021) study, which established a positive link between supply chain collaboration and firm performance in the pharmaceutical sector. Similarly, Oduro et al. (2020)

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

confirmed that effective supplier relationships are essential for innovation and competitiveness.

The results indicate that all four TQM constructs considerably influence organizational performance at KEMSA. While correlation analysis suggested weak or non-significant relationships between some constructs and performance, regression analysis revealed their unique predictive contributions when controlling for other variables. This contrast illustrates the complex nature of organizational performance, which may be shaped by multiple interacting factors. Notably, the strong beta weights for fact-based decisions and employee engagement suggest these two areas are the most immediate levers for improving performance outcomes. The absence of a strong bivariate correlation for relationship management may imply that its influence is indirect, possibly mediated by process efficiency or moderated by internal culture.

Conclusion

Fact-based decisions significantly influence organizational performance. The study revealed that employees at KEMSA appreciate the use of data to guide operational and strategic decisions, reflecting a strong understanding of the value of accurate information in optimizing resource allocation, reducing errors, and improving service quality. This alignment with data-driven decisions supports greater accountability and transparency within the organization, which are essential for achieving operational excellence. The process-centric approach was found to be positively impacting performance by promoting consistency and reducing operational variability.

Clearly defined and standardized processes contribute to efficient workflows, improved resource utilization, and enhanced service quality. However, the study identified a need for targeted training and mentorship, particularly for junior and less experienced staff, to bridge the knowledge gap and ensure organization-wide adherence to these best practices. Relationship management emerged as a crucial element in enhancing organizational cohesion and productivity. Effective communication, collaboration, and trust among staff members were associated with better team dynamics and a supportive work environment. However, the findings indicated that senior staff benefit more from these interpersonal relationships, suggesting a need for more inclusive relationship-building efforts across all organizational levels.

Employee engagement was confirmed as a significant driver of performance. Actively involving employees in decision-making and recognizing their contributions as well as their qualifications fosters commitment, motivation, and job satisfaction, ultimately leading to higher organizational performance. However, the study highlighted the need for more inclusive engagement practices to address the concerns of junior staff who

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

may feel less involved in decision-making. The study confirms that TQM practices collectively contribute to enhanced organizational performance. To sustain these improvements, KEMSA must continue to champion a quality-driven culture, promote participatory leadership, and invest in ongoing staff development.

Policy Recommendations

Based on the study's objectives, several recommendations are proposed to enhance the performance of the Kenya Medical Supplies Authority (KEMSA) through the effective implementation of Total Quality Management (TQM) practices. Regarding fact-based decisions, it is recommended that KEMSA leadership establish a structured framework for TQM training across all levels of the organization. This framework should incorporate regular refresher courses to reinforce employees' understanding of quality management tools and data-driven decisions. Furthermore, departmental heads should integrate quality targets into annual performance evaluations to ensure accountability, track improvements, and support a culture that embraces data-informed decisions.

Concerning the process-centric approach**,** middle-level managers and process supervisors should ensure that processes are consistently communicated and reinforced through structured workshops and on-the-job training. Special attention should be given to onboarding and supporting junior staff through routine orientation and training programs that emphasize the organization's process standards. Additionally, regular capacity-building sessions should be held to promote standardized workflows and continuous improvement across departments.

Regarding relationship management**,** senior management should initiate mentorship programs that foster participatory leadership. These programs should be designed to enhance collaboration between senior and junior staff, facilitating knowledge transfer, team cohesion, and improved communication across the organization. Furthermore, the Human Resource Department should formalize coaching programs by pairing experienced staff with new or junior employees, enabling smoother integration and consistent relationship building within teams.

Lastly, in terms of employee engagement**,** the organization should conduct frequent evaluations of human resource utilization. This will help in identifying challenges in optimizing the utilization of human capital, finances, and operational resources, thereby enhancing employee motivation and institutional performance. Job enrichment and enlargement should align with academic and professional qualifications and roles to ensure that employees feel valued, thereby improving the organization's performance. Collectively, these recommendations, if implemented effectively, are expected to

 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

significantly improve service delivery and align KEMSA's operations and core values with public health priorities.

Limitations and Future Research Direction

While the study achieved a strong response rate and used a validated questionnaire, several limitations persist. The cross-sectional design restricts causal inference, and the use of self-reported data may introduce bias. Construct validity was not tested through factor analysis.

Methodologically, the study did not include diagnostic tests for multicollinearity or endogeneity, nor did it control for relevant background variables. These omissions limit the robustness of the regression model. Future research should apply more rigorous econometric techniques, including control variables, diagnostic testing, and longitudinal designs, to enhance the reliability and generalizability of findings.

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 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Appendix A: Survey Instrument Summary Table

This table summarizes the questionnaire items used to measure the independent and dependent variables in the study

Each item was measured using a 5-point Likert scale: (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Variable	Code	Sample Item (1 out 5)	No. of Items	Source/Adapted From
Fact-Based Decisions	X1	Decisions in my department are based on verified data.	5	Otieno et al. (2021); Bungei (2022)
Process-Centric Approach	X2	Our procedures are well documented and standardized.	5	Dogan (2023); Gombe et al. (2024)
Relationship Management	X3	We have strong, collaborative relationships with our suppliers.	5	Kiarie et al. (2024); Oduro et al. (2020)
Employee Engagement	X4	I feel involved in decision-making in my department."	5	Gabra et al. (2019); Li et al. (2019)
Organizational Performance	Y	Service delivery targets are consistently met.	5	Joseph et al. (2024); Gutterman (2023)

Each construct was measured by computing the average score across its respective items.

These composite variables (X1, X2, X3, X4, Y) were then used in regression and correlation analysis.