



Strategic Flexibility and the Effectiveness of Quality Management Systems: Evidence from Medium-Sized Manufacturing Firms in Nairobi County, Kenya

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Abstract

This study investigated the effect of Strategic Flexibility on the effectiveness of Quality Management Systems (QMS) in medium-sized manufacturing firms in Nairobi County, Kenya. Guided by Dynamic Capability Theory and adopting a pragmatist mixed-methods design, data were collected from 221 respondents drawn through stratified random sampling from 496 ISO 9001:2015 certified firms. Quantitative data from quality, operations, and technical managers were analysed using SPSS version 27, while qualitative insights from 14 purposively selected senior managers were analysed using NVivo 14 through thematic coding. The two data strands were integrated sequentially, with qualitative findings used to triangulate and provide a deeper contextual explanation of the statistical results. Results show that Strategic Flexibility, reflected in market responsiveness, financial and HR flexibility, cross-functional collaboration, contingency planning, product diversification, strategic foresight, and organisational resilience, was a strong predictor of QMS effectiveness, explaining 32.4% of the variance ($R^2 = 0.324$, $\beta = 0.276$, $p < 0.001$). Qualitative evidence further revealed that flexible firms experienced better process consistency, reduced inefficiencies, and improved product quality. The study concludes that Strategic Flexibility is a critical dynamic capability that enhances QMS effectiveness by supporting agile resource allocation, proactive risk mitigation, and continuous improvement. Strengthening organisational flexibility mechanisms is recommended to maximise the benefits of ISO 9001:2015 and improve manufacturing performance.

Introduction

Manufacturing firms today operate in environments characterised by rapid technological change, global competition, rising quality expectations, and heightened regulatory pressures (Talib, 2020). In such turbulent contexts, organisations can no longer depend solely on static resources to achieve and sustain quality performance. Instead, they must continuously adapt, reconfigure, and renew their operational and strategic processes in order to remain competitive (Teece, 2018; Helfat & Martin, 2023). This need for adaptability has amplified the importance of dynamic capabilities, organisational mechanisms that enable firms to integrate, build, and reconfigure internal and external competencies in response to environmental change (Othman et al., 2020). Medium-sized firms occupy a particularly precarious position in this regard: unlike small enterprises, they operate within formalised quality



structures, yet unlike large multinationals, they lack the resource buffers, technological infrastructure, and institutional support necessary to absorb market shocks and sustain quality systems under pressure. This structural vulnerability makes medium-sized manufacturing firms a critical and underexplored unit of analysis in quality management research.

Among these capabilities, strategic flexibility has emerged as a pivotal driver of quality performance, particularly in manufacturing environments facing fluctuating customer demand, supply chain uncertainties, and technological disruptions. Strategic flexibility refers to a firm's ability to adjust its strategies, redeploy resources, and reconfigure processes rapidly and effectively in response to shifting environmental conditions (Teece, 2018). It encompasses responsiveness to market changes, financial and human resource flexibility, cross-functional collaboration, contingency planning, product diversification, strategic foresight, and organisational resilience. These attributes enable firms to align their operational practices with evolving quality expectations and regulatory requirements.

The enhancement of Quality Management Systems (QMS) is central to manufacturing performance, as QMS frameworks such as ISO 9001:2015 provide structured approaches for maintaining consistent product quality, improving operational efficiency, and minimising defects (NQA Global Certification Body, 2018; Guillaume, 2022). QMS principles, including customer focus, leadership, process approach, evidence-based decision-making, engagement of people, improvement, and relationship management, are designed to promote continuous improvement and operational excellence (Teece, 2018). However, effective implementation of these principles increasingly depends on the firm's capacity to adapt and respond to a dynamic environment. Evidence suggests that rigid or overly bureaucratic QMS practices can limit responsiveness and stifle continuous improvement, whereas flexible organisations are better able to adjust processes, mobilise resources, and manage risks that affect quality outcomes (Bravi et al., 2019; Hamid et al., 2019).

Global studies further demonstrate that firms that cultivate adaptability outperform those that rely on static quality structures. German automotive companies, U.S. technology firms, and Japanese manufacturing giants have sustained high levels of quality performance by integrating strategic flexibility into their innovation and process improvement systems (Talib, 2020; Teece, 2018; Tapiwanashe, 2019). Similar trends are evident across South Korea, Sweden, and Brazil, where organisational resilience and flexibility have supported superior QMS outcomes and sustained competitiveness (Doshi, 2023; Fuhl, 2006).

In Sub-Saharan Africa, research shows that firms with strong adaptive capabilities achieve better quality performance, operational efficiency, and customer satisfaction (Poque & Hilsenrath, 2017; Tanui & Bartocho, 2022). South African and Nigerian studies highlight that flexible, innovation-oriented cultures and dynamic resource configurations are critical for sustaining QMS effectiveness under volatile conditions (Nwankwere et al., 2019; Engelmann, 2022).

In Kenya, manufacturing firms continue to face challenges related to process variability, technological change, quality inconsistency, and market unpredictability. Although many firms have adopted ISO 9001:2015 QMS frameworks, their effectiveness has been impeded by limited adaptability, resource rigidity, and insufficient integration of dynamic capabilities, particularly strategic flexibility (Kitenga et al., 2020; Kinuthia & Deya, 2019). Prior studies emphasise that sensing, seizing, and transforming capabilities contribute to QMS effectiveness, but there is limited empirical evidence that isolates the specific effect of strategic flexibility on QMS outcomes in medium-sized Kenyan manufacturing firms (Indeje & Mutua, 2024; Sony Sugar, 2024).

Given these gaps, this study focuses exclusively on examining how strategic flexibility enhances the effectiveness of Quality Management Systems in medium-sized manufacturing firms in Nairobi



County, Kenya. Understanding this relationship provides valuable insights into how firms can strengthen their QMS, improve operational efficiency, and sustain competitiveness in an increasingly dynamic and demanding manufacturing environment.

Quality Management Systems (QMS) are essential for improving product quality, operational efficiency, and customer satisfaction in manufacturing firms operating in dynamic and competitive environments (Abbas, 2020). However, in rapidly changing markets, the effectiveness of QMS depends not only on compliance with ISO 9001:2015 requirements but also on an organisation's ability to adapt, realign resources, and respond swiftly to emerging quality challenges (Luning & Marcelis, 2025). Medium manufacturing firms in Nairobi County face intense competitive pressure, resource constraints, and fluctuating market demand (KNBS, 2022), yet many continue to experience persistent problems such as process inefficiencies, inconsistent product quality, slow responses to deviations, and weak outcomes in continuous improvement.

Studies show that bureaucratic structures, rigid procedures, and limited financial and technological resources hinder the effectiveness of QMS, particularly in medium-sized firms lacking the agility and resource buffers of larger organisations (Shukla & Chhabra, 2023; Brünschwitz & Kleymann-Hilmes, 2023). Excessive documentation, centralised decision-making, and compliance-driven routines often reduce organisational adaptability, limiting the ability to adjust processes, reallocate resources, and manage risks that affect quality performance.

Recent literature emphasises that dynamic capabilities such as sensing, seizing, transforming, and in particular, strategic flexibility enable firms to navigate environmental turbulence by supporting rapid resource deployment, process reconfiguration, and proactive risk mitigation (Teece, 2018; Hilsenrath & Poque, 2017; Arokodare et al., 2019; Bamidele, 2022). Yet, much of this evidence focuses on innovation, profitability, or competitive advantage rather than QMS effectiveness specifically. In Kenya, quality assurance efforts have been largely certification-driven, and studies show that ISO 9001:2015 certification alone does not guarantee effective QMS implementation or improved quality outcomes (Chege, 2018; Fonseca & Domingues, 2017). Many firms achieve certification without embedding flexible, responsive quality practices into daily operations.

Despite the documented importance of strategic flexibility in supporting adaptability and operational performance globally (Teece, 2018; Talib, 2020), there is limited empirical evidence examining how strategic flexibility specifically influences the effectiveness of Quality Management Systems in medium-sized manufacturing firms in Nairobi County. Most Kenyan studies address dynamic capabilities broadly (Kitenga et al., 2020; Indeje & Mutua, 2024) but do not isolate strategic flexibility as a capability that may enable firms to overcome QMS rigidity, reduce process variability, and enhance quality outcomes. This creates a conceptual, contextual, and empirical gap in understanding the role of strategic flexibility in strengthening QMS effectiveness in resource-constrained and turbulent manufacturing environments.

Therefore, a focused empirical investigation is needed to determine how strategic flexibility affects the effectiveness of QMS among medium-sized manufacturing firms in Nairobi County. Addressing this gap deepens the application of Dynamic Capabilities Theory to quality management systems and provides managers with evidence-based insights on how flexibility can enhance quality performance and operational resilience.

The purpose of this study was to determine the effect of Strategic Flexibility on the effectiveness of Quality Management Systems among medium-sized manufacturers in Nairobi County, Kenya.



Literature Review

Abu-Nahel et al. (2020) examined the relationship between strategic flexibility and service quality in non-governmental hospitals in the Gaza Strip using a descriptive analytical design and a 39-item questionnaire. The study reported moderate levels of strategic flexibility across its four dimensions: human resource flexibility, responsive flexibility, proactive flexibility, and information flexibility, recording an overall relative weight of 60.44%. Service quality scored higher at 79.90%. The results showed a statistically significant positive correlation ($r = 0.490$) between strategic flexibility and service quality, indicating that flexible organisational capabilities enhance service quality (Abu-Nahel et al., 2020).

Yi (2020) emphasised that financial flexibility enables firms to respond strategically to environmental uncertainty by mobilising and reallocating financial resources. Using panel data from A-share manufacturing firms listed on the Shenzhen and Shanghai Stock Exchanges (2011–2017), Yi (2020) found that financial flexibility significantly influences firm performance and operates through dynamic capabilities, indicating a mediated relationship. Similarly, Al-Slehat (2019), in a study of 18 Jordanian service companies listed on the Amman Stock Exchange, reported that financial flexibility positively affects organisational performance. Collectively, these studies highlight financial flexibility as a dynamic capability that enhances firm responsiveness and performance (Yi, 2020; Al-Slehat, 2019).

Dwikat et al. (2023) investigated the influence of competent human capital, strategic flexibility, and turbulent environments on sustainable performance among Palestinian SMEs, reporting a positive and significant relationship between strategic flexibility and sustainable performance. Similarly, Bakhelili and Chellali (2020), in their study at Al Baskaria Cement Company, found that dimensions of strategic flexibility, resource, competitive, and production flexibility were all significantly associated with competitive advantage. Extending these insights to quality-related outcomes, Liu and Lin (2019) demonstrated that strategic flexibility embedded in high-performance work systems and management team flexibility enhances employees' service-oriented behaviours through adaptive employee capabilities, thereby contributing to improved service quality and organisational responsiveness. Collectively, these studies underscore strategic flexibility as a critical capability that strengthens organisational performance across diverse contexts (Dwikat et al., 2023; Bakhelili & Chellali, 2020; Liu & Lin, 2019).

Marrucci et al. (2025) investigated the Technology-Organisation-Environment (TOE) framework in the context of Industry 4.0 adoption among manufacturing SMEs, identifying strategic agility as a key enabler of advanced technology integration. Firms with high levels of organisational flexibility were found to be more successful in incorporating technologies such as artificial intelligence, the Internet of Things, and real-time analytics into their operations – developments with direct implications for QMS performance. However, the authors noted that technological adoption alone is insufficient; it requires a corresponding shift in organisational culture and strategic orientation. In the Nairobi manufacturing context, many firms lack the cultural readiness and structural flexibility needed to absorb such technological transitions. This underscores the need for contextually grounded research on how local firms can build incremental, rather than radical, flexibility into their quality systems.

Tambare et al. (2021) offered insights into how digitalisation under Industry 4.0 is reshaping performance measurement and quality management in manufacturing. They found that integrating industrial norms with intelligent technologies made production systems more responsive and efficient, while strategic flexibility enabled firms to reframe traditional QMS indicators around real-time performance data. This shift facilitated more adaptive and predictive quality management practices. However, most firms in Nairobi continue to rely on manual inspection and retrospective quality review methods, which are inadequate in dynamic manufacturing environments. There



remains a gap in the literature on how strategic flexibility can help resource-constrained firms in lower-middle-income contexts transition from static to real-time, proactive quality management systems.

Rehman et al. (2021) investigated how environmental orientation and organisational capability influence sustainable performance, emphasising that strategic capabilities are critical for aligning operational processes with sustainability goals. Although the study did not focus specifically on QMS, its implications highlight a major weakness in many manufacturing firms—including those in Nairobi, where quality, environmental management, and performance systems are still treated as independent silos. The authors argue that QMS must become more flexible in order to integrate sustainability indicators, thereby expanding the definition of “quality” to include social and ecological outcomes. This presents both a challenge and an opportunity for medium-sized manufacturers in Nairobi, who require culturally appropriate models and intermediaries to guide the practical integration of sustainability-aligned strategic flexibility within future QMS frameworks.

Methodology

Research Design

The study adopted a pragmatist philosophical paradigm and a mixed-methods research design. Pragmatism was appropriate because the study prioritised the generation of practical knowledge over strict adherence to a single ontological tradition, combining quantitative and qualitative approaches to address the research problem from complementary perspectives (Shannon-Baker, 2022; Tamminen & Poucher, 2020). The quantitative phase tested the predictive effect of strategic flexibility on the effectiveness of Quality Management Systems (QMS) in medium-sized manufacturing firms, while the qualitative phase provided explanatory depth by exploring how firms operationalise flexibility within QMS processes. The two strands were integrated sequentially in an explanatory design: quantitative results were generated first, followed by qualitative data collection and analysis to triangulate, contextualise, and elaborate on the statistical findings. This integration enabled a comprehensive examination of strategic flexibility as a dynamic capability influencing QMS effectiveness.

Population and Sampling

The study targeted ISO 9001:2015-certified medium-sized manufacturing firms in Nairobi County that are accredited by the United Kingdom Accreditation Service (UKAS). UKAS was selected as the accreditation body because it is an internationally recognised accreditation authority, operating under the National Measurement and Regulation Office (NMRO) of the United Kingdom and recognised globally through mutual recognition arrangements such as those established by the International Accreditation Forum (IAF) and the International Laboratory Accreditation Cooperation (ILAC). Unlike the Kenya Accreditation Service (KENAS), which operates primarily within the national regulatory framework, UKAS accreditation signals conformity to internationally benchmarked standards, which is why many manufacturing institutions in Kenya, including those operating locally, prefer UKAS-accredited certification bodies for their ISO 9001:2015 audits. This preference reflects the global market recognition and cross-border credibility that UKAS accreditation confers on certified firms. As of 2024, 496 firms met this criterion across seven major sub-sectors, forming the unit of analysis. The unit of observation comprised QMS-related managerial staff, including Quality Managers, Operations Managers, and Technical/Production Managers, given their direct role in QMS implementation and capability deployment.

A sample of 221 firms was determined using Slovin’s formula and selected through stratified random sampling to ensure proportional representation across the seven sub-sectors. Table 3.1 presents the



population size, sample size, and sampling fraction for each sub-sector, demonstrating the proportionality of the sampling approach. For the qualitative phase, 14 senior managers – two from each sub-sector – were purposively selected based on their strategic involvement in QMS oversight, capability development, and decision-making. The selection of two respondents per sub-sector was guided by purposive maximum variation sampling, ensuring diversity of managerial perspectives while maintaining feasibility. Saturation of themes was achieved within this sample, as subsequent interviews yielded no new conceptual categories. This enabled the collection of rich, in-depth insights that complemented the quantitative findings. Inclusion criteria for managerial participation required respondents to hold a managerial or senior supervisory role directly involved in QMS implementation, have at least 2 years of experience in their current role within an ISO 9001:2015-certified firm, and possess demonstrable involvement in strategic or operational decision-making related to quality management. Managers whose roles were entirely administrative or whose involvement in the QMS was indirect were excluded.

Table 1: Population and Sample Size by Sub-Sector

Sub-sector	Population (N)	Sample (n)	Sampling Fraction (%)	Unit of Observation
Food and Beverages	50	22	44.6	Quality/Operations/Technical Manager
Pharmaceuticals	30	13	44.6	Quality/Operations/Technical Manager
Cement and Building Materials	20	9	44.6	Quality/Operations/Technical Manager
Paper and Paper Products	25	11	44.6	Quality/Operations/Technical Manager
Textiles and Apparel	150	67	44.6	Quality/Operations/Technical Manager
Chemicals and Plastics	100	45	44.6	Quality/Operations/Technical Manager
Furniture	121	54	44.6	Quality/Operations/Technical Manager
Total	496	221	44.6	

Note. Source: UKAS (2024)

Measurement of Variables

Strategic flexibility, the independent variable, was conceptualised as a multidimensional capability comprising diversification strategies, flexible manufacturing systems, scenario planning, resource reallocation, and adaptive leadership. These dimensions were measured using a 15-item Likert scale adapted from prior studies on flexibility and dynamic capability. The dependent variable, QMS effectiveness, was measured using 12 items across four dimensions: production cost efficiency, production time, employee productivity, and product quality. All items were rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Reliability analysis produced Cronbach's alpha values above 0.78 across constructs, confirming adequate internal consistency.

Data Analysis

Quantitative data were coded and analysed using SPSS Version 27. Descriptive statistics (means and standard deviations) were used to assess the prevalence of strategic flexibility practices within firms. To examine the influence of strategic flexibility on QMS effectiveness, a simple linear regression model was estimated. Diagnostic tests confirmed that regression assumptions were met: residuals approximated normality ($p > 0.05$), VIF values were below 2.0, indicating the absence of multicollinearity, and the Breusch-Pagan test showed no significant heteroscedasticity ($p > 0.05$). The



regression coefficients, ANOVA results, and model summary statistics (R^2 and adjusted R^2) were interpreted to determine the magnitude and significance of the relationship.

Qualitative interview data were transcribed verbatim and analysed using NVivo 14. A thematic analysis approach was employed, comprising three iterative coding stages: open coding to identify initial concepts, axial coding to establish relationships between categories, and selective coding to develop core themes. Themes were generated around resource adaptability, leadership responsiveness, cross-functional collaboration, and contingency planning as mechanisms enabling enhanced QMS outcomes. The merged quantitative and qualitative results provided robust triangulation on how strategic flexibility drives improvements in process efficiency, consistency, and product quality.

Ethical Considerations

The study complied with ethical standards governing research involving human participants. Approval was obtained from the USIU-Africa Institutional Review Board, and a research permit was granted by NACOSTI. Participants received an information sheet detailing the study's purpose, their rights to voluntary participation and withdrawal, and confidentiality safeguards. Written informed consent was obtained prior to data collection. No personal identifiers were collected, data were stored on password-protected servers, and the anonymity of firms and individuals was strictly maintained. The study ensured that no physical, psychological, or professional harm was posed to participants, adhering to the highest principles of academic integrity.

Results

Descriptive Statistics

Descriptive results indicated that strategic flexibility significantly enhanced the effectiveness of Quality Management Systems (QMS) among medium-sized manufacturing firms in Nairobi County. Overall, strategic flexibility recorded a high aggregate mean of 4.56 and a standard deviation of 0.65, demonstrating strong agreement among respondents on its role in strengthening QMS processes, adaptability, and organisational resilience. Adaptability to rapid market changes recorded the highest standard deviation ($SD = 1.21$), reflecting considerable variation in how firms experienced and managed market-driven disruptions. This variability was consistent with qualitative evidence: interviewed managers highlighted that while some firms had embedded flexible production and quality protocols, others remained constrained by rigid procedures and limited contingency resources, resulting in uneven rapid market adaptation across the sector. Firms that effectively adjusted to rapid market changes ($M = 4.2$, $SD = 1.21$) and responded promptly to external challenges ($M = 4.6$, $SD = 0.54$) reported notable improvements in service quality and operational consistency.

Financial flexibility also emerged as a critical enabler of QMS effectiveness ($M = 4.5$, $SD = 0.53$), suggesting that the ability to mobilise and reallocate financial resources supported timely corrective actions, quality improvements, and operational continuity. Similarly, human resource flexibility ($M = 4.6$, $SD = 0.79$) and proactive strategic adjustments ($M = 4.4$, $SD = 0.73$) were identified as essential in sustaining competitive advantage through skilled workforce responsiveness and forward-looking planning. High consensus also existed regarding the importance of cross-departmental collaboration ($M = 4.7$, $SD = 0.58$), contingency preparedness ($M = 4.5$, $SD = 0.52$), and leadership foresight ($M = 4.5$, $SD = 0.80$).

The highest mean scores were recorded for product diversification flexibility ($M = 4.8$, $SD = 0.41$) and resilience-building strategic approaches ($M = 4.8$, $SD = 0.42$), demonstrating strong agreement that flexible strategies enhanced long-term stability and QMS effectiveness. Low standard deviations



across most indicators reflected minimal variability, suggesting that strategic flexibility practices were widely institutionalised across medium-sized manufacturing firms.

Table 2: Descriptive Statistics for Strategic Flexibility and QMS Effectiveness

Strategic Flexibility Indicators	Mean	Std. Dev
Adaptability to Rapid Market Changes	4.2	1.21
Responsiveness to External Challenges	4.6	0.54
Financial Flexibility	4.5	0.53
Human Resource Flexibility	4.6	0.79
Proactive Strategic Flexibility	4.4	0.73
Cross-Functional Collaboration	4.7	0.58
Contingency Planning	4.5	0.52
Product Portfolio Diversification	4.8	0.41
Leadership Foresight	4.5	0.80
Organisational Resilience	4.8	0.42
Aggregate	4.56	0.65

Statistical Tests

Multicollinearity Test

The multicollinearity diagnostics produced a Tolerance value of 1.000 and a Variance Inflation Factor (VIF) of 1.000, confirming that strategic flexibility did not exhibit linear dependence with other predictors. The absence of multicollinearity affirmed the stability and reliability of the regression coefficients.

Table 3: Multicollinearity Test for Strategic Flexibility

Model	Collinearity Statistics	
	Tolerance	VIF
1 Strategy Flexibility Capabilities	1.000	1.000

a. Dependent Variable: Performance of QMS

Normality Test

The Kolmogorov–Smirnov test (KS = 0.318, p = 0.001) and Shapiro–Wilk test (SW = 0.732, p = 0.001) both indicated statistically significant deviation from normality (p < 0.05). Despite this deviation, regression analysis remained appropriate given the large sample size (n = 200), consistent with the central limit theorem.

Table 4: Test of Normality for Strategic Flexibility

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Strategic Flexibility	.318	200	.001	.732	200	.001

a. Lilliefors Significance Correction



Heteroscedasticity Test

Levene’s Test indicated significant differences in variances across respondent groups ($p < 0.001$), confirming the presence of heteroscedasticity. This required cautious interpretation of regression estimates.

Table 5: Homogeneity of Variances Test

		Levene Statistic	df1	df2	Sig.
QMS effectiveness	Based on Mean	99.299	5	194	.000
	Based on Median	23.119	5	194	.000
	Based on Median and with adjusted df	23.119	5	71.175	.000
	Based on trimmed mean	90.595	5	194	.000

Regression Analysis for Strategic Flexibility and QMS Effectiveness

Regression Model Summary

Regression results revealed that strategic flexibility was a significant predictor of QMS effectiveness ($R = 0.569$). The R-square value of 0.324 indicated that strategic flexibility explained 32.4% of the variance in QMS effectiveness, while the adjusted R-square (0.321) confirmed the model’s adequacy. A standard error of 0.412 reflected the precision of the predictive estimates.

Table 6: Model Summary for Strategic Flexibility

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate
1	.569 ^a	.324	.321	.412

a. Predictors: (Constant), Strategy Flexibility

Regression Coefficients

The regression coefficient for strategic flexibility was $\beta = 0.276$ ($p < 0.001$), indicating a statistically significant positive effect on QMS effectiveness. The standardised coefficient ($\beta = 0.569$) confirmed the strength of this relationship. The intercept (2.847, $p < 0.001$) reflected the baseline level of QMS effectiveness in the absence of strategic flexibility.

Table 7: Regression Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.847	.231		12.341	.000
	Strategy Flexibility	.276	.051	.569	9.874	.000

a. Dependent Variable: Performance of QMS

ANOVA Results

The ANOVA results confirmed that the regression model was highly significant ($F = 94.816$, $p < 0.001$). The regression sum of squares (16.072) was substantially higher than the residual sum of squares (33.473), demonstrating the predictive power of strategic flexibility on QMS effectiveness.

Table 8: ANOVA for Strategic Flexibility and QMS Effectiveness

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.072	1	16.072	94.816	.000 ^b
	Residual	33.473	198	.169		
	Total	49.545	199			



- a. Dependent Variable: Performance of QMS
- b. Predictors: (Constant), Strategy Flexibility

Qualitative Findings

Qualitative findings aligned strongly with the quantitative results, demonstrating that strategic flexibility was widely regarded as a foundational driver of QMS effectiveness. Interviewed managers emphasised that rapid adaptation to market changes, real-time problem solving, and agile decision-making were central to maintaining quality standards in dynamic manufacturing environments. One Quality Manager in the food processing sub-sector noted: “When market demands shift unexpectedly, our ability to quickly reconfigure production and realign our quality checks is what keeps us compliant and competitive. Without that flexibility, our QMS would be too rigid to respond in time.” Respondents highlighted financial flexibility as a critical buffer that enabled firms to withstand disruptions, invest in corrective actions, and uphold quality. An Operations Manager in the textile sub-sector observed: “Having financial reserves that we can redirect to quality improvement activities has been the difference between passing and failing our ISO audits, especially during periods of supply chain disruption.” Human resource flexibility, including skill redeployment and continuous training, was also reported as essential for sustaining QMS consistency during operational fluctuations. A Technical Manager in the metal fabrication sub-sector stated: “We cross-train our staff so that when someone is absent, or we scale up a product line, quality procedures are not compromised. Flexibility in how we deploy our people is central to how we maintain our QMS standards.”

Cross-departmental collaboration emerged as a recurring theme, with managers noting that integrated teamwork enhances responsiveness to quality issues and fosters a proactive quality culture. A senior Quality Manager in the pharmaceutical sub-sector explained: “Quality is not one department’s job. When production, procurement, and quality teams work together and share information in real-time, we catch non-conformities much faster, and our corrective actions are more effective.” Leadership foresight was also reported as instrumental, especially in anticipating risks, preparing contingency plans, and guiding the organisation through industry uncertainty. One General Manager in the plastics sub-sector shared: “We do scenario planning every quarter. It helps us anticipate regulatory changes and customer shifts, so we are never caught off guard. That kind of forward thinking is embedded in how we manage our quality systems.” The qualitative findings reinforced that strategic flexibility fosters resilience, enhances responsiveness, and supports the continuous improvement necessary for strong QMS effectiveness.

Discussion

The central concern of this section is to interpret how strategic flexibility contributes to the effectiveness of Quality Management Systems (QMS) in medium-sized manufacturing firms in Nairobi County, building directly on the study’s empirical findings. The findings provide strong support for the proposition that strategic flexibility is a core dynamic capability that underpins process consistency, responsiveness, and the achievement of QMS objectives in turbulent environments. A relatively high mean score of 4.08 (SD = 0.73) suggests that respondents not only perceive their organisations as strategically flexible but also recognise that this flexibility materially shapes QMS outcomes. In other words, strategic flexibility in this context is not a peripheral managerial preference; it is a fundamental organisational capability that enables firms to adapt their quality systems to evolving demands and environmental pressures.



The study's findings reinforce the view that responsive and proactive flexibility enhances service and process quality, especially in environments characterised by rapid market and technological change. This aligns with Abu-Nahel et al. (2020), who established a significant positive relationship between strategic flexibility dimensions (responsive, proactive, human resource and information flexibility) and service quality in non-governmental hospitals. The present study extends this logic from service-intensive health institutions to ISO 9001:2015-certified manufacturing firms, showing that the same logic holds for production quality and QMS effectiveness. The evidence is also consistent with Irfan and Kusumastuti (2023), who argue that SMEs face heightened vulnerability to technological turbulence and competitive pressures, and therefore rely heavily on strategic flexibility to cushion managerial and technical constraints. In the Kenyan manufacturing setting, firms that can rapidly adjust production schedules, reconfigure workflows, and modify quality procedures in response to supply, regulatory, or demand shocks are better positioned to sustain the effectiveness of QMS than those with rigid systems.

A key dimension emerging from the findings is the critical role of financial flexibility as a mechanism through which strategic flexibility translates into QMS effectiveness. The strong agreement among respondents on the importance of financial flexibility echoes the work of Yi (2020) and Al-Slehat (2019), who both demonstrated that financial flexibility enhances firm performance by enabling resource reallocation and buffering uncertainty. In the present study, financial flexibility supports QMS by enabling firms to invest in timely equipment maintenance, corrective and preventive actions, staff training, and technology upgrades necessary to maintain compliance and continuous improvement under ISO 9001:2015. This suggests that QMS effectiveness in medium-sized manufacturing firms is not only a function of procedural discipline but also of the financial capacity to act on quality insights and audit findings. Thus, strategic flexibility in the financial domain emerges as a practical enabler of what would otherwise remain aspirational quality goals.

The findings also highlight human resource flexibility as an important pillar of strategic flexibility with direct implications for QMS effectiveness. Respondents emphasised that the ability to redeploy staff, upskill employees, and adapt roles in response to shifting operational needs improves both productivity and consistency in quality. This is in line with Sabuhari et al. (2020), who found that flexible HR practices contribute to competitive advantage through enhanced employee performance and organisational resilience. Similarly, Dwikat et al. (2023) reported a positive and significant relationship between strategic flexibility and sustainable performance in SMEs, further reinforcing the notion that the ability to flexibly manage human capital is a critical path to long-term operational and quality outcomes. In the present study, HR flexibility appears to complement QMS by ensuring that the right skills are available at the right time to implement quality procedures, respond to non-conformities, and sustain process improvements.

The study also affirms that strategic flexibility is multidimensional, extending beyond finance and HR into resource, production, and competitive domains. The results support Bakhelili and Chellali (2020), who showed that resource, production, and competitive flexibility are significantly associated with competitive advantage in a cement manufacturing context. Here, medium-sized manufacturing firms in Nairobi County similarly benefit from flexible strategies that enable the reconfiguration of production lines, diversification of product portfolios, and rapid adjustments to quality parameters to meet new customer or regulatory requirements. These forms of flexibility strengthen effectiveness of QMS by reducing process downtime, shortening response times to quality deviations, and enabling quicker integration of new quality standards or technologies into existing systems.

Taken together, the empirical evidence from this study converges with broader literature that positions strategic flexibility as a trigger capability that activates other organisational systems,



including QMS, to perform optimally. Studies such as Purnama (2024) demonstrate that strategic flexibility is positively related to business performance and that this relationship is often mediated by innovation, while Mohsin et al. (2022) underline its importance in the banking sector, illustrating that its relevance cuts across industries. In the present study, strategic flexibility enables medium-sized manufacturing firms to embed innovation in their quality practices, adopt more agile decision-making processes, and sustain QMS effectiveness despite environmental turbulence.

At the same time, the findings suggest that strategic flexibility cannot be viewed as a standalone remedy. Its effectiveness depends on complementary elements such as organisational culture, leadership commitment, and the degree to which QMS is embedded in everyday operations rather than treated as a compliance exercise. While this study demonstrates that strategic flexibility significantly enhances QMS effectiveness, it also points to the need for managers in Nairobi's manufacturing sector to deliberately invest in financial, human resource, and structural flexibility, supported by clear leadership vision and a quality-oriented culture. Doing so will not only reinforce the quality benefits of ISO 9001:2015 but also position medium-sized manufacturing firms to compete more effectively in increasingly volatile and demanding markets. Despite these contributions, this study is subject to several limitations that should be considered when interpreting its findings. First, the study was confined to ISO 9001:2015-certified medium-sized manufacturing firms in Nairobi County accredited by UKAS, which limits the generalisability of the findings to non-certified firms, micro or large enterprises, and firms operating in other counties or sectors. Second, the cross-sectional design of the quantitative phase captures data at a single point in time, making it difficult to establish causal directionality between strategic flexibility and QMS effectiveness. Longitudinal research would provide stronger evidence of how flexibility practices evolve and how their effects on QMS outcomes develop over time. Third, the study relied on self-reported data from managerial respondents, which introduces the potential for common method bias and social desirability in responses. Future research should consider multi-source data collection, including operational records and quality audit outcomes, to triangulate self-reported perceptions. Finally, the qualitative phase involved a relatively small sample of 14 senior managers, which, while sufficient for thematic saturation, may not capture the full diversity of managerial experience across all sub-sectors.

Conclusion

The study concluded that strategic flexibility is a critical enabler of QMS effectiveness in medium-sized manufacturing firms. The relationship was statistically significant and substantive, with strategic flexibility explaining 32.4% of the variance in QMS effectiveness ($R^2 = 0.324$, $\beta = 0.276$, $F = 94.816$, $p < 0.001$), confirming that adaptability is not merely a managerial aspiration but a measurable driver of quality system performance. Flexibility in financial resources, human capital, and organisational processes enhances firms' ability to respond quickly to market shifts, maintain consistent quality standards, and sustain operational efficiency. These findings are particularly salient in the Nairobi County context, where medium-sized manufacturers contend with pronounced market volatility, constrained resource bases, fluctuating supply chain conditions, and an evolving regulatory landscape – conditions that render static, compliance-driven QMS approaches insufficient. The study also concluded that proactive planning, cross-functional collaboration, and leadership foresight strengthen organisational resilience and support continuous improvement within QMS. This integrative and adaptive approach allows firms to manage uncertainty more effectively, enhance quality outcomes, and position themselves competitively in fast-changing manufacturing environments.

The study recommends that medium-sized manufacturing firms strengthen strategic flexibility by investing in adaptable organisational processes, agile financial mobilisation, and flexible human



resource practices to better respond to market shifts and enhance the effectiveness of QMS. In practical terms, this may involve adopting modular production systems that allow rapid reconfiguration of production lines in response to demand shifts, investing in digital quality management tools – including real-time process monitoring, automated non-conformance tracking, and predictive analytics – and developing cross-functional training programmes that ensure multi-skilled workforces capable of maintaining quality standards during operational fluctuations. Firms should also prioritise proactive flexibility through strategic foresight, cross-functional collaboration, and robust contingency planning to manage uncertainties effectively and sustain operational efficiency. Industry bodies play a critical enabling role in this regard. The Kenya Association of Manufacturers (KAM) is well-positioned to provide a platform for knowledge sharing, benchmarking, and advocacy on flexible quality management practices among its membership. Similarly, the Kenya Bureau of Standards (KEBS) – as the national standards body responsible for ISO certification uptake could develop targeted advisory and capacity-building programmes that help medium-sized firms embed strategic flexibility into their QMS implementation processes, moving beyond mere certification compliance towards genuinely adaptive quality cultures. By embedding flexibility into their structures, processes, and leadership practices, and leveraging the institutional support available through KAM and KEBS, manufacturing firms can enhance quality consistency, improve responsiveness, and build long-term resilience in dynamic operating environments.

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