



OPERATIONAL EFFICIENCY STRATEGIES AND OPERATIONAL PERFORMANCE IN KENYA'S AVIATION INDUSTRY: THE MEDIATING ROLE OF SERVICE QUALITY

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Abstract:

Operational performance is a key indicator of efficiency and competitiveness in the aviation industry. It is commonly measured using indicators such as on-time performance, aircraft utilization, load factors, fuel efficiency, and operational disruptions. The general objective of the study was to determine the effect of operational efficiency strategies on operational performance in Kenya's aviation industry. Specifically, the study examined the effect of strategic fleet management, digital technology integration in operations, turnaround time optimization, and competency alignment on operational performance. In addition, the study assessed the mediating effect of service quality on the relationship between operational efficiency strategies and operational performance. The study was anchored on the Resource-Based View Theory, Dynamic Capabilities Theory, and Service Quality Theory and adopted an explanatory research design. The target population comprised 320 employees in Kenya's aviation industry working in the Operations Management, Engineering, Human Resource, and Training departments. A sample of 178 respondents was selected using stratified random sampling to ensure proportional representation across departments. Primary data were collected using structured questionnaires. A pilot study involving 18 respondents (10% of the sample) was conducted to test reliability, with Cronbach's Alpha used to assess internal consistency, while validity was determined using the Content Validity Index. Data were coded and analyzed using the Statistical Package for Social Sciences (SPSS). Both descriptive and inferential statistics were applied, including means, standard

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deviations, and correlation analysis to test relationships and mediation effects. The findings showed that strategic fleet management ($\beta = 0.50$, $p < 0.005$) and turnaround time optimization ($\beta = 0.53$, $p < 0.005$) significantly enhanced operational performance, while digital technology integration had a significant negative effect ($\beta = -0.24$, $p = 0.05$), indicating possible implementation challenges. Service quality significantly mediated the relationship between operational efficiency strategies and operational performance ($\beta = 0.0318$, $p = 0.0478$), strengthening these effects. Overall, operational efficiency strategies improved performance, with service quality playing a reinforcing role. The study recommended investment in fleet systems, turnaround optimization, effective digital technology adoption, staff training, and continuous service quality improvement to enhance operational efficiency in Kenya's aviation industry.

JEL: L93, M11, L25

Keywords: operational efficiency strategies, service quality, operational performance, aviation industry

1. Introduction

The aviation industry plays a critical role in facilitating international trade, tourism, investment, and economic growth. According to the International Air Transport Association (IATA, 2024), the global aviation sector supports millions of jobs and contributes significantly to world GDP through passenger and cargo transportation. As competition intensifies and customer expectations continue to evolve, airlines are increasingly adopting operational efficiency strategies aimed at reducing costs, improving service delivery, and enhancing operational performance. These strategies include fleet optimization, digitalization of processes, predictive maintenance, route rationalization, and efficient resource utilization (ICAO, 2016).

Globally, operational efficiency has become a major determinant of service quality and organizational performance in the aviation sector. Airlines that effectively manage aircraft utilization, turnaround times, scheduling systems, and operational costs are better positioned to provide reliable, timely, and customer-centered services. Studies have shown that improvements in operational efficiency contribute positively to customer satisfaction, profitability, and overall competitiveness. However, airlines worldwide continue to face challenges such as rising fuel prices, supply chain disruptions, labour shortages, and fluctuating passenger demand, all of which affect operational performance (Nielsen & Rasmussen, 2021).

In the African continent, the aviation industry remains an important driver of regional integration and economic development, although it faces significant operational and infrastructural challenges. According to the African Airlines Association (2024), African carriers account for a relatively small share of global air traffic and continue to experience high operating costs compared to airlines in other regions. Many airlines have

therefore adopted efficiency-enhancing measures such as fleet modernization, digital reservation systems, and route optimization to improve operational sustainability and service quality (Bazargan, 2016).

Within East Africa, airlines have increasingly invested in technology and operational improvements to strengthen competitiveness. Air Tanzania has expanded its fleet through government-supported aircraft acquisitions, while Uganda Airlines has modernized its operations through digital booking platforms and network expansion initiatives. Despite these efforts, airlines in the region continue to encounter challenges related to high operating costs, low passenger volumes on some routes, and limited financial resources, which affect service reliability and long-term performance (Secretariat, 2024).

Kenya possesses one of the most developed aviation sectors in East Africa and serves as a major regional aviation hub. The sector is anchored by Kenya Airways and supported by airports managed by the Kenya Airports Authority (KAA) and regulated by the Kenya Civil Aviation Authority (KCAA). According to KCAA (2024), Kenya's aviation industry continued to grow in passenger and cargo traffic following the recovery from the COVID-19 pandemic, with Jomo Kenyatta International Airport (JKIA) remaining one of Africa's busiest airports. The sector contributes significantly to tourism, trade, employment creation, and regional connectivity (Mpaayei & Sigei, 2025).

Kenya's aviation industry plays a significant role in the country's economic development by facilitating passenger and cargo transportation, supporting tourism, enhancing regional integration, and promoting international trade. Owing to its strategic geographical location, Kenya serves as a major aviation hub in East Africa, connecting the region to global markets through an extensive air transport network. The industry comprises airlines, airport operators, air navigation service providers, ground handling companies, and regulatory agencies whose coordinated activities are essential for ensuring safe, reliable, and efficient air transport services (Nyaga, 2021).

Despite significant investments in fleet modernization, digital technologies, employee development, and process improvements, Kenya's aviation industry continues to face operational performance challenges, including flight delays, schedule disruptions, aircraft downtime, airport congestion, and rising operational costs. Ideally, operational efficiency strategies should deliver on-time departures above 80%, optimal aircraft utilization, reduced turnaround times, and minimal disruptions. However, Kenya Airways reported approximately 72% on-time performance in 2024, below the global benchmark of over 80% (Kenya Airways, 2024). Additionally, passenger traffic at JKIA has exceeded its design capacity of 7.5 million passengers, contributing to congestion and operational inefficiencies (KCAA, 2023). The industry also faces challenges related to grounded aircraft, high fuel costs accounting for more than 30% of operating expenses, and maintenance- and workforce-related disruptions (Reuters, 2024). These challenges suggest that operational efficiency strategies have not yet translated into the expected improvements in operational performance.

Although operational efficiency strategies are widely recognized as important drivers of organizational performance, empirical findings on their effectiveness within Kenya's aviation industry remain limited and inconclusive. Existing studies have largely focused on strategic mergers (Mpaayei & Sigei, 2025), strategy implementation (Anene, 2021), competitive advantage (Bett & Njuguna, 2022), turnaround strategies (Nduta & Deya, 2020), and strategic planning (Kageni & Kariuki, 2025). While these studies provide valuable insights, they do not comprehensively examine how specific operational efficiency strategies influence operational performance within the aviation sector. Furthermore, most studies have treated service quality as an independent outcome rather than examining its role as a mechanism through which operational efficiency strategies affect operational performance.

As a result, there is limited empirical evidence on the combined effect of strategic fleet management, digital technology integration, turnaround time optimization, and competency alignment on operational performance in Kenya's aviation industry. Additionally, the mediating role of service quality in this relationship remains insufficiently explored. This knowledge gap limits the ability of aviation stakeholders to identify and implement the most effective operational interventions. Therefore, this study sought to determine the effect of operational efficiency strategies on operational performance in Kenya's aviation industry, with service quality examined as a mediating variable.

The general objective of the present study was to determine the effect of operational efficiency strategies on operational performance and the mediating effect of service quality in Kenya's aviation industry. Specifically, the study aimed to assess the effect of strategic fleet management on the operational performance of Kenya's aviation industry, to establish the effect of digital technology integration on the operational performance of Kenya's aviation industry, to determine the effect of turnaround time optimization on the operational performance of Kenya's aviation industry, to analyze the effect of competency alignment on the operational performance of Kenya's aviation industry and to examine the mediating effect of service quality on the relationship between operational efficiency strategies and operational performance in Kenya's aviation industry.

2. Literature Review

2.1 Theoretical Literature Review

A theoretical review provides the conceptual foundation upon which a study is anchored by examining relevant theories that explain the relationships among the study variables. It helps to establish the theoretical perspectives that guide the understanding of how operational efficiency strategies influence organizational outcomes within the aviation industry. In this study, the theoretical review is anchored in the Resource-Based View (RBV) Theory, Dynamic Capabilities Theory, and Service Quality Theory. These theories collectively explain how internal organizational resources, adaptive capabilities, and

service quality enhancement contribute to improved operational performance. The theories provide a comprehensive framework for understanding the role of strategic fleet management, digital technology integration, turnaround time optimization, competency alignment, and service quality in enhancing the operational performance of airlines operating in Kenya.

2.1.1 Resource-Based View Theory

The Resource-Based View (RBV) Theory was advanced by Barney (1991) and remains one of the most influential frameworks in strategic management. The theory explains how organizations achieve sustainable competitive advantage through the effective utilization of internal resources and capabilities. RBV posits that superior organizational performance results from the possession and strategic deployment of valuable, rare, inimitable, and non-substitutable (VRIN) resources. Such resources enable organizations to implement strategies that competitors find difficult to imitate or substitute (Barney, 2022). In organizational settings, RBV emphasizes that technology, infrastructure, human capital, and operational capabilities constitute critical internal resources that drive efficiency and long-term competitiveness (Kozlenkova *et al.*, 2014).

RBV emphasizes the importance of human capital in achieving operational excellence within aviation organizations. Competency alignment ensures that pilots, engineers, cabin crew, and ground operations personnel possess the technical expertise and operational knowledge required to support efficient airline operations. Skilled and well-trained employees contribute to improved safety standards, effective decision-making, and enhanced service quality (Kozlenkova *et al.*, 2014). The theory is particularly relevant to this study because it explains how operational efficiency strategies can function as valuable organizational resources that enhance operational performance in Kenya's aviation industry. In the aviation industry, the Resource-Based View provides a useful framework for understanding how operational efficiency strategies influence organizational performance. Airlines rely heavily on strategic resources such as aircraft fleets, advanced operational technologies, and skilled human resources to achieve operational excellence.

2.1.2 Dynamic Capabilities Theory

Dynamic Capabilities Theory was developed by Teece *et al.* (1997) to explain how organizations sustain competitive advantage in rapidly changing environments. The theory focuses on the capacity of a firm to integrate, create, and reorganize both its internal and external competencies in relation to changes in technology, market forces, and competition. In contrast to conventional strategic management methods that mainly emphasize organizational fixed resources, the Dynamic Capabilities Theory places special emphasis on organizational flexibility, innovation, and lifelong learning as key to the attainment of sustainable performance (Muthoni *et al.*, 2024).

The theory also explains the importance of turnaround time optimization in airline operations. Efficient turnaround procedures play a major role in ensuring that aircraft are fully utilized and delays are minimized. Moreover, the Dynamic Capabilities Theory emphasizes the relevance of competency alignment to aviation organizations. With the continued development of aviation technologies and operational systems, organizations should ensure that employees have the required technical skills and operational knowledge. Constant training, skills development, and knowledge sharing allow aviation organizations to enhance their workforce resources and adjust to evolving operational conditions.

2.1.3 Service Quality Theory

Service Quality Theory was developed by Parasuraman *et al.* (1985) and later refined through the SERVQUAL model in 1988. The theory explains how organizations evaluate and improve the quality of services delivered to customers. It posits that service quality is determined by the gap between customers' expectations and their perceptions of the actual service received (Gikutha, 2023). When perceived service performance meets or exceeds customer expectations, customers are likely to experience satisfaction, develop loyalty, and maintain positive relationships with the service provider. Consequently, service quality is considered a critical determinant of organizational competitiveness and performance, particularly in service-oriented industries such as aviation (ICAO, 2016).

The theory also provides a strong basis for explaining the mediating role of service quality in the relationship between operational efficiency strategies and operational performance. In the context of this study, operational efficiency strategies such as strategic fleet management, digital technology integration, turnaround time optimization, and competency alignment are expected to improve service quality by enhancing reliability, responsiveness, assurance, empathy, and tangibles. Improved service quality subsequently leads to better operational performance through increased customer satisfaction, enhanced customer retention, reduced service failures, and improved resource utilization. Therefore, service quality serves as the mechanism through which operational efficiency strategies are translated into improved operational performance within aviation organizations (Gikutha, 2023).

2.2 Empirical Literature Review

The empirical review examines previous studies related to operational efficiency strategies and operational performance within the aviation industry. Specifically, it synthesizes empirical evidence on the relationship between strategic fleet management, digital technology integration, turnaround time optimization, competency alignment, service quality, and organizational performance. The review provides insights into existing findings from both developed and developing economies, identifies areas of consensus and divergence in the literature, and highlights research gaps that justify the current study. Through this review, the study establishes the empirical foundation for

examining how operational efficiency strategies influence operational performance among airlines operating in Kenya.

2.2.1 Strategic Fleet Management and Operational Performance

Strategic fleet management has been widely recognized as a critical determinant of operational performance within the aviation industry. Existing empirical evidence suggests that effective fleet management contributes significantly to improved aircraft utilization, reduced maintenance costs, enhanced reliability, and overall operational efficiency. Johnson and Miller (2023), using data from 35 commercial airlines in the United States between 2016 and 2022, established that airlines operating younger and well-optimized fleets achieved higher utilization rates, improved punctuality, and lower maintenance costs. Similarly, their study of 20 Canadian airlines revealed that carriers with fleets averaging less than ten years in age experienced substantially lower maintenance expenses and greater operational reliability.

Comparable findings have been reported in other geographical contexts. Larsen and Johansen (2021) found that Norwegian airlines adopting flexible fleet management strategies recorded improved operational efficiency, fewer service interruptions, and more stable flight schedules. Likewise, Kim and Park (2024) demonstrated that the adoption of predictive maintenance systems among South Korean airlines enhanced operational reliability while reducing aircraft downtime. Within the Kenyan context, Roba (2023) established that effective fleet management practices significantly improved aircraft utilization and minimized operational delays. Collectively, these studies suggest that strategic fleet management positively influences operational performance. However, limited empirical attention has been given to the combined effect of fleet management and other operational efficiency strategies within Kenya's aviation sector.

2.2.2 Digital Technology Integration and Operational Performance

The integration of digital technologies has emerged as an important driver of operational performance in the aviation industry. Empirical studies indicate that digital systems enhance operational coordination, decision-making, maintenance planning, and overall efficiency. Davis and Morgan (2024) examined 30 commercial airlines in the United States and found that the implementation of predictive maintenance technologies and digital operational control systems reduced aircraft downtime and significantly improved operational efficiency. Similarly, a Canadian study by Davis and Morgan (2024) reported that digital aviation management systems enhanced coordination among maintenance, flight operations, and ground handling departments, resulting in improved punctuality and operational effectiveness.

Evidence from developing economies further supports these findings. Griffioen *et al.* (2020) found that South African airlines adopting digital operational systems experienced enhanced coordination and fewer operational disruptions. In Kenya, Muturi and Njoroge (2024) established that digital operational systems improved interdepartmental coordination and reduced flight delays. Despite these positive

outcomes, the authors noted that real-time monitoring and tracking technologies remain inadequately implemented in many developing aviation markets, limiting the realization of their full operational benefits. This suggests the need for further investigation into the extent to which digital technology integration contributes to operational performance within the Kenyan aviation industry.

2.2.3 Turnaround Time Optimization and Operational Performance

Turnaround time optimization has been identified as a key operational efficiency strategy that directly influences aircraft utilization and overall airline performance. Empirical studies indicate that reducing aircraft ground time contributes to increased operational efficiency and improved schedule reliability. Ivanov and Petrov (2023) found that enhanced ground handling coordination, gate management, and aircraft servicing significantly reduced turnaround times among Russian airlines. Their findings further revealed that airlines that reduced turnaround times achieved substantial improvements in aircraft utilization.

Similarly, Nielsen and Rasmussen (2021) reported that Scandinavian airlines with effective interdepartmental coordination and streamlined ground handling procedures experienced shorter turnaround times and superior operational performance. In China, Li and Zhang (2020) found that efficient gate allocation and coordinated ground operations improved flight reliability and operational efficiency. Within Kenya, Ochieng and Wekesa (2024) established that effective turnaround coordination enhanced aircraft utilization while reducing flight delays. These findings consistently demonstrate the importance of turnaround time optimization in improving operational performance. However, there remains limited evidence on how turnaround optimization interacts with other operational efficiency strategies to influence performance outcomes in Kenya's aviation sector.

2.2.4 Competency Alignment and Operational Performance

Competency alignment has increasingly gained attention as a strategic human resource practice that enhances organizational performance. The literature suggests that aligning employee skills and competencies with operational requirements improves efficiency, service quality, and operational reliability. Garcia and Martinez (2023) found that competency-based training and workforce development initiatives within the Spanish aviation industry significantly improved operational efficiency and reduced operational errors. Similarly, Campbell and Roberts (2022) reported that continuous employee training and competency development enhanced operational reliability, flight punctuality, and overall efficiency among Australian airlines.

Consistent findings have also been reported in Asia and Africa. Chen and Liu (2021) established that aligning employee competencies with operational requirements improved efficiency and minimized operational disruptions in Chinese aviation organizations. In Kenya, Wanjiku and Kariuki (2024) found that competency-based training and skills alignment strengthened operational coordination and improved

service efficiency. While the existing literature confirms the positive influence of competency alignment on operational performance, there remains limited empirical evidence examining competency alignment alongside other operational efficiency strategies within the Kenyan aviation industry.

2.2.5 Mediating Effect of Service Quality

Service quality has been extensively examined as a key determinant of organizational performance in service-oriented industries, including aviation. Existing studies suggest that dimensions of service quality, such as reliability, responsiveness, and assurance, contribute significantly to operational effectiveness and customer satisfaction. Dey *et al.* (2020) found that service reliability positively influenced operational efficiency and customer retention among international airlines. Similarly, Brady *et al.* (2002) established that timely responsiveness to customer concerns improved operational coordination and reduced service delays. Parasuraman *et al.* (2020) further observed that employee competence and customer assurance enhanced operational reliability and safety performance.

Within the Kenyan aviation context, Mbithi *et al.* (2017) found that consistent service delivery contributed to improved flight punctuality and operational efficiency. Likewise, Muturi and Njoroge (2024) reported that service reliability enhanced airline operational effectiveness, while Wanjiku and Kariuki (2024) established that prompt responses to operational disruptions improved service delivery and punctuality. Although these studies demonstrate the importance of service quality in influencing organizational performance, they primarily treat service quality as an independent predictor of performance. Consequently, limited empirical attention has been given to the mediating role of service quality in the relationship between operational efficiency strategies and operational performance. This represents an important knowledge gap that the current study seeks to address.

3. Research Methodology

3.1 Research Design

This study employed an explanatory research design to examine the relationships between operational efficiency strategies and operational performance within Kenya's aviation industry. The design was deemed appropriate because it facilitates the investigation of causal relationships among variables and enables the assessment of the magnitude and direction of such relationships (Krell *et al.*, 2021). Specifically, the study sought to determine the influence of strategic fleet management, digital technology integration, turnaround time optimization, and competency alignment on operational performance, while also examining the mediating role of service quality. The explanatory design provided a robust framework for testing the study hypotheses and generating empirical evidence on the proposed relationships.

3.2 Target Population and Sampling Procedure

The target population comprised 320 operational and managerial personnel drawn from Kenya's aviation industry. These individuals were selected because of their direct involvement in operational decision-making and implementation of operational efficiency initiatives. The sample size was determined using Yamane's (1967) formula, yielding a sample of 178 respondents. To ensure adequate representation of the diverse operational functions within the aviation sector, stratified random sampling was employed. The population was categorized into four strata: operations managers, aviation engineers and maintenance personnel, ground operations supervisors, and human resource and training managers. Thereafter, proportionate random sampling was applied within each stratum to select respondents. This sampling approach enhanced representativeness and minimized sampling bias.

3.3 Data Collection Instrument and Procedure

Primary data were collected using a structured questionnaire designed to capture respondents' perceptions of the study variables. The questionnaire comprised two sections: demographic characteristics and measurement items for strategic fleet management, digital technology integration, turnaround time optimization, competency alignment, service quality, and operational performance. All measurement items were assessed using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Before the main survey, a pilot study involving 18 respondents, representing approximately 10% of the sample size, was conducted among Kenya Air Force ground operations officers. Reliability of the instrument was evaluated using Cronbach's alpha coefficient, with all constructs exceeding the recommended threshold of 0.70, indicating satisfactory internal consistency. Content validity was assessed using the Content Validity Index (CVI), and all constructs achieved values above the acceptable threshold. Ethical approval and research authorization were obtained from the National Commission for Science, Technology, and Innovation (NACOSTI), while an introductory letter was obtained from KCA University before the commencement of data collection.

3.4 Data Analysis

The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies, means, and standard deviations, were used to summarize the characteristics of the data and respondents. Inferential analysis was conducted using Pearson correlation analysis and multiple regression techniques to examine the relationships among the study variables and test the proposed hypotheses.

The mediating effect of service quality was assessed using Hayes' PROCESS Macro Model 4 within SPSS. Before inferential analysis, diagnostic tests were conducted to assess compliance with regression assumptions. These included tests for multicollinearity using Variance Inflation Factors (VIF), normality using the Shapiro–

Wilk test, and heteroscedasticity using the Breusch–Pagan test. Where violations of homoscedasticity were detected, robust standard errors were applied to ensure the reliability and validity of the regression estimates.

4. Results and Discussion

4.1 Response Rate

Of the 178 questionnaires distributed, 126 were completed and returned, yielding a response rate of 71%. This response rate exceeded the minimum threshold recommended for social science research and was considered adequate for statistical analysis, thereby minimizing the likelihood of non-response bias and enhancing the reliability of the findings.

Table 1: Response Rate

Category	Frequency	Percentage (%)
Returned Questionnaires	126	71.0
Unreturned Questionnaires	52	29.0
Total	178	100.0

4.2 Reliability Analysis

The reliability of the measurement scales was assessed using Cronbach's alpha coefficients. All constructs exceeded the recommended threshold of 0.70, with values ranging from 0.913 to 0.928, indicating excellent internal consistency and reliability of the research instrument.

Table 2: Reliability Statistics

Construct	Items	Cronbach's Alpha
Strategic Fleet Management	10	0.923
Digital Technology Integration	10	0.915
Turnaround Time Optimization	10	0.913
Competency Alignment	10	0.928
Service Quality	10	0.919
Operational Performance	10	0.920

4.3 Descriptive Statistics

The descriptive results indicate that respondents generally agreed that operational efficiency strategies contribute positively to operational performance within Kenya's aviation industry. Strategic fleet management and competency alignment recorded the highest mean scores ($M = 4.16$), followed by digital technology integration ($M = 4.10$), turnaround time optimization ($M = 4.06$), and service quality ($M = 4.03$). Operational performance recorded a mean score of 3.95, suggesting moderately strong performance outcomes across the participating airlines.

Table 3: Descriptive Statistics

Variable	Mean	Standard Deviation
Strategic Fleet Management	4.16	0.76
Digital Technology Integration	4.10	0.86
Turnaround Time Optimization	4.06	0.82
Competency Alignment	4.16	0.79
Service Quality	4.03	0.86
Operational Performance	3.95	0.85

4.4 Correlation Analysis

Pearson correlation analysis revealed significant positive associations among all study variables and operational performance ($p < 0.01$). Turnaround time optimization exhibited the strongest association with operational performance ($r = 0.803$), followed closely by strategic fleet management ($r = 0.798$). Service quality ($r = 0.693$), competency alignment ($r = 0.627$), and digital technology integration ($r = 0.630$) also demonstrated significant positive relationships with operational performance. The findings suggest that improvements in operational efficiency strategies are associated with enhanced airline performance outcomes.

Table 4: Correlation Matrix

Variable	SFM	DTI	TTO	CA	SQ	OP
SFM	1					
DTI	.644**	1				
TTO	.644**	.762**	1			
CA	.703**	.767**	.629**	1		
SQ	.604**	.841**	.846**	.542**	1	
OP	.798**	.630**	.803**	.627**	.693**	1

$p < 0.01$.

4.5 Multiple Regression Results

The regression model demonstrated strong explanatory power, accounting for 79% of the variation in operational performance ($R^2 = 0.790$). The overall model was statistically significant ($F = 90.251$, $p < 0.001$), indicating that the selected operational efficiency strategies collectively explained a substantial proportion of operational performance within Kenya's aviation industry.

Table 5: Model Summary

Statistic	Value
R	0.889
R^2	0.790
Adjusted R^2	0.781
F-statistic	90.251
p-value	<0.001

Table 6: Regression Coefficients

Variable	β	t-value	p-value
Strategic Fleet Management	0.50	7.76	<0.001
Digital Technology Integration	-0.24	-2.19	0.030
Turnaround Time Optimization	0.53	6.16	<0.001
Competency Alignment	0.07	0.80	0.420
Service Quality	0.11	0.98	0.330

The results indicate that strategic fleet management ($\beta = 0.50$, $p < 0.001$) and turnaround time optimization ($\beta = 0.53$, $p < 0.001$) exerted significant positive effects on operational performance. Conversely, digital technology integration exhibited a significant negative direct effect ($\beta = -0.24$, $p = 0.030$), suggesting that technology investments may not automatically translate into improved operational outcomes unless effectively integrated into operational and service processes. Competency alignment and service quality did not exhibit statistically significant direct effects in the full regression model.

4.6 Mediation Analysis

The mediating role of service quality was examined using PROCESS Macro Model 4 with bootstrap confidence intervals. The findings indicate varying mediation effects across the operational efficiency strategies.

Table 7: Summary of Mediation Results

Independent Variable	Direct Effect Significant?	Indirect Effect Significant?	Mediation Outcome
Strategic Fleet Management	Yes	Not Applicable	Moderation Effect Observed
Digital Technology Integration	No	Yes	Full Mediation
Turnaround Time Optimization	Yes	No	No Mediation
Competency Alignment	Yes	Yes	Partial Mediation

Digital technology integration exhibited a significant indirect effect on operational performance through service quality ($\beta = 0.561$, 95% CI [0.303, 0.819]), while the direct effect became insignificant, indicating full mediation. Competency alignment demonstrated both significant direct and indirect effects, suggesting partial mediation. In contrast, service quality did not mediate the relationship between turnaround time optimization and operational performance. The findings further revealed a significant interaction effect between strategic fleet management and service quality, suggesting that the performance benefits of fleet management are strengthened under conditions of higher service quality.

4.7 Discussion of Findings

The findings demonstrate that strategic fleet management and turnaround time optimization are the most influential determinants of operational performance within Kenya's aviation industry. These results support the Resource-Based View and Dynamic Capabilities perspectives, which emphasize the strategic value of operational resources and organizational capabilities in enhancing performance outcomes.

The negative direct effect of digital technology integration, coupled with a significant positive indirect effect through service quality, suggests that technology alone does not guarantee improved performance. Rather, its effectiveness depends on how successfully it enhances service delivery and customer experience. This finding highlights the importance of aligning technological investments with service quality objectives.

The partial mediation observed between competency alignment and operational performance indicates that employee competencies improve performance both directly through operational effectiveness and indirectly through enhanced service quality. Overall, the results underscore the strategic role of service quality as a mechanism through which operational efficiency initiatives are translated into superior organizational performance within the aviation sector.

5. Conclusions and Recommendations

5.1 Conclusions

This study examined the influence of operational efficiency strategies on operational performance in Kenya's aviation industry and the mediating role of service quality. The findings demonstrate that operational efficiency strategies are critical drivers of airline performance, collectively explaining a substantial proportion of performance variation within the sector.

The study established that strategic fleet management and turnaround time optimization are the most influential determinants of operational performance. Airlines that effectively manage fleet utilization, maintenance processes, and turnaround operations are more likely to achieve higher levels of reliability, punctuality, and operational efficiency. These findings reinforce the strategic importance of operational resource management in enhancing organizational performance.

The results further reveal that digital technology integration contributes to operational performance primarily through its ability to enhance service quality. While the direct effect of digital technology integration was negative, its significant indirect effect through service quality suggests that technology investments generate value when they are effectively integrated into customer-facing and operational service processes. Similarly, competency alignment was found to improve operational performance both directly and indirectly through service quality, highlighting the importance of workforce capabilities in achieving operational excellence.

The study also confirms the strategic role of service quality as a mechanism through which internal operational efficiency initiatives are translated into superior organizational outcomes. Consequently, operational efficiency and service quality should not be viewed as independent organizational objectives but as complementary factors that jointly enhance operational performance within the aviation industry.

5.2 Recommendations

5.2.1 Managerial Recommendations

Airlines should prioritize investments in strategic fleet management practices, particularly predictive maintenance systems, fleet modernization initiatives, and data-driven route optimization models. These interventions can enhance aircraft utilization, reduce operational disruptions, and improve reliability. Management should strengthen turnaround time management by improving coordination among flight operations, ground handling personnel, and airport service providers. The adoption of real-time monitoring systems and standardized turnaround procedures can significantly reduce delays and improve operational efficiency.

Aviation organizations should ensure that digital transformation initiatives are closely aligned with service delivery objectives. Investments in digital technologies should focus not only on operational automation but also on enhancing customer experience, communication, responsiveness, and service reliability. Furthermore, airlines should institutionalize continuous professional development programs and competency-based workforce management systems to ensure that employee capabilities remain aligned with evolving technological and operational requirements within the aviation sector.

5.2.2 Policy Recommendations

The Kenya Civil Aviation Authority (KCAA) should develop and enforce industry-wide operational performance benchmarks covering key indicators such as aircraft utilization, turnaround time, punctuality, and service quality. Such benchmarks would promote operational excellence and facilitate performance monitoring across the industry.

Government agencies and aviation regulators should support digital transformation within the aviation sector by creating enabling regulatory frameworks and investment incentives that encourage the adoption of advanced aviation technologies. In addition, continued investment in airport infrastructure, air traffic management systems, and ground handling facilities is necessary to improve operational efficiency and support the sustainable growth of Kenya's aviation industry.

5.2.3 Recommendations for Future Research

Future studies should examine operational efficiency strategies using longitudinal data to assess their effects over time and establish stronger causal inferences. Researchers may also explore the moderating roles of organizational culture, regulatory compliance, and technological readiness in the relationship between operational efficiency strategies and

operational performance. Comparative studies involving airlines from different African countries would further enhance understanding of contextual factors influencing aviation performance across the region.

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Conflict of Interest Statement

My name is Loise Wangari Ng'ang'a, and I declare that there are no conflicts of interest regarding the publication of this paper. I have no financial, professional, institutional, or personal relationships that could have influenced the design, conduct, analysis, interpretation, or reporting of this research. The views and conclusions presented in this paper are solely those of the author.

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