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Disruptive Technology and Operational Efficiency of Private Hospitals in Kenya

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Abstract:

Purpose: *The primary objective of this study was to examine the effect of disruptive technologies—specifically telemedicine and artificial intelligence (AI)—on the operational efficiency of private hospitals in Kenya.*

Material/methods: *The study was grounded in the Unified Theory of Acceptance and Use of Technology and the Technology Acceptance Model. An explanatory research design was employed. The target population comprised 446 Level 4 private health facilities across Kenya. Using simple random sampling, a sample of 211 hospitals was selected, and respondents were drawn from IT and Operations Department Heads. Data was collected through structured questionnaires. Content validity and Cronbach's Alpha were used to assess the instrument's validity and reliability. Data analysis involved descriptive statistics (means, standard deviations, frequencies, and percentages) and inferential statistics (Pearson correlation and multiple regression) to test the study hypotheses.*

Findings: *The results indicated that both telemedicine and artificial intelligence have a statistically significant positive effect on operational efficiency in private hospitals. Specifically, these technologies improve service delivery, enhance resource utilization, and strengthen patient care processes.*

Conclusion*: The study concludes that disruptive technologies play a vital role in optimizing hospital operations. However, the realization of their full benefits is contingent on addressing challenges related to cost, accessibility, and data security.*

Value: *The study underscores the need for private hospitals to invest in supportive infrastructure, capacity building, and regulatory frameworks to facilitate effective technology adoption. Emphasis on cybersecurity and equitable access strategies is essential to ensure sustainable integration of telemedicine and AI into hospital operations.*

Keywords: *Telemedicine, Artificial Intelligence, Operational Efficiency, Private Hospitals*

Paper Type: *Research Article*

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1.1. Introduction

The operational efficiency of hospitals is crucial for the delivery of high-quality healthcare services, particularly in private hospitals where competition and patient expectations are high (Zehir & Zehir, 2023). Efficient hospital operations ensure that resources are optimized, patient wait times are minimized, and services are delivered consistently and accurately (Vogus, et al., 2021). However, improving operational efficiency is a significant challenge, especially as new technologies continuously emerge and disrupt traditional workflows. The adoption and integration of such technologies require substantial investments and retraining of staff, which can strain hospital resources (Prabhod, 2024). In light of these challenges, the consideration of disruptive technologies—innovative solutions that fundamentally alter operational frameworks—has become essential for enhancing efficiency and achieving optimal healthcare outcomes (Singh & Singh, 2024).

Disruptive technology refers to innovations that create new ways of operating and can substantially change traditional processes (Mookerjee & Rao, 2021). Jekov, (2017) considers that disruptive technologies are termed as such due to their radical computational power, near-endless quantities of data, and unprecedented technological advances. In the context of healthcare, disruptive technologies offer unique opportunities for improving operational efficiency by reducing costs, increasing diagnostic accuracy, and optimizing resource utilization (Potluri & Vajjhala, 2024). Technologies such as telemedicine and artificial intelligence (AI) have demonstrated the potential to streamline processes, provide patient-centered solutions, and increase accessibility to medical services (Banerjee, et al., 2022). These technologies can bridge gaps in healthcare delivery, making hospital operations faster, more accurate, and better suited to patient needs.

Disruptive technologies encompass a range of components, each with distinct applications in the healthcare sector. For instance, telemedicine, as outlined by Haleem et al. (2021), allows healthcare providers to remotely diagnose and treat patients, facilitating timely follow-up appointments and building accurate medical histories. Similarly, Rahman et al. (2023) describes artificial intelligence as a tool for increasing diagnostic accuracy and managing vast datasets, enhancing decision-making and overall hospital efficiency. These components of disruptive technologies can provide hospitals with innovative tools that can directly impact operational efficiency, making healthcare delivery more effective and responsive.

However, the influence of this disruptive innovation on the operational efficiency of private hospitals is lacking a comprehensive understanding, especially within the Kenyan healthcare context. While disruptive technologies hold the potential to transform hospital operations, there is limited research on how effectively these innovations are enhancing efficiency in private hospitals. Factors such as limited infrastructure, high costs, and the need for specialized training present unique challenges in the adoption and impact of these technologies. This gap in knowledge underscores the need to examine how telemedicine and artificial intelligence are being utilized, and to what extent they contribute to operational improvements in private healthcare settings.

Operational efficiency is crucial to ensuring effective service delivery in hospitals. However, private hospitals in Kenya face persistent operational challenges that

frequently compromise service quality. A report from the Kenya Medical Practitioners, Pharmacists and Dentists Union (KMPDU) (2022) found that patients in 63% of private hospitals experience an average wait time of one month to see a specialist. In addition, multi-disciplinary committees often take up to three and a half months to recommend treatment options, underscoring the urgent need for technological solutions to improve operational flow.

In Kenya, operational challenges in private hospitals are further evident. Naeku and Wanyonyi (2021) noted significant performance gaps in these hospitals, with cases such as preventable delays linked to patient fatalities (Sokodirectory, 2022). A survey by Nyambane (2017) reported that 47% of private hospitals in Nairobi County struggle to meet operational deadlines, contributing to delays in care. This has placed an added burden on public healthcare facilities, leaving patients vulnerable and, in some cases, leading to worsened outcomes or even fatalities (Anadolu, 2020; Africanews, 2021).

Several studies have examined operational efficiency in Kenyan hospitals. However, these studies, along with others, have not specifically examined the impact of disruptive technologies on the operational efficiency of private hospitals in Kenya. This gap has left many hospitals struggling to build the necessary capacity to implement disruptive innovations that could substantially improve their service delivery. To address this critical gap, the present study seeks to investigate the effect of disruptive technologies on the operational efficiency of private hospitals in Kenya.

1.2. Theoretical and Conceptual Framework

The Unified Theory of Acceptance and Use of Technology (UTAUT), introduced by Venkatesh et al. (2003), synthesizes eight prior models into four core determinants of technology adoption: performance expectancy, effort expectancy, social influence, and facilitating conditions (Kiwanuka, 2015). Subsequent validations and extensions—such as UTAUT2's application to telemedicine uptake during COVID-19 in low-resource settings (Shiferaw et al., 2021) and integrative studies combining UTAUT with IS success and security constructs (Thabet et al., 2023)—underscore its strong predictive power across sectors (Williams et al., 2015). Critics note, however, that UTAUT's broad scope can underplay cultural or contextual nuances, prompting tailored adaptations in diverse environments. In Kenyan private hospitals, UTAUT frames how telemedicine's perceived usefulness (e.g., reduced wait times, remote consultations) and ease of use directly impact both provider and patient adoption, thereby informing strategies to enhance operational efficiency and healthcare access.

The Technology Acceptance Model (TAM), pioneered by Davis (1986), posits that perceived usefulness (PU) and perceived ease of use (PEOU) are the primary drivers of an individual's attitude toward—and intention to use—new technologies (Marangunić & Granić, 2015). Extensions like TAM2 (Venkatesh & Bala, 2008) incorporate social influence and facilitating conditions, while applications in healthcare (Holden & Karsh, 2010) demonstrate TAM's utility in explaining clinicians' acceptance of information systems. Critics argue that TAM may oversimplify adoption dynamics by omitting organizational and environmental factors. Applying TAM to artificial intelligence in Kenyan private hospitals highlights how staff perceptions of AI's ability to improve diagnostics, manage patient data, and streamline workflows (PU) alongside system learnability (PEOU) shape uptake; understanding these perceptions can guide the

design of user-friendly interfaces, training programs, and change-management efforts that drive operational gains.

The conceptual framework provides the relationship between variables and provides an avenue to clarify the assumptions that inform such relationships between the respective variables used in the study (Luft et al. 2022). The independent variables are disruptive innovation with a specific focus on telemedicine, artificial intelligence and its use in service offering. On the other hand, the dependent variable is operational performance.

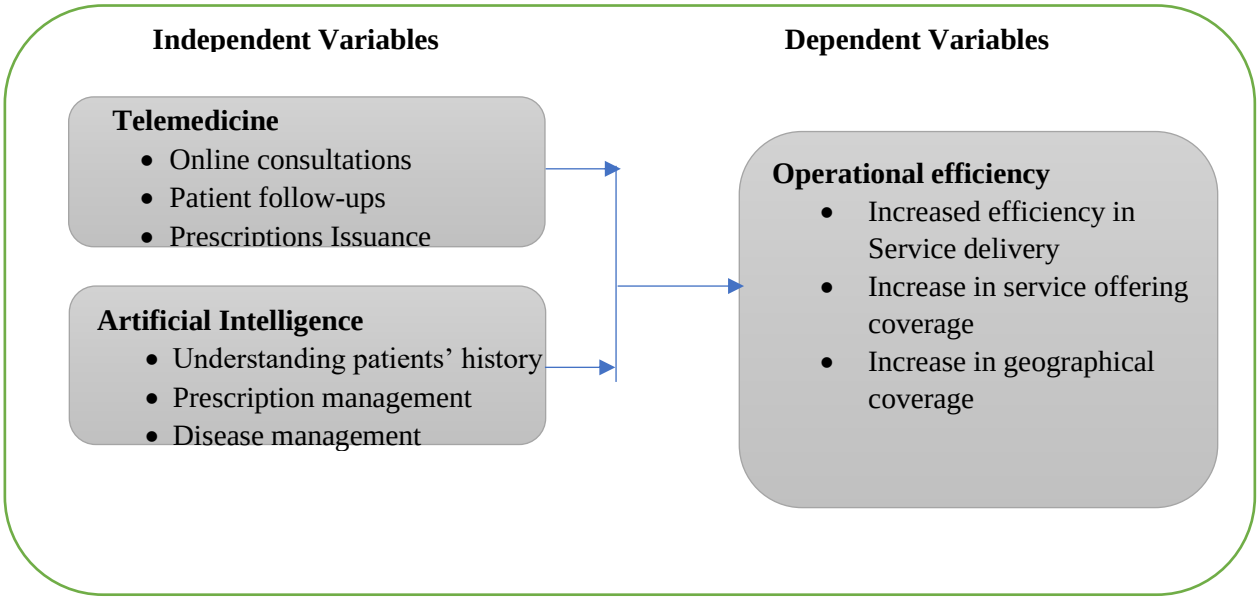

***Figure 1**: Conceptual framework*

2.1. Empirical Review

Influence of telemedicine on operational efficiency

Ran et al. (2024) examined telemedicine's effect on the operational efficiency of public hospitals by using a cross-sectional research design. This study leveraged data from the 2022 Health Informatization Statistical Survey and analyzed 8,944 public hospitals to assess telemedicine's impact on revenue and business performance. Results from a multivariate linear model revealed that telemedicine was implemented in 35.51% of public hospitals, with a significant positive effect on revenue, consultations, and discharge rates, although the extent of this effect varied by hospital level. Specifically, primary hospitals saw notable improvements in business capacity and revenue due to telemedicine, which ultimately supported enhanced operational efficiency in these institutions.

Zhang et al. (2022) conducted a scoping review on telemedicine's influence on the capacity development of respiratory departments in public primary hospitals in China. Using sources such as PubMed, Cochrane Library, EMBASE, and Google Scholar, the study underscored telemedicine's substantial role in creating a more comprehensive national health system. By enabling real-time medical information sharing, telemedicine helped to bridge information gaps between doctors and patients, encouraging informed medical decisions. Additionally, in public emergencies,

telemedicine enabled rapid deployment of high-quality medical resources to affected areas, safeguarding lives and supporting effective patient care in challenging conditions.

In Ukraine, Struminsky (2022) explored telemedicine's impact on healthcare access through a mixed-methods study that combined both qualitative and quantitative analyses. This research focused on telemedicine's role in improving healthcare accessibility, examining variables such as convenience, cost, service capacity, and geographical reach. Findings confirmed the positive influence of telemedicine in these areas, showing that it increased service availability, reduced costs, and improved geographic distribution of healthcare services. Overall, the study reinforced telemedicine's effectiveness in enhancing access to health services across multiple dimensions.

The Kangethe (2018), a sample of 120 respondents were interviewed in a study to analyze telemedicine as a disruptive innovation to the healthcare industry in Nairobi county targeting service effectiveness, cost efficiency and accessibility to healthcare. A significant relationship was found between telemedicine and service effectiveness when telemedicine was used as a service delivery tool. In addition, the use of this innovation, led to a significant decrease in the cost of managing patients within the triage with a significant decrease in outpatient and emergencies management. These findings indicated that telemedicine depicted a strong position relationship with accessibility to healthcare within Nairobi County by reducing the rate of hospitalization thus improving the healthcare processes outcome (Kangethe 2018).

Wang et al. (2019), challenged the premise of telemedicine as a healthcare service delivery citing the fact that it does not consider the patient's choice. Though their study found a significant relationship between telemedicine and operational cost efficiency, they concluded that a dual-channel healthcare system yields more significant results in the quest to strike a balance between transportation cost and the gap between online and offline sensitivity. They further argued that where the offline waiting time sensitivity is not critical, a physical visit is favored while in the case of a critical offline waiting time sensitivity then telemedicine is favored as long as the online waiting time sensitivity is not critical (Wang et. al. 2019). Haleem, et. al. (2021), focused on the capabilities, features and applications of telemedicine in healthcare especially after the onset of the Covid 19 pandemic which made physical visits to hospitals become part of the hospitals operating risk. Their study found significant relationship between use of telemedicine and the operational efficiency through time and cost savings for both the hospital and patients. However, in line with Wang et. al. (2019), they recommended a dual system where telemedicine complements physical consultations to enhance the quality of healthcare offering.

Stoltzfus (2023), associated the decrease in the risk of communicable diseases, decreased overall encounter time consumption and seamless transition between healthcare teams with telemedicine arguing that the increased use of telemedicine across India contributed significantly increased efficiency among healthcare providers. A similar study was replicated by Chukwudi and Chima (2024) whose findings indicates that for telemedicine to work seamlessly, it ought to be integrated with the digital tracking and accessibility of health records. They however cited inequitable access to telemedicine, data protection concerns and healthcare professional adaptation as the remain challenges facing uptake of telemedicine as a healthcare service delivery mechanism.

Effect of Artificial intelligence on Operational efficiency

Rahman et. al. (2024), likened the growth in the use of artificial intelligence in the healthcare sector to becoming a pillar in the future medical world. Their review of available literature in artificial intelligence in the healthcare sector revealed a high rate of absorption and adaptation in operational areas that require high diagnostic accuracy as well as data management under scenarios of numerous data variables. This rate of absorption in effect was found to improve workers productivity within the healthcare sector. However, Rahman et al. (2024)'s findings outlined the need for a balance between the positive aspects of artificial intelligence with the negative ones from a strategic standpoint such as data breaches, concern for clinical implementation as well acceptance among healthcare workers and scientists.

Alowais et. al. (2023), studied the effect of artificial intelligence on operational efficiency of a sample top hospitals across the world with a specific focus on patient care and quality of life. Their findings indicated that there was an improved accuracy in disease diagnosis, treatment selection and clinical laboratory testing thus indicating that the respective entities recorded significantly lower costs, increased time savings and minimal human error when artificial intelligence is integrated into healthcare provision compared to when it is not. The capability of AI to improve on time savings and accurate diagnostics was therefore linked to increased efficiency both financial and technical staffing productivity among the studied samples.

Olaoye (2024) built on Alowais et. al. (2023)'s study focusing on artificial intelligence as a contributor to improved patient care, diagnosis, treatment and healthcare delivery systems. His findings indicated that clinical decision support systems aided by AI provide healthcare professionals with evidence-based recommendations that aid in the identification of potential risks, optimal treatment strategies and personalized medicine approaches. However, Olaoye (2024), argues that though AI has challenges such as ethical considerations such as security, bias and privacy, AI adaptation in healthcare have a significant correlation with increased ability to identify and align ethical challenges with AI's potential on growth in operational efficiency.

3.1. Methodology

The study employed an explanatory, positivist research design, leveraging quantitative methods to test existing theories on disruptive technologies and operational efficiency in Kenya's level-4 private hospitals (Ministry of Health, 2023). Focusing on Heads of IT and Operations Departments, who possess firsthand insight into telemedicine implementation, the research drew from a population of 446 facilities and, using Slovin's formula, determined a sample of 211 respondents selected via random sampling. Primary data were collected through a structured, seven-section questionnaire—beginning with demographics and followed by five-point Likert items adapted from prior studies on disruptive technologies and efficiency—and piloted with 20 IT and operations staff in a level-5 hospital. Expert review and face- and content-validity checks refined the instrument, while Cronbach's alpha (threshold ≥ 0.70) established internal consistency. Completed surveys were coded and analyzed in SPSS, with descriptive statistics (tables, means, charts) summarizing the data and inferential techniques—at a 5% significance level—testing hypotheses via regression models to elucidate the impact of disruptive technologies on operational efficiency.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon_1$$

Where

Y is operational efficiency in private hospitals; , β_0 = constant (coefficient of intercept); X_1= telemedicine, X_2= artificial intelligence, ε =Error Term; B_1, B_2, = regression coefficient of four variables

4.1. Findings And Discussion

This section presents the findings and results of the use of variables using procedures mentioned in chapter three of the methodology. In line with the study's specific objectives, data were analyzed, interpreted, and inferences drawn to determine the influence of disruptive technologies on operational efficiency. Of the 211 questionnaires distributed to Heads of IT and Operations in Level 4 private health facilities, 184 were returned (87.2%), 13 were discarded as unusable (6.2%), yielding a final usable response rate of 81.0%. This exceeds Mugenda and Mugenda's (2013) 70% "very good" benchmark and Cooper and Schindler's (2014) 60% reliability threshold, indicating that the dataset is both representative and robust. The high response rate minimizes non-response bias, ensuring that senior departmental perspectives are well captured, while the low unusable rate underscores the completeness and relevance of the data, thereby strengthening the validity and generalizability of the subsequent analysis.

4.1.1. Descriptive Statistics

Operational efficiency in private hospitals in Kenya was assessed based on key performance indicators such as service delivery, , service coverage, geographical expansion, and records management. Table 1 presents descriptive statistics for operational efficiency, highlighting key trends, strengths, and areas that require improvement. This study's descriptors show that private hospitals in Kenya have made moderate strides in operational efficiency: expanding service offerings (mean = 3.66, SD = 1.55) and geographic reach (mean = 3.75, SD = 1.03). However, they scored lower on service-delivery efficiency (mean = 2.65, SD = 1.31), indicating persistent workflow bottlenecks and uneven adoption of best practices. Overall operational efficiency was moderate (mean = 3.29, SD = 0.96). These mixed results suggest that, while hospitals are successfully broadening services and strengthening risk controls, they must intensify efforts to optimize core processes—through targeted staff training, process audits, and deeper integration of disruptive technologies—to achieve consistently high performance.

Table 1: *Descriptive Statistics for Operational efficiency*

	Mean	**Std. Dev**
Our hospital has achieved increased efficiency in service delivery,	2.65	1.31
There has been a marked increase in our service offering coverage,	3.66	1.55
We have expanded our operation in geographical coverage	3.75	1.03
Our hospital has achieved increased efficiency in service delivery	2.55	1.02

Operational efficiency	**3.29**	**0.96**

The telemedicine descriptors reveal a mixed picture of adoption and satisfaction: respondents rate the effectiveness of online consultations moderately (mean = 3.23, SD = 1.33) and follow-up care via telemedicine similarly (mean = 3.20, SD = 1.35), while the convenience of virtual visits compared to in-person appointments is lukewarm (mean = 3.04, SD = 1.44). Prescription issuance through telemedicine fares better (mean = 3.42, SD = 1.38), but perceptions of clinical quality remain below par (mean = 2.67, SD = 1.23), and willingness to recommend the service is low (mean = 2.31, SD = 1.45). The overall telemedicine acceptance score (mean = 2.98, SD = 1.08) underscores moderate uptake, highlighting the need for stronger quality assurance, enhanced follow-up protocols, and more robust patient-engagement strategies to drive broader adoption.

Table 2: *Descriptive Statistics for Telemedicine*

	Mean	**Std. Dev**
Our hospital healthcare professionals provide online consultations that effectively address my medical concerns.	3.23	1.33
Our hospital healthcare professionals conduct follow-up care through telemedicine.	3.20	1.35
The online consultations offered by our hospital healthcare professionals are more convenient than traditional in-person visits.	3.04	1.44
Our hospital healthcare professionals issue prescriptions through telemedicine.	3.42	1.38
The quality of care provided through online consultations by our hospital healthcare professionals is comparable to that of in-person consultations.	2.67	1.23
I encourage others to use the telemedicine services offered by our hospital healthcare professionals based on my positive experiences.	2.31	1.45
Telemedicine	**2.98**	**1.08**

Respondents expressed moderate confidence in AI's role in private hospitals: analyzing patient medical histories received a mean of 3.41 (SD = 1.50), and prescription management scored 3.38 (SD = 1.43), indicating these applications are viewed as beneficial. AI's contribution to operational efficiency was similarly rated at 3.34 (SD = 1.33). In contrast, perceptions of AI in diagnostics (mean = 3.02, SD = 1.47) and disease management (mean = 2.99, SD = 1.28) were more muted, reflecting mixed views on its precision and utility. The lowest confidence was in AI's ability to streamline patient care (mean = 2.95, SD = 1.19). Overall, AI acceptance stood at a moderate 3.18 (SD = 0.93), suggesting that while certain AI functions are embraced, further investment in staff training, technological infrastructure, and system integration is needed to enhance its effectiveness across diagnostics, disease management, and patient-care workflows.

Table 3: *Descriptive Statistics for Artificial Intelligence*

	Mean	Std. Dev
Our hospital effectively utilizes artificial intelligence to analyze patients' medical histories, enhancing the quality of care provided.	3.41	1.50
We employ artificial intelligence for prescription management in our hospital, which significantly improves the accuracy and safety of medication administration.	3.38	1.43
The study incorporates artificial intelligence in diagnostics to enhance the precision of patient evaluations.	3.02	1.47
The research leverages artificial intelligence to advance our understanding of various disease management	2.99	1.28
The application of artificial intelligence in patient care has proven to be beneficial in streamlining processes and improving outcomes	2.95	1.19
Our hospital utilizes artificial intelligence to optimize operational efficiency across various healthcare functions.	3.34	1.33
Artificial intelligence	**3.18**	**0.93**

4.1.2. Correlation Analysis

Correlation analysis was conducted to examine the strength and direction of relationships between operational efficiency and key technological variables, including telemedicine and artificial intelligence. Table 4 presents the Pearson correlation coefficients and significance levels for these relationships, providing insights into how these factors influence operational efficiency. Findings in Table 4.9 revealed telemedicine exhibited the strongest correlation with operational efficiency ($r = 0.686$, $p < 0.01$), indicating that increased adoption of telemedicine services enhances hospital efficiency. Artificial intelligence was significantly correlated with operational efficiency ($r = 0.620$, $p < 0.01$), emphasizing its role in optimizing diagnostics, prescription management, and operational processes.

Table 4: *Correlation Analysis*

	Operational efficiency	Telemedicine	Artificial intelligence
Operational efficiency	1		
Telemedicine	.686**	1	
Artificial intelligence	.620**	.580**	1

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

4.1.3. Regression Analysis

Regression analysis encompasses a range of statistical techniques used to infer causal relationships among interrelated variables (Sarstedt & Mooi, 2014). Given its broad applicability across various fields, it was selected as the primary method for testing the hypotheses in this study. Multiple regression analysis specifically focused on assessing the impact of disruptive technologies— Telemedicine and Artificial intelligence on operational efficiency of private hospitals in Kenya. The regression analysis included several components: a model summary, ANOVA for assessing the goodness of fit, and Coefficient of Estimates, as illustrated in Tables 5. The model summary, detailed in

Table 5, evaluates the relationships among the aforementioned variables and their combined influence on operational efficiency. The results, as presented in Table 5, indicate that the predictors collectively accounted for 61.1% of the variation in operational efficiency ($R^2 = 0.611$), with an Adjusted R^2 of 0.598. This suggests that artificial intelligence and telemedicine significantly contribute to explaining variations in operational efficiency. The high R^2 value implies that the independent variables included in the model are strong predictors of operational efficiency, reinforcing the importance of effective disruptive technologies in enhancing workforce efficiency. However, the remaining 38.9% of the variance in operational efficiency is attributed to other factors not captured in the model, highlighting the need for further exploration of additional variables that may influence operational performance. To assess the overall significance of the regression model, an F-test was conducted using ANOVA. This test determines whether the independent variable telemedicine and artificial intelligence — collectively explain a significant proportion of the variance in operational efficiency. The results are summarized in Table 5. The ANOVA results presented in Table 5 indicate that the joint prediction of the disruptive technologies Telemedicine and Artificial intelligence on operational efficiency was statistically significant ($F = 48.327$, $p = .000$). This finding suggests that the model is well-fitted to predict operational efficiency based on these disruptive technologies' variables.

The first objective focused on assessing the effect of telemedicine on operational efficiency, and the findings demonstrated that telemedicine had the highest influence ($\beta = 0.312$, $p = 0.000$). This suggests that its integration significantly enhances hospital processes, contributing to more streamlined workflows, reduced patient waiting times, and better patient outcomes. These results align with prior studies, such as Ran et al. (2024), which highlighted the extensive adoption of telemedicine in public hospitals, leading to increased revenue, consultation efficiency, and discharge rates. Similarly, Zhang et al. (2022) found that telemedicine enhances real-time medical information sharing, enabling better decision-making and efficient resource deployment during emergencies. Other studies, including Stoltzfus (2023) and Kangethe (2018), confirmed that telemedicine improves accessibility to healthcare by reducing hospitalization rates and outpatient management costs. However, concerns such as inequitable access, data protection, and adaptation challenges remain (Chukwudi & Chima, 2024). These findings underscore the need for strategic policies to address these challenges while maximizing telemedicine's potential.

The second objective analyzed the effect of artificial intelligence (AI) on operational efficiency, and the results showed a significant positive impact ($\beta = 0.216$, $p = 0.004$), underscoring its role in enhancing diagnostic accuracy and optimizing healthcare processes. AI has been increasingly applied in various medical functions, ranging from patient diagnostics to administrative processes, contributing to efficiency gains and cost reductions. Rahman et al. (2024) noted a high adaptation rate of AI in operational areas requiring data-intensive processes, improving workforce productivity. Similarly, Alowais et al. (2023) found that AI integration resulted in enhanced diagnostic accuracy, reduced costs, and increased efficiency in healthcare functions. Olaoye (2024) expanded on these findings, highlighting AI's role in clinical decision support systems, which aid in risk identification and personalized treatment plans. However, ethical concerns such as data security, bias, and privacy remain challenges in AI adoption (Olaoye, 2024). Addressing these challenges requires comprehensive regulatory

Table 5: *Regression Analysis*

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	0.402	0.206		1.950	0.053
Telemedicine	0.317	0.081	0.312	3.914	0.000
Artificial intelligence	0.226	0.077	0.216	2.927	0.004
Model Summary Statistics					
R	0.782				
R Square	0.611				
Adjusted R Square	0.598				
ANOVA for goodness of fit					
F	48.327				
Sig.	0.000				

a Dependent Variable: operational efficiency

5.1. Conclusion

Based on the findings, the study concludes that telemedicine is a key factor in improving operational efficiency in private hospitals. Telemedicine enhances service delivery by enabling real-time consultations, reducing patient wait times, and optimizing resource use. It facilitates better patient access to medical expertise while minimizing the need for physical visits, making healthcare more accessible and efficient. However, concerns such as data security, technological adaptation, and accessibility disparities must be addressed to fully harness its benefits. Furthermore, the study highlights that artificial intelligence (AI) is essential in optimizing hospital efficiency. AI improves diagnostic accuracy, enhances workflow automation, and supports clinical decision-making by analyzing vast amounts of medical data. AI-powered systems contribute to more efficient prescription management, patient monitoring, and administrative processes, reducing medical errors and improving healthcare delivery. However, ethical concerns related to data privacy, algorithm bias, and workforce adaptation remain critical areas that require attention to ensure responsible AI integration.

6.1. Recommendations

Based on the conclusions, the study recommends that private hospitals strengthen the adoption of telemedicine by investing in infrastructure, training healthcare providers, and ensuring seamless integration with existing hospital systems. To maximize its benefits, hospitals should implement secure telehealth platforms, address data security concerns, and develop policies that enhance accessibility, particularly for underserved populations. Additionally, healthcare regulators should establish standardized telemedicine guidelines to ensure quality service delivery and equitable access to remote healthcare services. The study further recommends that healthcare institutions expand the use of artificial intelligence in diagnostic and operational processes. AI implementation should focus on enhancing diagnostic accuracy, automating administrative tasks, and improving personalized patient care. To address ethical concerns, hospitals should adopt robust data protection measures, develop transparent AI governance policies, and ensure continuous staff training to promote responsible AI usage. Collaboration between healthcare providers, technology developers, and

policymakers is essential to establish regulatory frameworks that mitigate risks associated with AI adoption.

7.1. Further Research

The present study has provided valuable insights into the impact of disruptive technologies on the operational efficiency of private hospitals in Kenya, specifically examining two key innovations: telemedicine and artificial intelligence. To develop a more comprehensive understanding of how disruptive technologies influence healthcare operations, future research should consider exploring additional technological advancements, particularly within the realm of digital finance and automated healthcare solutions. Furthermore, the study's focus on Level 4 private hospitals in Kenya may limit the broader applicability of the findings. To strengthen the generalizability of these results, future research should extend the analysis to include public hospitals and higher-level referral facilities, such as Level 5 and Level 6 hospitals. In expanding the scope to diverse healthcare settings, researchers can assess whether the impact of disruptive technologies remains consistent across different hospital categories and operational environments.

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