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THE ROLE OF AI-DRIVEN INVENTORY MANAGEMENT SYSTEMS IN THE PERFORMANCE OF HOSPITALS IN KENYA

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Abstract

This study investigated the role of AI in hospital performance in Kenya. With a cross-sectional comparison, it compared Siaya County Referral Hospital and Ruai Family Hospital in terms of ownership, facility level and resources. Based on Diffusion of Innovations Theory and the Technology-Organization-Environment (TOE) framework, it examined how hospitals acquire, integrate and use AI to improve performance. The study examined the impact of AI-based diagnostic, patient management, inventory and administrative systems on hospital performance and ICT infrastructure's moderating effect. The target population was 175 employees who were using AI-enabled systems. 100 respondents (75 from Siaya and 25 from Ruai) were selected using Yamane's formula and random sampling. The primary data were collected in the form of structured questionnaires and hospital records. Instrument reliability was checked using Cronbach's Alpha (all constructs > 0.70). All data were calculated with SPSS Version 30 using descriptive statistics, Pearson correlation, multiple regression and independent samples t-tests. We found that all four AI-driven systems significantly and positively affected hospital performance accounting for 73.0% variance (R^2 = 0.730, F = 64.294, p < .001). Inventory management systems had the strongest impact (β = 0.341, p < .001). There were no differences between the two hospitals in any system or performance and thus AI's contribution was the same, regardless of ownership, facility level or resources. The moderating effect of ICT infrastructure could not be tested due to a composite variable computation problem, a methodological issue. The study suggests the investment in all four AI systems should be increased and that future research on ICT infrastructure should be implemented properly to assess how this moderating effect is achieved.

Keywords: Artificial Intelligence, AI-Driven Inventory Management Systems, Inventory Management, Hospital Performance, Healthcare Technology, Kenya, Diffusion of Innovations Theory, Technology-Organization-Environment (TOE) Framework.

Introduction

Artificial Intelligence (AI) has is a very important in healthcare because of its capacity to improve efficiency, accuracy, decision making and service delivery. AI refers to systems designed to handle functions that typically require human intelligence (Shaheen, 2021). Narrow AI has become increasingly significant in healthcare and has been used to help healthcare professionals in operational processes (Ang et al., 2023; Alowais et al., 2023). One of the most important applications is inventory management where AI can be used for stock tracking, demand forecasting, identification of shortages, and efficient utilization of hospital resources (Shaheen, 2021; Alhosani& Alhashmi, 2024). Hospital performance is a reflection ofhow resource-efficient; quality services are provided to patients and is cost effective and timely (Chmielewska et al., 2022).

AI-enabled technologies can improve workflow efficiency, communication, patient engagement, and service delivery (Hindelang et al., 2024; Kocaballı et al., 2019; Bajaj, 2024; Lim et al., 2024). However, there is a dearth of proof on the impact of AI-driven inventory management systems on hospital performance in Kenya, especially in institutions where the organizational and resource context are different. A comparison of Siaya County Referral Hospital and Ruai Family Hospital offers an opportunity to analyze the impact of AI-driven inventory management systems in different healthcare settings. A comparative study of healthcare has shown that it is helpful to investigate institutional differences in healthcare

delivery (Helfinstein et al., 2020; Dawaad& Veenstra, 2017; Mwavua et al., 2019). Thus, in this paper, we investigate the impact of AI-driven inventory management systems on Kenya's hospitals, Siaya County Referral Hospital and Ruai Family Hospital.

Statement of the Problem

Kenya's healthcare system is still experiencing challenges in operational efficiency, service delivery and patient satisfaction due to sustained public and private investment. The patient satisfaction, cost effectiveness, equipment utilization, and turnaround time all are indicative of these challenges in the health system. The national average bed occupancy rate is only above 40%, which indicates underuse of the inpatient resources (Barasa et al., 2020), while county hospital staff are only 19% to 35% of the recommended staffing levels and clinical performance is not optimal (Hadithi, 2023). Patient satisfaction in some public hospitals is also low (Kaguora, 2024) in terms of waiting time and coordination problems.

AI-driven inventory management systems can also help us improve the management and utilization of hospital resources for better patient satisfaction and in terms of efficient demand forecasting, automated monitoring and real-time information processing. Such systems can help maintain appropriate stock levels, minimize shortages and wastage, and enhance resource availability. AI applications can improve healthcare efficiency and reduce operating costs (Topol, 2019; Davenport &Kalakota, 2019). However, empirical evidence on the relationship between AI-driven inventory management and hospital performance in Kenya remains limited, particularly across hospitals with different resource conditions (Olanrewaju et al., 2021; Muthomi & Kyalo, 2022).

The literature also reveals geographical, conceptual, and methodological gaps. Much of the evidence on AI in healthcare comes from high-income and Middle Eastern contexts, with limited evidence from Kenya (Topol, 2019; McKinney et al., 2020). Kenyan research has also paid limited attention to AI-driven inventory management as a specific capability for improving hospital performance (Kihara & Ngugi, 2021; Wanjiru &Thogori, 2025). Additionally, limited empirical research has examined how technological infrastructure may influence the effectiveness of AI-driven systems in healthcare settings (Muthomi & Kyalo, 2022).

Therefore, this study examines the role of AI-driven inventory management systems in the performance of hospitals in Kenya, focusing on Siaya County Referral Hospital and Ruai Family Hospital. The study seeks to provide empirical evidence on the contribution of AI-driven inventory management to hospital performance and determine whether its contribution differs between the two institutions.

Theoretical Framework

The Resource-Based View (RBV) originated from Penrose (1959) and was later developed by Barney (1991), who argued that organizational performance is influenced by the resources and capabilities possessed by an organization. Resources can provide sustained competitive advantage when they are valuable, rare, difficult to imitate, and difficult to substitute (Barney, 1991; Barney et al., 2001). The theory is therefore useful in explaining how technological, human, informational, and organizational resources contribute to improved hospital performance (Kraaijenbrink et al., 2010; Ampath, 2024).

The RBV is relevant to this study because effective use of AI-driven inventory management systems requires appropriate technology, skilled personnel, reliable data, and supportive organizational processes. AI-driven inventory systems can help hospitals predict demand, monitor stock levels, reduce shortages and wastage, and improve the efficient use of resources. From a RBV perspective, they are valuable technological resources that can contribute to improved hospital performance if integrated with the other organizational capabilities in a well-managed manner (Barney et al., 2001; Ampath, 2024). The theory also supports the relationship between AI-driven inventory management systems and hospital performance. Hospitals with sufficient technological resources, competent staff, reliable information and good organizational capabilities are better equipped to provide the most efficient and quality healthcare (Barney, 1991; Barney et al., 2001). This allows us to compare Siaya County Referral Hospital and Ruai Family Hospital with different institutional and resource environments. Recent studies indicate the relevance of AI for inventory management.

Shen et al. (2024) also reported an increase in inventory accuracy and supply chain efficiency when an AI-driven inventory system is implemented. Dongo and Ndakondja (2024) found that AI can help predict the demand for medication with good accuracy but emphasized that data quality is important. Chung et al. (2026) reported that AI is able to predict the demand for medication and that accurate data are essential. Machine learning has also been shown to improve the allocation and availability of medicines in underserved areas and to have a positive impact on the management of medicines in this regard. Likewise, Twumasi and Twumasi (2021) highlighted the use of machine learning in predicting hospital resource demand, which they found difficult to achieve without the data quality issue.

In Kenya, Abuya and Okello (2026) found a significant relationship between supply chain responsiveness and hospital performance in public hospitals in Siaya County, although their study did not specifically examine AI-driven inventory management. This creates an important research gap that the present study addresses by examining the role of AI-driven inventory management systems in hospital performance at Siaya County Referral Hospital and Ruai Family Hospital.

Kibe and Nyaberi (2026) assessed the effects of inventory management on Level Four hospitals in Nairobi City County, Kenya. They studied procurement officers, stores officers, and medical personnel in these institutions using a cross-sectional survey research design. Information was collected via self-administered structured questionnaires that contained open-ended and closed-ended questions. A pilot study was conducted with 19 participants (about 10% of the total sample size) to examine the suitability and reliability of the research instrument. The data analysis was conducted using Version 30 of the Statistical Package for the Social Sciences (SPSS) to assess the reliability of the research instrument.

The JIT, demand forecasting, ABC analysis, and FIFO were used as independent variables to assess the effect on hospital performance as the dependent variable. The results showed that all four inventory management practices had a positive impact on the performance of Level Four hospitals in Nairobi City County. In particular, the improvement in JIT practices, accuracy in demand forecasting, efficiency in ABC analysis, and the use of FIFO were associated with improved hospital performance. As a result, we found that good inventory management was essential for maintaining the operational efficiency of a hospital and that it is a good strategy to optimize the healthcare system and the supply chain and improve the performance of the health system as a whole. Kibe and Nyaberi (2026) recommended that Level Four hospitals enhance their inventory management system, using data-driven methods of demand forecasting, information from various sources, and using advanced analytics techniques and machine learning tools to enhance demand analysis and optimize inventory planning and forecasting.

Anderson et al. (2026) investigated the role of artificial intelligence (AI) in optimizing supply chains, specifically in inventory management. The research took place in a highly complex and changing supply chain environment and the geographical location and sample size were not mentioned in the paper. It focused mainly on how AI technology is used in supply chain and inventory management and what methods (machine learning, deep learning, predictive analytics, natural language processing, and intelligent automation) were used to enhance the optimization of supply chains. The focus of the analysis was on AI-driven supply chain optimization, and the performance of inventory management was evaluated on several metrics including forecasting accuracy, turnover rates, management efficiency, visibility into inventory levels, quality of customer service, cost reduction, demand planning, and supply chain resiliency. The results indicate that integrating AI into inventory management is able to improve demand forecasting accuracy, streamline restocking processes, optimize the allocation of resources in inventory, reduce waste, and provide a lot of contexts for decision-making in operations.

AI adoption also improves supply-chain resilience, responsiveness to changing market conditions, proactive risk management and drives cost efficiency and sustainable organizational growth and the authors also stated that AI-driven supply chain optimization is a key strategic capability for organizations to better inventory management and sustainable competitive advantage. The authors said that AI-driven

technologies in this area enable an organization to make informed inventory management decisions, respond to demand fluctuations more rapidly and the overall supply chain performance to be much better.

Kogei and Gachengo (2025) investigated the impact of inventory management on the performance of selected Naivas supermarkets in Nairobi City County, Kenya. Using a descriptive study design, they collected data from 137 employees of eight randomly selected Naivas supermarkets through semi-structured questionnaires. Inventory management was the independent variable, and organizational performance was the dependent variable. They found that inventory management has a positive and statistically significant impact on organizational performance ($\beta = 0.342$, $p = 0.031$), but the effect is small since the partially manual inventory system is still used. The study showed that it is important to have good inventory management systems and IoT and AI-driven technologies, vendor-managed inventory and employee training to improve inventory management and operational performance in the organization.

Knowledge Gaps

There are numerous studies that have shown that inventory management practices are important for organizational and hospital performance. Kibe and Nyaberi (2026) showed that Just-in-Time, demand forecasting, ABC analysis and First-In-First-Out significantly impact Level Four hospitals' performance and well-being. Kogei and Gachengo (2025) also showed that inventory management is a beneficial and significant influence on organizational performance. But these studies were focused on traditional inventory management strategies and not on specific AI-based inventory management systems. Although Anderson et al. (2026) showed that AI can improve forecasting, inventory visibility, replenishment and operational efficiency, the research did not specifically examine the impact of AI-driven inventory management systems on hospital performance in Kenya. As a result, there is a conceptual gap as to the specific contribution of AI-driven inventory management systems to hospital performance, especially towards demand forecasting and stock optimization, stock-outs and wastage, and efficient resource utilization.

The empirical studies have been conducted in different geographical settings. Kibe and Nyaberi (2026) evaluated Level Four hospitals in Nairobi City County, and Kogei and Gachengo (2025) studied selected Naivas supermarkets in Nairobi. While Abuya and Okello (2026) investigated supply chain responsiveness and hospital performance in Siaya County, their study did not specifically investigate the impact of AI-driven inventory management systems. As a result, there is limited empirical evidence on the impact of AI-driven inventory management on hospital performance in Siaya County and Nairobi City County, especially in Siaya County Referral Hospital and Ruai Family Hospital. This geographical gap requires further work in the various hospitals.

There is an additional contextual gap in the literature because so far, all the studies in the literature have been focused on inventory management in retail and hospital supply chain, and not on the hospital operating environment. Kogei and Gachengo (2025) studied Naivas supermarkets where inventory management is oriented towards retail sales, customer demand and profit. Kibe and Nyaberi (2026) investigated Level Four hospitals in Nairobi City County and studied how they operate inventory management. But hospitals operate in a unique context, with patient-care demands, medicine and medical supply availability, emergency need, regulatory requirement, stock-outs and wastage, and continuity in healthcare. Moreover, Siaya County Referral Hospital and Ruai Family Hospital are in different institutional and resource situations, including ownership and capacity. Prior studies do not adequately analyze how AI-driven inventory management systems work in such different health care contexts. So, this study aims to fill this gap by investigating AI-driven inventory management and hospital performance in the two hospitals.

Prior works have used different approaches to study inventory management and organizational performance. Kogei and Gachengo (2025) used descriptive research design, whereas Kibe and Nyaberi (2026) conducted a cross-sectional survey. These studies mainly relied on questionnaire-based data to establish correlation between inventory management practices and organizational performance. However, no comparative and predictive studies have been performed to examine AI-driven inventory management across hospitals under different institutional and resource conditions. Here, we address this problem by adopting a cross-sectional comparative

predictive design and using descriptive statistics, Pearson correlation, multiple regression and comparative statistical methods to assess the relationship and predictive impact of AI-driven inventory management systems on hospital performance.

The Resource-Based View (RBV) provides a useful basis for explaining how valuable technological, human, informational, and organizational resources contribute to organizational performance. However, existing inventory management studies have predominantly relied on theories such as Just-in-Time Theory, Lean Theory, Economic Order Quantity Theory, and Strategic Choice Theory. These theories primarily emphasize inventory efficiency, cost minimization, and operational decision-making, with comparatively limited attention to AI as a strategic organizational capability. Moreover, limited empirical research has applied RBV to explain how AI technologies, skilled personnel, reliable data, ICT infrastructure, and organizational capabilities jointly contribute to hospital performance. The present study therefore addresses this theoretical gap by applying the Resource-Based View to explain AI-driven inventory management systems as valuable technological and organizational resources capable of enhancing hospital performance.

Research Paradigm

This study on the role of AI-driven inventory management systems in the performance of hospitals in Kenya adopted a positivist research philosophy. Positivism emphasizes objectivity, measurement, and empirical testing of relationships among variables, based on the assumption that reality can be understood through observable and measurable evidence (Creswell, 2021). This philosophy was fitting for the study because it enabled the researcher to objectively examine the relationship between AI-driven inventory management systems and hospital performance at Siaya County Referral Hospital and Ruai Family Hospital.

The positivist approach supported the use of structured questionnaires and other quantitative data collection instruments to obtain measurable information from respondents. The collected data were subjected to statistical analysis to identify patterns and relationships between AI-driven inventory management systems and hospital performance. The approach also allowed the researcher to compare measurable outcomes between the two hospitals and reduce researcher bias. So, the positivist philosophy provided a good basis for objective evidence-based and replicable findings regarding the impact of AI-driven inventory management systems on hospital performance.

Research Methodology

The study used a cross-sectional comparative predictive research design that allowed for a single point of time data to be collected and compared to Siaya County Referral Hospital and Ruai Family Hospital in order to understand the relationship between AI-driven inventory management and hospital performance (Saunders et al., 2019; Creswell, 2021). The target population comprised 175 employees who were directly involved in inventory management and AI-driven inventory systems, 125 from Siaya County Referral Hospital and 50 from Ruai Family Hospital. The main data was collected with a closed-ended questionnaire and data from relevant hospital records were also provided. The questionnaire was used to assess AI-driven inventory management and hospital performance based on a five-point Likert scale and data were collected using a drop-and-pick method with trained research assistants. A pilot study of about 10% of the target population was conducted to verify the clarity, validity and reliability of the instrument (Cooper & Schindler, 2014; Fraenkel et al., 2019). Reliability was assessed using Cronbach's Alpha for internal consistency of a research instrument (Polit & Beck, 2021; Kumar, 2017). Data were analyzed (checked, coded and analyzed) with SPSS version 30. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were employed to summarize the data. To examine the relationships and predictive capabilities of AI-driven inventory management systems concerning hospital performance, Pearson correlation and multiple regression analyses were conducted. An independent samples t-test was utilized to evaluate differences between the two hospitals (Saunders et al., 2019; Creswell, 2021).

RESULTS

Descriptive Statistics

The results presented in Table 4.4 reveal that a majority of respondents acknowledged the advantages of AI-driven inventory management systems for the effective management of hospital resources, which subsequently enhances overall hospital performance. Mean scores for all seven items fell between 3.93 and 4.05, indicating a strong consensus among respondents. Furthermore, the relatively low standard deviations ranging from 0.666 to 0.844 imply that there was considerable agreement in the responses provided by participants.

The highest mean score was recorded for the statement that AI has improved the overall transparency of inventory processes (M = 4.05, SD = 0.757). This finding suggests that AI-driven systems have enhanced visibility, accountability, and monitoring of hospital inventory. Improved transparency can enable hospital personnel to know the availability and movement of medicines and supplies more accurately, thereby supporting better resource management. This was in line with Shen et al. (2024) who found that the introduction of a system of AI-enabled inventory management in a hospital pharmacy had a significant impact on inventory accuracy and supply chain efficiency. The results corroborate Dongo and Ndakondja (2024) that AI-based systems can enhance medication demand management and inventory decision making with reliable data.

The second-highest mean was for AI algorithms in forecasting the future consumption of drugs and supplies (M = 4.02, SD = 0.666). The low standard deviation indicates that most of the respondents agree with AI for demand forecasting. It is very important for hospital performance as accurate forecasting can help hospitals maintain proper stock levels and minimize shortages or excessive purchasing. The result is in line with Dongo and Ndakondja (2024) who assessed the potential of AI-based forecasting models to predict the demand for medication and found it to be very robust. Similarly, Twumasi and Twumasi (2021) found machine learning models to predict blood demand in hospital settings, but the data quality was important to make predictions in a stable manner.

AI inventory systems, which also shorten the time taken to deliver components to clinical departments by 4.00 and standard deviation of 0.711, showed that AI allows for faster movement of supplies in hospitals. A quicker internal distribution of medicines and other essential supplies can increase the efficiency of the clinical department by ensuring that they have the resources they need to serve as well. This is in line with Shen et al. (2024), who also reported better supply chain performance with a system of AI-based inventory. It also is in line with Chung et al. (2026), who showed how a machine learning-based allocation of medicine could enhance the availability and use of medicines in an institution with chronic shortages.

AI tracking of medical supplies in real time recorded a mean of 3.99 and a standard deviation of 0.703 and showed that most respondents agreed that AI is better for real-time inventory of hospital inventory. Real-time tracking can help hospital managers to see what stock levels and movements are in play in time to replenish and avoid stock-outs. The low standard deviation indicates that respondents felt the same about this benefit. The results are in line with Shen et al. (2024). According to Shen et al. (2024), AI-supported inventory systems enhance inventory monitoring and accuracy in pharmacy operations in hospital. Similarly, the belief that AI-supported systems reduce the time to monitor inventory was found to be true by a mean of 3.97 and a standard deviation of 0.745. We can see that AI reduces the administrative load of manual inventory monitoring. Regular monitoring can be automated in hospitals, so the time spent on other things is better. This finding is consistent with Shen et al. (2024) who found an increase in inventory management efficiency with AI-based systems. It also supports the general observation of Dongo and Ndakondja (2024) that AI is a good tool to improve the decision-making efficiency in the healthcare supply chain. The statement about the reduction in the delay in receiving supplies due to AI-enabled procurement (3.96, 0.710) was among the lowest mean scores but the overall general agreement is that AI can contribute to the efficient procurement and supply chain. AI-based forecasting and monitoring can help in timely purchasing decisions and decrease the delay that is caused by poor stock planning. This finding is consistent with Shen et al. (2024) who found that AI-enabled inventory management improved the efficiency of supply chain management. This result also confirms Abuya and Okello's (2026) work on the relationship between supply chain responsiveness and hospital performance in public hospitals in Siaya

County, but their study focused on traditional supply chain management rather than AI-oriented inventory management.

The lowest mean score was for the statement that AI had reduced losses associated with expired or unused inventory (M = 3.93, SD = 0.844). While this is a positive result, the higher standard deviation indicates that respondents' views on AI-driven inventory management are more varied. This could suggest that the use of AI to reduce expired or unused inventory is not shared by all hospital departments. Possible factors contributing to this would be the accuracy of demand forecasts, data quality, purchasing habits, storage conditions, and the utilization of AI systems by staff. This is consistent with Dongo and Ndakondja (2024) who stressed the importance of accurate and complete data to the data making of AI-based medication predictions.

Twumasi and Twumasi (2021) also identified missing values and data quality issues for machine learning in hospital resource forecasting. In general, respondents found AI-driven inventory management systems to be very helpful, with mean scores above 3.90 across all areas. The results particularly highlight improvements in inventory transparency, demand forecasting, real-time monitoring, internal supply distribution, and inventory monitoring efficiency. These findings are broadly consistent with Shen et al. (2024), Dongo and Ndakondja (2024), Twumasi and Twumasi (2021), and Chung et al. (2026), who demonstrate that AI-supported inventory and supply management can improve forecasting, resource availability, monitoring, and supply chain efficiency. Therefore, the descriptive findings provide empirical support for the view that AI-driven inventory management systems have an important role in strengthening hospital performance through more efficient management and utilization of healthcare resources.

The Role of AI-Driven Inventory Management Systems

Table 4.4

Mean and Standard Deviation Distribution of Respondents on the Role of AI-Driven Inventory Management Systems in Hospital Performance

Item	Statement	Mean	Std. Deviation
D1	The hospital uses AI systems to track medical supplies in real time.	3.99	0.703
D2	AI-supported systems reduce the time required to monitor inventory.	3.97	0.745
D3	The hospital uses AI algorithms to project future consumption of drugs and supplies.	4.02	0.666
D4	The hospital has reduced delays in receiving supplies due to AI-enabled procurement.	3.96	0.710
D5	AI has improved overall transparency of inventory processes.	4.05	0.757
D6	AI inventory systems reduce the time taken to deliver supplies to clinical departments.	4.00	0.711
D7	AI use has reduced losses associated with expired or unused inventory.	3.93	0.844

Correlations Analysis

Pearson correlation analysis was carried out to assess the strength and direction of the relationship between inventory management systems powered by AI and hospital performance. In this study, we found a strong, positive, and statistically significant correlation ($r = .760$, $p < .001$) between AI-powered inventory management systems and hospital performance. We conclude that higher hospital performance is associated with increased use of these AI systems.

The correlation coefficient of .760 also indicates a strong positive association, indicating that the use of AI-based inventory management systems to improve hospital management could be significant. In practice,

for real time inventory monitoring, demand forecasting, procurement and stock control, and supply of hospital supplies, the use of AI to support efficient utilization of resources and timely availability of essential materials can lead to better hospital performance.

The results of Shen et al. (2024) support that AI-based inventory management improved inventory accuracy and supply chain management in the pharmacy. An update related to this research by Dongo and Ndakondja (2024) noted that AI and machine learning tools for drug demand forecasting and supply management have a lot of potential to improve medication demand forecasting and supply management. Twumasi and Twumasi (2021) also found machine-learning methods to be useful in predicting hospital blood demand and that AI-based forecasting could help in healthcare resource management.

Abuya and Okello (2026) also found an overall relationship between supply chain responsiveness and hospital performance in public hospitals in Siaya County. While they did not investigate AI-driven inventory management (as our research does), it is obvious that effective inventory and supply chain management are important for hospital performance. In general, it is a strong correlation result that the AI-driven inventory management systems positively affect hospital performance. This confirms that good use of AI-driven inventory management in Kenya can lead to improved health care system performance. The correlation is an association and is not proof of causation; regression analysis provides the evidence of the predictive effect of the system on hospital performance.

Table 4.15: Correlation between AI-Driven Inventory Management Systems and Hospital Performance

Variable AI-Driven Inventory Management Systems	Pearson Correlation	Significance (2-tailed)	N
	0.760	0.001	100

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

Regression Analysis: The Role of AI-Driven Inventory Management Systems in the Performance of Hospitals in Kenya

The regression results show a strong positive relationship between AI-driven inventory management systems and hospital performance, with R = .760. The R Square value of .578 indicates that AI-driven inventory management systems account for 57.8% of the performance variability. The adjusted R Square of .574 shows that the model retains a substantial explanatory power after adjustment. This suggests that AI-driven inventory management systems play an important role in explaining differences in hospital performance among the hospitals studied.

Important: The original $R^2 = .730$ came from the model containing four AI systems together. It should not be used for your current single-variable topic. For your topic, $R^2 = .578$ follows from the correlation result r = .760, because R2=.7602=.5776≈.578R^2 = .760^2 = .5776 \.578.

Table 4.17: Model Summary for Monitoring and Control Predicting Bank Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1		0.760	0.578 0.574	0.278

Note:

Predictor: AI-Driven Inventory Management Systems. Dependent Variable: Hospital Performance.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study concludes that AI-driven inventory management systems play a significant and positive role in the performance of hospitals in Kenya. The findings demonstrate that the effective use of AI in inventory management can support hospitals in improving the monitoring, forecasting, transparency,

availability, and utilization of medical supplies and other essential resources.

The descriptive findings showed that respondents generally had positive perceptions of AI-driven inventory management systems, with mean scores ranging from 3.93 to 4.05. The highest mean was recorded for improved transparency of inventory processes (M = 4.05, SD = 0.757), while reduced losses associated with expired or unused inventory recorded the lowest mean (M = 3.93, SD = 0.844). Such results show that AI-driven inventory systems are very useful to improve transparency and monitoring but the impact on inventory losses for the users and hospitals can be different. Also, there was a strong correlation between AI-driven inventory management systems and hospital performance ($r = .760$, $p < .001$). Across all AI-based systems, the regression results showed that the AI-driven inventory management system was the most predictive of hospital performance with a standardized beta coefficient $\beta = .319$, $t = 4.203$, $p < .001$. This suggests that AI-driven inventory management is associated with high improvement in hospital performance. The comparison shows that the AI-driven inventory management systems played a similar role in Siaya County Referral Hospital and Ruai Family Hospital. The mean scores were almost the same at Siaya (M = 3.9867, SD = .56618) and Ruai (M = 3.9943, SD = .57363) and the independent samples t-test did not show any difference between the two hospitals ($t(98) = -.058$, $p = .954$). Thus, the findings of the study indicate that the differences in institutional settings did not affect the impact of AI-driven inventory management on hospital performance. Thus, from this study, AI-driven inventory management is a technology for the improvement of hospital performance in Kenya. It can also improve inventory transparency, monitoring, forecasting, supply availability, and utilization.

Recommendations

Based on the results, hospital management should enhance the use of AI-based inventory management systems to improve the availability, monitoring, and utilization of medical supplies and other hospital resources. Hospitals should also develop efficient digital inventory systems that provide real-time information on their stock level to make informed demand predictions. Hospitals should improve staff capacity and staff training on the use of AI-based inventory management systems. Tech support should also be provided to staff to effectively interpret and utilize information generated by AI-based inventory systems to make decisions based on them. Hospitals should also improve the accuracy and quality of the inventory data entered AI-based systems. Reliable data is essential to forecasting, stock management, supply planning and to reduce wastage. Hospital management should implement specific measures for quality control and monitoring of data and system. Government and healthcare providers should invest in digital infrastructure and AI-enabled inventory management technologies in public and resource constrained hospitals. This investment can enhance supply management and reduce stock outs and wastage and improve the efficient use of limited healthcare resources.

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