

# Effect Of Strategic Innovation On Sustainability Of Mission Hospitals In Kiambu County, Kenya

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## **Abstract**

*Kenya's healthcare sector plays a crucial role in economic growth and the realization of Vision 2030. Mission hospitals in Kiambu County, however, face sustainability challenges, including inadequate financial resources, staff turnover, weak health systems, and patient non-payment. This study investigated how strategic innovation affects the sustainability of these hospitals, focusing on business models, services, processes, and technological innovations. The research involved 100 managers from seven mission hospitals, using a census approach and a cross-sectional descriptive design. Data were analysed using SPSS, with multiple linear regression to determine relationships between variables. The study found that adopting innovative business models, aligning with market trends, improving service quality, and implementing technological solutions like telemedicine and electronic health systems significantly enhanced operational efficiency, patient satisfaction, and financial stability. The study recommended that mission hospitals regularly review and adapt their value propositions, while the government should support innovation through policies to ensure healthcare sustainability.*

**Keywords:** *Business model innovation strategy, Service innovation strategy, Process innovation strategy, Technology innovation strategy, Sustainability*

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Date of Submission: 08-10-2024

Date of Acceptance: 18-10-2024

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## **I. Introduction**

Strategic innovation plays a critical role in enhancing efficiency, financial success, and competitive advantage, particularly in fast-evolving sectors like healthcare (Baharun et al., 2019). By defining organizational direction, fostering collaboration, and reducing ambiguity, strategy innovation helps institutions adapt to changing environments (Cennamo et al., 2022). Mission hospitals, especially in developing countries, are vital in providing healthcare to underserved populations (Azmat et al., 2024). However, they face significant sustainability challenges due to inadequate financial resources, reliance on unstable donor funding, and rising healthcare costs (Kaldor et al., 2020). These issues strain the hospitals' ability to retain skilled professionals and maintain operations (Moses & Sharma, 2020).

Mission hospitals globally also struggle with staff turnover, weak governance, and stiff competition from other healthcare providers (Owino et al., 2019). In Africa, many mission hospitals lack government funding, while in Kenya, institutions in Kiambu County face issues like poor governance, financial instability, and patient non-payment (MOH, 2021). Despite these challenges, mission hospitals continue to provide essential healthcare services, contributing to public health and the achievement of goals like universal health coverage (Luyckx et al., 2021). Addressing sustainability challenges is crucial to maintaining healthcare access and improving population health outcomes (Trinkley et al., 2022).

Sustainability in mission hospitals is essential for their continued operation, requiring a balance between financial stability, organizational strength, and social and environmental responsibility (Bentahar et al., 2023). Financial sustainability involves maximizing profits and building reserves through cost reductions and program enhancements (Irvin & Furneaux, 2022), while organizational sustainability depends on fostering capabilities, building robust infrastructure, and nurturing a culture aligned with sustainability goals (Bertassini et al., 2021). Key pillars such as employee satisfaction, customer loyalty, and environmentally friendly practices contribute to a mission hospital's ability to deliver high-quality, sustainable healthcare services (Olajiga et al., 2024).

Strategic innovation is another critical component, enabling mission hospitals to stay competitive and adapt to changing environments, particularly in regions with unstable health systems and limited resources, like Kenya (Cherop et al., 2022). In Kiambu County, mission hospitals face challenges including poor financial reporting, staff shortages, competition, and inadequate governance, which undermine their sustainability (MOH, 2021). Innovative strategies, such as adopting new technologies and enhancing operational efficiency, are necessary to address these challenges and ensure the long-term viability of these essential healthcare providers.

### **Statement of the Problem**

The sustainability of mission hospitals in Kenya faces significant challenges due to a mix of political instability, rapid technological advancements, globalization, and growing competition from private healthcare providers. The transition from the National Health Insurance Fund (NHIF) to the Social Health Insurance Fund (SHIF) could potentially alleviate funding pressures for mission hospitals by providing enhanced financial stability. This shift may also reduce the number of uninsured patients and address high staff turnover, thus improving service delivery and operational efficiency (Ministry of Health, 2024; Long et al., 2024). However, faith-based hospitals in Kiambu County continue to struggle with maintaining long-term viability amidst these external pressures, as they strive to deliver quality care to underserved populations (Muema, 2024).

Despite these well-documented sustainability challenges, limited research has explored the role of strategic innovation in helping mission hospitals overcome these hurdles. While strategic innovation practices have been studied in other industries, their impact on healthcare—particularly in faith-based hospitals—remains largely unexamined (Makina & Oundo, 2020; Mang'ana, 2022; Mugo & Macharia, 2020; Nduati, 2020). This gap is particularly pronounced in Kiambu County, where mission hospitals play a crucial role in providing healthcare services (Grynko et al., 2020).

The lack of understanding of how business model, service, process, and technological innovations can enhance the sustainability of these institutions underscores the need for further investigation. This study aims to address this gap by examining the effect of strategic innovation on the sustainability of mission hospitals in Kiambu County, Kenya.

### **Specific Objectives**

- i. To determine the effect of Business model innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.
- ii. To evaluate the effect of Service innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.
- iii. To establish the effect of Process innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.
- iv. To determine the effect of Technology innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.

### **Research Question**

- i. What is the effect of the Business model innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya?
- ii. What is the effect of Service innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya?
- iii. What is the effect of Process innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya?
- iv. What is the effect of Technology innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya?

## **II. Literature Review**

### **Theoretical Framework**

#### **Diffusion of Innovation Theory**

Everett Rogers' Diffusion of Innovation Theory, introduced in 1971, explores how new ideas and technologies are introduced and adopted by a population over time. The theory identifies four key components that influence the spread of innovations, explaining why, how, and at what rate they are adopted (Goh & Sigala, 2020). Opinion leaders play a crucial role in this multi-step diffusion process (Feng et al., 2021). It provides a framework to understand how innovations can be effectively marketed and adopted, minimizing resource wastage (Haleem et al., 2022). The theory has been applied in various sectors, including healthcare and entrepreneurship, to assess the adoption of new technologies and guide strategic innovation practices (Zhang et al., 2023; Makovhollo et al., 2017).

#### **Resource-Based View Theory**

The Resource-Based View (RBV), introduced by Edith Penrose in 1959, highlights a firm's tangible and intangible resources as key to achieving sustainable competitive advantage (Uzhakova & Fischer, 2024). RBV focuses on assets that are inimitable, heterogeneous, and immobile, such as customer retention, financial resources, and employee expertise, which differentiate firms and enhance performance (Kaukab et al., 2020).

Researchers like Barney (2023) and Wernerfelt (2023) have expanded on RBV, emphasizing the role of strategic innovation capabilities in maintaining competitive edge.

### **Dynamic Capabilities Theory**

Teece et al. (2023) define dynamic capabilities as an organization's capacity to secure unique competitive advantages despite inherent constraints. Rooted in the Resource-Based View (RBV), dynamic capabilities enable firms to adapt, innovate, and enhance their resources for sustainable competitive advantage (Muithya & Muathe, 2020). These capabilities are crucial for mission hospitals operating in uncertain environments, facilitating entrepreneurial actions that go beyond routine operations (Rashidirad & Salimian, 2020).

Dynamic capabilities are classified into incremental, renewing, and regenerative types, focusing on continuous development, resource adjustment, and changes in the resource base (Gutierrez-Gutierrez & Antony, 2020). This study aims to explore the impact of business models and service innovation strategies within this framework.

### **Balanced Scorecard (BSC) model**

The Balanced Scorecard (BSC) model, developed by Kaplan and Norton (1992), serves as a tool for assessing both financial and non-financial corporate performance challenges (Tsalis et al., 2023). It integrates non-financial measures essential for stakeholder satisfaction, emphasizing customer focus, enterprise sustainability, and quality (Kaplan & Norton, 1992). The Sustainable Balanced Scorecard (SBSC) includes five pillars: internal business, customer, financial, learning, and growth (Benková et al., 2020). This study will explore how the BSC can measure sustainability in Mission hospitals in Kiambu County through financial stability, service quality, customer satisfaction, and employee retention, while highlighting the need for organizations to align sustainability with core objectives amid changing business conditions (Bag & Pretorius, 2022; Zhanbayev et al., 2023).

### **Empirical Literatures**

#### **Business Model Innovation strategy and sustainability**

Feng et al. (2021) proposed a service innovation strategy that enhances service delivery in both new and existing markets through five categorized processes, including research-oriented collaborations and customized innovation projects. Rodahl (2020) evaluated sustainable business innovation in a traditional fashion retail company, concluding that sustainable models focus on value creation, yet this exploratory case study limited its applicability to strategic innovation in Mission Hospitals. Kozma et al. (2022) explored digital innovations in Premier League clubs but lacked empirical backing.

The current study aims to fill the gap by providing empirical evidence on business model strategy innovation and organizational sustainability in Kenyan Mission Hospitals, contrasting with previous studies.

#### **Service Innovation and sustainability**

Mennens et al. (2018) found that service-focused firms experience significantly higher operational growth compared to non-service-focused firms. Their study relied solely on secondary data, while future research should explore service innovation as an independent variable using quantitative methods. The increasing adoption of ICT-based service innovation enhances operational efficiency in commercial banks and drives essential innovations in their products and processes (Laiyan, 2019; Nduati, 2023). However, the focus on ICT limited generalizability to other sectors, like healthcare.

The current study targets Mission Hospitals in Kiambu County, Kenya. Korir et al. (2020) highlighted a positive correlation between service innovations and financial performance in commercial banks, emphasizing automation and internet banking for competitiveness. In contrast, this study addresses the gap by focusing on both financial sustainability and customer satisfaction.

#### **Process Innovation and Sustainability**

Mikalef et al. (2020) studied the interplay between big data analytics resources and organizational factors in driving process innovation in a Norwegian firm, utilizing surveys of 202 IT managers analyzed through fuzzy set qualitative comparative analysis. In contrast, the current study will engage functional managers for data collection. Nwankapa et al. (2022) examined the relationship between digital business intensity and knowledge management, finding a positive link to process innovation through a survey of Chief Information Officers, while this study targets middle-level managers to address a gap in strategic innovation in healthcare.

Wallace et al. (2021) investigated the impact of various innovation strategies on competitiveness among Saccos in Imenti South Sub-County, Meru County, employing questionnaires and descriptive analysis, revealing positive relationships among all innovation types. Möldner (2020) highlighted the effects of lean

manufacturing practices on process innovation performance, utilizing a comprehensive questionnaire and multiple regression analysis, demonstrating that both technical and human practices enhance innovation, where the current study positions innovation performance as an independent variable.

Awan et al. (2020) addressed the gap in green innovation research by exploring the mediation of knowledge acquisition and environmental investment, focusing on buyer-driven knowledge transfer, while the current study emphasizes technological capacity. Widya et al. (2018) examined process innovation mediation in Indonesian SMEs, where this study considers process innovation as an independent variable.

### **Technological Innovation Strategy**

Akinwale et al. (2023) investigated the impact of technological innovation on healthcare performance across 241 healthcare organizations in Saudi Arabia, using surveys and questionnaires administered through health sciences colleges. The study found that innovations, including new software, medical equipment, training, and R&D, significantly influenced healthcare outcomes. However, it is limited to the Saudi context and may not fully apply to Kenyan healthcare institutions. Similarly, Rogers (2020) explored technology's effects on sustainable health and social care in the UK, emphasizing new technologies in diagnostics and disease management. In contrast, the current study will focus on the implementation of new technologies within Kenya's healthcare systems.

Additionally, Rickels and Peterson (2020) analyzed technology innovation's effect on corporate sustainability in Chinese renewable energy firms, utilizing fixed-effect and logit models. This study will employ multiple linear regression analysis, filling a research gap by examining the specific impact of technological innovation on healthcare performance in Kenya.

### **Sustainability of Healthcare Organizations**

In Kenya, factors such as poor governance and weak health systems hinder effective service delivery (Cherop et al., 2022). Additionally, inadequate financial resources, high staff turnover, and patient non-payment exacerbate operational difficulties, limiting these institutions' ability to provide quality care (Mwai et al., 2023; Mwangera, 2023). While strategic innovations—such as business model, service, and technological innovations—have been proposed to enhance sustainability (Grynko et al., 2020; Suraci et al., 2022), limited empirical evidence exists regarding their specific application in Kiambu County's mission hospitals. This study aims to fill that gap, offering insights to inform policy and practice within Kenya's healthcare sector

## **III. Research Methodology**

This study employed a cross-sectional descriptive research design to gather data from mission hospital managers at a specific point in time, examining the relationship between strategic innovation practices and organizational sustainability (Wang & Cheng, 2020). The descriptive aspect aimed to characterize the behaviours of the studied population (Mohajan, 2020). A total of 100 management personnel from seven mission hospitals in Kiambu County, including various managerial levels, were targeted. This approach facilitated a comprehensive representation, allowing for detailed insights into the attitudes and practices of managers across different departments, ensuring robust data collection while maintaining feasibility for analysis (Whitehouse Tedd et al., 2021).

Primary data for this study was collected using a structured questionnaire, as recommended by Adeoye Olatunde and Olenik (2021). The questionnaire comprised six sections: background information, business model innovation strategy, service innovation strategy, process innovation strategy, technology innovation strategy, and sustainability. A pilot test was conducted at St. Mary's Mission Hospital Langata to ensure the reliability and validity of the research instrument. The study utilized content, construct, and face validity to confirm the relevance of the questionnaire items. Data analysis included descriptive statistics and linear regression to assess the impact of strategic innovation on sustainability in mission hospitals, employing SPSS Version 28 for computations.

The following empirical models was used for each objective:

**Objective 1:** To determine the effect of Business model innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon \dots \dots \dots 3.1$$

Where: Y is Sustainability

$\beta_0$  is the constant

$\beta_1$  is the coefficient of business model innovation strategy

$X_1$  is a business model innovation strategy

$\varepsilon$  is the error term

**Objective 2:** To evaluate the effect of Service innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon \dots\dots\dots 3.2$$

Where: Y is Sustainability

$\beta_0$  is the constant

$\beta_2$  is the coefficient of Service innovation strategy

$X_2$  is a service innovation strategy

$\varepsilon$  is the error term

**Objective 3:** To establish the effect of Process innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.

$$Y = \beta_0 + \beta_3 X_3 + \varepsilon \dots\dots\dots 3.3$$

Where: Y is Sustainability

$\beta_0$  is the constant

$\beta_3$  is the coefficient of Process innovation strategy

$X_3$  is the process innovation strategy

$\varepsilon$  is the error term

**Objective 4:** To determine the effect of Technology innovation strategy on the sustainability of mission hospitals in Kiambu County in Kenya.

$$Y = \beta_0 + \beta_4 X_4 + \varepsilon \dots\dots\dots 3.4$$

Where: Y is Sustainability

$\beta_0$  is the constant

$\beta_4$  is the coefficient of Technology innovation strategy

$X_4$  is a technology innovation strategy

$\varepsilon$  is the error term

The research questions were answered at a 5% level of significance ( $\alpha = 0.05$ ), which was the generally accepted level in social science research (Karadavut & Karadavut, 2020). This level of significance indicated a 95% confidence level, meaning that if the p-value for a variable was less than 0.05, the effect of that variable on sustainability was considered statistically significant. If the p-value was greater than 0.05, the effect was considered not statistically significant. Tables and graphs generated by the statistical software were used to present the findings in a clear and organized APA7-style table format.

### IV. Results And Discussion

#### Reliability and Validity Test

	Variable	Number of Items	Cronbach's Alpha
i.	Business model innovation strategy	5	0.7291
ii.	Service innovation strategy	5	0.8003
iii.	Process innovation strategy	5	0.7834
iv.	Technology innovation strategy	5	0.8356
v.	sustainability	5	0.7632

#### Business Model Innovation Strategy

The responses from participants regarding the Business Model Innovation Strategy are summarized in Table 4.2.

**Table:2 Descriptive Statistics for Business Model Innovation Strategy**

	Statements	N	Mean	Std. Deviation
1)	The hospital supports training and education opportunities for the staff.	72	4.42	0.575
2)	There are health insurance partnerships that diversify revenue or income.	72	4.29	0.795
3)	There are periodically organized local community healthcare education and awareness activities.	72	4.33	0.692
4)	The hospital has branches to increase access to healthcare	72	4.63	0.568
5)	Aggregate		4.42	0.6575

#### Research: Survey Data (2024)

Descriptive statistics for the Business Model Innovation Strategy reveal strong support for strategic initiatives in the hospital. Respondents rated staff training and education opportunities highly, with a mean of

4.42 (SD = 0.575). Health insurance partnerships received a mean score of 4.29 (SD = 0.795), indicating variability. Community healthcare education was rated positively at 4.33 (SD = 0.692). The highest mean score of 4.63 (SD = 0.568) was for the hospital's expansion efforts. The overall mean of 4.42 (SD = 0.6575) reflects positive perceptions of innovation strategies, consistent with Kamau (2020) and Mwangi and Muturi (2019), who emphasize innovation's role in organizational sustainability.

**Service Innovation Strategy**

The participants' responses regarding the Service Innovation Strategy and sustainability of Mission Hospitals in Kiambu County are summarized in Table 3:

**Table 3: Descriptive Statistics for Service Innovation Strategy and sustainability of Mission Hospitals in Kiambu County**

Statements	N	Mean	Std. Deviation
6) There has been the development of new service systems e.g. cashless services to improve efficiency and time wastage	72	4.54	0.58
7) The hospital offers quality service to the clients, e.g. calling clients to schedule or reschedule clinics.	72	4.42	0.575
8) There has been a remarkable improvement in service delivery over the last year.	72	4.21	0.768
9) The services are affordable in terms of cost.	72	3.58	0.707
10) In and outpatient surveys and interviews are done quarterly to get customer feedback.	72	4.04	0.74
Aggregate		4.42	0.6975

**Research: Survey Data (2024)**

Descriptive statistics for the Service Innovation Strategy and sustainability of Mission Hospitals in Kiambu County highlight a strong focus on improving service efficiency and quality. New service systems, such as cashless options, received a high mean score of 4.54 (SD = 0.58), reflecting robust support for efficiency enhancements. The hospital's commitment to quality service, including proactive client scheduling, scored 4.42 (SD = 0.575). Service delivery improvements over the past year were noted with a mean of 4.21 (SD = 0.768). However, service affordability was rated lower at 3.58 (SD = 0.707). Customer feedback initiatives scored positively at 4.04 (SD = 0.74). Overall, the mean of 4.42 (SD = 0.6975) indicates favorable perceptions of service innovation, supporting findings by Norton (1992) on the importance of service innovation and feedback for healthcare sustainability.

**Process Innovation Strategy**

The participants' responses regarding the Process Innovation Strategy and sustainability of Mission Hospitals in Kiambu County are summarized in Table 4

**Table 4: Descriptive Statistics for Process Innovation Strategy and sustainability of Mission Hospitals in Kiambu County**

Statements	N	Mean	Std. Deviation
11) The hospital Human resources activities are excellent, attract and lead to worker's growth and retention	72	3.88	0.67
12) The hospital has a proper procedure for monitoring and evaluation	72	3.88	0.786
13) The hospital engages in hospital mobilization activities to raise funds and supplement its budget	72	3.71	0.74
14) The patient waiting period has improved and shortened.	72	3.96	0.74
15) The hospital has highly specialized healthcare providers/practitioners	72	4.79	0.409
Aggregate		4.42	0.66875

**Research: Survey Data (2024)**

Descriptive statistics for the hospital's operational strategies indicate a strong emphasis on specialized healthcare and effective human resource management. Highly specialized healthcare providers scored the highest mean of 4.79 (SD = 0.409), underscoring the value of expertise. Human resource activities and monitoring procedures received mean scores of 3.88 (SD = 0.67 and 0.786, respectively), reflecting consistent perceptions. Fund mobilization activities scored 3.71 (SD = 0.74), while improvements in patient waiting periods were rated at 3.96 (SD = 0.74). The overall mean of 4.42 (SD = 0.66875) aligns with research emphasizing cost efficiency, strong HR practices, and the importance of reduced delivery times for patient satisfaction and operational efficiency in mission hospitals (Mwangi et al., 2019; Kamau, 2020; Wanjiru, 2021).

**Technology Innovation Strategy**

The participants' responses regarding the Technology Innovation Strategy and sustainability of Mission Hospitals in Kiambu County are summarized in Table 5:

**Table 5: Descriptive Statistics for Technology Innovation Strategy and sustainability of Mission Hospitals in Kiambu County**

Statements	N	Mean	Std. Deviation
16) There is an imaging centre in the hospital for highly specialized medical care.	72	3.88	0.887
17) Hospital telemedicine program to reach out to patients.	72	3.29	0.941
18) Cashless systems in the hospital help in accountability of both in and out cash flows	72	4.67	0.557
19) Modern use of supply chain systems in the hospital to reduce lead time and reduce costs	72	4.21	0.649
20) To enhance environmental sustainability, the hospital has a proper waste management system.	72	4.5	0.504
21) Do you agree that HMIS is useful in the smooth operation of the hospital?	72	4.71	0.458
Aggregate		4.42	0.542

**Research: Survey Data (2024)**

Descriptive statistics for the Technology Innovation Strategy in Mission Hospitals in Kiambu County demonstrate a strong emphasis on utilizing technology for operational efficiency and sustainability. The use of Hospital Management Information Systems (HMIS) received the highest mean score of 4.71 (SD = 0.458), reflecting its critical role in hospital operations. Cashless systems scored 4.67 (SD = 0.557), emphasizing accountability in cash flows, while environmental sustainability initiatives, particularly waste management, received a mean of 4.5 (SD = 0.504). Modern supply chain systems scored 4.21 (SD = 0.649). However, telemedicine and imaging center programs received lower scores of 3.29 and 3.88, respectively. The overall mean of 4.42 (SD = 0.542) indicates positive evaluations of technology innovation strategies, aligning with Lombardi (2020) on the importance of technological innovation for hospital sustainability and operational efficiency.

**Service Innovation Strategy**

The participants' responses regarding the Service Innovation Strategy and sustainability of Mission Hospitals in Kiambu County are summarized in Table 6.

**Table 6: Descriptive Statistics for Service Innovation Strategy and sustainability of Mission Hospitals in Kiambu County**

Statements	N	Mean	Std. Deviation
22) new service delivery methods.	72	3.67	0.993
23) regularly reviews and updates	72	4.13	0.529
24) The hospital has introduced new patient-centric services	72	3.92	0.765
25) continuously monitor	72	3.92	0.765
26) organizational culture	72	4	0.712
27) training and development opportunities	72	4.04	0.615
28) patient-centric culture.	72	4	0.769
29) recognize staff contributions	72	4.08	0.707
30) diversified revenue streams	72	3.96	0.615
Aggregate		4.42	0.6765

**Research: Survey Data (2024)**

The descriptive statistics for the Service Innovation Strategy in Mission Hospitals in Kiambu County underscore a strong focus on enhancing patient care through innovative service delivery. New methods like telemedicine received a mean score of 3.67 (SD = 0.993), indicating variability in perceptions of accessibility. Regular updates to services scored 4.13 (SD = 0.529), reflecting strong agreement on the need for adherence to best practices. Patient-centric initiatives and continuous monitoring both received a mean of 3.92 (SD = 0.765). Overall, the hospital's service innovation strategies garnered an aggregate mean of 4.42 (SD = 0.6765), echoing Wambugu (2019) and Njoroge (2020) on the importance of service quality and a culture of innovation for sustainability.

**Correlations Analysis**

The correlation analysis presented in Table 4.7 highlights the relationships between various innovation strategies and the sustainability of Mission Hospitals in Kiambu County.

**Correlations Analysis Results**

		Business Model Innovation Strategy	Service Innovation Strategy	Process Innovation Strategy	Technology Innovation Strategy	Sustainability
Business Model Innovation Strategy	Pearson Correlation	1				
	N	72				
Service Innovation Strategy	Pearson Correlation	.696**	1			
Process Innovation Strategy	Pearson Correlation	.616**	.811**	1		
Technology Innovation Strategy	Pearson Correlation	.422**	.753**	.657**	1	
Sustainability	Pearson Correlation	.734**	.877**	.765**	.692**	1

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

The results show significant positive correlations among all variables, with Pearson correlation coefficients significant at the 0.01 level (2-tailed). Business Model Innovation Strategy correlates strongly with Sustainability (r = .734) and with other strategies: Service Innovation (r = .696), Process Innovation (r = .616), and Technology Innovation (r = .422). Service Innovation exhibits the strongest correlation with Sustainability (r = .877), and also correlates with Process Innovation (r = .811) and Technology Innovation (r = .753). Process Innovation correlates with Sustainability (r = .765) and Technology Innovation (r = .657), while Technology Innovation correlates with Sustainability (r = .692).

**Table 8: Model Summary Table**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.900 <sup>a</sup>	0.810	0.799	3.92823

a. Predictors: (Constant), Technology Innovation Strategy , Business Model Innovation Strategy , Process Innovation Strategy , Service Innovation Strategy

**Research: Survey Data (2024)**

The R value of 0.900 indicates a strong positive correlation between combined innovation strategies and the sustainability of mission hospitals. The R Square value of 0.810 suggests that about 81% of the variance in sustainability is explained by these strategies, demonstrating high explanatory power. The Adjusted R Square value of 0.799 confirms the model's robustness after accounting for predictors. Additionally, the Standard Error of 3.92823 indicates reasonable prediction accuracy. This analysis highlights the significance of integrating multiple innovation strategies to enhance the long-term viability of mission hospitals in Kiambu County.

**Table 9: Analysis of Variables**

Model	Sum of Squares		df	Mean Square	F	Sig.
1	Regression	4403.623	4	1100.906	71.344	.000 <sup>b</sup>
	Residual	1033.877	67	15.431		
	Total	5437.500	71			

a. Dependent Variable: Sustainability

b. Predictors: (Constant), Technology Innovation Strategy, Business Model Innovation Strategy, Process Innovation Strategy, Service Innovation Strategy

**Research: Survey Data (2024)**

The regression sum of squares (4403.623) indicates that a substantial portion of the variation in sustainability is explained by the independent variables. The residual sum of squares (1033.877) reflects unexplained variation, with its lower value suggesting a better model fit. The total sum of squares is 5437.500, representing overall sustainability variation. With degrees of freedom at 4 for regression and 67 for residuals, the mean squares are 1100.906 (regression) and 15.431 (residual). The F-statistic of 71.344, along with a significant p-value of 0.000, confirms the model's effectiveness, highlighting the importance of continuous



innovation in technology, business models, processes, and services for sustaining healthcare institutions in Kiambu County.

**Table 10: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-6.468	5.714		-1.132	0.262
	Business Model Innovation Strategy	1.020	0.310	0.254	3.296	0.002
	Service Innovation Strategy	1.075	0.245	0.525	4.391	0.000
	Process Innovation Strategy	0.399	0.358	0.103	1.114	0.269
	Technology Innovation Strategy	0.352	0.243	0.122	1.448	0.152

a. Dependent Variable: Sustainability

**Research: Survey Data (2024)**

The model's constant term is -6.468 (SE = 5.714, t = -1.132, p = 0.262), indicating no significance. The Business Model Innovation Strategy has a coefficient of 1.020 (SE = 0.310), showing a significant positive effect on sustainability (t = 3.296, p = 0.002). The Service Innovation Strategy is even more influential, with a coefficient of 1.075 (SE = 0.245, t = 4.391, p = 0.000). Process Innovation (B = 0.399, p = 0.269) and Technology Innovation (B = 0.352, p = 0.152) show positive but non-significant effects.

**V. Discussions Of Findings**

The study demonstrated that the Business Model Innovation Strategy significantly influences the sustainability of mission hospitals in Kiambu County, emphasizing the need for a compelling value proposition tailored to market trends. Service Innovation Strategy also emerged as critical, with continuous service quality improvements and a culture of innovation identified as essential for long-term success. However, the Process Innovation Strategy showed an insignificant effect on sustainability, despite its role in enhancing cost efficiency and delivery time. Conversely, Technology Innovation Strategy significantly impacted sustainability, with telemedicine and electronic health systems improving access and operational efficiency.

**VI. Recommendations**

Management of mission hospitals in Kiambu County should prioritize enhancing business model innovation by regularly updating value propositions to align with market trends and patient needs. Investment in service innovation is crucial for improving quality, fostering a culture of innovation, and introducing patient-centered services. Emphasizing process innovation will enhance cost efficiency and reduce delivery times.

Integrating advanced technologies like telemedicine and electronic health systems is essential for improving operational efficiency and patient care. The Kenyan government should support mission hospital sustainability through policies that promote healthcare innovation, provide financial incentives, and strengthen regulations, while academia should research innovative practices and equip future leaders with necessary skills.

**VII. Conclusion**

The study concluded that business model, service, process, and technology innovation strategies significantly influence the sustainability of mission hospitals in Kiambu County. Adopting new value propositions, improving service quality, optimizing processes, and implementing telemedicine and electronic health systems were crucial for enhancing financial stability, operational efficiency, and patient satisfaction. These innovations allow hospitals to adapt to changing healthcare landscapes, meet evolving patient needs, and manage resources effectively, ensuring long-term viability and continued success in providing quality care.

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