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Operational Innovation and Financial Sustainability of Rehabilitation Centers in Kenya: A comparative Study of Miritini, Asumbi and Sinai

By: Victor Owuor RADIDO[1], Agnes NJERU (PhD)[2] and Henry KIOGORA (PhD)[3]

Abstract

Rehabilitation centers in Kenya face the challenge of maintaining continuous treatment and support services while securing adequate financial resources to meet operating costs. This study examined the relationship between operational innovation and financial sustainability of rehabilitation centers in Kenya through a comparative analysis of Miritini, Asumbi, and Sinai rehabilitation centers. It focused on three dimensions of operational innovation: product innovation, process innovation, and service innovation. The study was guided by Schumpeter's Theory of Innovation, Dynamic Capabilities Theory, Diffusion of Innovation Theory, and Resource-Based View. A descriptive cross-sectional survey design was adopted. The target population comprised of 60 managerial and senior operational staff across the three centers, and a census approach was used. Data was collected using a structured questionnaire, and 53 valid responses were obtained, representing a response rate of 88.3%. Quantitative data were analyzed using descriptive statistics, Pearson correlation, regression analysis, and one-way analysis of variance, with Tukey HSD post-hoc comparisons used where appropriate. The multiple regression model explained 67.2% of the variation in financial sustainability. Product innovation and service innovation were statistically significant predictors in the combined model, while process innovation did not make a statistically significant independent contribution after the other innovation dimensions were controlled for. The comparative analysis also identified significant differences in the levels of the study variables among the three rehabilitation centers. The findings highlight the importance of examining different dimensions of operational innovation and recognizing institutional differences when developing strategies to support financial sustainability. The study provides context-specific evidence for rehabilitation-center managers, policymakers, and researchers concerned with operational innovation and the sustainability of rehabilitation services in Kenya.

Key Words: *Operational innovation, financial sustainability, rehabilitation centers, product innovation, process innovation, service innovation*

1. Introduction

Rehabilitation services play an important role in addressing substance use disorders and supporting the recovery and reintegration of affected individuals into society. Rehabilitation centers provide structured treatment programmes, counselling, psychosocial support, and other interventions intended to improve the well-being of individuals experiencing substance use and related challenges. The effectiveness and continuity of these services depend not only on the availability of qualified personnel and appropriate facilities but also on the ability of rehabilitation centers to manage their operations efficiently and maintain adequate financial resources (World Health Organization [WHO], 2023).

[1] *Master of Business Administration Student, Department of Business and Economics, Zetech University, Nairobi, Kenya, Email: victorradido@yahoo.com*
[2] *Department of Business and Economics, Zetech University, Nairobi, Kenya, Email: agnes.njeru@zetech.ac.ke*
[3] *Department of Business and Economics, Zetech University, Nairobi, Kenya, Email: henry.kiogora@zetech.ac.ke*

Globally, rehabilitation is increasingly recognized as an essential component of comprehensive health systems. The WHO (2023) estimated that approximately 2.4 billion people worldwide live with health conditions that may benefit from rehabilitation. However, access to rehabilitation continues to be constrained by shortages of skilled professionals, inadequate infrastructure, limited financing, and insufficient integration of rehabilitation into primary healthcare systems (Heinemann et al., 2020). These challenges are particularly significant in resource-constrained settings, where institutions must respond to growing service needs while operating within limited financial and human-resource capacities.

Financial sustainability is therefore an important concern for rehabilitation institutions because continuity of care requires reliable resources for personnel, facilities, treatment programmes, equipment, and other operational expenses. The Organization for Economic Co-operation and Development (OECD, 2021) discussed the financing challenges experienced by countries undergoing transitions in development assistance, particularly where declining external support is not adequately replaced by domestic financing. Such transitions can expose health and social-service institutions to funding uncertainty and require them to identify alternative sources of financial support.

In Kenya, rehabilitation services form part of the broader response to substance uses disorders and related social and health challenges. The National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA, 2022) documented substance-use concerns that underscore the importance of prevention, treatment, and rehabilitation interventions. The demand for such services creates a continuing need for institutions that can provide appropriate care while maintaining the financial and operational capacity required for sustained service delivery. However, the ability of rehabilitation centers to respond to this need may be affected by differences in ownership, financing arrangements, staffing, infrastructure, geographical location, and institutional resources.

Operational innovation provides one possible means of responding to these challenges. Product innovation may involve introducing new rehabilitation programmes, developing specialized treatment packages, or improving existing interventions to respond to changing client needs. Process innovation may involve improving resource allocation, administrative procedures, record management, procurement, and the coordination of treatment activities. Service innovation may include expanding outreach, strengthening aftercare, introducing appropriate digital support, and improving the

accessibility and responsiveness of rehabilitation services (Schumpeter, 1934; Teece et al., 1997; Rogers, 2003).

Despite the relevance of innovation, there is a need for rehabilitation-specific empirical evidence examining how product, process, and service innovation relate to financial sustainability in Kenya. Evidence drawn from other industries or general healthcare settings may provide useful insights, but it may not fully explain the circumstances of rehabilitation center whose services combine financial requirements with important social and recovery-related objectives. A comparative examination of centers operating in different contexts can therefore help establish whether the adoption and perceived effectiveness of operational innovations vary across institutions and how such variations relate to financial sustainability.

This study therefore sought to examine the relationship between operational innovation and financial sustainability of rehabilitation centers in Kenya through a comparative analysis of Miritini, Asumbi, and Sinai rehabilitation centers. The specific objectives were to: (1) examine the relationship between product innovation and financial sustainability; (2) assess the relationship between process innovation and financial sustainability; (3) evaluate the relationship between service innovation and financial sustainability; and (4) compare the levels of product innovation, process innovation, service innovation, and financial sustainability among the three rehabilitation centers.

2. Literature Review

2.1 Theoretical Framework

This study is anchored on four theories that collectively provide a foundation for examining how operational innovation influences the financial sustainability of rehabilitation centers.

Schumpeter's Theory of Innovation (1934) explains economic and organizational progress because of introducing new combinations such as new products, new methods of production, and new forms of organization. Schumpeter portrayed innovation as the main driver of growth, arguing that organizations progress by shaking up existing practices through "creative destruction." In the context of this study, the theory provides a basis for examining product innovation and its relationship with financial sustainability.

Dynamic Capabilities Theory (Teece et al., 1997) argues that an organization's long-term survival depends on its ability to integrate, build, and reconfigure internal and external competencies in response to rapidly changing environments. The theory emphasizes flexibility, learning, and continual process renewal as essential drivers of organizational resilience. This theory provides a logical foundation for understanding process innovation within rehabilitation centers.

Diffusion of Innovation Theory (Rogers, 2003) proposes that the adoption of new ideas, behaviors, or practices within a social system occurs through a structured process influenced by communication channels, time, and the characteristics of the innovation itself. The theory is relevant to understanding the adoption of service innovations within rehabilitation centers.

Resource-Based View (RBV) (Barney, 1991) argues that an organization's ability to achieve and sustain competitive advantage depends on its access to valuable, rare, inimitable, and non-substitutable resources. The theory is relevant to financial sustainability because it emphasizes the role of organizational resources and capabilities in maintaining performance over time.

2.2 Empirical Literature

2.2.1 Product Innovation and Financial Sustainability

Cheah et al. (2021) examined the relationship between innovation and financial performance and found that organizations introducing innovative products achieved improved financial outcomes through increased market relevance and customer uptake. However, the study was conducted in a general corporate context and focused on financial performance rather than financial sustainability. Latifi et al. (2021) analyzed business model and product-related innovation and established that innovation-driven organizations demonstrated superior financial performance. Nandal et al. (2021) found a positive, statistically significant relationship between product innovation and profitability and operational efficiency. However, these studies focused on profit-oriented organizations in developed economies and did not examine health or rehabilitation institutions.

2.2.2 Process Innovation and Financial Sustainability

Amatya and Khan (2022) explored the implementation of rehabilitation innovations and emphasized the improvement of internal processes such as service coordination, referral pathways, information systems, and governance structures. Appiah et al. (2025) found that effectively managed process

innovations improve financial performance in manufacturing SMEs. Sher et al. (2021) conceptualized process innovation as improvements in internal operational processes that enhance efficiency, reduce waste, and optimize resource use. However, empirical evidence remains limited in service-based organizations, particularly within healthcare and rehabilitation settings in developing countries.

2.2.3 Service Innovation and Financial Sustainability

Kustina et al. (2025) studied how service innovation affects financial sustainability in rural banks in Bali and found that service innovation has a strong positive effect on financial sustainability. Kriegl et al. (2024) analyzed how institutional factors influence service innovation in German rehabilitation clinics and found that organizational norms, regulatory frameworks, and internal policies shape whether and how innovative service practices get adopted. Pradana and Syahbandi (2025) examined how sustainable service innovations support financial resilience in organizations facing economic shocks. However, these studies were conducted in banking, high-resource healthcare, or general business contexts and did not specifically examine rehabilitation centers in resource-constrained settings.

2.3 Research Gaps

The empirical review reveals several interconnected gaps in existing literature. First, there is a profound sectoral and geographical disconnect—seminal studies are predominantly situated within for-profit corporate or manufacturing environments in developed economies. Second, a critical conceptual gap exists as many studies measure organizational success mainly in terms of short-term financial performance rather than long-term financial sustainability. Third, there is a methodological gap in targeted and comparative research examining how different forms of innovation translate into improved financial sustainability within rehabilitation contexts. Finally, there is an absence of comparative institutional analysis within a single national setting,

particularly in Kenya where contextual differences can significantly shape organizational outcomes. This study addresses these gaps by focusing specifically on rehabilitation centers, examining multiple regions, adopting a broader understanding of financial sustainability, and using a comparative approach.

3. Methodology

The study adopted a descriptive cross-sectional survey design. Data were collected using structured questionnaires to capture operational innovation practices and assess their relationship with financial sustainability in selected rehabilitation centers. This design was appropriate for generating quantitative data that supports both descriptive and inferential statistical analysis.

The target population consisted of managerial and key operational staff directly involved in innovation, programme development, service delivery coordination, and financial management across three selected rehabilitation centres. The population included centre directors or managers, finance and administrative officers, programme coordinators, senior clinical supervisors, and operational supervisors. According to administrative records from the three centres, there were a total of 60 staff members in managerial and senior operational roles: Miritini Rehabilitation Centre (22), Asumbi Rehabilitation Centre (24), and Sinai Rehabilitation Centre (14).

Given the relatively small target population of 60, the study adopted a census approach rather than a sampling technique. According to Mugenda and Mugenda (2023), when the target population is less than 100, it is methodologically appropriate to conduct a census because including all members enhances accuracy and eliminates sampling error.

The study relied exclusively on primary data collected using a structured questionnaire administered to respondents. The questionnaire consisted of Likert-scale items designed to measure product, process, and service innovation, as well as indicators of financial sustainability. The questionnaire was administered through online platforms (Google Forms) and in-person distribution.

Reliability was assessed using Cronbach's Alpha coefficient. A coefficient of 0.70 and above was considered acceptable. Validity was ensured through content and construct validity, with expert evaluation by research supervisors and alignment of questionnaire items with the conceptual framework.

Data was analyzed using the Statistical Package for Social Sciences (SPSS) Version 28. Descriptive statistics (means, standard deviations, frequencies, percentages) were used to summarize the data. Inferential analysis included Pearson's correlation analysis, simple linear regression, multiple linear

regression, and one-way ANOVA with Tukey HSD post-hoc tests. All analyses used a 95% confidence level ($\alpha = 0.05$).

4. Study Results

4.1 Response Rate

Out of the 60 questionnaires distributed, 53 were completed and returned, representing an overall response rate of 88.3%. Asumbi Rehabilitation Centre recorded the highest response rate at 95.8%, followed by Miritini at 86.4%, and Sinai at 78.6%. All response rates exceeded the minimum threshold of 70% recommended for survey research.

4.2 Demographic Characteristics

The distribution of respondents by position showed that Directors/Managers constituted the largest proportion (30.2%), followed by Programme Coordinators (22.6%), Finance/Accounts Officers (20.8%), Clinical Supervisors (13.2%), and Operations Supervisors (13.2%). Most respondents (34.0%) had worked in their respective centers for 2-5 years, followed by those with over 10 years of experience (24.5%). Regarding education, 49.1% held a bachelor's degree, 28.3% held a Diploma, 17.0% held a master's degree, and 5.7% held a Doctorate.

4.3 Diagnostic Tests

Reliability Analysis: All study constructs achieved Cronbach's Alpha coefficients above 0.70: Product Innovation ($\alpha = 0.83$), Process Innovation ($\alpha = 0.80$), Service Innovation ($\alpha = 0.86$), and Financial Sustainability ($\alpha = 0.81$).

Normality Test: Kolmogorov-Smirnov test results indicated that all study variables recorded significance values of 0.200 ($p > 0.05$), confirming normal distribution.

Homogeneity of Variance: Levene's Test results showed significance values greater than 0.05 for all variables, confirming equal variances across groups.

Multicollinearity: All VIF values were below 5.0 (PI: 2.15; PrI: 2.35; SI: 2.12), indicating no multicollinearity concerns.

Independence of Errors: The Durbin-Watson statistic was 1.88, indicating no autocorrelation.

Table 1: Descriptive Statistics

Variable	Mean	Std. Deviation
Product Innovation	4.07	0.60
Process Innovation	4.03	0.66
Service Innovation	4.09	0.63
Financial Sustainability	3.97	0.65

Service Innovation recorded the highest mean score (M = 4.09), followed by Product Innovation (M = 4.07), Process Innovation (M = 4.03), and Financial Sustainability (M = 3.97).

Table 2: Correlation Analysis

Variable	PI	PrI	SI	FS
Product Innovation (PI)	1.000			
Process Innovation (PrI)	0.64**	1.000		
Service Innovation (SI)	0.59**	0.65**	1.000	
Financial Sustainability (FS)	0.71**	0.68**	0.74**	1.000

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

All dimensions of operational innovation were positively and significantly associated with Financial Sustainability. Service Innovation demonstrated the strongest correlation ($r = 0.74$, $p < 0.01$), followed by Product Innovation ($r = 0.71$, $p < 0.01$) and Process Innovation ($r = 0.68$, $p < 0.01$).

4.4 Regression Analysis

Table 3: Simple Linear Regression Results:

Model	R^2	B	β	t	Sig.	F
PI → FS	0.518	0.72	0.72	10.28	0.000	55.28
PrI → FS	0.476	0.68	0.69	9.71	0.000	46.30
SI → FS	0.563	0.75	0.75	11.20	0.000	65.60

Table 4: Multiple Regression Model Summary:

R	R^2	Adjusted R^2	Std. Error	Durbin-Watson
0.82	0.672	0.652	0.39	1.88

The multiple regression model explained 67.2% of the variation in Financial Sustainability.

Table 5: ANOVA for Multiple Regression:

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	15.96	3	5.32	35.47	0.000
Residual	7.79	49	0.16		
Total	23.75	52			

Table 6: Regression Coefficients:

Variable	B	Std. Error	β	t	Sig.	VIF
(Constant)	0.40	0.25		1.60	0.116	
PI	0.33	0.10	0.30	3.30	0.002	2.15
PrI	0.16	0.09	0.16	1.78	0.081	2.35
SI	0.37	0.09	0.36	4.11	0.000	2.12

Product Innovation (B = 0.33, β = 0.30, p = 0.002) and Service Innovation (B = 0.37, β = 0.36, p < 0.001) were statistically significant predictors. Process Innovation (B = 0.16, β = 0.16, p = 0.081) did not make a statistically significant independent contribution

4.4 Comparative Analysis

Table 7: One-Way ANOVA Results

Variable	F(2,50)	Sig.	Partial η^2
Product Innovation	4.98	0.011	0.166
Process Innovation	4.12	0.022	0.141
Service Innovation	5.62	0.006	0.184
Financial Sustainability	4.35	0.018	0.148

Table 8: Tukey HSD Post-Hoc Results:

Variable	Comparison	Mean Difference	Sig.
PI	Asumbi vs Miritini	+0.27	0.008
PrI	Asumbi vs Miritini	+0.25	0.016
SI	Asumbi vs Miritini	+0.29	0.005
FS	Asumbi vs Miritini	+0.28	0.010
FS	Asumbi vs Sinai	+0.17	0.045

The comparative analysis revealed that Asumbi Rehabilitation Centre consistently recorded the highest mean scores across all study variables. Statistically significant differences were primarily attributable to Asumbi's superior performance compared to Miritini, with Asumbi also demonstrating significantly higher financial sustainability than Sinai.

5. Discussion

The findings of this study provide important insights into the relationship between operational innovation and financial sustainability in Kenyan rehabilitation centres.

5.1 Product Innovation and Financial Sustainability

The study established a strong positive and statistically significant relationship between product innovation and financial sustainability ($r = 0.71$, $p < 0.01$). This finding aligns with Cheah et al. (2021) and Latifi et al. (2021), who found that organizations introducing innovative products achieve improved financial outcomes. The finding suggests that rehabilitation centres that continuously invest in innovative programmes and services strengthen their ability to attract clients, improve service relevance, and achieve sustainable financial performance. This supports Schumpeter's (1934) assertion that innovation drives organizational progress through the introduction of new combinations.

5.2 Process Innovation and Financial Sustainability

Process innovation demonstrated a significant positive influence on financial sustainability when examined independently ($r = 0.68$, $p < 0.01$; $R^2 = 0.476$). However, its independent contribution became statistically insignificant in the multiple regression model ($B = 0.16$, $p = 0.081$). This finding suggests that while efficient operational processes remain an important component of organizational performance, their contribution to financial sustainability is strengthened when implemented alongside innovative programmes and enhanced service delivery. This finding is consistent with Amatya and Khan (2022), who emphasized the importance of process improvements for service efficiency, and Appiah et al. (2025), who found that process innovations improve financial performance when aligned with customer-driven strategies.

5.3 Service Innovation and Financial Sustainability

Service innovation emerged as the strongest predictor of financial sustainability ($r = 0.74$, $p < 0.01$; $R^2 = 0.563$; $\beta = 0.36$, $p < 0.001$). This finding indicates that rehabilitation centres prioritizing continuous improvement of service delivery are more likely to strengthen client satisfaction, improve institutional reputation, increase service utilization, and achieve long-term financial sustainability. This finding supports Kustina et al. (2025), who found that service innovation has a strong positive effect on financial sustainability, and Kriegl et al. (2024), who emphasized the importance of service

innovation in healthcare settings. The finding also aligns with Rogers' (2003) Diffusion of Innovation Theory, which explains how new approaches to service delivery are adopted and diffused within organizations.

5.4 Comparative Analysis

The comparative analysis revealed significant differences among the three rehabilitation centres, with Asumbi Rehabilitation Centre consistently outperforming Miritini and Sinai across all study variables. These differences suggest that organizational context, resource availability, and institutional practices influence both the implementation of operational innovation and its relationship with financial sustainability. The findings support the Resource-Based View (Barney, 1991), which emphasizes that organizations with unique internal resources are better positioned to achieve sustainable competitive advantage.

6. Conclusion

Based on the findings, the study concludes that:

(a) Product innovation is a significant determinant of the financial sustainability of rehabilitation centres in Kenya. Centres that continuously introduce new rehabilitation programmes, diversify treatment services, and tailor interventions to evolving client needs are more likely to strengthen their financial sustainability.

(b) Process innovation contributes positively to financial sustainability by improving operational efficiency and optimizing resource utilization. However, its contribution is most effective when integrated with broader operational innovation strategies rather than implemented in isolation.

(c) Service innovation is the most influential dimension of operational innovation in enhancing financial sustainability. Continuous improvement in service delivery, responsiveness to clients' needs, and quality of rehabilitation services strengthen client satisfaction and contributes significantly to sustainable financial performance.

(d) Significant differences exist in the levels of operational innovation and financial sustainability among rehabilitation centres in Kenya. The superior performance of Asumbi Rehabilitation Centre demonstrates that centres adopting stronger operational innovation practices are more likely to achieve better financial outcomes.

Overall, the study concludes that operational innovation is a critical strategic resource for enhancing the financial sustainability of rehabilitation centres in Kenya.

7. Recommendations

Based on the findings, the following recommendations are made:

For Rehabilitation Centre Managers:

(a) Strengthen Product Innovation: Institutionalize product innovation as a core strategic function by regularly reviewing and expanding rehabilitation programmes to meet emerging client needs. Establish structured programme development and review mechanisms involving management, healthcare professionals, clients, and caregivers.

(b) Enhance Process Innovation: Continuously improve operational systems, enhance workflow efficiency, and integrate modern technologies into service delivery and administrative functions. Invest in digital health information systems and automate routine administrative processes where feasible.

(c) Institutionalize Service Innovation: Embed continuous service improvement within organizational culture and strategic plans. Establish formal quality improvement programmes that regularly assess client experience and monitor service quality.

(d) Promote Benchmarking: Establish structured benchmarking and knowledge-sharing initiatives to facilitate the transfer of successful operational innovation practices across institutions.

For Policymakers and Regulators:

(a) Strengthen Policy Support: Create an enabling institutional and policy environment that supports continuous innovation. Increase investment in innovation infrastructure, support research and development activities, and provide financial incentives for rehabilitation centres that adopt innovative service delivery models.

(b) Facilitate Knowledge Sharing: Develop platforms for sharing experiences, innovations, and best practices among rehabilitation centres.

8. Limitations and Future Research Limitations:

a) The study was confined to three rehabilitation centres, limiting generalizability to all rehabilitation centres in Kenya.

b) The cross-sectional design captured respondents' perceptions at a single point in time and could

not examine changes over time.

c) The study relied primarily on self-reported data, which is susceptible to response bias.

d) The study focused exclusively on three dimensions of operational innovation as predictors of financial sustainability.

9. Suggestions for Further Research:

a) Longitudinal research designs to examine how operational innovation practices influence financial sustainability over extended periods.

b) Extension of the scope to include a larger number of rehabilitation centres across different counties in Kenya.

c) Investigation of other organizational factors that may affect financial sustainability, such as leadership practices, organizational culture, and digital transformation.

d) Examination of possible moderating or mediating effects of contextual variables on the relationship between operational innovation and financial sustainability.

e) Adoption of mixed methods or qualitative research designs to complement quantitative findings.

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