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## **Effect of Operational Risk Management On Financial Sustainability of TVET Institutions in Nyeri County, Kenya**

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# Effect of Operational Risk Management On Financial Sustainability of TVET Institutions in Nyeri County, Kenya

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## Abstract

This study examined the effect of operational risk management on financial sustainability of Technical and Vocational Education and Training (TVET) institutions in Nyeri County, Kenya. The research employed a descriptive cross-sectional survey design targeting all 40 TVET institutions in the county, with data collected from 73 institutional heads and finance officers, achieving a response rate of 91.3%. The study utilized structured questionnaires to assess operational risk management practices including internal control systems, risk policies, audit procedures, staff training, and corrective action mechanisms. Descriptive analysis revealed that TVET institutions had well-established operational risk management practices, with consistently high mean scores across all indicators. Pearson correlation analysis demonstrated a strong positive relationship between operational risk management and financial sustainability, while regression analysis confirmed a significant positive effect with operational risk management explaining 55.1% of the variance in financial sustainability outcomes. The findings indicate that TVET institutions with comprehensive operational risk frameworks, including clear policies, robust internal controls, regular audits, and trained staff, achieve superior financial sustainability compared to those with weaker risk management systems. The study concludes that operational risk management is a critical determinant of financial sustainability in TVET institutions. The study recommends that institutions strengthen their internal control systems, enhance audit processes, develop comprehensive risk policies, and invest in continuous staff training to improve their long-term financial viability.

**Keywords:** *Operational Risk Management, Financial Sustainability, TVET institutions*

## 1.1 Introduction

Financial sustainability represents a fundamental prerequisite for organizational longevity and effectiveness, particularly in educational institutions where resource optimization directly impacts service delivery quality and stakeholder outcomes. Technical and Vocational Education and Training (TVET) institutions face unique operational challenges that require systematic risk management approaches to ensure continued financial viability while maintaining their core mission of skills development (Beer & Mulder, 2020). The ability of these institutions to manage operational risks effectively determines not only their immediate financial stability but also their capacity to invest in infrastructure, attract qualified personnel, and respond to evolving industry demands that are essential for graduate employability (Zalieniene & Pereira, 2021). Without robust operational risk management frameworks, TVET institutions may experience disruptions that compromise both their educational mandate and financial sustainability.

Operational risk management encompasses the systematic identification, assessment, and mitigation of risks arising from internal processes, human resources, technological systems, and external events that could adversely affect institutional operations and financial performance (Smith & Jones, 2020). In the context of TVET institutions, operational risks manifest through various channels including inadequate internal controls, staff errors, technology failures, fraud, and process inefficiencies that can lead to significant financial losses and operational disruptions (Taylor, 2021). The implementation of comprehensive operational risk management practices, including clear policies, robust internal control systems, regular audits, and staff training programs, serves as a critical defense mechanism against potential financial threats while ensuring optimal resource utilization (Araz et al., 2021). These practices become particularly crucial for TVET institutions that operate with limited budgets and face increasing pressure to demonstrate value for money in their training programs.

The relationship between operational risk management and financial sustainability has gained considerable attention in recent years, as institutions recognize that proactive risk management strategies can significantly enhance their long-term viability and performance outcomes (Pakhchanyan, 2016). Research evidence suggests that organizations with well-established operational risk management frameworks demonstrate superior financial performance, reduced operational losses, and enhanced stakeholder confidence compared to those with inadequate risk management practices (Garcia-Benau et al., 2021). For TVET institutions specifically, effective operational risk management not only protects existing resources but also creates an enabling environment for strategic investments in curriculum development, equipment modernization, and industry partnerships that are essential for maintaining relevance and competitiveness in the dynamic skills training market (Hudakova et al., 2023). Understanding this relationship is therefore critical for institutional leaders seeking to optimize both risk management practices and financial sustainability outcomes.

## 1.2 Problem Statement

Technical and Vocational Education and Training (TVET) institutions play a critical role in addressing skills gaps and providing practical, job-oriented training that meets the demands of various industries, thereby contributing significantly to economic development and employment creation (Beer & Mulder, 2020). However, these institutions face mounting operational challenges that threaten their financial sustainability and ability to deliver quality education. Poor funding mechanisms, inadequate resource allocation, and weak financial management practices have

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emerged as significant barriers that restrict infrastructure quality, equipment availability, and training materials, ultimately affecting training outcomes and graduate employability (Kovalchuk et al., 2022; Okoth, 2023). The perception of TVET education as less prestigious compared to traditional academic pathways has further exacerbated these challenges, creating additional pressure on institutions to demonstrate their value while operating within constrained financial environments (Leal Filho et al., 2022).

Despite the recognized importance of TVET institutions in national development, there remains a significant gap in understanding how operational risk management practices influence their financial sustainability. While numerous studies have examined financial sustainability in universities, with researchers like Kimathi and Irungu (2024) and Kithinji et al. (2023) highlighting sustainability challenges in public higher education, these studies focused on institutions with different operational models, funding structures, and risk profiles compared to TVET institutions. Limited research has specifically addressed the operational risk management practices of TVET institutions and their impact on financial sustainability, with existing studies like those by Vasilev (2024) and Wabwile et al. (2024) concentrating primarily on academic performance rather than financial outcomes (Magut & Kihara, 2019; Ngwato, 2020). This knowledge gap leaves TVET administrators without evidence-based guidance on how operational risk management strategies can enhance their institutions' financial viability.

The financial challenges facing TVET institutions have become increasingly acute, with many institutions struggling to meet basic operational costs including utility payments, salary obligations, and mandatory statutory contributions such as income tax and pension funds. The funding deficit affecting universities and TVETs has been estimated at Sh58.8 billion for the financial year ending June 2025, highlighting the severity of the financial sustainability crisis in the education sector (Ministry of Education, 2024). In Nyeri County specifically, TVET institutions operate within a complex risk environment influenced by institutional risk policies, regulatory frameworks, and varying management capabilities, yet there is limited empirical evidence on how operational risk management practices affect their financial sustainability outcomes (TVETA, 2024). This study therefore sought to address this critical knowledge gap by examining the relationship between operational risk management and financial sustainability in TVET institutions within Nyeri County, Kenya.

### **1.3 Research Objectives**

To establish the effect of operational risk management on financial sustainability of TVET institutions in Nyeri County, Kenya.

### **1.4 Research Hypotheses**

**H<sub>0</sub>1:** Operational risk management has no significant effect on financial sustainability of TVET institutions in Nyeri County, Kenya.

## **2.1 Literature Review**

### **2.2 Theoretical Review**

This study was anchored on the contingency theory, originally formulated by Fred Fiedler in 1964 and further developed by Lawrence and Lorsch in 1967, which posits that organizational effectiveness is fundamentally dependent on the alignment between external environmental

conditions and internal organizational structures and processes (Brucci et al., 2021). The theory emphasizes that there is no one-size-fits-all approach to management, as the most effective organizational strategies and structures are contingent upon specific situational factors including environmental uncertainty, organizational complexity, and technological requirements (Shala et al., 2021). In the context of operational risk management within TVET institutions, contingency theory provides a valuable framework for understanding how these institutions must adapt their risk management practices to their unique operational environments, regulatory contexts, and resource constraints to achieve optimal financial sustainability outcomes (Araral, 2022). The theory suggests that TVET institutions in Nyeri County must develop operational risk management strategies that are specifically tailored to their institutional characteristics, local market conditions, external funding dependencies, and regulatory requirements rather than adopting generic risk management approaches, thereby enabling them to effectively balance operational efficiency with financial sustainability while responding appropriately to environmental uncertainties and internal operational challenges (Linh, 2024; Lartey, 2020).

### 2.3 Empirical Review

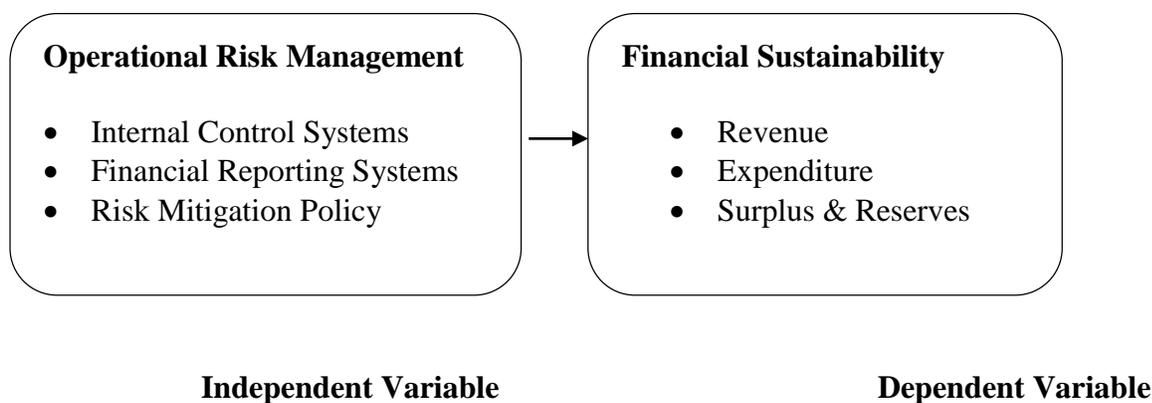
The relationship between operational risk management and financial performance has been extensively studied across various sectors, with findings consistently demonstrating the critical role of effective risk management in enhancing institutional sustainability. Garcia-Benau et al. (2021) conducted a comprehensive study of Spanish financial institutions and identified multidimensional relationships between risk profiles and sustainability outcomes, finding that conservative operational risk practices were significantly associated with greater commitment to sustainable development goals, thereby indicating strong connections between financial prudence and long-term organizational viability. However, regional variations in operational risk effects have been documented, with Hudakova et al. (2023) reporting moderately high operational risk impacts in Slovakia, Poland, and Hungary, while Czech Republic results showed weaker correlations, suggesting that the effectiveness of operational risk management practices may be context-specific and influenced by local regulatory environments and institutional cultures. These geographical differences highlight the importance of understanding how operational risk management practices adapt to different operational contexts and regulatory frameworks.

The empirical evidence regarding the impact of operational risk management on organizational performance presents mixed but generally positive results, particularly in the financial services sector. Ndege (2023) found that operational risk management did not significantly affect return on assets (ROA) in secondary data analysis of Ugandan banking institutions, while Annah (2022) reported statistically significant profit declines due to control failures and unethical practices in single-site sampling studies, though the limited generalizability of these findings requires careful interpretation. Conversely, Mwaura (2020) demonstrated substantial improvements in financial performance among Nairobi-based Savings and Credit Cooperative Organizations (SACCOs) with effective operational risk controls, particularly in managing system-related and marketing-related risks, suggesting that collaborative financial institutions may benefit more significantly from structured operational risk management approaches. The quantified impact of operational misconduct has been clearly demonstrated by Njeri (2022), who measured negative effects of fraud in Kenyan commercial banks, finding that each instance of fraud decreased ROA and ROE by 0.96 and 5.02 percent respectively, underscoring the financial materiality of operational risk failures.

Within the educational sector, emerging research has begun to explore operational risk management implications for institutional sustainability, though studies specifically focusing on TVET institutions remain limited. Koros (2023) conducted a mixed-methods study revealing significant cost implications of operational risk in private universities, while Kimathi (2024) demonstrated that improved financial stability in public universities resulted from integrated risk management frameworks, indicating that comprehensive approaches to risk management yield superior outcomes compared to fragmented strategies. These institutional-specific patterns suggest that educational institutions face unique operational risk challenges that require tailored management approaches, though both studies focused on university contexts that may differ substantially from TVET operational models in terms of funding structures, regulatory oversight, and stakeholder expectations. The limited research specifically addressing TVET institutions represents a significant gap in the literature, particularly given the distinct operational characteristics, funding dependencies, and risk profiles of these institutions compared to traditional universities, highlighting the need for focused empirical investigation into how operational risk management practices influence financial sustainability outcomes in the TVET sector.

### 2.4 Conceptual Model

The measures in the research with their indicators are shown in Figure 1.



**Figure 1 Conceptual Framework**

As shown in Figure 1, Operational Risk Management was the independent variable while financial sustainability was the dependent variable. Indicators for each of the variables are shown which were used to measure each of the five variables.

### 3.1 Research Methodology

This study employed a descriptive cross-sectional survey design to examine the effect of operational risk management on financial sustainability of TVET institutions in Nyeri County, Kenya. The design was particularly suitable for this research as it enabled the simultaneous measurement and assessment of multiple variables and their interrelationships without experimental manipulation, while facilitating efficient data collection across geographically dispersed TVET institutions with methodological rigor (Tan, 2022). The study targeted all 40 TVET institutions in Nyeri County using a census approach, with data collected from institutional heads and finance officers who possess firsthand knowledge of financial operations, risk management practices, and institutional sustainability strategies. Data collection was conducted through structured self-administered questionnaires distributed both electronically via Google

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Forms and physically to accommodate respondent preferences, ensuring high response rates and data quality while maintaining anonymity and confidentiality throughout the one-month data collection period.

#### **4.1 Results and Findings**

The study achieved a high response rate of 91.3%, with 73 respondents out of 80 targeted participants from the 40 TVET institutions in Nyeri County participating in the research. This response rate exceeded the recommended threshold of 70% (Pajo, 2024), indicating strong participant cooperation and ensuring the data obtained was reliable and suitable for fulfilling the study's objectives. The distribution included 36 respondents (94.7% response rate) from public TVETs and 37 respondents (88.1% response rate) from private institutions, providing balanced representation across both sectors.

The demographic profile revealed that the majority of respondents held bachelor's degrees (53.4%), followed by those with postgraduate qualifications (42.5%), and a small percentage with higher diplomas (4.1%), indicating a highly educated sample well-positioned to understand financial risk management practices. Regarding work experience, most respondents (61.6%) had 1-5 years of experience, while 24.7% had 6-10 years, 11.0% had 11-15 years, and 2.7% had over 20 years of experience. The institutional age analysis showed that the majority of TVET institutions (79.5%) had been operational for 1-25 years, with 15.1% operating for 26-50 years, and few institutions (2.7% each) falling in the 51-75 years and over 100 years categories. These findings indicated that the study attracted responses from well-educated professionals with diverse working experience employed in TVETs of varying operational histories, enhancing the credibility of understanding financial risk management and performance of TVETs.

#### **4.2 Descriptive Statistics**

##### **4.2.1 Operational Risk Management**

The descriptive analysis revealed strong implementation of operational risk management practices across TVET institutions. Respondents indicated high levels of agreement regarding the presence of clear operational risk policies ( $M = 4.26$ ,  $SD = 0.746$ ), internal control systems to minimize financial risks ( $M = 4.34$ ,  $SD = 0.583$ ), and regular financial transaction reviews to detect errors or fraud ( $M = 4.34$ ,  $SD = 0.65$ ). Additionally, institutions demonstrated commitment to periodic internal audits for assessing financial controls ( $M = 4.33$ ,  $SD = 0.746$ ), staff training on risk mitigation procedures ( $M = 4.44$ ,  $SD = 0.707$ ), and taking corrective actions when weaknesses in financial processes were identified ( $M = 4.19$ ,  $SD = 0.793$ ). These findings indicated that operational risk management practices were well-established in the studied TVET institutions, with consistent high-level agreement on the significance of internal control systems, risk policies, audits, financial reviews, and staff training as essential components of financial management.

##### **4.2.2 Financial Sustainability**

Financial sustainability measures showed mixed but generally positive results. Institutions demonstrated strength in having reliable revenue sources supporting operations ( $M = 4.08$ ,  $SD = 1.051$ ), meeting short-term financial obligations on time ( $M = 4.14$ ,  $SD = 0.99$ ), maintaining financial reserves for future needs or emergencies ( $M = 4.0$ ,  $SD = 1.183$ ), and controlling and monitoring expenditure regularly ( $M = 4.21$ ,  $SD = 0.881$ ). However, institutions showed relatively lower performance in maintaining steady income flow from diverse sources ( $M = 3.9$ ,  $SD = 1.016$ ).

and consistently generating annual financial surpluses ( $M = 3.6$ ,  $SD = 1.288$ ), with the latter showing the highest variability in responses. These results indicated that while TVET institutions were strong in expenditure control, short-term obligation management, and maintaining reserves, they faced challenges in revenue diversification and consistent surplus generation.

### 4.3 Correlation Results

This research conducted Pearson correlation analysis to find out the influence of operational risk management on financial sustainability. The results are summarised in Table 1.

**Table 1: Correlation Results**

Variables	Operational	Sustainability
Operational	1	.742 .000
Sustainability	.73 .742 .000 .73	1 73

Source: Field Data (2025)

Pearson correlation analysis was conducted to examine the relationship between operational risk management and financial sustainability of TVET institutions in Nyeri County. The results presented in Table 1 reveal a strong positive correlation between operational risk management and financial sustainability ( $r = 0.742$ ,  $p < 0.001$ ), indicating a statistically significant relationship between these two variables. This correlation coefficient suggests that approximately 55% of the variance in financial sustainability can be explained by operational risk management practices, demonstrating that TVET institutions with more robust operational risk management systems tend to exhibit higher levels of financial sustainability. The statistical significance ( $p < 0.001$ ) confirms that this relationship is not due to chance, providing strong evidence that effective operational risk management practices, including internal controls, regular audits, staff training, and systematic risk policies, are closely associated with improved financial outcomes in TVET institutions. These findings align with theoretical expectations and provide empirical support for the hypothesis that operational risk management significantly influences institutional financial sustainability in the TVET sector.

### 4.4 Regression Results

To determine the predictive power and significance of operational risk management on financial sustainability, multiple regression analysis was conducted. The comprehensive results are presented in Table 2 below.

**Table 1: Regression Analysis Results for Operational Risk Management and Financial Sustainability**

<b>Model Summary</b>					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.742	.551	.545	2.89102	
<b>ANOVA</b>					
Model		Sum of Squares	df	Mean Square	F
1	Regression	878.542	1	878.542	105.118
	Residual	593.273	71	8.358	
	Total	1471.815	72		
<b>Coefficients</b>					
	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	sig
(Constant)	-21.058	3.333		-6.318	0.000
Operational Risk Management	.753	.155	.405	4.861	

*Dependent Variable: Financial Sustainability*

Source: Field Data (2025)

The regression analysis results demonstrate that operational risk management significantly predicts financial sustainability of TVET institutions in Nyeri County, Kenya. The model summary reveals a strong correlation ( $R = .742$ ) between operational risk management and financial sustainability, with the coefficient of determination ( $R^2 = .551$ ) indicating that operational risk management explains 55.1% of the variance in financial sustainability. The adjusted  $R^2$  of .545 confirms that this explanatory power remains robust when accounting for the number of predictors in the model, while the standard error of estimate (2.89102) suggests reasonable precision in the model's predictions. These statistics demonstrate that operational risk management represents a substantial predictor of institutional financial health, accounting for more than half of the variation in sustainability outcomes across TVET institutions.

The ANOVA results confirm the overall statistical significance of the regression model, with  $F(1, 71) = 105.118$ ,  $p < .05$ , indicating that the model significantly predicts financial sustainability outcomes. The substantial F-statistic demonstrates that the relationship between operational risk management and financial sustainability is highly unlikely to have occurred by chance, providing strong evidence for the validity of the predictive model. The regression sum of squares (878.542) represents the portion of total variance explained by operational risk management, while the residual sum of squares (593.273) indicates the unexplained variance, confirming that operational risk management is a major determinant of financial sustainability in TVET institutions.

The coefficients analysis reveals that operational risk management has a statistically significant positive effect on financial sustainability ( $B = .753$ ,  $\beta = .405$ ,  $t = 4.861$ ,  $p < .05$ ). The unstandardized coefficient indicates that each unit increase in operational risk management practices results in a 0.753-unit improvement in financial sustainability, while the standardized coefficient shows that operational risk management contributes 40.5% of a standard deviation change in financial sustainability for every standard deviation change in operational risk management. The regression equation can be expressed as:  $\text{Financial Sustainability} = -21.058 + 0.753(\text{Operational Risk Management})$ , where the negative constant emphasizes the critical importance of implementing operational risk management practices for achieving positive financial sustainability outcomes. These results provide compelling evidence that TVET institutions can significantly enhance their financial sustainability through strategic investments in operational risk management frameworks, including internal controls, audit systems, staff training, and policy development initiatives.

#### 4.5 Discussion

The findings of this study demonstrate that operational risk management has a significant positive effect on the financial sustainability of TVET institutions in Nyeri County, Kenya, with the regression results revealing that operational risk management practices explain 55.1% of the variance in financial sustainability outcomes. This strong relationship aligns with previous research findings, particularly those of Mwangi (2020), who established that the presence of internal control systems was closely associated with increased financial performance in public institutions by minimizing instances of mismanagement and fund misuse. Similarly, Kariuki and Kamau (2019) found that institutions with well-defined operational policies and frequent audits demonstrated better accountability and resource utilization, which translated into improved financial sustainability. The high mean scores across all operational risk management indicators in this study suggest that TVET institutions in Nyeri County have recognized the critical importance of systematic approaches to risk management, with particular emphasis on staff training ( $M = 4.44$ ) and internal control systems ( $M = 4.34$ ), which supports the institutional capacity to identify and mitigate operational risks before they adversely impact financial performance.

The magnitude of the relationship between operational risk management and financial sustainability ( $\beta = 0.405$ ,  $p < 0.001$ ) indicates that operational risk management represents one of the most influential factors in determining TVET institutional financial health, which is consistent with theoretical expectations derived from contingency theory. The theory's emphasis on adapting management practices to specific organizational contexts is reflected in the finding that TVET institutions with comprehensive operational frameworks, including clear policies, robust internal controls, regular audits, and well-trained staff, achieve superior financial sustainability outcomes compared to those with weaker risk management systems. However, these findings contrast with some previous research, such as Otieno (2017), who argued that the mere existence of risk management policies does not necessarily translate to better financial results unless they are effectively implemented and enforced. The strong empirical relationship found in this study suggests that TVET institutions in Nyeri County have moved beyond policy formulation to actual implementation, as evidenced by the consistent high ratings across all operational risk management dimensions, particularly in areas of corrective action implementation and regular financial transaction reviews.

## 5.1 Conclusions

The study concludes that operational risk management has a significant positive effect on the financial sustainability of TVET institutions in Nyeri County, Kenya. The findings reveal that TVET institutions with comprehensive operational risk frameworks, including clear policies, robust internal control systems, regular audits, and well-trained staff, demonstrate superior financial sustainability compared to those with weaker risk management systems. These results confirm that strategic investments in operational risk management capabilities, particularly in internal controls, staff training, and policy development, yield measurable improvements in TVET institutional financial viability and long-term sustainability outcomes.

## 6.1 Recommendations

The study recommends that TVET institutions should strengthen their internal control systems and enhance operational audit processes to ensure comprehensive risk oversight. Institutions should develop clear operational risk policy frameworks and invest in continuous staff training on risk mitigation procedures to build institutional capacity for proactive risk management. Additionally, TVET institutions should implement systematic corrective action mechanisms for identified weaknesses and establish regular monitoring systems to ensure sustained effectiveness of operational risk management practices in supporting long-term financial sustainability.

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