



Sustainable Research-Based Project Management: An Integrated Framework for Tanzanian Universities

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Abstract

While universities in Tanzania have consistently mobilised research funds to drive sustainable development, the long-term sustainability of these projects is often hindered by fragmented management approaches. This study aimed to institutionalise a robust mechanism for managing research-based project funds by developing an integrated framework. Using a case study of a prominent research-intensive university in Tanzania, selected for its extensive experience in administering diverse research portfolios, the study employed a descriptive research design. A mixed-methods approach was adopted, utilising both quantitative and qualitative data to ensure triangulation and a comprehensive understanding of the phenomenon. Data were collected from a sample of 65 respondents through questionnaires and semi-structured interviews. Quantitative data were analysed using SPSS, while qualitative insights were subjected to thematic analysis to align with the research objectives. The findings reveal a high level of institutional readiness to adopt and support an integrated framework to enhance research project performance. Consequently, the study recommends that government bodies and policymakers engage in effective stakeholder consultation when rectifying regulations. Such an approach ensures informed decision-making and fosters an environment conducive to sustainable research management in the higher education sector.

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1. Introduction

1.1. The Evolution of Tanzanian Higher Education

The landscape of higher education in Tanzania has undergone exponential expansion since the nation achieved independence. What began as a solitary institution in 1961 transformed into a vast network of over 420 tertiary training centres by 2014 (Istoroyekti & Hum, 2016) ^[9]. Today, the Tanzania Commission for Universities (TCU, 2021) ^[23] oversees a diverse ecosystem of 52 Higher Learning Institutions (HLIs), ranging from comprehensive public and private universities to specialised research-intensive institutes.

1.2. The Research Funding-Functionality

Despite this institutional growth, HLIs across Sub-Saharan Africa face a systemic crisis regarding financial sustainability. Most universities operate under a "triad of dependence," characterised by a heavy reliance on national government subventions, international competitive grants, and private industrial donations (Andoh, 2019) ^[2]. This vulnerability is acutely illustrated at the Case Study Institution (CSI) in the United Republic of Tanzania. Currently, external sources constitute approximately 99% of the funding for CSI's 71 active research projects, comprising 25 international grants, 15 industrial partnerships, and 10 government subventions (CSI, 2021) ^[5]. While CSI has demonstrated remarkable proficiency in securing external capital, a

critical disconnect persists: high funding levels do not inherently guarantee sustainable research outcomes or institutional functionality.

1.3. Research Project Management and the Evaluation Crisis

The successful execution of research initiatives depends fundamentally on robust project management, which ensures that projects are delivered within established temporal and budgetary constraints (Kerzner, 2022) ^[10]. This is particularly critical for HLIs that manage multimillion-dollar grants annually. However, a significant gap remains in how these resources are governed post-acquisition. Current institutional practices often suffer from a lack of rigorous evaluation following project closure. Evaluative efforts are frequently limited to basic financial audits, which fail to capture the complexities of the project life cycle or the long-term impact on the university's strategic mission (Mazzucato, 2018; OECD, 2021) ^[15, 17].

Furthermore, the historical autonomy of HLIs has inadvertently led to fragmented governance where research funds are managed in silos, resulting in a loss of synergy between funders and beneficiaries. To address these inefficiencies, there is an urgent need for a *Centralised Institutional Research Project Evaluation Framework*. The same already established in Europe and Asia, such as the *UK's Research Excellence Framework (REF)*, demonstrate how tracking long-term impact ensures that financial inputs translate into tangible institutional growth (Sivertsen, 2017) ^[21].

1.4. Research Hypotheses

To empirically address the challenges of external funding dependency and fragmented management at the university, this study tests the following hypotheses:

1. The Impact of the Research Project Management Framework. H_1 investigates the direct relationship between operational management processes and research project outcomes. It posits that a structured approach to the project life cycle and stakeholder engagement is a primary driver of research performance.
2. The Moderating Role of Project Governance. H_2 moves beyond direct effects to examine the "enabling environment." It suggests that the strength of the relationship between management and success depends on the quality of the institutional oversight.

2. Literature Review

2.1. Theoretical Literature Review

The theoretical review provides the conceptual lens through which research project management and institutional sustainability are examined. As noted by Kumar (2012) ^[14], this section establishes the basis for understanding the complex interactions within the study's variables.

2.1.1. Project Foundation Theory

Originating from the transformation view of operations, Project Foundation Theory conceptualises a project as the conversion of distinct inputs into desired outputs. Koskela and Howell (2002) ^[12] argue that management efficiency is achieved by decomposing this transformation into manageable tasks, thereby reducing costs and optimising resource allocation. In the context of CSI, this theory suggests that research success is a product of how effectively grant inputs are converted into intellectual and social outputs.

2.1.2. Project Management Theory: The Control Models

Project Management Theory is traditionally anchored in three functional models: Management-as-Planning, the Dispatching Model, and the Thermostat Model (Hassan *et al.*, 2012) ^[7]. These models posit a causal link between managerial planning and organisational results. However, standard management tools often fail in higher education because they do not account for the unique informational and methodological specificities of academic research. Effective research management requires a specialised adaptation of these models to balance institutional control with academic creativity (Hassan *et al.*, 2012) ^[7].

2.1.3. Resource Dependence Theory (RDT)

Resource Dependence Theory (Pfeffer & Salancik, 1978) ^[19] explains how external resource scarcity dictates organizational behavior. Organisations are not autonomous; they must negotiate with their environment to secure survival. In Tanzanian HLIs, RDT is highly relevant as institutions navigate a "triad of dependence" on government subventions and international donors (Hillman & Withers, 2009) [8]. This dependency often creates power imbalances, necessitating strategic alliances and robust internal frameworks to maintain institutional legitimacy and autonomy.

2.2. Empirical Literature Review

2.2.1. Project Management Dynamics in Higher Education

The university environment presents a unique management challenge: balancing administrative oversight with the autonomy of research groups. Prieto (2015) ^[20] notes that tensions often arise when individual researchers maintain direct external relations with funders, bypassing central university frameworks. Empirical evidence suggests a widespread efficiency gap in this sector. A study by KPMG International across 600 institutions found that 86% of universities lost up to a quarter of their targeted project benefits due to poor management (Alenezi *et al.*, 2015) ^[11]. Similarly, research by McKinsey & Company and the University of Oxford revealed that large-scale institutional projects often generate 56% less value than anticipated while exceeding budgets by 45% (Kubilus, 2016) ^[13]. These statistics underscore the critical need for trained managers who understand the intersection of public interest and scientific inquiry.

2.2.2. The Global and Local Crisis in Research Funding

African higher education funding is at a critical juncture. Mgaiwa (2018) [16] highlights a paradoxical trend: while nominal funding for flagship institutions increased by 79.5% between 2000 and 2010, the actual government approval rates for requested budgets plummeted from 82.6% to 37%. This declining support is often driven by a policy shift favouring primary education, leaving HLIs to struggle with "functional complexity" (OECD, 2017) ^[18]. Consequently, financial independence through innovative income generation and rigorous grant management has become a prerequisite for institutional survival.

2.3. Critique of the Literature and Research Gap

While existing literature highlights the challenges of university research project management, several gaps still exist. Table 1 summarises the main empirical studies related to research-based project management and funding in higher

education, identifying their focus, findings, and the specific gaps that the current study intends to address.

Table 1: Summary of Key Empirical Studies and Identified Gaps

Author (Year)	Study Focus	Key Findings	Identified Research Gap
Alenezi <i>et al.</i> (2015)	Project portfolio benefits in HLIs (Global survey)	86% of institutions lose significant targeted benefits due to poor project management	Primarily diagnostic; did not provide a specific framework for sub-Saharan African contexts
Kubilus (2016)	IT and Technology projects in universities.	Large-scale projects frequently exceed budgets by 45% and under-deliver on value	Focused on technical IT projects rather than the broader research grant management lifecycle
Mgaiwa (2018)	Financing Higher Education in Tanzania.	Identified a sharp decline in government approval rates and a high "dependency ratio" on donors	Focused on the economics of funding rather than the internal management mechanisms to handle those funds
OECD (2017)	Functional complexity of HEI funding.	Governance is often too rigid or too loose to manage the "triad of dependence" effectively	Lacks empirical testing of how governance specifically moderates the success of individual research grants
Prieto (2015)	Conflict between the administration and researchers.	Tensions arise due to "siloe" management, where Project Investigators bypass the central university systems	Did not propose a centralised evaluation framework to bridge the gap between PIs and administration
Current Study	Integrated Research-Based Project Management	N/A (Proposed Study)	Synthesises Research-Based Project Management and Governance into a single integrated evaluation framework

Source: (Research Data, 2022)

As illustrated in Table 1, while the research funding crisis and management inefficiency are well-documented, there is a distinct lack of research that integrates Research-based Project Governance as a moderator for Project Management Frameworks within the Tanzanian context. Most studies are either purely economic or purely operational. This study fills this void by examining how the interaction between structured management and institutional leadership can turn high external dependency into sustainable research functionality.

2.4. Conceptual Framework

The conceptual framework for this study is grounded in Institutional Theory and Project Management Body of Knowledge (PMBOK) principles. It posits that research success is not merely a product of financial inputs, but a result of the interaction between technical management processes and institutional oversight (Kessy *et al.* 2018) ^[11]. Figure 1 below depicts a conceptual framework as the base for the establishment of integrated mechanisms for the management of research-based projects.

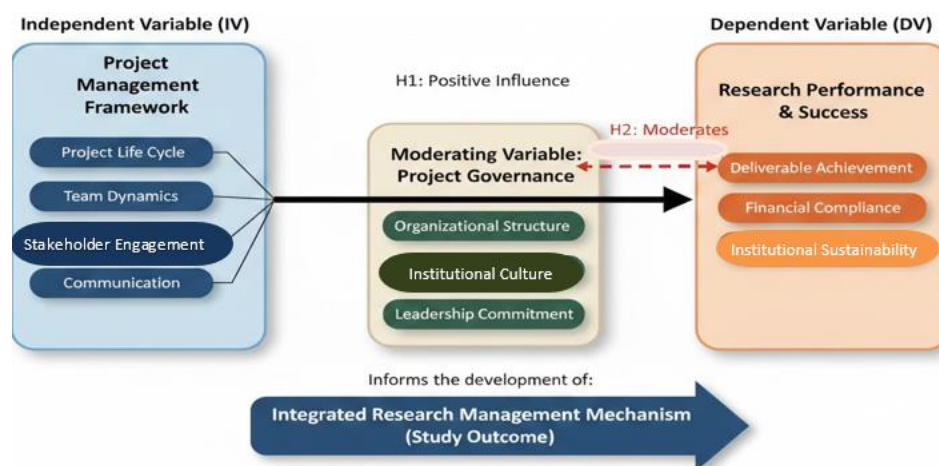


Fig 1: Conceptual framework

2.4.1. Project Management Framework and Research Performance

The literature suggests that standardised research project management processes are critical drivers of project efficiency. Therefore, it is posited that a robust framework correlates with superior research outcomes.

H₁: The Project Management Framework (comprising Life Cycle, Team Dynamics, Stakeholder Engagement, and Communication) has a significant positive influence on the performance of externally funded research projects.

2.4.2. The Moderating Role of Project Governance

Beyond technical management, institutional governance acts as a catalyst or a barrier (Baron & Kenny, 1986) ^[3]. This study suggests that the effectiveness of management practices is enhanced when supported by strong organisational structures and leadership.

H₂: Project Governance (comprising Organisational Structure, Institutional Culture, and Leadership Commitment) significantly moderates the relationship between management practices and project success, such that the relationship is stronger under high levels of governance.

3. Methodology

3.1. Population and Sampling Technique

The target population for this study comprises 350 staff members involved in research management, including Principal Investigators (PIs), research assistants, and administrative officers in the grants office. From this population, a sample of 65 respondents was selected. This sample size was determined using a purposive sampling technique, ensuring that participants have direct involvement in the 71 active research projects currently managed by the institution. Purposive sampling is particularly effective in case studies where specific expertise and experience are required to provide reliable data on complex management frameworks (Creswell & Creswell, 2018) ^[4].

3.2. Data Analysis

The quantitative data collected from the Likert-scale surveys were analysed using Statistical Package for the Social Sciences (SPSS) version 26.0. Also, the study deployed

thematic analysis for qualitative data. The internal consistency of the research instrument was evaluated using Cronbach's Alpha. The Project Management Framework scale ($\alpha = 0.84$), Project Governance scale ($\alpha = 0.79$), and Research Performance scale ($\alpha = 0.82$) all exceeded the recommended threshold of 0.70 (Hair *et al.*, 2019), indicating high reliability. The results of H_1 revealed that the Project Management Framework significantly predicts research performance ($F(1,63) = 42.15, p < .001$). The model explained approximately 38% of the variance in project success ($R^2 = 0.385$). The standardised coefficient ($\beta = 0.62, p < .05$) indicates that for every unit increase in the quality of the management framework, research performance increases by 0.62 units. Therefore, H_1 is supported.

Hierarchical Moderated Regression Analysis (MRA) was used to test (H_2) whether Project Governance strengthens the relationship between management practices and success, as presented in Table 2.

Table 2: The Test on Project Governance strengthens

Model	R ²	ΔR^2	β (Interaction)	Sig.
Step 1 (IV \rightarrow DV)	0.38	-	-	0.000
Step 2 (IV + MV \rightarrow DV)	0.45	0.07	-	0.002
Step 3 (IV \times MV \rightarrow DV)	0.52	0.07	0.24	0.015

Source: (Research Data, 2022)

The interaction term (Management Framework \times Governance) accounted for a significant 7% increase in variance explained ($p = .015$). This demonstrates that the impact of management practices on research success is significantly higher when institutional governance is strong. Thus, H_2 is supported.

4. Discussion of Findings

4.1. Quantitative Analysis of Findings

The support for H_1 aligns with the Project Foundation Theory (Koskela & Howell, 2002) ^[12], confirming that breaking down research grants into structured "transformative tasks" (life cycles) leads to better output delivery. At CSI, this suggests that the reliance on external funding (CSI, 2021) ^[5] can be managed effectively if team dynamics and communication protocols are standardised.

The validation of H_2 is perhaps the most significant finding for Tanzanian HLIs. It confirms that "Management" alone is insufficient. As suggested by Resource Dependence Theory (Pfeffer & Salancik, 1978) ^[19], the institutional environment, specifically leadership commitment, serves as the catalyst. When the university leadership provides a supportive organisational structure, the technical management of grants becomes significantly more efficient. This echoes the findings of Mgaiwa (2018) ^[16], who argued that active leadership is mandatory to navigate the "functional complexity" of modern higher education.

4.2. Thematic Analysis of Findings

Following the qualitative assessment of staff responses and institutional reports, four central themes emerged regarding the management of research funds.

Theme 1: The "Compliance vs. Performance" Paradox

Respondents consistently noted that current management efforts are heavily skewed toward financial auditing rather than scientific impact. While projects often pass financial

audits, there is no standardised mechanism to track if the research deliverables align with the university's long-term strategic vision.

Theme 2: Fragmented Communication Silos

A significant finding was the "silo effect" between the central Grants Office and individual Principal Investigators (PIs). The lack of an integrated digital communication framework leads to delays in fund requisition and procurement, often resulting in project extensions.

Theme 3: Leadership as a Catalyst for Sustainability

The data confirmed that project success is highly sensitive to Leadership Commitment. In projects where senior management took an active interest in troubleshooting administrative bottlenecks, the transition from "external grant" to "institutional capacity" was more successful.

Theme 4: Inadequate Post-Project Evaluation

There is a notable absence of an "Exit Strategy" or post-closure evaluation. Once funding ends, tracking the research's long-term influence (citations, policy changes, or spinoffs) ceases, contributing to the "Funding-Functionality Gap."

5. Conclusion

This study proposes the establishment of an Integrated Research Management Framework (IRMF) as a strategic model designed to transition Tanzanian Higher Learning Institutions (HLIs) from a state of passive fund absorption toward long-term institutional sustainability. The framework is constructed upon a modular logic, wherein technical management, institutional oversight, and the project life cycle operate in synergy rather than in silos. The Integrated Research Management serves as the primary practical output of this study. It posits that by internalising this framework, universities can mitigate systemic dependency risks by

fostering an internal ecosystem optimised for self-sustaining momentum. Ultimately, this mechanism seeks to reconfigure the 'triad of dependence' into a robust 'triad of autonomy'.

6. Recommendations

Based on the findings that institutional governance significantly influences the success of research funding, the following policy interventions are recommended to address the "Funding-Functionality Gap" in Tanzanian Higher Learning Institutions (HLIs).

6.1. Formalisation of Research Project Management Offices

It is recommended that the Tanzania Commission for Universities (TCU) mandate the institutionalisation of specialised Research Project Management Offices (RPMOs) within all accredited higher learning institutions. This initiative should involve the deployment of a professionalised cadre of certified project managers tasked with the 'science of management', specifically scheduling, procurement, and donor compliance. By decoupling these administrative complexities from the primary investigative process, institutions enable researchers to dedicate their expertise exclusively to the 'art of research,' thereby enhancing both the quality and the throughput of institutional output.

6.2. Implementation of a National Research Impact Framework

It is recommended that the Tanzanian government transition beyond compliance-based financial oversight toward a more holistic evaluative model. The development of an Integrated Research Excellence Framework (REF) is essential to align future government subventions with tangible research outputs, including patent filings, policy influence, and measurable community impact. Furthermore, the government should prioritise the implementation of Standardised Digital Grant Management Systems (SDGMS) across HLIs. By integrating financial, procurement, and technical reporting into a unified dashboard, institutions can provide real-time transparency to Principal Investigators (PIs), university leadership, and state auditors. Such an integrated approach is a direct intervention against the 45% budget overruns and 7% schedule delays prevalent in global research management literature (Kubilus, 2016) ^[13].

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