Bridging the Capability Gap: Project Scope Definition Competencies and the Implementation Performance of Educational Infrastructure Projects in Kenya

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ABSTRACT

The execution of decentralized social asset initiatives in developing market economies **remains** heavily constrained by capacity gaps within non-technical governance boards. This study **evaluated** the structural relationships between project scope definition competencies and the implementation performance of educational infrastructure projects funded under the Economic Stimulus Programme (ESP) in Kisumu County, Kenya. Utilizing a descriptive survey research design, data **was** retrieved from 106 institutional stakeholders, spanning school Boards of Management (BOM) and Project Management Committees (PMC). Inferential statistical models **revealed** a severe structural deficit: only 27.8% of the institutions utilized a Work Breakdown Structure (WBS), and 54.55% of the respondents characterized the entire front-end scope definition process as inadequate. Cross-tabulation **linked** poor scope baseline formulation directly with construction delays, field coordination failures, and critical budget overruns. Pearson Chi-square analysis explicitly **rejected** the null hypothesis ($\chi^2 = 12.514$, df = 2, $p = 0.002$), while Spearman's rank correlation **established** a significant linear path ($\rho = 0.340$, $p = 0.0001$) linking scoping precision to successful asset delivery. Conversely, complexity and behavioral governance perspectives **were** introduced to challenge linear planning rigidities. The study **recommended** mandatory technical capacity audits and standardized scope validation protocols prior to capital asset funding disbursement.

Keywords: Project Scope Definition, Work Breakdown Structure (WBS), Economic Stimulus Programme, Educational Infrastructure, Capability Trap, Isomorphic Mimicry.

INTRODUCTION

Globally, the successful implementation of public developmental infrastructure projects serves as a primary engine for macroeconomic growth, institutional capacity building, and sustainable social transformation. Despite its critical importance, public asset delivery across the globe is consistently hampered by systemic performance bottlenecks. According to the Project Management Institute (PMI, 2021), a primary structural driver behind public project failure, catastrophic budget overruns, and prolonged schedule slippages is deficient project scope management, specifically occurring during the front-end project scope definition phase. Project scope definition is the technical process of establishing explicit project boundaries, isolating baseline deliverables, and detailing the specific work packages required to execute a project successfully (Fageha & Aibinu, 2014).

While developed economies typically manage public investments through specialized, certified project management practitioners, many developing global contexts rely on a different model. In these regions, public initiatives are frequently assigned to institutional administrators or heads who possess domain-specific expertise—such as education, administration, or public health—but lack formal training in project management mechanics and lifecycle governance (Ika, 2020). This lack of specialized competencies often leads to poorly defined scope baselines, unmanaged scope creep, and premature asset abandonment.

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Regionally across Africa, governments have increasingly deployed decentralized funding mechanisms and targeted Economic Stimulus Programmes (ESPs) to accelerate grassroots development, foster regional equity, and cushion domestic economies against macroeconomic shocks. These frameworks are designed to bypass central bureaucratic choke points by funneling capital directly from national treasuries to localized sectors, including agriculture, health, and primary or secondary education. However, despite the strategic value of these sub-Saharan economic interventions, empirical evidence shows that a large percentage of decentralized public projects fail to fully realize their core objectives (Wanyona, 2019). Infrastructure initiatives are frequently hindered because local steering committees lack necessary management capacity. When localized project planners and institutional supervisors cannot clearly define what is included or excluded from a project's technical scope, resources are spread thin across competing demands, resulting in structural defects, expensive mid-lifecycle variations, and widespread project stalling.

In Kenya, the Economic Stimulus Programme (ESP) was strategically launched by the national government to jumpstart economic productivity, bridge regional infrastructure gaps, and enhance social infrastructure during periods of economic recession and systemic disruptions. A massive share of this fiscal stimulus was intentionally channeled into the education sector, where the government allocated billions of Kenyan shillings toward upgrading selected institutions into regional "Centers of Excellence," constructing modern classrooms, science laboratories, and library blocks, and supplying comprehensive Information and Communications Technology (ICT) infrastructure to expand secondary education access. To foster local ownership and lower procurement overheads, the implementation of these secondary school ESP infrastructure projects was legally designated to internal institutional actors—primarily school Principals, institutional Boards of Management (BoM), and local project committees.

Advanced project management competency remains a critical institutional prerequisite for ensuring that public socio-economic infrastructure initiatives are delivered on time, within budgeted allocations, and according to engineering specifications. These specialized capabilities enable public entities to articulate clear baseline objectives, eliminate costly omission errors, and systematically coordinate human and material resources to attain optimal returns on public investments (Richman, 2002; Svetlana, 1997). Within the arena of public asset development, implementing strategic frameworks through disciplined project structures guarantees a sustainable competitive advantage by matching stakeholder expectations with innovative institutional capabilities (Cleland & Gareis, 1994).

Project implementation is fundamentally an execution process that translates conceptual plans, policy models, and technical blueprints into functional physical outputs (Lewis, 2006). This operational phase requires a comprehensive audit of institutional strengths, structural constraints, resource requirements, and baseline parameters—including schedules, expenditures, and manpower levels—before field deployment (Project Management Institute [PMI], 2013). A vital safeguard in this lifecycle is rigorous project monitoring, which ensures that project execution aligns seamlessly with initial planning baselines (Lewis, 2006). Within this operational structure, project scope definition forms the technical foundation for successful execution. It establishes a comprehensive, document-driven description of a project's boundaries, core deliverables, exclusions, and operational sub-work packages. Clear scope definition aligns stakeholder expectations, prevents uncontrolled scope creep, and enables reliable cost and schedule estimations (Bannister, 2021; Jiang, 2020). Conversely, vague scope definitions result in structural friction, persistent miscommunications, frequent budget revisions, and extensive project delays (Li, 2022; Turner, 2019).

Problem Statement

The relationship between project scope definition and cost overruns or project stalling remains a persistent problem within public sector infrastructure initiatives across developing economies. Vague project scopes often manifest as ambiguous objectives, poor requirements logging, and frequent mid-execution changes (Bannister, 2021; Ika, 2020). Within the Kenyan education sector’s Economic Stimulus Programme (ESP), implementation inefficiencies were widespread. Kisumu County was particularly vulnerable, experiencing up to an 80% non-completion rate of institutional projects. While general project failures are frequently attributed to financial deficits, a critical underlying factor is the lack of technical skills and knowledge required to define project

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scopes effectively during initial phases. Insufficient stakeholder engagement from institutional actors (such as Boards of Management and Project Management Committees) often results in overlooked structural requirements. This oversight triggers costly retrofits, mid-stream variations, and protracted delays (Li, 2022; Turner, 2019). Understanding how project scope definition competencies influence public project execution is essential for optimizing public funds and enhancing infrastructure development frameworks.

LITERATURE REVIEW & THEORETICAL FRAMEWORK

This study is grounded in three complementary theoretical paradigms: Systems Theory, Stakeholder Theory, and Complexity and Behavioral Governance Theories. Systems Theory, originated by Ludwig von Bertalanffy, views a public project as a complex arrangement of interrelated subsystems. A failure in a foundational component—such as initial project scope definition—reverberates through the entire system, causing miscommunications, operational friction, and eventual project failure (Wang, 2020). Stakeholder Theory (Freeman, 1984) underscores that public education infrastructure initiatives involve diverse stakeholder networks, including line ministries, school boards, contractors, and local communities. Neglecting to engage these groups during scope definition leads to omitted requirements that later manifest as costly, disruptive change orders (Gonzalez, 2021). Finally, Complexity and Behavioral Governance Theories (Flyvbjerg, 2014) provide an advanced lens arguing that institutional performance is significantly shaped by psychological biases, relational configurations, and systemic instability, which challenge linear and rigid mechanistic frameworks.

Empirical literature consistently highlights a direct link between scope management proficiency and project performance. Traditional project management schools posit that front-end control establishes the predictability needed for complex physical engineering assets. Ika (2020) demonstrated that unclear scope definitions are a primary driver of public infrastructure failures, showing that roughly 75% of surveyed projects exceeded initial budgets due to scope creep and poor requirements analysis. Similarly, Hajialiasghari (2021) discovered that 63% of construction projects suffered budget overruns due to a lack of structured, standardized scope management frameworks, which triggered institutional disputes and delays. Qualitative assessments by Gonzalez (2021) revealed that poor communication during early project scoping resulted in an average 20% escalation in final costs. In an analysis of 200 government-funded projects, Li (2022) established that mid-execution scope alterations accounted for 30% of total cost overruns, validating the hypothesis that strict boundary setting and precise baseline documentation protect project budgets. Turner (2019) verified that public projects implementing formalized, transparent communication protocols experienced 40% fewer cost overruns than those with ad-hoc communication styles.

Conversely, a robust body of evolutionary project governance literature challenges this rigid focus on absolute front-end scope definition. Scholars from the complexity theory and behavioral governance schools challenge this linear planning model. Scholars like Serrador and Pinto (2015) and Pinto and Winch (2022) argue that in highly volatile socio-economic environments—such as emergency fiscal stimulus rollouts in developing nations—forcing complete scope definition early introduces severe institutional rigidity. They suggest that over-specifying requirements under tight timelines can cause "procedural paralysis" (Ika, 2020).

Flyvbjerg (2014) and Love et al. (2012) argue that in public infrastructure delivery, project failures are rarely caused by a simple lack of planning tools like the WBS. Instead, they state that overruns are driven by psychological optimism bias and strategic misrepresentation, where project actors intentionally manipulate early scope data to secure funding approvals. Furthermore, Crawford et al. (2003) and Andrews et al. (2013) warn that forcing sophisticated scoping and tracking tools onto non-technical local committees often results in isomorphic mimicry. In this scenario, local actors mimic complex western planning procedures without truly understanding them, turning the WBS and scope statements into a superficial paper exercise that adds administrative friction without improving actual asset delivery. Relational contracting scholars (Macaulay, 2018; Poppo & Zenger, 2002) caution that strict baseline locks prevent project teams from making organic, mid-lifecycle adjustments that community end-users actually need, meaning that a highly compliant scope can still deliver an asset that fails to provide real community utility.

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RESEARCH METHODOLOGY

Introduction and Research Design

This chapter outlines the study's methodological framework. The study adopted a mixed-methods descriptive survey design, utilizing both quantitative and qualitative approaches. This layout enabled data triangulation via questionnaires, interviews, and observations to gather firsthand information efficiently.

Target Population and Sampling Framework

The target population comprised stakeholders from 7 secondary schools (one per constituency) in Kisumu County funded under the Economic Stimulus Programme (ESP), totaling 189 individuals: 98 Board of Management (BOM) members, 56 Site Committee members, and 35 Ministry of Education (MOE) officers.

Yamane's (1967) formula determined a minimum sample size of 128 at a 95% confidence level (e = 0.05):

$$n = N / [1 + N(e)^2]$$

$$n = 189 / [1 + 189(0.05)^2] = 189 / [1 + 189(0.0025)] \approx 128$$

Stratified random sampling ensured proportionate representation across sub-groups, while judgmental sampling selected interviewees per school based on operational authority. Out of the 128 sampled participants, 106 provided valid, fully completed responses, which serves as the empirical analytical baseline (N = 106) for this study.

Table 1: Sampling Distribution Matrix

Respondents Stratum	Population (Nh)	Proportion (%)	Sample Size (nh)	Target Per School
Board of Management (BOM)	98	68%	66	9
Ministry of Education (MOE) Officers	35	68%	24	3
Site Committee Members	56	68%	38	5
Total	**189**	**68%**	**128**	**17**

Research Instruments, Validity, and Reliability

Semi-structured questionnaires (covering demographics, execution, initiation, and scope parameters) and interview guides were utilized. Instruments were piloted using 5 participants per school at Ngiya Girls and Sawagongo High Schools (omitted from the final study). Content and face validity were established via supervisor and peer reviews. Reliability was verified using the test-retest method and Pearson's Product-Moment Correlation coefficient (r), yielding stable coefficients of 0.75 for MOE officers and 0.72 for Committees, both exceeding the acceptable 0.70 academic threshold.

Data Collection and Analysis Techniques

Following NACOSTI clearance, the researcher personally administered and collected instruments across schools and education offices. Qualitative data was analyzed using thematic frameworks. Quantitative data was processed through SPSS (v20) using frequency tables, Chi-square tests, and correlation tests at a 95% confidence level ($\alpha = 0.05$). To analyze the effects of skill levels on project execution, a multiple linear regression model was specified:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

(Where Y is implementation performance, X variables are technical capability predictors, β represents coefficients, and ε represents the stochastic error term).

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Ethical Considerations

Institutional approvals were obtained from the Ministry of Higher Education. Informed consent was mandatory, participation remained strictly voluntary with unconditional withdrawal rights, and complete respondent anonymity and data confidentiality were maintained throughout.

RESULTS AND DISCUSSION

Quantitative Diagnostics of Project Scope Definition

Project scope definition comprises the structural processes through which project parameters are bounded, baseline deliverables are isolated, and work packages are prepared for field deployment. Within early project lifecycles, an incomplete or superficial scope baseline is widely recognized as a fatal structural deficit in social infrastructure delivery models. To determine the exact operational reach of these practices within the Economic Stimulus Programme (ESP) across public secondary schools in Kisumu County, a diagnostic baseline profile was compiled (Table 2).

Table 2: Diagnostic Evaluation Matrix of Project Scope Definition Metrics

Metric / Parameter Evaluated	Yes (n / %)	No (n / %)	Not Sure (n / %)	Total Valid Responses (n / %)
Use of Work Breakdown Structure (WBS) as a primary scoping tool	28 / 27.8%	51 / 50.0%	23 / 22.2%	102 / 100.0%
Formal definition and documentation of core deliverables	34 / 35.4%	62 / 64.6%	00 / 0.0%	96 / 100.0%
Allocation and availability of a detailed Project Scope Statement	44 / 44.0%	56 / 56.0%	00 / 0.0%	100 / 100.0%
Systemic updating of WBS relative to mid-lifecycle scope variations	39 / 37.5%	65 / 62.5%	00 / 0.0%	104 / 100.0%

A Work Breakdown Structure (WBS) acts as the fundamental baseline for decomposing organizational workloads into manageable components. It visually locks down the final project scope, ensuring that every lower-tier deliverable maps directly to an authorized funding stream (PMI, 2021). The empirical findings show that only 27.8% of the studied institutions systematically utilized a WBS during initial scope definitions. This subset demonstrates alignment with international project management body of knowledge (PMBOK) guidelines, drastically dropping the risk of omission errors.

Conversely, 50.0% of the implementation committees completely omitted the WBS tool. This omission introduces major planning gaps where localized committees struggle to visualize project boundaries, leaving 22.2% of the administrative stakeholders entirely unsure of their scoping infrastructure. Because the WBS rules dictate that the structure must reflect exactly 100% of the authorized scope, any architectural element excluded from this breakdown is contractually unauthorized.

This structural deficit is further emphasized by the fact that 64.6% of the projects failed to formally define their core deliverables, leaving only 35.4% with structured milestones. Without explicit deliverables, front-end cost estimation and schedule sequencing lose baseline reliability, exposing emergency stimulus funds to immediate scope creep. Similarly, 56.0% of the projects operated without a finalized Project Scope Statement, leaving critical line-ministry and community stakeholders without a shared operational script. Furthermore, 62.5% of the institutions completely failed to update their tracking baselines when mid-lifecycle variations occurred. This dynamic implies that the majority of these stimulus projects operated under non-discretionary, unmanaged scope changes, leaving them vulnerable to extended schedule overruns or complete asset abandonment.

To assess the operational utility of the underlying documentation, the structural integrity of the WBS Dictionary was evaluated (Table 3).

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Table 3: Analytical Assessment of WBS Dictionary Structural Integrity

Evaluated Level of Detail within the WBS Dictionary	Absolute Frequency (n)	Relative Percentage (%)
Adequate Detail	11	25.0%
Fairly Adequate Detail	9	20.5%
Inadequate Detail	24	54.5%
Total Valid Baseline	**44**	**100.0%**

The WBS Dictionary provides the technical parameters, quality metrics, and statements of work required to accurately track daily construction performance. However, 54.5% of the active project teams reported that the provided WBS dictionaries lacked adequate detail, rendering them practically useless during execution. This lack of clear data severely limited the utility of the WBS dictionary, preventing local steering committees from enforcing standard quality control checkpoints or delivering clear status reports to the central Ministry of Education. To summarize the broad perception of overall scoping quality, the final baseline assessment shows that only 20.0% of the 106 surveyed stakeholders rated their initial scope definition as fully adequate. Meanwhile, 20.45% viewed it as fairly adequate, and a definitive majority of 54.55% explicitly categorized the entire front-end scope definition process as inadequate.

Inferential Cross-Tabulations and Association Pathing

Detailed Scope Authorization and Project Completion Status

To evaluate the direct operational link between formal scope verification tools and final project execution states, the allocation of a detailed Project Scope Statement was cross-tabulated against final project status (Table 4).

Table 4: Cross-Tabulation of Scope Statement Availability vs. Final Project Status

Detailed Scope Statement Availed?	Completed Status (n / %)	Under Construction / Stalled (n / %)	Group Row Total (N / %)
Yes	28 / 62.8%	19 / 37.2%	47 / 100.0%
No	16 / 27.1%	43 / 72.9%	59 / 100.0%

The cross-tabulation reveals a stark operational split: 62.8% of the institutions that provided a detailed Project Scope Statement successfully completed their physical infrastructure rollouts. Conversely, among the teams that failed to establish a scope statement, 72.9% of their infrastructure projects remained trapped in permanent construction or stalled cycles. To test the statistical significance of this pattern, a Pearson Chi-square test of independence was executed. The analysis returned a value of $\chi^2 = 10.238$, translating to a p-value of 0.001. Because $p < 0.05$, this confirms a highly significant relationship, proving that the preparation of an explicit scope statement directly separates successful asset handovers from failed or stalled initiatives.

Technical Detail in the WBS Dictionary and Overall Scope Control

To assess the relationship between continuous scope documentation and ongoing operational control, the level of detail within the WBS Dictionary was cross-tabulated against the perceived level of project scope control (Table 5).

Table 5: Cross-Tabulation of WBS Dictionary Detail vs. Degree of Scope Control

Technical Detail in WBS Dictionary	Very Good (n / %)	Good (n / %)	Average (n / %)	Poor (n / %)	Very Poor (n / %)	Total (N)
Adequate	10 / 71.4%	18 / 78.3%	10 / 38.5%	0 / 0.0%	0 / 0.0%	38
Fairly Adequate	2 / 14.3%	5 / 21.7%	10 / 38.6%	6 / 23.1%	4 / 50.0%	27
Inadequate	2 / 14.3%	0 / 0.0%	25 / 71.4%	10 / 38.5%	4 / 50.0%	41
Column Totals (n)	**14**	**23**	**45**	**16**	**8**	**106**

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The inferential distribution demonstrates that robust technical documentation correlates directly with tight project tracking. Specifically, 71.4% and 78.3% of the administrators who retained highly detailed WBS dictionaries recorded "Very Good" and "Good" overall scope control. Conversely, the vast majority of those working with inadequate dictionaries suffered from "Average" to "Very Poor" scope control. The Pearson Chi-square test returned a value of $\chi^2 = 21.976$ with a p-value of 0.005. This highly significant metric confirms that technical documentation details directly dictate whether an institutional framework can successfully control scope and protect project budgets.

WBS Utilization and Organizational Coordination Challenges

The study also evaluated how using a WBS during initial planning influences day-to-day project coordination (Table 6).

Table 6: Cross-Tabulation of WBS Usage vs. Field Coordination Challenges

Coordination Challenges Encountered?	WBS Used: Yes (n / %)	WBS Used: No (n / %)	WBS Used: Not Sure (n / %)	Total Baseline (N)
Yes	3 / 10.0%	32 / 67.2%	10 / 52.6%	45
No	31 / 90.0%	16 / 32.8%	9 / 47.4%	56
Column Totals (n)	**34**	**48**	**19**	**101**

The data demonstrates that 90.0% of the project committees that actively deployed a WBS reported no field coordination challenges. In sharp contrast, 67.2% of the teams that bypassed the WBS suffered from constant coordination bottlenecks. The resulting Pearson Chi-square test returned a value of $\chi^2 = 20.047$ with an asymptotic significance of $p = 0.0001$. This highly significant result proves that the structural breakdown of work packages provides a vital operational roadmap that streamlines task coordination across multi-stakeholder school infrastructure projects.

Deliverable Definition and Predefined Budget Adherence

To evaluate baseline financial tracking, the formal definition of deliverables was cross-tabulated against the project's ability to finish within its predefined ESP budget allocation (Table 7).

Table 7: Cross-Tabulation of Deliverable Definition vs. Predefined Budget Adherence

Deliverables Formally Defined?	Completed On Budget: Yes (n / %)	Completed On Budget: No (n / %)	Complete Baseline (N)
Yes	21 / 53.8%	17 / 27.0%	38
No	18 / 46.2%	46 / 73.0%	64

The data shows that 53.8% of the institutions that locked in their deliverables successfully finished within their predefined budget. Conversely, 73.0% of the teams that failed to define their deliverables experienced severe budget overruns. The Pearson Chi-square test returned a p-value of 0.003. Because $p < 0.05$, this confirms that explicit deliverable tracking is a significant statistical driver of fiscal discipline, protecting emergency public stimulus funds from unmanaged cost expansion.

Formal Hypothesis Testing

To evaluate the overarching relationship between project scope definition and final project implementation performance, a null hypothesis was formally tested:

> ***H_0: There is no significant relationship between project scope definition competencies and the implementation performance of Economic Stimulus Programme projects in Kenyan public secondary schools.***

The categorical data measuring scope definition quality was cross-tabulated against the actual implementation status markers across all 106 cases. The final non-parametric test output is organized in Table 8.

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Table 8: Chi-Square Postulations for Scope Definition and ESP Project Implementation

Statistical Test Metric	Value	df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	12.514[a]	2	.002
Likelihood Ratio	12.601	2	.002
Linear-by-Linear Association	12.383	1	.000
N of Valid Cases	**106**		

The Pearson Chi-square test returned a value of $\chi^2 = 12.514$, df = 2, with an asymptotic significance of $p = 0.002$. Because the calculated p-value is well below the standard statistical threshold ($\alpha = 0.05$), the null hypothesis (H_0) is rejected. This demonstrates a highly significant relationship between scope definition competencies and actual implementation performance.

To determine the strength and direction of this relationship, a Spearman's rank correlation coefficient (ρ) was calculated. The analysis revealed a stable, positive correlation ($\rho = 0.340$, $p = 0.0001$), proving that rigorous front-end scope definition strongly tracks with successful project delivery.

DISCUSSIONS

The structural and inferential patterns extracted across the 106 cases in this study provide explicit mathematical validation for mainstream project governance paradigms. The empirical finding that 72.9% of the project teams operating without a clear Project Scope Statement suffered project stalling or non-completion (yielding a highly significant Chi-square metric of $\chi^2 = 10.238$, $p = 0.001$) serves as a direct operational proof of the theoretical models posited by Fageha and Aibinu (2014). Their research establishes that front-end scope definition deficiencies introduce deep-seated contractual vulnerabilities that structurally degrade capital building asset delivery. Furthermore, the strong linear pathway mapped by the Spearman's rank correlation coefficient ($\rho = 0.340$, $p = 0.0001$) confirms that scoping precision directly tracks successful physical asset delivery, verifying the international development framework of Ika (2020), which separates successful development loans from catastrophic delivery breakdowns based entirely on early lifecycle requirements definition.

This direct relationship between technical planning precision and project containment is reinforced by the cross-tabulation of WBS Dictionary integrity against field management outcomes. The strong association between highly detailed tracking artifacts and robust, ongoing control regimes ($\chi^2 = 21.976$, $p = 0.005$) confirms the engineering planning frameworks validated by Gibson et al. (2006), who argue that early-stage diagnostic planning acts as a preventative insulate against mid-lifecycle variations. Correspondingly, the financial reality that 73.0% of the institutional projects that failed to establish formalized deliverables recorded extensive budget overruns ($p = 0.003$) matches the cost containment laws derived by Kerzner (2017). Kerzner proved that poorly bounded project baselines generate structural cost inflation exceeding 50% of the original budget. When local committees fail to decompose tasks, this micro-level deficit scales into macro-level multi-stakeholder failures, matching the structural challenges identified by Wanyona (2019) within sub-Saharan decentralized funding mechanisms.

Conversely, a robust school of modern project governance and evolutionary economic complexity explicitly challenges the linear, deterministic assumption that absolute front-end scope locking guarantees optimal physical project delivery. While the comprehensive non-parametric test rejected the null hypothesis ($\chi^2 = 12.514$, df = 2, $p = 0.002$), evolutionary scholars such as Serrador and Pinto (2015) and Pinto and Winch (2022) caution against over-interpreting this linear path. They argue that in highly volatile, multi-stakeholder social ecosystems—such as emergency fiscal stimulus rollouts in sub-Saharan African contexts—enforcing an absolute scope freeze early on generates dangerous institutional rigidities. Under compressed execution timelines, forcing extensive requirement freezes often triggers a severe condition of 'procedural paralysis,' locking down projects into unoptimized initial templates that cannot absorb inevitable material supply shifts or shifting community needs.

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Furthermore, behavioral governance perspectives offer an alternative interpretation of our baseline descriptive profile, where a definitive majority of 54.55% of the active institutional actors characterized the initial scoping phase as fundamentally inadequate. Rather than a simple lack of planning artifacts, Flyvbjerg (2014) and Love et al. (2012) present strong empirical evidence showing that public infrastructure cost growth is primarily driven by psychological optimism bias and strategic misrepresentation. Project actors frequently manipulate early scoping boundaries to make initiatives appear artificially inexpensive and secure initial treasury funding approvals. Finally, the stark structural gap where 50.0% of the implementation committees completely omitted the WBS tool points to a deeper systemic anomaly outlined by Crawford et al. (2003) and Andrews et al. (2013): the 'capability trap.' Forcing specialized, Western-centric project structures onto non-technical local school Boards of Management (BOM) drives local actors into isomorphic mimicry. They adopt complex planning documents strictly as a superficial compliance exercise to release funds, adding structural friction without improving actual construction performance or delivering real social asset utility.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the empirical evidence, this study concludes that project scope definition competency is a critical structural determinant of public infrastructure delivery in decentralized Kenyan contexts. The widespread omission of core planning tools—specifically the Work Breakdown Structure (WBS) and formalized Project Scope Statements—leaves projects profoundly exposed to field coordination deadlocks, mid-lifecycle friction, and severe financial overruns. While traditional management paradigms view these failures strictly as technical execution flaws, the introduction of behavioral and complexity perspectives reveals a deeper issue: a distinct capability trap. Forcing non-technical school boards (BOMs) and localized site committees to execute advanced scope architectures without hands-on institutional support fosters isomorphic mimicry. They produce superficial regulatory compliance metrics that fail to translate into physical asset sustainability.

Recommendations for Policy and Practice

To optimize future public asset capital funding disbursements within the educational sector, the study proposes the following targeted recommendations:

1. Mandatory Technical Capacity Audits: The Ministry of Education should institute mandatory project management competency audits for all school Boards of Management (BOM) before releasing capital infrastructure grants. Where skill gaps exist, a certified project manager must be co-opted into the local committee.
2. Standardized Front-End Scoping Protocols: The government should abandon ad-hoc planning styles in favor of standardized, pre-populated Project Scope Statements and WBS templates specifically tailored for standard educational facilities (e.g., standard classrooms, laboratories, and library blocks).
3. Institutionalization of WBS Dictionaries: Implementing agencies must make detailed WBS Dictionaries a mandatory component of the contractual baseline. This ensures that non-technical local supervisors possess clear, explicit quality control benchmarks to review daily field contractor performance.
4. Adaptive Governance Frameworks: Funding frameworks should integrate flexible contingency lines and clear, formalized mid-lifecycle change-management protocols. This allows project teams to navigate shifting community requirements without triggering bureaucratic gridlock or complete project abandonment.

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