The Influence of Pre-Project Planning on the Budget Absorption Rate of Public Funded Infrastructure Projects in Kenya a Comparative Case Study of Narok, Migori, and Kisii County Government Projects

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ABSTRACT

This research investigates the persistent problem of low budget absorption in publicly financed infrastructure projects within Kenya's devolved governance system. It examines the impact of Pre-Project Planning (PPP) on this issue, with key objectives of exploring how scope definition, clarity of objectives, stakeholder involvement, and risk identification lead to better budget absorption. This study is grounded in Construction Management Theory, Systems Theory, and the Organizational Decision-Making Model, which guided the analysis of project processes and outcomes.

Adopting a causal-comparative case study design, the research utilized a mixed-methods approach, collecting data from various project stakeholders through structured questionnaires, interviews, and document analysis. Quantitative data were subjected to Pearson's correlation and multiple regression analysis.

The findings establish a significant positive correlation between effective risk identification and budget absorption, confirming its central role in fiscal success. In contrast, a statistically significant negative correlation was found between clarity of objectives and budget absorption, an unexpected finding suggesting that overly rigid plans may hinder financial flexibility. The research concludes that while PPP is central to improving budget absorption, its success is inextricably linked to addressing concurrent governance challenges and proactive management of project delays. This study makes a key empirical contribution by providing actionable insights for policymakers and project managers on how to enhance project delivery within Kenya's devolved governance environment.

Keywords: Budget Absorption, Public-Funded Infrastructure, Project Success, Kenya, Pre-Project Planning.

INTRODUCTION

In public infrastructure development, pre-project planning (PPP) has emerged as a cornerstone of project success. It is defined as "the process of developing sufficient strategic information with which owners can address risk and decide to commit resources to maximize the chance for a successful project" (Wang & Gibson, 2006). PPP enables government agencies to align project objectives with available resources, stakeholder expectations, and long-term development goals. Other scholars such as (Koskinen, 2020) and (Sarde, 2016) highlighted PPP as synonymous with conceptual planning, front-end engineering design

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(FEED), schematic design, and front-end loading, among others. (Terry, Hang, Knut and Edkins, 2019), emphasize that most project failures stem from poor decisions made during the front-end stage the period when the project's foundations are laid and strategic value is created. Therefore, this phase is often referred to as the “make-or-break” point in project management.

Despite the acknowledged importance of PPP, its application in Kenya's devolved governance context especially in counties remains inconsistent and under-researched. County governments are now responsible for a significant share of Kenya's infrastructural development, as outlined in Schedule Four of the Constitution of Kenya (GOK, 2010). Yet, many counties continue to report alarmingly low development budget absorption rates, which threaten the delivery of critical public services and erode public trust in the devolution framework. According to the Controller of Budget reported that “in the first half of the FY 2023/2024, Narok County posted a budget absorption rate of 41%, Migori County 14.3%, and Kisii County a mere 3.9%” (GOK, 2024). These figures reflect a concerning disconnect between budgetary planning and actual project execution.

Budget absorption is defined as the proportion of actual expenditure compared to the allocated or budgeted funds Anthony et. al, (2021). (Laiboni, 2021) adds that this metric reflects how efficiently a government or organization utilizes allocated financial resources within a fiscal year. Ideally, high absorption rates suggest efficient planning, procurement, and project implementation processes, while low absorption rates indicate poor planning, bottlenecks in execution, and systemic inefficiencies. (Andriati, 2017), notes that a government’s performance is often judged by its ability to fully absorb planned budgets, as unspent funds may signify stalled projects, wasted opportunities, or failed service delivery.

Given the complexity of infrastructure projects, the construction industry is a crucial barometer of planning and financial efficiency. Studies from across the world confirm the sector's significant contribution to GDP and its catalytic role in job creation, economic diversification, and poverty reduction (Mobolaji & Wale , 2012), (Zahir et al, (2011). For instance, in Indonesia, the construction sector contributed 10.6% to the GDP between 2013 and 2018, the highest globally during that period Musarat et. al, (2020). Nigeria's construction sector contributed 9.5% in 2021 (Saka, Adegbembo, 2022), while in Kenya, the sector's contribution to GDP declined sharply from 5.2% in 2021 to just 3.1% in 2023 (Kenya National Bureau of Statistic, 2023), (Statista, 2024).

This declining trend is often linked to poor planning, procurement delays, inflationary pressures, and capacity gaps challenges that PPP aims to resolve.

Evidence suggests that weak PPP practices contribute to common project failures, such as cost overruns, delayed timelines, and substandard outputs. Yue and Demisew both document widespread delays in African construction projects due to poor scoping and scheduling (Yue, 2018), (Demisew, 2020). Similarly, projects must have clear starting and ending points, budget frameworks, defined scopes, and performance criteria all of which are shaped during the PPP phase (Joseph, 2012). Wang, Yu-Ren, and Edward, emphasize that poor scope definition during the front-end planning phase is a critical factor undermining project performance (Wang & Gibson, 2006). Furthermore, H+M Industrial also contend that schedule risks in capital projects can largely be mitigated if a proper execution strategy and scope are defined early in the planning process (H+M Industrial, 2021).

In Kenya, systemic inefficiencies in managing construction risks, attributing much of this to outdated contractual practices and poor PPP processes (Gichunge, 2000). While the National Construction Authority made calls to improve construction management practices through research and capacity development (NCA-Kenya, 2021), much remains to be done in counties where planning frameworks are weak and under-resourced. This is compounded by evidence from Kipkirui (Kipkirui, 2020), who documented that development budget absorption rates across counties have fluctuated between 49% and 66% in recent years well below the 100% ideal. The Controller of Budget further confirmed a downward trend, reporting a national absorption rate of 50.9% in FY 2021/2022, down from 60.1% the previous year (GOK, 2022).

This study examines how pre-project planning influences the absorption rate of development budgets in public-funded infrastructure projects across three counties: Narok, Migori, and Kisii. These counties were

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selected based on their varying demographic profiles, geographical coverage, and performance in budget absorption. According to the Kenya National Bureau of Statistics, Narok has a population of 1,157,873 and covers 15,263 km², Migori has 1,161,343 residents over 2,586 km², while Kisii hosts 1,266,860 people within 1,318 km² (Kenya National Bureau of Statistics, 2019). These counties present ideal case studies for understanding how local-level planning mechanisms affect infrastructure delivery and financial performance.

Furthermore, the study is anchored in Kenya's constitutional vision of devolution, which aims to promote social and economic development and ensure equitable access to government services (GOK, 2010). Infrastructure is the backbone of this development vision, and PPP is the vehicle through which well-scoped, timely, and cost-effective projects are initiated and implemented. With over 60% of devolved functions under Schedule Four requiring infrastructure inputs, weak planning equates to stalled devolution (Wikipedia, 2024). Kwakye affirms that local governments are not only implementers but strategic planners of development, making their approach to PPP a key determinant of service delivery success (Kwakye, 1997).

Pre-project planning (PPP) plays a crucial role in aligning strategic goals with project execution, especially in the public sector where accountability and resource optimization are critical. The success or failure of many infrastructure projects in developing countries has been closely linked to the quality of planning conducted before project execution. Decisions made during the front-end planning stages greatly influence a project's success trajectory (Terry, et al. 2019). In Kenya, where infrastructural development is fundamental to realizing the goals of devolution, the effectiveness of PPP becomes even more vital. This is particularly true in counties such as Narok, Migori, and Kisii, where poor planning practices often result in incomplete projects, delays, and unspent development budgets despite the availability of funds.

Kenya's construction industry, while contributing to national GDP and social development, has struggled with low project completion rates and inefficient fund absorption, undermining the goals of Vision 2030 and the Big Four Agenda. The construction sector's GDP contribution has consistently declined, from 5.2% in 2021 to 3.1% in 2023 (Kenya National Bureau of Statistic, 2023), a trend partially due to planning-related inefficiencies. While most research on project delays focuses on implementation-phase issues like contractor performance and external disruptions (Msafiri, 2015) and (Yue, 2018), this study emphasizes the overlooked role of pre-project planning. By investigating how planning practices influence budget absorption, particularly in county governments, this research seeks to offer actionable insights into optimizing project delivery frameworks, thus promoting more effective public investment outcomes.

In sum, this study investigates the relationship between pre-project planning and budget absorption in public infrastructure projects. It seeks to fill a critical gap in both academic literature and policy discourse, offering practical insights for county governments, policymakers, development partners, and project managers. By focusing on Narok, Migori, and Kisii counties, the study draws comparative lessons and proposes recommendations that could shape Kenya's devolved development trajectory for years to come.

Theoretical Framework And Literature Review

This section provides an analytical overview of the theoretical, legal, and conceptual frameworks, as well as existing literature, relevant to pre-project planning and budget absorption, laying the groundwork for addressing the core research problem of persistent low budget absorption in public-funded infrastructure projects in Kenyan counties.

Theoretical Framework

This study was underpinned by three core theories that provide the analytical lens to understand the relationship between pre-project planning practices and project outcomes. These theories were instrumental in framing the research questions and guiding the investigation.

i) Construction Management Theory

Construction Management Theory, rooted in the principles of scientific management, provides the fundamental framework for this study. The Project Management Institute (PMI) argued that a project's success

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is determined by the effective management of its key variables, namely scope, time, cost, and quality (PMI, 2021). The central research question of this study seeked to determine the effect of pre-project planning on budget absorption. This was directly addressed by this theory, which highlighted how robust planning in early project phases including the establishment of realistic budgets and schedules is crucial for managing costs and ensuring efficient expenditure control. This theory guided the investigation into how PPP practices influenced project's ability to absorb allocated funds effectively and promotes the use of planning tools to achieve efficiency.

ii) Systems Theory

Developed by Ludwig von Bertalanffy, Systems Theory views an infrastructure project as a complex, interconnected system. This theory was particularly relevant to the study's objective of examining the role of stakeholders and institutional actors. It allowed for an analysis of how various internal and external factors, such as the project owner, consultants, communities, and government institutions, interact to influence project outcomes. This theoretical perspective was essential for addressing the research question on the role of stakeholder engagement. It also provided a robust way to analyze how the alignment of a county's project systems with national government objectives and institutional actors, such as the Controller of Budget and Auditor General, is essential for successful budget absorption.

iii) Organizational Decision-Making Model

This model provides a framework for analyzing the critical decisions made during the pre-project planning phase. It assumes that clear roles, responsibilities, and effective decision-making processes are essential for successful project outcomes (Ali, 2002). This model was crucial for investigating the study's objective of determining the effect of project governance on budget absorption. It allowed for the assessment of how structured governance frameworks and decision-making processes particularly those related to stakeholder engagement and risk mitigation contribute to improved budget absorption rates. This model directly informed the investigation into how the lack of a structured approach to project-related decisions can lead to inefficiencies and poor budget performance.

LITERATURE REVIEW AND LEGAL FRAMEWORK

A significant body of literature consistently acknowledges the importance of planning in public project performance. (Andriati, 2017) highlighted in his study on Indonesian government institutions that "research has often focused on financial administration while overlooking the direct influence of pre-project preparedness". Similarly, (Ogano & Pretorius, 2013) emphasized the critical role of front-end planning in reducing project uncertainties within Sub-Saharan Africa's electricity utility sector, though their research did not directly connect this planning to budget absorption outcomes. This research filled these conceptual gaps by focusing specifically on how effective pre-project planning enhances budget utilization in Kenyan counties, thereby addressing the core research problem.

On an international level, the literatures consistently emphasized the importance of clear project definition and structured planning tools in mitigating project uncertainties. The argument by (Fageha & Aibinu, 2014) and (Wang & Gibson, 2006) is that comprehensive and clear scope definition is essential for enhancing project outcomes and preventing issues like scope creep, which can lead to cost overruns and poor budget utilization. This aligned with the study's focus on the alignment between a project's scope, budget estimates, and timelines, as a misalignment often signals underutilization of development funds. The conceptual tools for assessing planning readiness have been a focal point of research. (Rahat et al. (2023) demonstrated that frameworks like the Project Definition Rating Index (PDRI) can reduce project delays and costs in the USA. However, their study did not evaluate the PDRI's specific impact on budget absorption, which was a core focus of this research. Similarly, (Sherif & Price, 1999) introduced the Agreement Matrix as a structured approach to assess planning readiness and enhance project outcomes through stakeholder alignment and a comprehensive scope definition.

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In the Sub-Saharan African context, the literatures highlights both the challenges and the importance of front-end planning. A framework of critical success factors for infrastructure projects in South Africa was developed by Rasebotsa, et al. (2025), which included stakeholder management and risk mitigation as key elements. This study built on their findings by focusing on how these factors, when implemented during pre-project planning, influence budget absorption.

In Kenya, while previous studies have acknowledged the importance of planning, they had not treated pre-project planning as a distinct phase with a measurable impact on project success. For instance, (Desmond & Mohinder, 2020) and (Langat, 2015) recognized planning and funding as key factors in public school infrastructure projects but they did not isolate pre-project planning as a distinct phase. The current study addresses this void by isolating pre-project planning variables such as project definition, stakeholder alignment, and risk mitigation, and evaluating their direct influence on budget absorption. Furthermore, Kimathi et al. (2021) examined budgeting practices in Nyeri County and noted that inefficiencies could hamper budget absorption, but they did not isolate the specific contributions of pre-project planning activities like project definition. This study extends their findings by analyzing how the clarity of project objectives and the quality of project definition, as measured by tools like a comprehensive project charter, influence budget absorption across multiple counties.

The persistent struggle with low budget absorption in counties, despite a robust legal framework like the Public Finance Management Act (2012), suggests that legal compliance alone is insufficient without the effective implementation of pre-project planning practices. (Mohamed, 2018) highlighted the implications of low budget absorption, linking it to inefficient service delivery and rightly pointing out that a failure to utilize allocated resources results in poor budget performance. This study built on his work by empirically evaluating specific planning practices and the utilization of tools like County Integrated Development Plans (CIDPs) and County Fiscal Strategy Papers (CFSPs) to address this concern. In a similar vein, (Kipkirui, 2020) emphasized that high budget allocation promotes efficiency but he did not delve into the specific project phases where planning deficiencies are most prevalent. This study extends his work by examining how the utilization of pre-project planning tools impacts budget absorption.

Conceptual Framework

The conceptual framework for this study is a synthesis of the reviewed literature and is grounded in the theoretical models discussed above. It asserts that pre-project planning practices serve as the independent variables influencing the dependent variable which is budget absorption. Building on the premise that effective planning is critical for project success, this study's conceptual framework empirically evaluates how specific planning practices influenced a public project's budget absorption rate. The six planning practices identified for this study are project definition, objective clarity, scope completeness, estimate accuracy, stakeholder engagement, and risk identification.

The relationship between these variables was guided by core theories, which suggests that effective management in the initial phases of a project is crucial for its overall success. This study aimed to empirically test this relationship within the context of public-funded projects in Kenya using a multiple linear regression model.

CONCLUSION

In summary, the literature reveals a consistent acknowledgment of the importance of planning in public project performance. However, it also exposes a critical research gap, particularly in directly linking the specific elements of pre-project planning to budget absorption rates. This study, guided by the Construction Management Theory, Systems Theory, and the Organizational Decision-Making Model, contributes to filling this void by systematically analyzing how various elements of pre-project planning influence budget absorption in public-funded infrastructure projects in Kenya. The conceptual framework for this study operationalizes this relationship by using a multiple linear regression model

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($Y= \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + \epsilon$) to test the causal influence of six key planning variables on the budget absorption rate.

METHODOLOGY

Population and Sampling

The study targeted all infrastructure development projects in the selected counties scheduled for implementation during the 2023/2024 financial year, each with an estimated cost of at least KES 10 million. A total of 63 projects were identified from the Annual Development Plans (ADPs), comprising 17 from Narok, 22 from Migori, and 24 from Kisii. To ensure sample validity and sufficient statistical power, the sample size was calculated using Cochran's formula to ensure sufficient statistical power, yielding minimum sample requirements of 12 projects for Narok, 14 for Migori, and 15 for Kisii.

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{E^2}$$

Equation 1- Cochran's Formulae

Source; https://www.socscistatistics.com/tests/samplesize/default.aspx, 2025)

i) n = Sample Size (The number of projects selected for the study).

ii) Z = Z-score (the standard normal deviate corresponding to the desired confidence level of 1.96 for 95% confidence).

iii) p = Estimated Proportion (the anticipated proportion of the characteristic being studied in the population set to 0.5 for known maximum sample size).

iv) E = 5% was selected as the desired level of precision (Margin of error).

Research Design

This study employed a causal-comparative case study design to examine the influence of pre-project planning (PPP) practices on the budget absorption rate of publicly funded infrastructure projects in Kenya. The selected counties Narok, Migori, and Kisii represented distinct levels of budget absorption performance based on reports from the Office of the Auditor General (GOK, 2024) with Narok performing among the highest, Migori at the median, and Kisii among the lowest. This design enabled a comparative exploration of PPP practices and their correlation with financial outcomes, aligning with Creswell and Creswell's (Creswell & Creswell, 2012) characterization of causal-comparative research as a non-experimental approach that investigates existing differences across groups to explore potential cause-effect relationships.

Data Collection and Measurement

Data collection incorporated both primary and secondary sources to provide a comprehensive understanding of the study variables. Primary data were obtained via structured Google Form questionnaires that included both closed-ended and open-ended questions. These were administered to planning and implementation teams associated with each project. Additionally, in-depth interviews were conducted with stakeholders, such as project users and community leaders, to obtain qualitative insights into the effectiveness of PPP processes and perceived barriers to efficient budget absorption. Secondary data were sourced from county-level financial and planning documents, including the County Budget Review and Outlook Papers (CBROPs) for Narok, Migori, and Kisii (2024), the 2023/2024 ADPs for each county, and the Controller of Budget's (2024) County Governments Budget Implementation Review Report.

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Data Analysis

Data were analysed using SPSS. Descriptive statistics were computed to summarize variable distributions, while multiple linear regression analysis was used to assess the relationship between PPP practices and budget absorption rates. The study applied the following causal formula:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \beta 6X6 + \epsilon$$

Where, the Budget Absorption Rate (Y) was the dependent variable, while the six planning practices were the independent variables (X1 to X6).

The beta coefficients (β1 to β6) were calculated by regressing the six planning practices against the dependent variable, Budget Absorption Rate (Y), to quantify each practice's unique contribution. This rigorous approach was used to address the study's research questions. The acceptability of a beta value was determined by its statistical significance (p-value). A p-value less than the 0.05 significance level was the criterion for a beta coefficient to be considered acceptable, as it indicated a statistically significant relationship that was unlikely to be due to chance.

Conversely, if a beta value had a p-value greater than 0.05, the relationship was considered not statistically significant. Such a finding would imply that the observed relationship was likely a result of random chance and that the specific planning practice did not have a reliable, measurable influence on the budget absorption rate. Therefore, even if a beta value appeared large, it would not be deemed acceptable for making conclusions if its corresponding p-value was too high.

This statistical process provided empirical evidence to address the study's research questions by identifying which planning practices were most influential in improving budget absorption in Kenyan public projects. The error term (ϵ) captured any unmeasured factors or random variation affecting the projects, ensuring that the final conclusions were based on the specific relationships identified within the model.

The study's conceptual framework and operationalization of variables are summarized in the table 1.

Table 1- Operationalization of Variables

Variable	How It Was Measured (Indicators)	Variable Code
Project Definition	Feasibility study conducted? How well were objectives rated?	X1
Clarity of Objectives	Did a project charter and business case exist?	X2
Project Scope	Cost and schedule accuracy, and clarity of objective ratings.	X3
Estimates & Schedules	Cost and scheduling methods used, schedule delays and update frequency.	X4
Stakeholder Engagement	Methods and effectiveness of stakeholder involvement.	X5
Risk Identification	A rating of how well risks were considered.	X6
Budget Absorption Rate	The percentage of the budget spent, from project records.	Y

Source; Author's own construct 2025

A secondary model introduced dummy variables for county location (Narok and Migori), using Kisii as the reference category, to control for regional effects.

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Qualitative data from interviews and document reviews were subjected to thematic content analysis. This analysis assessed the quality and completeness of PPP documentation, such as project charters, business cases, feasibility studies, risk registers, and stakeholder engagement plans, and contextualized them within the broader administrative and institutional frameworks of each county.

To ensure data quality, a comprehensive validation process was conducted. This involved cleaning the dataset, converting qualitative responses into numeric codes, and addressing missing values through listwise deletion. List wise deletion is a method for handling missing data where any case (row) with at least one missing value is completely removed from the dataset before analysis (Hair, Black, Babin, & Anderson, 2019).

Cronbach's Alpha was used to assess the internal consistency of multi-item scales, with expectation that all major constructs meet the acceptable reliability threshold of 0.70 to 1.0.

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum s^2(X_i)}{s^2(Y)}\right)$$

Equation 2- Cronbach's Alpha formula.

Source: https://www.bachelorprint.com/au/

Where “n” refers to the number of scale items, “s^2 (Xi)” refers to the variance associated with item, and “s^2 (Y)” refers to the variance associated with the observed total scores. The interpretation of these variables for each of the study's constructs is provided in Table 2.

Table 2- Details of Multi-item Variable

Variable	***How It Was Measured (Indicators)***	***Variable Codes(n)***	***Individual Item Variance (s2(Xi))***	***Total Score Variance (s2(Y))***
Project Definition	How well were objectives rated?	X1_3,X1_4, X1_5,X1_6, X1_7,X1_8, X1_9,X1_10	Variance of each of the 8 indicators	Variance of the total scores for the variable
Clarity of Objectives	Did a project charter and business case exist?	X2_1, X2_2, X2_3, X2_4, X2_5, X2_6	Variance of each of the 6 indicators	Variance of the total scores for the variable
Project Scope	Existence of Cost and schedule at PPP phase, Resource Allocation, Communication Plan, Quality Management Plan, feasibility study conducted and how feasibility study informs the project definition inform project definition.	X3_1, X3_2, X3_3, X3_4, X3_5, X3_6, X3_8.	Variance of each of the 7 indicators	Variance of the total scores for the variable
Estimates and Schedules	Accuracy of Cost estimate and scheduling methods used, schedule delays and	X4_1, X4_2, X4_3, X4_4, X4_5, X4_6,	Variance of each of the 7 indicators	Variance of the total scores for the variable

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	update frequency.	X4_7		
Stakeholder Engagement	Methods and effectiveness of stakeholder involvement.	X5_1, X5_2, X5_3	Variance of each of the 3 indicators	Variance of the total scores for the variable

Source; Author's own construct 2025

To account for projects with more than one respondent, the study employed data aggregation. For each project, responses from multiple individuals were averaged to create a single, representative score for each variable, thus maintaining the project as the primary unit of analysis for quantitative regression. This approach ensured that the project-level analysis was based on a consolidated view rather than on individual perspectives, providing a more robust and reliable dataset.

RESULTS

This section presents the analysis and interpretation of data collected from Narok, Migori, and Kisii counties on the relationship between pre-project planning (PPP) practices and budget absorption in publicly funded infrastructure projects. The findings are organized thematically based on the research objectives and statistical tests, including descriptive statistics, correlation analysis, and ANOVA, as appropriate.

Procedure and Data Preparation

The data for this analysis was collected from respondents using questionnaires, interviews, and document verification, covering project-specific information, budget absorption rates, and various planning indicators.

Data preparation involved:

i) Relevant numerical and categorical data points were manually extracted from the questionnaire forms.

ii) Standardization was performed to ensure consistent naming conventions and data types across different datasets.

iii) Qualitative responses such as "Yes/No" or specific methods were converted into binary numerical values 1 indicating presence/affirmative and 0 indicating absence/negative while "Not sure" or blank responses were treated as missing data (NaN).

iv) Rows with missing values (NaNs) in the variables being analyzed were excluded from each specific correlation calculation to ensure valid paired observations.

v) A zero-variance check was conducted prior to correlation analysis to confirm that both variables had variation; variables with no variance were excluded and documented accordingly.

vi) These preprocessing steps ensured that only clean, standardized, and statistically valid data were used in the correlation analysis.

Validation of Data Collected

The actual sample sizes collected in form of projects (unit of analysis), determined by counting project IDs from the aggregated data, were analyzed for sufficiency against the calculated required sample sizes. The actual sample sizes were: Narok = 13 projects, Migori = 16 projects, and Kisii = 14 projects.

Table 4.2 summarizes the sample size analysis, which confirmed that the data collected from all the counties were sufficient to achieve the desired precision and confidence for estimating population means.

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Table 3- Sample Size Analysis for sufficiency

County	***Population (N)***	***Required (Means, σ=0.15)***	***Actual Sample received (n)***	***Sufficiency***	***% for Unit of Analysis Reached.***
Narok	17	12	13	Yes (13 ≥ 12)	76.47%
Migori	22	14	16	Yes (16 ≥ 14)	72.73%
Kisii	24	15	15	Yes (15 = 15)	62.50%

Source: Author's Field Survey

Data Reliability Analysis

The internal consistency of the multi-item scales was assessed using Cronbach's alpha. The Pilot Study instrument's reliability was also confirmed using a test-retest method, demonstrating its stability over time.

The Cronbach's alpha analysis revealed that all the items exhibited acceptable to excellent levels of internal consistency as shown in table 4.

Table 4- Cronbach's Alpha results

Items	**Cronbach's Alpha results**	**Remarks**
Pilot study (All Items)	0.89	Good
X1-Project Definition	0.75	Acceptable
X2-Clarity of Objectives	0.97	Excellent
X3-Project Scope	0.79	Acceptable
X4-Estimates and Schedules	0.71	Acceptable
X5- Stakeholder Engagement	N/A	Not Applicable

Source: Author's Field Survey

The X5-Stakeholder Engagement measure, consisting of a single qualitative item, was excluded from this analysis as it was not amenable to Cronbach's alpha testing.

These findings collectively indicated that the survey instrument was largely reliable and consistent in its measurement of the key constructs

Data analysis

Response Rates and Sample Validity

The data collection for this study involved two key response rates: participant and project level. A total of 108 out of 150 questionnaires were completed, yielding a participant response rate of 72%. This rate is considered "excellent" and surpasses the 50% threshold for data analysis (Mugenda and Mugenda, 2003). Concurrently, data was successfully collected for 44 of the 63 targeted projects, resulting in a project-level response rate of 69.84%.

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Both robust response rates ensure the analysed data is highly representative of the target project population. This high level of participation lends considerable credibility to the empirical evidence, significantly enhancing the external validity and generalizability of the study's findings while mitigating potential non-response bias.

Demographic Profile of Respondents Analysis

The demographic analysis of participants is represented in table 4.

The participants' varied expertise and prior experience in budgeting significantly bolster the data's credibility. The high representation of professionals from finance-centric roles, like Quantity Surveyors (81.25% with experience) and Procurement Officers and Internal Auditors (100% experience), ensures that the findings on project budgeting and financial oversight are grounded in real-world expertise.

The contributions from technical professionals like engineers and project managers provide a crucial perspective. Their insights into how financial planning impacts project implementation, combined with the specialized knowledge of budgeting experts, validate the survey's conclusions from multiple angles, strengthening data reliability.

Table 5- Demographic Analysis of Participants.

Professional Role	*Percentage of Total Respondents*	*(%) of "**No**" Budgeting Experience*	*(%) "**Yes**" Experience in Budgeting*
Quantity Surveyor	18.60%	18.75%	81.25%
Electrical Engineer	15.12%	92.31%	7.69%
Project Manager	9.30%	50.00%	50.00%
Engineer	9.30%	50.00%	50.00%
Community Representative	6.98%	83.33%	16.67%
Contractor	6.98%	50.00%	50.00%
Project target user	4.65%	100.00%	0.00%
Accounting Officer	4.65%	25.00%	75.00%
Project Architect	4.65%	50.00%	50.00%
Structural Engineer	3.49%	66.67%	33.33%
Planning Officer	3.49%	0.00%	100.00%
Project Coordinator	3.49%	33.33%	66.67%
Internal Auditor	2.33%	0.00%	100.00%
Clerk of Works	2.33%	50.00%	50.00%
Procurement Officer	2.33%	0.00%	100.00%
Mechanical Engineer	2.33%	100.00%	0.00%

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Source: Author's Field Survey

Respondent Experience and County Budget Absorption Performance

An analysis of the respondents' prior experience in project planning and budgeting was crucial in establishing the link between human capital and historical county budget absorption rates. Table 6 presents a summary finding of how respondents' experience correlation with average absorption rates for FY 2023/2024.

Table 6- Aggregated Respondent Experience and Historical Budget Absorption by County

County	Projects Surveyed	Projects with Respondents with Prior Experience	% projects with Experience	Avg. Budget Absorption (2023/2024)
Kisii	15	8	53.33%	3.9%
Migori	50	15	30.00%	14.3%
Narok	11	11	100.00%	41.0%

Source: Author's Field Survey

The data reveals a strong correlation between respondent experience and budget absorption. Narok County, with the highest percentage of experienced respondents (100%) achieved the highest absorption rate. Migori County, with respondent experience of 30%, reported a mid-range budget absorption rate. Although Kisii showed a slightly higher experience rate than Migori (53.33%), its absorption rate remained the lowest, suggesting that experience alone is not sufficient contextual and structural factors may override.

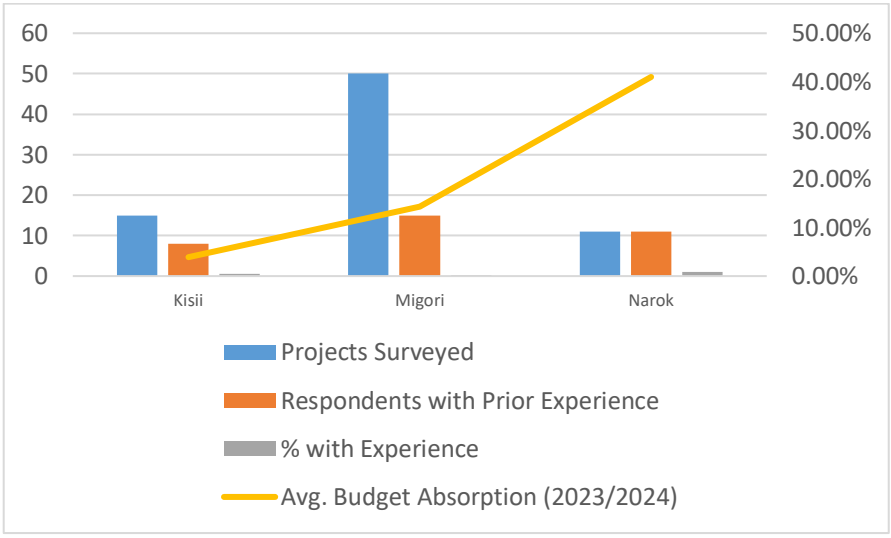

Figure 1- Respondent Experience and Historical Budget Absorption by County

Source: Author's Field Survey

Analysis of PPP Conceptual Factors and Budget Absorption

The relationship between project variables and budget absorption was investigated through a multi-method analysis.

A Pearson correlation analysis was first conducted to examine the linear relationships between specific planning elements and financial performance. This revealed a strong positive correlation between Risk Identification and budget absorption, while Stakeholder Engagement and Clarity of Objectives showed weak

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negative correlations. Following this, a causal-comparative analysis (ANOVA) was performed to investigate whether the project's county had a statistically significant impact on budget absorption rates.

The combined findings from these analyses suggest that both individual planning practices and a project's location have a significant influence on budget outcomes.

Finally, a multiple linear regression model was created to assess the collective influence and individual predictive power of these planning variables on budget absorption. This model confirmed that these variables collectively explain a substantial portion of the variance in budget absorption.

a) Correlation and Causal-Comparative Analysis

Using Pearson correlation, the analysis of project data across Narok, Migori, and Kisii counties revealed that specific planning elements and a project's location significantly influence budget outcomes.

Pearson Correlation Matrix

As shown in Table 7, the analysis revealed a strong positive relationship between Risk Identification (X_6) and Budget Absorption (Y−Actual) (r = 0.50), suggesting that more effective risk identification practices are strongly associated with higher budget absorption rates. In contrast, a weak negative relationship was found between Stakeholder Engagement (X_5) and Y-Actual (r = -0.30), and between Clarity of Objectives (X_2) and Y-Actual (r = -0.28).

Table 7- Pearson Correlation Matrix

	Y-Actual	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**
Y-Actual	1.00	0.15	-0.28	0.15	0.06	-0.30	0.50
X1	0.15	1.00	0.06	0.03	-0.00	0.05	0.07
X2	-0.28	0.06	1.00	0.51	0.38	0.24	-0.13
X3	0.15	0.03	0.51	1.00	0.55	0.19	0.11
X4	0.06	-0.00	0.38	0.55	1.00	0.34	-0.02
X5	-0.30	0.05	0.24	0.19	0.34	1.00	-0.15
X6	0.50	0.07	-0.13	0.11	-0.02	-0.15	1.00

Source: Author’s Field Survey

The findings, for instance, showed a strong positive relationship between Risk Identification (X6) and budget absorption, while a negative relationship was observed with Clarity of Objectives (X2)

b)Causal-Comparative Analysis (ANOVA)

A one-way ANOVA was performed to examine if there were statistically significant differences in mean budget absorption across the three counties. The analysis showed a statistically significant difference (p-value = 0.000956) in mean budget absorption, confirming that a project's county has a meaningful impact on its financial outcome. The descriptive statistics in Table 8 show the average budget absorption for each group, while the ANOVA table in Table 9 provides the full statistical results.

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Table 8- Descriptive Statistics and Frequency of Observations by County

Project Group (County)	Count	Mean Budget Absorption	Standard Deviation
A (Narok)	13	0.79	0.14
B (Migori)	16	0.41	0.20
C (Kisii)	15	0.59	0.34

Source: Author's Field Survey

Table 9- ANOVA Table

	Sum of Squares	Degrees of Freedom	F-statistic	P-value
County	0.996582	2	8.27741	0.000956
Residual	2.46815	41	nan	nan

Source: Author's Field Survey

c) Predictive Modeling (Multiple Linear Regression)

A multiple regression model was fitted to predict budget absorption based on the six independent variables.

The model was found to be statistically significant (F-statistic = 4.925, p-value = 0.000860). The model's R-squared value of 0.444 indicates that these six variables collectively explain 44.4% of the variation in budget absorption. The full regression summary is shown in Table 10 below.

Table 10- OLS Regression Results

Dep. Variable:		Q("Y-Actual") R-squared:	0.444
Model:		OLS Adj. R-squared:	0.354
Method:		Least Squares F-statistic:	4.925
Date:	Wed, 20 Aug 2025	Prob (F-statistic):	0.000860
Time:	11:40:51	Log-Likelihood:	6.3956
No. Observations:	43	AIC:	1.209
Df Residuals:	37	BIC:	13.70
Df Model:	6	Covariance Type:	Non-robust

Source: Author's Field Survey

Table 11-OLS Regression Results-B

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	0.0266	0.317	0.084	0.934	-0.617	0.67

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Q("X1")	0.0963	0.081	1.189	0.242	-0.068	0.26
Q("X2")	-0.3681	0.149	-2.468	0.018	-0.67	-0.066
Q("X3")	0.2221	0.14	1.582	0.122	-0.062	0.507
Q("X4")	0.1265	0.126	1.006	0.321	-0.128	0.381
Q("X5")	-0.089	0.044	-2.016	0.051	-0.178	0
Q("X6")	0.1493	0.05	2.976	0.005	0.048	0.251

Source: Author's Field Survey

Omnibus:	1.917	Durbin-Watson:	2.088
Prob(Omnibus):	0.384	Jarque-Bera (JB):	1.831
Skew:	-0.456	Prob(JB):	0.400
Kurtosis:	2.590	Cond. No.	52.5

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

d) Analysis of How Involvement of Stakeholders Influence Budget Absorption.

An analysis was conducted using both closed and open-ended questionnaires to assess how stakeholder involvement during the PPP stage contributed to budget absorption. The findings are summarized in Table 13.

Table 12- Distribution of Budget Absorption by Stakeholder Group and County

Stakeholder Group	County	<50% Absorption	50–79% Absorption	≥80% Absorption
Community	Narok	0	0	3
	Kisii	2	1	3
Contractor/Consultant	Narok	0	2	2
County Officials	Narok	0	0	4
	Migori	13	36	1
	Kisii	4	0	1
Technical Experts	Kisii	3	1	1

Source: Author's Field Survey

Table 13 and Figure 2 shows how mean budget absorption rates was influence by the involvement of various stakeholder group at PPP phase.

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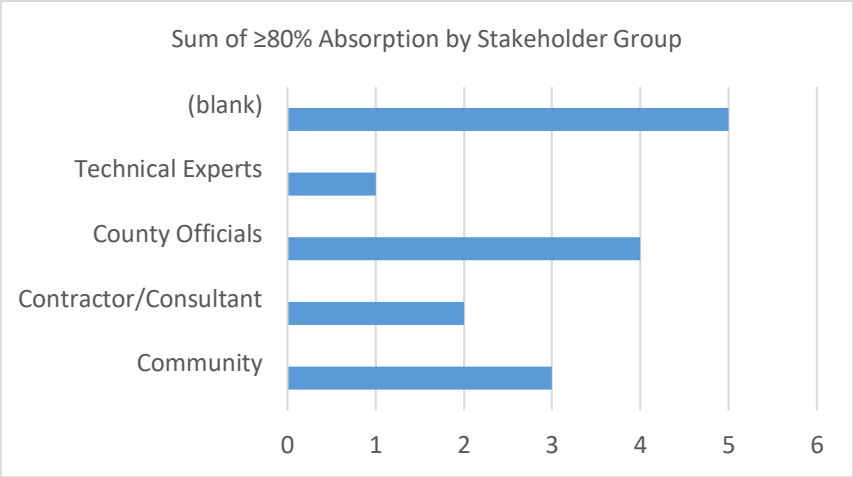


Figure 2- Distribution of Budget Absorption by Stakeholder Group and County.

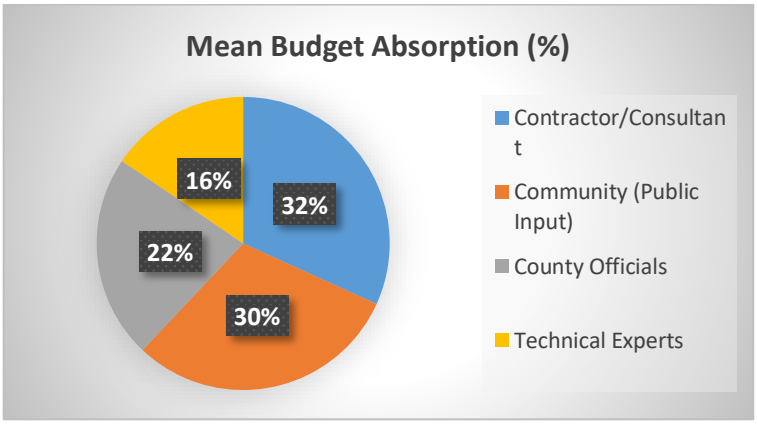
Source: Author's Field Survey

Table 13-Mean Budget Absorption by Stakeholder Type (Overall)

Stakeholder Group	Mean Budget Absorption (%)
Contractor/Consultant	80.00
Community (Public Input)	76.11
County Officials	56.55
Technical Experts	39.00

Source: Author's Field Survey

Figure 2: Mean Budget Absorption by Stakeholder Type



Source: Author's Field Survey

The key finding on stakeholder involvement is that projects with robust engagement from private consultants, contractors, and the community at the pre-project planning (PPP) stage demonstrated significantly higher success in budget absorption. This finding is deeply aligned with the legal and theoretical frameworks governing public finance and project management in Kenya.

This empirical evidence resonates directly with the principles of public participation enshrined in the Constitution of Kenya, 2010, and is operationalized by the County Governments Act, 2012. Specifically,

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Section 100 of the Act mandates public participation in county governance, and these findings provide a quantitative basis for the fiscal benefits of such engagement. The success observed in projects with strong community and private sector input underscores that participatory development is not merely a legal requirement but a critical mechanism for achieving fiscal efficiency and project success. This also reinforces the concept of "front-end loading", where investments in early-stage project planning, particularly those that ensure inclusivity and draw on specialized expertise, have the greatest influence on downstream project outcomes, including improved budget utilization.

Table 14 summarizes the correspondence between findings and research objectives.

Table 14- Correspondence of Findings to Research Objectives

Key Finding	Linked Objective(s)
Project Objectives Rating positively influences absorption	Objective 2, 3
Stakeholder Engagement is a key predictor	Objective 2, 3
Structured planning tools (PDRI) enhance absorption	Objective 2, 3, 4
Weak absorption despite formal processes in some counties	Objective 1, 3
Variations by stakeholder type and county	Objective 2, 4

Source: Author's Field Survey

This results section highlights strong empirical evidence of the role that pre-project planning plays in enhancing budget absorption. Counties with stronger planning practices, higher stakeholder engagement, and greater respondent experience (notably Narok) consistently reported superior financial performance. Conversely, Kisii and Migori counties revealed critical gaps in implementation and stakeholder diversity, explaining their lower absorption rates. These results lay the foundation for practical policy recommendations in the discussion section.

DISCUSSION

a) Key Findings and Insights on Pre-Project Planning and Budget Absorption

This study aimed to explore how pre-project planning (PPP) practices influence budget absorption in public-funded infrastructure projects within Kenya's devolved governance system, focusing on Kisii, Migori, and Narok counties. The analysis, grounded in empirical data and statistical correlations, reveals significant patterns linking specific planning practices to the financial performance of development projects. These insights build upon previous studies and national audit findings, expanding the understanding of how structured project planning influences fiscal outcomes at the county level.

A key insight emerging from the findings is the critical role that formalized project planning processes, particularly those focused on risk, play in enhancing budget absorption. The correlation analysis showed a strong positive relationship between Risk Identification (X6) and Budget Absorption (Y-Actual) with a correlation coefficient of 0.50. This was further confirmed in the multiple regression model, where it emerged as the strongest positive and statistically significant predictor (coefficient = 0.1493, p-value = 0.005). This suggests that systematic identification and management of project risks are foundational mechanisms that mitigate uncertainties and contribute to more efficient and effective budget spending.

Interestingly, the study found a counter-intuitive and statistically significant negative relationship between Clarity of Objectives (X2) and budget absorption, with a correlation coefficient of -0.28. This was reinforced in the multiple regression model, where it emerged as a significant negative predictor (coefficient = -0.3681, p-

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value = 0.018). This suggests that, within this specific context, an increase in the clarity of project objectives may be associated with a decrease in budget absorption. This unexpected finding warrants further qualitative research to determine if overly rigid objectives constrain project execution, thereby hindering flexibility in financial management.

The study also revealed that other planning elements, such as Project Definition (X1), Project Scope (X3), and Cost and Scheduling (X4), had weak to negligible correlations and were not statistically significant predictors in the regression model. This indicates that while these elements are valuable, they do not independently drive financial performance to the same degree as the overall structure and formalization of planning efforts, particularly risk management.

b) The Influence of County-Level Context

A significant dimension of the analysis involves the comparison of budget absorption patterns across the three counties. The ANOVA results showed a statistically significant difference in mean budget absorption, confirming that a project's county has a meaningful impact on its financial outcome.

Narok County exhibited the highest average budget absorption at 78.6%, with a relatively low standard deviation, suggesting consistent and effective financial management.

Migori County had a mid-range average of 59%, with the highest standard deviation of the three groups, indicating a wide range of budget performance. This suggests that while some projects perform well, others face significant systemic execution barriers.

Kisii County as the lowest performer, demonstrated the weakest average budget absorption at 41.4%, and showed weak correlations across most planning variables.

These findings underscore that while formal planning is a key factor, it must be accompanied by effective execution systems. Variations in governance capacity and institutional efficiency across counties shape the ultimate impact of those planning efforts.

Furthermore, the analysis of stakeholder involvement provides a critical layer of understanding. While the overall effect of Stakeholder Engagement (X5) was on the cusp of significance, your data shows that the type of stakeholder is critical. Projects that involved external stakeholders—particularly contractors, consultants, and community members—reported significantly higher absorption rates compared to those driven solely by county officials or technical experts. This indicates that inclusive and participatory planning not only fosters more realistic plans but also enhances community ownership and reduces resistance, directly contributing to fiscal success.

In sum, the study reinforces the notion that pre-project planning plays a central role in determining project success within devolved governments. However, it also highlights that planning must be accompanied by effective execution systems and that variations in governance capacity, stakeholder involvement, and institutional efficiency across counties shape the ultimate impact of those planning efforts.

CONCLUSION

This study has provided a comprehensive investigation into the influence of Pre-Project Planning (PPP) practices on budget absorption rates in public-funded infrastructure projects across three Kenyan counties Narok, Migori, and Kisii. Drawing from both quantitative and qualitative analyses, the findings affirm that structured and formalized planning practices significantly shape the financial performance of development projects.

Key pre-project planning components including the use of project charters, risk assessments, budget estimates, and formal scheduling demonstrated consistent moderate to strong positive correlations with budget absorption rates. This relationship was especially pronounced in Narok County, where a robust planning framework aligned with the highest budget absorption performance. Conversely, Kisii County, despite exhibiting the

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potential for positive outcomes through planning, suffered from the adverse effects of severe project delays and systemic inefficiencies, resulting in extremely low absorption. Migori's case, marked by weak and inconsistent correlations, highlighted the influence of broader governance and operational factors not directly captured by planning variables.

A pivotal conclusion from this research is that the presence of structured PPP documentation and processes is more impactful than the sophistication of individual components or techniques used within them. Formalization of planning practices alone appears to significantly contribute to improved budget utilization. Furthermore, inclusive stakeholder engagement particularly involving contractors and communities emerged as a powerful enabler of budget absorption, reinforcing the need for participatory planning approaches.

Ultimately, this study concludes that effective pre-project planning is not merely a bureaucratic requirement but a strategic tool that can transform development outcomes. However, the success of such planning is contingent on its integration with responsive governance, streamlined execution mechanisms, and consistent stakeholder collaboration. By institutionalizing robust PPP processes, devolved governments in Kenya can bridge the gap between allocated funds and actualized development, thereby advancing equity and service delivery across counties.

RECOMMENDATIONS FOR FURTHER RESEARCH

a) Investigate Non-Linear Relationships and Moderating Factors:

Future research should explore non-linear relationships between PPP practices and budget absorption, potentially employing advanced statistical techniques (e.g., regression analysis, structural equation modelling) to uncover more complex interactions.

The weak linear correlations observed in Migori County suggest that other, potentially unmeasured, or non-linearly interacting factors are at play. This could involve examining how contextual factors such as political stability, administrative capacity, leadership effectiveness, and levels of corruption (as hinted at in) moderate the relationship between PPP and budget absorption. Understanding these moderating effects would provide a more nuanced and complete picture of budget absorption dynamics in diverse county contexts.

b) Qualitative Exploration of "Why" Behind Correlations

Conduct qualitative follow-up studies (e.g., in-depth interviews, focus groups with county officials and project managers) to understand the underlying reasons why certain correlations are strong or weak, particularly the stark differences between counties. While quantitative correlations show what relationships exist, qualitative research can illuminate the how and why. For instance, understanding why Migori's correlations are weak could involve exploring specific bureaucratic hurdles, political interference, or unique local challenges.

Conversely, understanding the mechanisms behind Kisii and Narok's strong correlations (both positive and negative) could reveal best practices or critical vulnerabilities in their operational environments. This would move beyond statistical association to uncover the practical realities and human factors that drive or impede budget absorption, providing richer information for policy formulation. For example, why is "Confidence in Accuracy of Budget Allocations" so strongly correlated in Kisii and Narok? Is it a reflection of robust internal controls, or a consequence of a highly centralized decision-making process.

c) Longitudinal Studies on PPP Implementation and Budget Absorption

Implement longitudinal studies to track the evolution of PPP practices and their impact on budget absorption over multiple fiscal years. This cross-sectional study provides a snapshot. A longitudinal approach would allow for the observation of trends, the impact of policy changes, and the long-term effects of sustained PPP improvements.

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