PROJECT MANAGEMENT STANDARDISATION PRACTICES AND PERFORMANCE OF PUBLIC INFRASTRUCTURE PROJECTS IN TRANS NZOIA COUNTY, KENYA

[1] Waudo Wanga David, [2] Dr. Osoro Anthony (PhD)

[1] Msc., Student, Jomo Kenyatta University of Agriculture and Technology

[2] Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

This study examined the relationship between project management standardisation practices and the performance of public infrastructure projects in Trans Nzoia County, Kenya. The investigation focused on key dimensions of standardisation: project planning, and monitoring and evaluation. A descriptive survey research design was adopted, targeting a census of 135 respondents drawn from the Department of Public Works, Roads, Transport, Infrastructure, and Energy. Data was collected using semi-structured, self-administered questionnaires, enabling the collection of quantitative and qualitative insights. A pilot study involving 10% of the target population was conducted to assess the validity and reliability of the research instrument. Reliability was confirmed with a Cronbach's alpha value exceeding 0.7, and the content validity index (CVI) met the accepted threshold. Data analysis was performed using SPSS Version 28, and findings were presented using tables and figures. The results indicated that all four standardisation practices had a statistically significant and positive influence on project performance, with project planning showing the strongest relationship. Based on these findings, the study recommends strengthening institutional frameworks for planning, and monitoring. The insights generated are expected to inform policy formulation, improve project delivery, and contribute to academic and professional discourse on project management in devolved governance systems. The study recommends replication in other counties and sectors to validate and extend these findings.

Key Words: Project Management Standardisation Practices, Performance, Public Infrastructure Projects, Project Planning, Monitoring and Evaluation

Background of the Study

A project is generally defined as a temporary endeavour to create a unique product, service, or result (Project Management Institute [PMI], 2021; Fen-he Zi & Li Y., 2005). Projects are initiated with specific objectives and are constrained by defined timelines, resource limitations, and deliverable requirements. Their temporary and goal-oriented nature differentiates them from routine operations, designed to achieve a specific outcome before closing. Despite the diversity in project types, their performance is commonly assessed based on three interdependent dimensions: scope, time, and cost (Barendsen, Muß & Silvius, 2021). These three elements form the foundation of what is widely referred to as the "project management triangle" or "quality triangle," and changes in one dimension inevitably affect the others. For instance, increasing project scope often requires more time and budget, while reducing the timeline may lead to higher costs or limited deliverables. This interconnectedness means that successful project execution requires carefully balancing these variables (Kerzner, 2013).

In recent decades, a fourth dimension—stakeholder satisfaction—has emerged as a critical indicator of project success, particularly in public sector projects where community engagement is vital (Turner & Zolin, 2012). While some scholars argue that stakeholder needs are inherently part of the project scope, others treat satisfaction as an independent measure, citing its growing influence on acceptance, sustainability, and post-completion utility (Barendsen et al., 2021). This evolution reflects a broader shift from purely technical project outcomes to those fulfilling social and institutional objectives. As a result, project performance is now increasingly modelled as a function of scope, cost, time, and stakeholder satisfaction (PMI, 2021). This broader framework enhances project managers' ability to capture tangible and intangible success factors in increasingly complex environments.

Projects typically follow a structured framework known as the project life cycle to manage these dimensions effectively. The life cycle organises activities from initiation to completion (Kerzner, 2013). Although the number of phases may vary depending on the methodology adopted, a standard life cycle generally includes four primary stages: conceptualisation, planning, execution, and termination (Barendsen et al., 2021). Each phase is associated with deliverables such as feasibility reports, work plans, progress evaluations, and final assessments. Understanding the project life cycle equips managers with a roadmap for sequencing activities, allocating resources, and assessing progress at different stages. Moreover, it provides a basis for identifying risk points and determining the appropriate interventions to keep the project on track (Bouncken, Fredrich & Pesch, 2018). A lifecycle-based approach also enables learning from past experiences and applying that knowledge to future projects (Atad-Ettegui et al., 2010)

Among the most important projects are public infrastructure projects essential for socio-economic development. These projects facilitate access to clean water, sanitation, electricity, transportation, and other essential services, thereby improving the quality of life for citizens and supporting business activity (World Bank, 2021). Infrastructure also plays a crucial role in national resilience, enabling societies to withstand and recover from environmental, economic, and social shocks (World Economic Forum, 2023). However, public infrastructure projects often suffer performance-related challenges despite their strategic importance. The World Bank (2024) reports that over 60% of global infrastructure projects experience significant delays and budget overruns, which result in the inefficient use of public resources and reduced development impact. Likewise, the Project Management Institute (2017) highlights that most large-scale infrastructure initiatives are delayed by an average of 18 months, while Kerzner (2013) estimates that nearly 70% exceed their initial cost projections by up to 30%.

A key determinant of project success lies in the planning phase, where the project concept is developed into a comprehensive execution strategy. This phase involves defining the scope of work, identifying resource requirements, estimating timelines, and establishing clear deliverables (PMI, 2021). It culminates in creating a project plan, which acts as a blueprint for guiding implementation. The plan typically includes a work breakdown structure (WBS), a schedule with task dependencies, and a cost estimate for labour, materials, and equipment (Barendsen et al., 2021). The budget established at this stage becomes a control mechanism for managing expenditures throughout the project's life. Alongside these planning tools, risk management is undertaken to identify high-impact threats and develop mitigation strategies to minimise their occurrence or consequences (Kerzner, 2013). By anticipating potential disruptions early, project teams are better positioned to maintain schedule integrity and cost discipline.

Moreover, effective planning also requires identifying and engaging stakeholders who can significantly influence project success. Developing a stakeholder communication plan at this stage ensures that relevant parties receive timely updates and that their feedback is integrated into project decisions (Turner, 2009). When stakeholder concerns are addressed proactively, the likelihood of project disputes or delays due to opposition is significantly reduced. This is especially important in public sector projects, where accountability, transparency, and community trust are critical. Therefore, a well-structured planning process that includes stakeholder management not only improves execution efficiency but also enhances the legitimacy and long-term impact of infrastructure projects (Buganová & Šimíčková, 2019).

Statement of the Problem

Public infrastructure projects are critical to enhancing service delivery and promoting economic development in Kenya. Despite increased investments at national and county levels, many such projects experience delays, cost overruns, substandard artistry, and, in some cases, abandonment. These performance challenges have been consistently linked to inadequate planning, weak project governance, poor stakeholder engagement, and the lack of standardised project management practices (WB, 2021; Office of the Auditor General, 2022). While the national government and development partners have introduced tools and guidelines to strengthen project delivery, their application across counties remains inconsistent and often superficial. As a result, infrastructure initiatives frequently fail to achieve their intended outcomes, leading to inefficient use of public resources and reduced public trust in government institutions.

In Trans Nzoia County, the Department of Public Works, Roads, Transport, Infrastructure, and Energy implements various capital projects, including road upgrades, street lighting, and public building construction. However, recent development reports highlight recurring issues such as scope ambiguities, delays in approvals, contractor underperformance, and limited supervision. These problems are compounded by the absence of a centralised Project Management Office (PMO) and a formalised framework for project planning, , monitoring, and evaluation (Trans Nzoia CIDP, 2023–2027). Infrastructure projects risk continued inefficiencies and underperformance without adopting structured and standardised project management practices. Bridging this gap required an intentional shift toward adopting structured project management frameworks, fostering stakeholder engagement, leveraging technology, and institutionalising performance tracking mechanisms. This study, therefore, sought to examine the relationship between project management standardisation practices and the performance of public infrastructure projects in Trans Nzoia County, Kenya.

Objectives of the Study

The general objective was to examine the relationship between project management standardisation practices and the performance of public infrastructure projects in Trans Nzoia County, Kenya.

The following were the specific objectives;

1. To assess the effect of standardised project planning on the performance of public infrastructure projects in Trans Nzoia County, Kenya.
2. To establish the effect of standardised project monitoring and evaluation on the performance of public infrastructure projects in Trans Nzoia County, Kenya.

LITERATURE REVIEW

Theoretical Review

Project Management Theory

Project Management Theory provides the foundation for understanding how projects can be systematically managed using defined processes, tools, and best practices. This theory has evolved over decades of project-based work in engineering, defence, construction, and, more recently, the public sector. It is most associated with process-based methodologies such as PMBOK (Project Management Body of Knowledge), PRINCE2, and Agile, which offer practical guidance on how to plan, implement, monitor, and close projects in a structured manner (PMI, 2021).
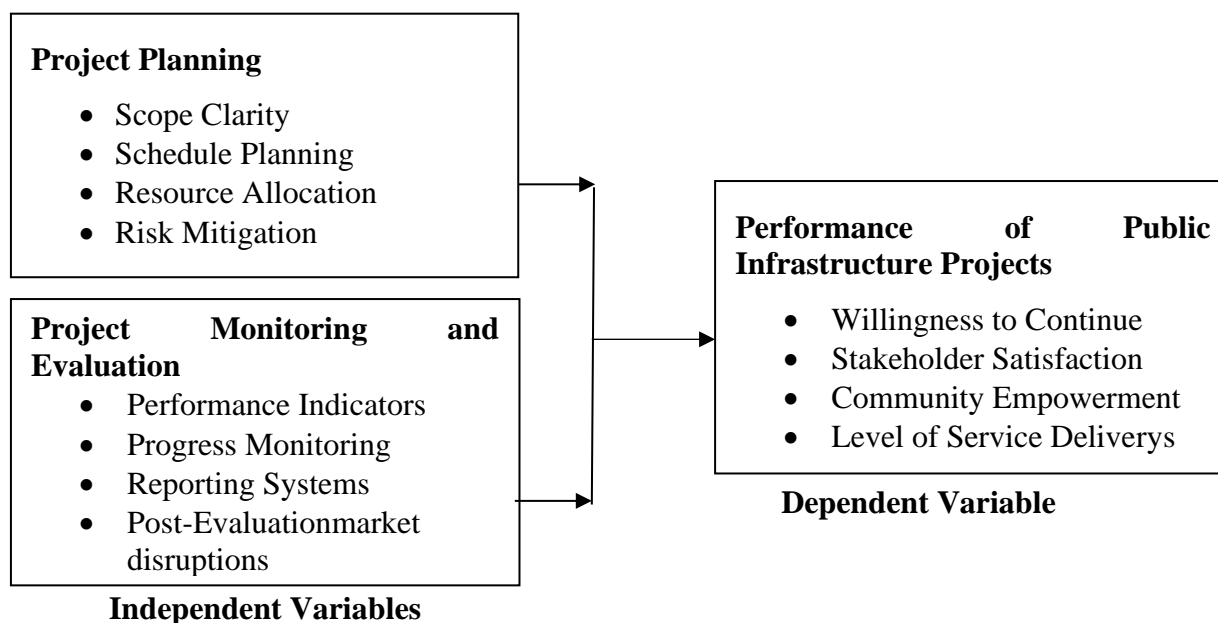
The core premise of Project Management Theory is that project success is not merely a function of individual talent or institutional resources but of applying structured methodologies consistently across all project phases. These phases typically include initiation, planning, execution, monitoring and control, and closure. Each phase is supported by standardised tools like Gantt charts, Work Breakdown Structures (WBS), project charters, stakeholder matrices, and risk registers, which ensure clarity, accountability, and coordination. The theory also highlights key performance constraints: time, cost, and scope—often conceptualised as the "project management triangle" (Kerzner, 2013). Quality is increasingly being integrated as a fourth dimension, especially in public sector contexts where stakeholder satisfaction and long-term utility are critical.

Project Management Theory is particularly relevant in the public infrastructure sector, where projects are often large, multidisciplinary, and politically sensitive. In county governments like Trans Nzoia, public infrastructure projects require coordination across departments, service providers, and local communities. The absence of standard tools and procedures has frequently led to cost overruns, delays, and project abandonment. The theory offers a roadmap for addressing such challenges by emphasising process standardisation, proactive risk management, and performance monitoring. Moreover, the theory aligns well with the broader goals of devolution, which call for improved service delivery, citizen participation, and financial accountability. County-level departments can benefit significantly from adopting standardised project management frameworks that ensure all projects follow a transparent and replicable lifecycle. In this study, Project Management Theory is the foundation for examining how consistent planning practices can improve infrastructure project performance within a devolved governance structure.

Conceptual Framework

The conceptual framework for this study outlines the relationship between standardised project management practices and the performance of public infrastructure projects. The independent

variables include key dimensions: standardised project planning, and standardised monitoring and evaluation. These dimensions reflect structured processes to enhance efficiency, transparency, and control throughout the project lifecycle (PMI, 2021; Kerzner, 2013). The dependent variable is project performance, measured through indicators such as timeliness, cost efficiency, quality of deliverables, and stakeholder satisfaction (Barendsen, Muß & Silvius, 2021). According to Mugenda and Mugenda (2003), a conceptual framework enables researchers to link variables and logically guide data collection and analysis. This framework assumes that adopting standardised practices enhances clarity, coordination, and decision-making in project delivery. The conceptual framework informs the development of research objectives, questions, and methodology by presenting a structured understanding of how key variables interact. It also provides a logical foundation for investigating how project standardisation influences outcomes in the devolved governance setting of Trans Nzoia County. The framework is visually presented in Figure 2.1, showing the direct influence of each independent variable on the performance of public infrastructure projects.

Project Planning

- Scope Clarity
- Schedule Planning
- Resource Allocation
- Risk Mitigation

Project Monitoring and Evaluation

- Performance Indicators
- Progress Monitoring
- Reporting Systems
- Post-Evaluationmarket disruptions

Independent Variables

Performance of Public Infrastructure Projects

- Willingness to Continue
- Stakeholder Satisfaction
- Community Empowerment
- Level of Service Deliverys

Dependent Variable

Figure 2. 1: Conceptual Framework

Empirical Review

Project Planning and Performance

Project planning is a foundational phase in the project management lifecycle, providing the structure upon which successful execution and delivery are built. During this phase, detailed activity schedules, resource allocation plans, financial estimates, and timelines are formulated based on project appraisals and approvals. A key output of this stage is the Detailed Project Report (DPR), which outlines the scope, sequence of activities, estimated costs, human resource requirements, and timelines, serving as a blueprint for implementation (Musawir et al., 2020). Planning also involves identifying project-specific risks and developing mitigation strategies, aligning all components with the project's quality parameters. Effective planning enhances clarity and coordination and enables project managers to make informed decisions that reduce uncertainties and promote timely delivery.

Project managers increasingly rely on modern tools and techniques to support planning and anticipate the impact of deviations from initial schedules or budgets. These tools range from traditional bar charts to more advanced network-based planning methods, such as the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT), which help visualise task dependencies and forecast bottlenecks (Shaqour, 2022). The objective is to

develop an optimal initial plan and adapt dynamically as challenges emerge during execution. Project Management Theory supports this approach by emphasising structured planning frameworks as critical to minimising risks, managing scope, and ensuring alignment with project goals. The PMBOK framework, for example, provides planning guidelines that integrate scheduling, budgeting, and resource management into a unified process (PMI, 2008).

Daily operations in organisations—especially those handling public infrastructure—consist of interconnected tasks. While performed by different individuals or departments, these tasks must often converge in a project environment that demands teamwork, accountability, and coordination (Musawir et al., 2020). Effective project planning ensures that these efforts are unified through clear timelines, defined roles, and shared objectives. However, it is critical to note that not all structured activities constitute a project. A project is distinctively characterised by its temporary nature, defined objectives, and structured scope to achieve a particular outcome within a specific timeframe (Shaqour, 2022). Thus, project planning is not merely about organising tasks but also about creating a systematic process that optimises resources to deliver measurable results within time and budget constraints.

Moreover, project planning is vital in aligning strategic goals with operational execution. It allows for translating organisational strategies into tangible actions without disrupting the normal flow of organisational activities. As Kerzner (cited in Shaqour, 2022) notes, project management introduces a temporary system over the existing structure to achieve specific goals. Through careful planning, this system ensures clarity in resource use—people, finances, time, or equipment—while maintaining control mechanisms that help achieve the project's desired outputs.

Project planning is recognised as a key determinant of infrastructure project performance. According to Musawir et al. (2020), comprehensive planning enhances goal alignment, optimises resource allocation, and provides early warning against potential risks, reducing delays and cost overruns. The PMBOK framework similarly stresses the importance of structured project schedules, planning baselines, and integration mechanisms for achieving successful outcomes (PMI, 2008). International evidence further supports this position. For instance, Infrastructure Canada (2021) reported that infrastructure projects with robust planning frameworks were 30% more likely to meet deadlines than those with loosely defined schedules. Likewise, Australia's Roads Annuity Programme demonstrated that structured planning enabled 85% of public infrastructure projects to be completed on time and within budget (Shaqour, 2022).

In summary, project planning is not only a prerequisite for successful project execution but also a performance driver that determines whether infrastructure investments yield the intended outcomes. Its role in aligning vision with implementation, managing constraints, engaging stakeholders, and optimising resources underscores its centrality in any performance-oriented project management approach, especially within the public infrastructure sector.

Monitoring, Evaluation, and Performance

Robust Monitoring and Evaluation (M&E) frameworks are fundamental to successful project management, particularly in public infrastructure development. M&E ensures that project progress is tracked, performance targets are met, and stakeholders are informed throughout the project lifecycle. Lopez et al. (2010) state that institutionalised M&E practices significantly improve project transparency and reduce operational inefficiencies. These frameworks support informed decision-making by generating timely, evidence-based feedback that guides corrective actions when deviations from the original plan occur. Furthermore, Infrastructure Canada (2021) demonstrates that countries with established M&E systems tend to achieve higher success rates in public projects due to enhanced accountability and proactive management interventions.

Monitoring begins immediately after the execution phase starts and continues throughout the project's duration (Shaqour, 2022). It involves continuous tracking of performance indicators—such as cost, time, and quality—against the planned baseline. This enables the early identification of deviations and allows project teams to initiate corrective measures before issues escalate. The planning phase lays this foundation by producing detailed schedules and assigning responsibilities. As Lalmi, Fernandez, and Souad (2021) explain, construction projects require detailed sequencing of tasks and consideration of dependencies like equipment availability and material delivery schedules. Without a clear plan, effective monitoring becomes challenging, as there would be no established benchmarks against which performance can be assessed.

A comprehensive M&E system comprises several key components: performance standard setting, data collection, performance measurement, review, reporting, and corrective action. First, performance standards must be clearly defined and communicated to all stakeholders. The project manager establishes an environment where monitoring processes are understood, roles are assigned, and reporting mechanisms are respected (Shaqour, 2022). Once implementation begins, project monitors collect data on what has been achieved relative to what was planned. This data is then quantified and analysed to ensure compliance with the established standards. Scholz, Sieckmann, and Kohl (2020) emphasise that measuring progress against defined targets is essential to facilitate timely intervention. When discrepancies are found, the monitor recommends corrective actions, and unresolved issues are escalated to the project manager for resolution.

Monitoring is also multi-dimensional. It includes tracking time schedules, workforce utilisation, resource deployment, budget consumption, and alignment with performance specifications. Lalmi, Fernandez, and Souad (2021) note that an effective monitoring system must be adaptable, intelligible, and easily integrated into project operations. The ultimate goal of control, as an extension of monitoring, is to keep the project aligned with its objectives, ensuring that outputs are delivered on time, within budget, and to the required quality. This requires a feedback loop that connects planning, execution, and review processes.

In summary, monitoring and evaluation are not mere administrative functions—they are strategic tools that underpin the success of infrastructure projects. They provide real-time visibility into project status, enable accountability at every level, and facilitate continuous improvement through informed decision-making. By embedding standardised M&E practices into the project management cycle, counties can significantly reduce the risk of failure, enhance stakeholder trust, and ensure the efficient use of public resources.

Performance of Public Infrastructure Projects

Project performance is a multidimensional concept encompassing effectiveness, efficiency, and quality of project delivery. While there is no universally accepted classification for projects, they are often grouped based on goals into two broad categories: industrial (commercial) and developmental projects (Silvius, 2021). Industrial projects aim to provide goods or services that meet market demand and generate financial returns for investors and stakeholders. These projects can be further classified by nature of work (repetitive or non-repetitive), project duration (short-term or long-term), budget size (large or small), risk level (high, low, or negligible), and mode of implementation (e.g., build, build-operate-transfer). Demand-based industrial projects are designed to respond to customer needs, both existing and emerging, such as agro-processing facilities and fertiliser plants (Shaqour, 2022). On the other hand, resource- or supply-based projects capitalise on locally available inputs such as land, water, minerals, agricultural produce, or skilled labour. Examples include oil refineries, metallurgical industries, IT parks, and clinical research hubs, which are often developed in response to either natural or human resource availability.

Developmental projects, by contrast, are designed to stimulate broader socio-economic progress. Public sector institutions typically undertake these projects to create infrastructure, promote equity, and facilitate long-term economic growth. Sectors such as irrigation, agriculture, transportation, health, and education are common areas for developmental projects, particularly prevalent in low- and middle-income countries (Silvius, 2021). These projects tend to have cascading effects, improving immediate service delivery and enabling further private and public sector economic investments. In the Kenyan context, such projects are typically implemented by county and national governments and funded through public budgets and donor support.

The capability and cohesion of the project team significantly influence the performance of public infrastructure projects. A high-performing team consists of individuals who are technically competent, motivated, and aligned with the project's objectives (Shaqour, 2022). The project manager creates an environment that fosters productivity, encourages collaboration, and promotes accountability. This involves ensuring that team members possess the requisite knowledge and skills and providing continuous performance evaluation, feedback, and support for professional development. Performance evaluations serve a dual purpose: they assess individual contributions to the project and provide critical data for overall project performance measurement.

Effective project team management includes regular assessments of individual and group outputs, work behaviours, and job-related attributes such as punctuality, initiative, and teamwork (Silvius, 2021). The findings from these evaluations inform managerial decisions, such as adjustments to task assignments, the need for further training, or the implementation of reward and recognition systems. According to Shaqour (2022), project managers should offer constructive feedback to team members, highlight areas for improvement, reward top performers, and take corrective action when performance is lacking. This approach helps maintain team morale, sustains momentum throughout the project lifecycle, and ultimately enhances the quality and timeliness of deliverables.

In summary, the performance of public infrastructure projects is shaped not only by technical and financial inputs but also by the structure and coordination of the project team, the nature of the project itself, and the level of alignment between stakeholder expectations and project goals. Recognising the diversity in project types, whether industrial or developmental, and managing human capital effectively are essential for ensuring that public projects deliver sustainable value and meet intended development outcomes.

RESEARCH METHODOLOGY

This study employed a descriptive survey research design. The target population was 135 respondents directly engaged in key project functions such as planning and evaluation. This study employed a Purposive random sampling technique, collecting data from the entire target population rather than a selected subset. The target population comprised 135 respondents actively managing public infrastructure projects under the Department of Public Works, Roads, Transport, Infrastructure, and Energy in Trans Nzoia County. Given the relatively small and well-defined population, a census approach was considered most appropriate to enhance data accuracy, inclusiveness, and the reliability of results.

The primary instrument for data collection in this study was a self-administered questionnaire, which is widely recognised for its effectiveness in capturing data that may not be directly observable (Kothari, 2011). The questionnaire consisted of open and closed-ended items, structured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), and open-ended questions allowing respondents to elaborate on their views and experiences. This study collected both qualitative and quantitative data. As noted by Mugenda and Mugenda (2008), once the questionnaires were returned, the raw data were edited for errors

or omissions, with corrections made where necessary. The data was coded and entered into the Statistical Package for Social Science (SPSS), version 28. This step is essential to ensure the accuracy and consistency of the data.

Descriptive statistics summarised and described the data meaningfully, employing tools like charts, tables, and bar graphs. Inferential statistics helped draw conclusions from the analysed data and generalise the findings to the broader population. For instance, predictions were made based on the analysis results, and these findings were generalised to the study population, given that the test sample represents a part of the population (Kothari, 2011). The data was tested for the assumptions of various analytical models, and the most appropriate model was selected based on these tests. One of the models used was multiple linear regression, which assessed the relationships between the variables.

RESEARCH FINDINGS AND DISCUSSION

One hundred twenty-one questionnaires were distributed, of which 102 were duly filled and returned, translating to a response rate of 84.3%. Sharma (2018) states that a response rate above 70% is sufficient for reliable and valid generalisation in social science research. This high return rate indicates a strong engagement from the target population and adds robustness to the study's findings.

Descriptive Statistics

This section presents descriptive findings relating to the four independent variables—project planning, monitoring and evaluation—and the dependent variable, performance of public infrastructure projects. The analysis used mean scores and standard deviations from responses measured on a 5-point Likert scale, where 1 represented "Strongly Disagree" and 5 represented "Strongly Agree." According to Kothari (2011), Likert-type scale analysis effectively identifies prevailing attitudes and perceptions in social science research. The results are interpreted in relation to existing project management literature to highlight areas of strength and weakness in standardisation practices across Trans Nzoia County.

Project Planning

The first dimension of analysis was project planning. Table 1 shows that the highest-rated statement under this variable was "Projects have clearly defined scopes," with a mean score of 3.87 (SD = 0.761). This suggests that most infrastructure projects within the county are initiated with clear boundaries in terms of objectives, deliverables, and expected outcomes. A well-defined scope is essential for minimising ambiguity and managing client expectations (PMI, 2021). The second-highest mean score was recorded for "Resource allocation plans are developed during planning" (Mean = 3.70, SD = 0.794), indicating that allocating human, material, and financial resources is a moderately standardised practice. Similarly, the preparation of formal Work Breakdown Structures (WBS) scored a mean of 3.65 (SD = 0.832), which suggests a fair level of structured activity decomposition is practised. However, this may not be uniformly implemented across departments or project types. The lowest-scoring item under project planning was "Risks are identified and mitigation plans established" (Mean = 3.42, SD = 0.875). This result points to a relatively weak risk management culture, corroborating findings by Kerzner (2013), who argued that poor risk anticipation and mitigation planning are major contributors to project delays and budget overruns. Overall, the data indicates that while foundational planning elements are present, there is a clear need to institutionalise risk analysis tools such as risk registers and impact probability matrices across all departments.

Table 1: Project Planning

Statement	Mean	Std. Deviation
Project activities are implemented according to schedule	3.87	0.761
Budget controls are enforced during implementation	3.65	0.832
Contractor performance is regularly monitored and evaluated	3.70	0.794
Implementation follows approved execution plans	3.42	0.875
Overall	**3.66**	**0.816**

Project Monitoring and Evaluation

Monitoring and evaluation (M&E) practices were assessed to determine how performance is tracked and lessons are captured. The highest mean score was recorded for "Key performance indicators are established" (Mean = 3.62, SD = 0.741), suggesting that departments try to define project-specific metrics during the early stages of project execution. Likewise, "Progress is tracked through formal monitoring tools" scored 3.56 (SD = 0.788), indicating moderate adoption of structured tracking tools such as progress reports, checklists, and milestone reviews. The statement "Reports are submitted periodically and reviewed" scored a mean of 3.48 (SD = 0.803), reflecting a moderately strong reporting culture. However, "Lessons learned are captured and used for future improvement" recorded the lowest mean of 3.26 (SD = 0.913), indicating limited institutional learning. This is consistent with findings by Scholz, Sieckmann, and Kohl (2020), who emphasise that a weak feedback culture prevents continuous improvement in project delivery. These findings suggest that while real-time monitoring is moderately present, post-project evaluation and knowledge management are largely informal or non-existent.

Table 2: Project Monitoring and Evaluation

Statement	Mean	Std. Deviation
Key performance indicators are established	3.62	0.741
Progress is tracked through formal monitoring tools	3.56	0.788
Reports are submitted periodically and reviewed	3.48	0.803
Lessons learned are captured and used for future improvement	3.26	0.913
Overall	**3.48**	**0.811**

Performance of Public Infrastructure Projects

The performance of public infrastructure projects was assessed using four indicators aligned with the conceptual framework: willingness to replicate similar projects, stakeholder satisfaction, community empowerment, and service delivery improvement. As shown in Table 3, responses reflected moderately positive perceptions across all indicators. The highest-rated statement, "There is a willingness to replicate similar projects" (Mean = 3.60), suggests strategic confidence in the design and impact of existing projects. This was closely followed by "Stakeholders express satisfaction with project outcomes" (Mean = 3.57), indicating that projects are generally meeting expectations, supporting Barendsen et al. (2021)'s argument that satisfaction fosters ownership and sustainability. "Improvement in service delivery" also scored favourably (Mean = 3.52), confirming that projects address local access and infrastructure gaps. However, "Community empowerment" received the lowest score (Mean = 3.41), suggesting that the' broader socio-economic impact of projects is less evident while projects are physically implemented. Overall, performance is viewed positively, particularly regarding stakeholder experience and replicability, though greater emphasis on community impact is necessary to enhance long-term developmental value (Lalmi, Fernandez & Souad, 2021).

Table 3: Performance of Public Infrastructure Projects

Statement	Mean	Std. Deviation
There is a willingness to replicate similar projects	3.60	0.738
Stakeholders express satisfaction with project outcomes	3.57	0.764
Projects empower communities through direct and indirect impact	3.41	0.855
Projects to improve service delivery and accessibility	3.52	0.782
Overall	**3.53**	**0.785**

Pearson Correlation Analysis

A Pearson Product-Moment Correlation Coefficient analysis was conducted to examine the relationship between project management standardisation practices and the performance of public infrastructure projects. Pearson's correlation assesses the strength and direction of linear relationships between variables and is commonly used in explanatory research within project management and social sciences (Kothari, 2011). The results of the correlation matrix are summarised in Table 4.

Table 4: Pearson Correlation Coefficients

Variables	PP	ME	PPIP
Project Planning (PP)	1		
Monitoring & Evaluation (ME)	.618**	1	
Project Performance (PPIP)	.675**	.614**	1

Note: Correlation is significant at the 0.01 level (2-tailed)

The correlation matrix above provides a comprehensive view of the relationships among all variables in the study. The strongest correlation was between project planning and project performance (r = .675, p < 0.01), reinforcing the centrality of structured planning in successful infrastructure delivery. Similarly, monitoring and evaluation (r = .614), also demonstrated significant positive associations with performance outcomes. Inter-variable relationships among the independent constructs were also significant. For instance, project planning and monitoring and evaluation (r = .618), were strongly correlated, suggesting interdependence in how standardisation practices are operationalised. This finding reflects Kerzner's (2013) view that integration across planning, , and monitoring phases is key to cohesive project delivery. These statistically significant results confirm that each aspect of project management standardisation positively contributes to overall project performance and supports other practice areas, reinforcing the need for a systemic approach to managing public infrastructure projects in Trans Nzoia County.

Regression Analysis

A multiple linear regression analysis was conducted to determine the extent to which project management standardisation practices predict the performance of public infrastructure projects.

Table 5: Regression Coefficient Results

Predictor Variable	Unstandardised B	Std. Error	Standardised Beta (β)	t-value	Sig. (p)
(Constant)	-0.134	0.060	—	-1.144	0.003
Project Planning	0.471	0.132	0.858	5.472	0.002**
Monitoring & Evaluation	0.266	0.115	0.321	2.657	0.003**

All independent variables had positive and statistically significant effects on project performance ($p < 0.01$), confirming their relevance in predicting infrastructure project outcomes. Project planning had the highest standardised beta coefficient ($\beta = 0.858$, $p = 0.002$), suggesting it is the most influential factor. This underscores findings by PMI (2021) and Kerzner (2013), who emphasise that proper planning, through defined scopes, schedules, and resource frameworks, forms the backbone of successful project delivery. Monitoring and evaluation also showed a strong effect ($\beta = 0.321$, $p = 0.003$), indicating that progress tracking, feedback loops, and lesson-learning significantly impact performance. The negative constant (-0.134) is not of direct interpretive value. However, it may suggest that performance outcomes are suboptimal without any influence from the independent variables, further reinforcing the need for structured management practices. These findings validate the study's conceptual framework and support the adoption of all four dimensions to optimise project delivery within Trans Nzoia County.

Conclusion

Project planning

The study concludes that a strong and positive relationship exists between project planning and the performance of public infrastructure projects in Trans Nzoia County. Planning practices such as specification identification, resource scheduling, design review, and structured risk anticipation influenced performance significantly. Project planning implementation was found to have enhanced operational efficiency, reduced uncertainty, and supported better allocation of roles and responsibilities. As a result, the county has increased the quality and accountability of its suppliers and improved early-stage decision-making. The findings support the conclusion that strategic and well-coordinated planning processes are essential in enhancing infrastructure development outcomes in Trans Nzoia County.

Project Monitoring and Evaluation

Finally, the study concludes that monitoring and evaluation are positively associated with the performance of infrastructure projects in Trans Nzoia County. Performance tracking, policy enforcement, dispute resolution frameworks, and participatory feedback were key coordination mechanisms influencing service delivery. Using alternative dispute resolution (ADR) and inclusive feedback systems has created a culture of mutual accountability and performance improvement. These mechanisms allow challenges to be addressed amicably while reducing litigation costs and enhancing responsiveness. Therefore, the study concludes that proper monitoring and evaluation practices—anchored in coordination, lesson-learning, and accountability—have significantly contributed to improved service delivery in public infrastructure projects in the county.

Recommendations

Project Planning

The study recommends that project planning should not be viewed merely as a procedural requirement but as a strategic function that defines how public infrastructure projects are conceptualised, structured, and executed. Planning should begin with precise needs specification, well-documented scopes, and timelines defining all stakeholders' roles and responsibilities. Trans Nzoia County should institutionalise early-stage evaluation mechanisms, risk identification strategies, and supplier readiness assessments before tendering. Quality control mechanisms should be embedded within planning frameworks, not left for post-contractual phases. Preparing comprehensive planning documents and quality evaluation templates will ensure consistency, mitigate disputes, and increase project predictability. By

formalising project planning within a robust structure, the county will ensure that its infrastructure outcomes are efficient, cost-effective, and aligned with community needs.

Project Monitoring and Evaluation

The study recommends that Trans Nzoia County enhance project monitoring and evaluation by embedding continuous assessment and structured reporting throughout the infrastructure project lifecycle. Effective M&E tracks performance and promotes learning, accountability, and timely corrective action. When poorly managed relationships and expectations, especially with suppliers and consultants, occur, it often results in delivery challenges, delays, or stakeholder dissatisfaction. The county should develop and apply conflict resolution frameworks, including alternative dispute resolution (ADR), to manage supplier and stakeholder relations without litigation. The M&E systems should also include post-project evaluations and feedback loops to ensure institutional learning. This will allow the county to document what worked and did not and use that information to refine future infrastructure strategies and policies. Strengthened monitoring and evaluation will reduce inefficiencies, improve governance, and higher-quality infrastructure outcomes.

Areas for Further Studies

This study focused on the influence of project planning, and monitoring and evaluation on the performance of public infrastructure projects in Trans Nzoia County, Kenya. The study recommends that similar research be conducted in other counties within Kenya to allow for comparative analysis and validation of findings across different administrative and geographic contexts. Furthermore, future studies could replicate this model within other public sectors, such as health, education, agriculture, or private infrastructure projects, to test for sectoral differences in project management effectiveness. It is also recommended that future researchers expand the scope by incorporating additional variables such as political interference, financial capacity, legal frameworks, or technological tools like e-procurement systems to provide a more holistic understanding of performance drivers in infrastructure development.

<div align="center">

REFERENCES

</div>

Barendsen, W., Muß, A. C., & Silvius, A. J. G. (2021). Exploring team members' perceptions of internal sustainability communication in sustainable project management. *Project Leadership and Society, 2*, 100015.

Kerzner, H. (2013). *Project management: A systems approach to planning, scheduling, and controlling* (11th ed.). Wiley.

Kothari, C. R. (2011). *Research methodology: Methods and techniques* (2nd ed.). New Age International Publishers.

Lalmi, A., Fernandez, C., & Souad, B. (2021). Community participation and sustainable infrastructure development: A case of African cities. *Habitat International, 107*, 102295.

Mugenda, O. M., & Mugenda, A. G. (2008). *Research methods: Quantitative and qualitative approaches*. ACTS Press.

Musawir, A. U., Abd-Karim, S. B., & Mohd-Danuri, M. S. (2020). Project governance and its role in enabling organisational strategy implementation: A systematic literature review. *International Journal of Project Management, 38*(1), 1–16.

Office of the Auditor General. (2022). *Report on the performance of infrastructure development projects in devolved units*. Nairobi: Government Printer.

Osoro, A. (2021). Influence of project management participation on completion of Masaba Water and Sanitation Project in Trans-Nzoia County, Kenya. *Strategic Journal of Business & Change Management, 8*(4), 123–135.

Project Management Institute (PMI). (2021). *A guide to the project management body of knowledge (PMBOK® Guide)* (7th ed.). Project Management Institute.

Scholz, R. W., Sieckmann, F., & Kohl, H. (2020). Project performance in inter-organisational environments: Stakeholder perspectives. *Project Leadership and Society, 1*, 100005.

Shaqour, E. N. (2022). The role of implementing BIM applications in enhancing project management knowledge areas in Egypt. *Ain Shams Engineering Journal, 13*(1), 101509.

Turner, J. R. (2009). *Handbook of project-based management: Leading organisational strategic change* (3rd ed.). McGraw-Hill.

Turner, J. R., & Zolin, R. (2012). Forecasting success on large projects: Developing reliable scales to predict multiple perspectives by multiple stakeholders over multiple time frames. *Project Management Journal, 43*(5), 87–99.

World Bank. (2021). *World development report 2021: Data for better lives*. World Bank.

World Economic Forum. (2023). *Global competitiveness report 2023*. World Economic Forum.