

MONITORING PROJECT COMMUNICATION AND PERFORMANCE OF WATER PROJECTS IN LOWER EASTERN REGION, KENYA

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ABSTRACT

Effective communication is fundamental to successful project implementation because it facilitates information sharing, coordination, reporting and timely decision-making. Nevertheless, many water projects in Kenya continue to experience implementation challenges associated with ineffective communication systems, resulting in delays, cost overruns and poor project performance. This study examined the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya, and evaluated the moderating effect of project environment. The study adopted a cross-sectional research design based on the pragmatism research philosophy and employed a mixed methods approach. A sample of 336 water projects was selected through proportionate stratified random sampling from a target population of 2,665 water projects, while 39 key informants were purposively selected. Data were collected using structured questionnaires and interview guides and analyzed using descriptive statistics, Pearson correlation, simple linear regression and hierarchical regression analysis. The findings revealed that monitoring project communication

positively and significantly influenced the performance of water projects. Furthermore, project environment significantly strengthened the relationship between monitoring project communication and project performance. The study concludes that effective communication systems characterized by timely reporting, feedback, coordination and information sharing significantly improve project implementation and overall project performance, particularly within supportive organizational environments. The study recommends strengthening communication management systems, enhancing stakeholder information sharing, investing in communication technologies and promoting supportive organizational environments to improve the implementation and performance of water projects.

Keywords: Monitoring project communication, project environment, project performance, water projects, communication management, Kenya.

INTRODUCTION

Project monitoring practices refer to all the activities undertaken to determine whether desired results are being achieved in accordance with planned implementation schedules, with the objective of measuring project progress against established targets (World Bank, 2024). Through continuous assessment of project implementation against planned activities,

monitoring enables project managers to identify deviations early and institute corrective measures that improve project outcomes (Fox & Macleod, 2023). Effective project monitoring facilitates the delivery of project benefits through regular reviews and timely decision-making, thereby enhancing the achievement of project goals. Project performance is reflected in the efficient and effective attainment of project objectives in terms of time, cost, scope and stakeholder satisfaction (Decotiis & Dyer, 2022; Lonnerfford & Johansson, 2021).

Globally, project monitoring has become an integral management function for enhancing project implementation and promoting sustainable development. Monitoring provides continuous information on project progress, enabling implementing agencies to identify emerging challenges and make informed decisions that accelerate project implementation (UNDAF, 2023; Saiful, 2021). Similarly, the OECD (2021) observes that project monitoring strengthens communication, transparency, accountability and responsiveness to unforeseen circumstances while empowering project teams to evaluate progress against planned objectives. Effective communication is a critical component of project monitoring because it ensures that project information is captured, shared and acted upon throughout the project life cycle. The Project Management Institute (PMI, 2023) notes that capturing project information is essential for measuring project performance, while Olawale (2019) argues that clear communication channels enhance communication flow among stakeholders through effective reporting and feedback. Likewise, Omid and Mehdi (2022) established that efficient communication unifies project stakeholders during implementation by facilitating monitoring of project schedules against planned targets, reducing project costs, improving delivery time and creating a conducive working environment that enhances project performance.

Across Sub-Saharan Africa, monitoring practices have increasingly been adopted to improve the performance of public infrastructure projects. Ghana institutionalized project monitoring across the public sector to strengthen project implementation by continuously tracking project progress and providing regular feedback for decision-making (Kissi et al., 2019; Damoah, Akwei, & Momzughi, 2020). Nevertheless, many infrastructure projects in Africa continue to experience delays, cost overruns and poor performance due to inadequate information flow, weak institutional capacity, bureaucratic processes and corruption that undermine transparency and accountability (Watermeyer & Phillips, 2020; Meyer, Masehla, & Kot, 2023; Olanrewaju, Tan, & Kwan, 2023). Ceesay (2019) further notes that political interference and corruption negatively affect communication and information flow during project implementation, thereby constraining project performance across the region.

In Kenya, reforms in the water sector have progressively strengthened project monitoring to improve service delivery. Although Kenya introduced monitoring practices at both national and community levels from the 1980s, inadequate reporting, weak feedback mechanisms and poor communication between implementing agencies and stakeholders resulted in fragmented implementation of government projects and reduced project performance (GOK, 2007; GOK, 2023). The establishment of the National Integrated Monitoring and Evaluation System (NIMES) improved monitoring by providing policy makers with project information for informed decision-making, while subsequent reforms under the Water Act 2022 and Water Bill

2024 further strengthened monitoring and stakeholder engagement in water project implementation (GOK, 2022). Empirical evidence also underscores the importance of communication in improving project performance. Mwakuyo and Kidombo (2023) found that cohesion between project teams and government agencies enhances the quality of project outcomes, while Hyasu and Spalek (2019) observed that effective communication strengthens coordination among project participants and contributes to successful project delivery. Despite increased government investment in the water sector, many water projects in Kenya continue to experience delays, cost overruns and failure to achieve intended objectives (Munyiri & Muchelule, 2021). In Lower Eastern Region, declining water availability, ageing infrastructure and increasing demand for water services continue to challenge the successful implementation of water projects, necessitating an examination of the influence of monitoring project communication on the performance of water projects in the region.

Statement of the Problem

The Government of Kenya continues to invest substantial financial resources in water infrastructure to achieve universal access to safe and adequate water by 2030 (GOK, 2007; COK, 2010). Despite these investments and continuous reforms in the water sector, many water projects continue to experience delays, cost overruns, abandonment and failure to achieve planned objectives (Budget Watch, 2019/2020; WASREB, 2019/2020). Reports from Lower Eastern Kenya indicate that several major water projects remain incomplete or have stalled, including six mega dams in Makueni County and numerous water projects in Kitui County, while only 21% of planned water projects in Machakos County achieved their intended targets (County Government of Makueni, 2019; Nyanga, 2019; POK, 2019; World Bank, 2020). Nationally, more than 50% of projects perform below expectations, with water project abandonment reaching 47% by 2023 (Abdi, 2024; Sakamoto & Kiarie, 2024).

Effective project communication facilitates information sharing, reporting, feedback and coordination among project stakeholders, thereby supporting timely decision-making and successful project implementation. However, inadequate communication channels, weak reporting systems and poor information flow continue to undermine project implementation in many public sector projects. Although previous studies have examined project communication in sectors such as roads, construction and state corporations, limited empirical evidence exists on the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya (Hussein, 2020; Muchelule, 2021; Mutua, Juma, & Owuor, 2020; Olawale, 2019; Roba & Odollo, 2022). In addition, few studies have examined whether project environment moderates the relationship between monitoring project communication and project performance. This contextual and empirical gap necessitated the present study, which sought to establish the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya, while examining the moderating effect of project environment.

Objectives of the Study

General Objective

To establish the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya.

Specific Objectives

1. To examine the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya.
2. To determine the moderating influence of project environment on the relationship between monitoring project communication and the performance of water projects in Lower Eastern Region, Kenya.
- 3.

Research Hypotheses

- i. **H₀₁:** Monitoring project communication has no significant influence on the performance of water projects in Lower Eastern Region, Kenya.
- ii. **H₀₂:** Project environment has no significant moderating influence on the relationship between monitoring project communication and the performance of water projects in Lower Eastern Region, Kenya.

LITERATURE REVIEW

Theoretical Framework

This study is anchored on Program Theory and Environment Theory. Program Theory, developed by Chen, Rossi, Patton and Weiss (1995), explains how planned interventions are transformed into desired outcomes through structured implementation processes. The theory emphasizes that project performance depends on how effectively project inputs are converted into outputs through continuous monitoring, evaluation and timely corrective action. It provides a logical framework for tracking project implementation, identifying deviations and ensuring that planned objectives are achieved (Sethi & Philippines, 2012). Program Theory further explains that monitoring practices constitute key project inputs which, when effectively implemented, enhance project outcomes by facilitating coordination, information sharing and continuous assessment of implementation progress (Bickman, 2007; Lipsey, 2011). Within the present study, monitoring project communication represents a critical implementation process through which communication channels, communication flow, reporting and feedback facilitate effective coordination among project stakeholders, thereby enhancing the performance of water projects.

The study also adopts Environment Theory, advanced by Florence Nightingale in 1859, to explain the moderating influence of project environment. The theory maintains that organizational outcomes are shaped by internal and external environmental conditions that either facilitate or constrain implementation processes (Iram, 2021). In project management, environmental factors including organizational culture, team cooperation, budgeted resources and technical competency influence the effectiveness of communication processes and ultimately determine project performance (Akanni et al., 2020; Alon, 2023). Consequently,

project environment may strengthen or weaken the influence of monitoring project communication on project performance depending on prevailing organizational conditions. Environment Theory therefore provides an appropriate theoretical basis for examining the moderating effect of project environment on the relationship between monitoring project communication and the performance of water projects in Lower Eastern Region, Kenya.

Conceptual Framework

The conceptual framework illustrates the relationship between monitoring project communication and the performance of water projects, with project environment acting as the moderating variable. Monitoring project communication is operationalized through communication channels, communication flow, reporting and feedback, and communication planning. Performance of water projects is measured using the number of water projects completed, timely delivery, stakeholders' satisfaction and delivery within cost. Project environment, comprising organizational culture, team cooperation, budgeted funds and technical competency, is expected to moderate the relationship between monitoring project communication and project performance. Figure 1 presents the conceptual framework guiding the study.

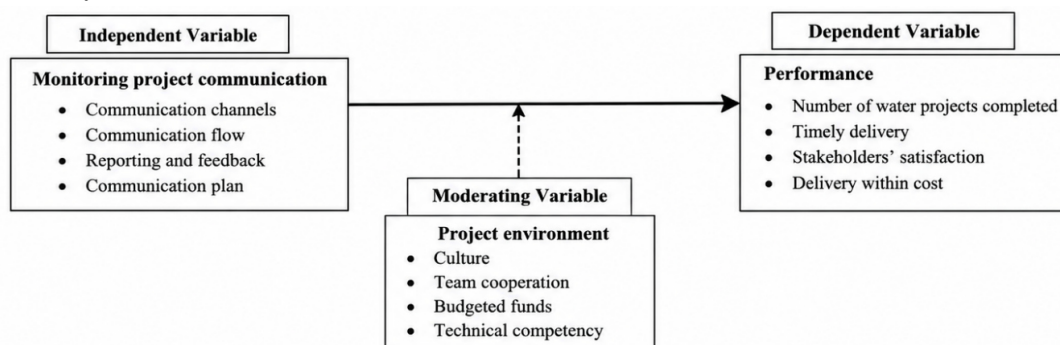


Figure 1: Conceptual Framework

Monitoring Project Communication

Monitoring project communication refers to the continuous management and evaluation of communication processes during project implementation to ensure that accurate information reaches the appropriate stakeholders at the right time. Effective communication has become increasingly important because of project complexity, diverse stakeholder interests and the need for timely coordination among project teams (Dreesen, Lindeh, Meures, Schmidt, & Rosenkranz, 2022). Establishing effective communication channels, communication plans, reporting mechanisms and feedback systems enhances coordination, facilitates information sharing and supports informed decision-making (Zulch, 2022). According to Roudias (2020), continuous monitoring of project communication strengthens collaboration among stakeholders, improves problem-solving and enables early identification of implementation challenges, thereby enhancing project performance.

Performance of Water Projects

Project performance refers to the extent to which project objectives are achieved efficiently and effectively (Lonnerfford & Johansson, 2021). It encompasses timely completion, adherence to approved budgets, achievement of planned outputs and stakeholder satisfaction (Bass, 2022). Akanni et al. (2020) emphasize that successful project performance reflects delivery within agreed scope, schedule and cost while meeting the expectations of beneficiaries. Accordingly, this study measures performance of water projects using the number of completed water projects, timely delivery, stakeholders' satisfaction and delivery within the approved budget.

Project Environment

Project environment comprises the internal and external conditions surrounding project implementation that influence organizational performance. Organizational culture, cooperation among project teams, availability of financial resources and technical competency create an environment that can either facilitate or constrain project implementation (Akanni, Oke, & Akpomiemie, 2020). Boone et al. (2019) argue that supportive organizational culture promotes collaboration and improves project outcomes, while Damoah, Akwe and Mouzughi (2020) identify inadequate financial resources and institutional inefficiencies as major contributors to poor project performance. In this study, project environment is treated as a moderating variable that may strengthen or weaken the relationship between monitoring project communication and performance of water projects.

Empirical Review

Monitoring Project Communication and Performance of Water Projects

Project communication is widely recognized as a critical monitoring practice that facilitates coordination, information sharing and timely decision-making throughout the project life cycle. Mavuso and Agumba (2019) established that effective communication management significantly influenced successful project delivery in the Swaziland construction industry by ensuring that accurate project information reached the appropriate stakeholders at the right time. Similarly, Pollack and Matous (2019) and Guerra, Leite and Faust (2020) observed that clear communication strengthened collaboration among project teams, improved coordination and enabled timely responses to project challenges. In the United Kingdom, Olawale (2019) further found that effective communication flow contributed to improved control of project cost and time by ensuring that updated and accurate information was communicated promptly to relevant project participants.

Empirical evidence from Africa and Kenya similarly demonstrates that monitoring project communication positively influences project performance. Mutua, Juma and Owuor (2020) established that project communication significantly enhanced implementation of road construction projects in Kilifi County by strengthening team coordination and facilitating regular feedback for informed decision-making. Likewise, Winiko, Mbugua and Kyalo (2021) found that dissemination of monitoring and evaluation results had a positive influence on the performance of digital education projects in Malawi, while Richardson (2020) emphasized that timely communication of project monitoring results provides opportunities for immediate

corrective action. Hyasu and Spalek (2019) further reported that controlled communication flow throughout the project life cycle enhances harmony, understanding and coordination among project teams. In Kenya's water sector, Mutai, Wanyoike and Kihara (2022) found a strong positive relationship between project communication and project performance, while Musoti (2023) established that continuous monitoring of project communication significantly improved the performance of water and sanitation projects in Siaya County.

The reviewed literature consistently demonstrates that monitoring project communication contributes significantly to improved project performance through effective information flow, coordination, reporting and feedback. However, most previous studies focused on construction projects, road infrastructure, education projects and general public sector projects, with limited empirical evidence drawn specifically from water projects in Lower Eastern Region, Kenya. In addition, the majority of studies adopted descriptive research designs and primarily examined the direct influence of project communication without considering the moderating role of project environment. Consequently, empirical evidence explaining how project environment influences the relationship between monitoring project communication and performance of water projects remains limited, thereby justifying the present study.

Project Environment as a Moderator

Project environment constitutes the organizational and operational context within which projects are implemented and has increasingly been recognized as an important determinant of project success. Idris and Kolawole (2022) found that organizational culture promotes knowledge sharing and improves project performance within Nigerian construction projects. Similarly, Chaudhry, Yuan, Hu and Cooke (2022) observed that organizational culture influences employee behaviour, collaboration and project implementation effectiveness, while Adeleke, Bahraini and Kamarudden (2023) emphasized that flexible organizational structures enhance communication, knowledge sharing and coordination among project teams, thereby improving project outcomes.

Studies conducted within Africa further demonstrate that environmental factors such as team cooperation, financial capacity and organizational support significantly influence project implementation. Sinesilassie, Zafar, Tabish and Jha (2023) reported that weak cooperation among project participants, inadequate management support and poor human resource relations adversely affected the performance of water projects in Ethiopia. Likewise, Njeri and Were (2023) established that management support, employee commitment and teamwork significantly improved project performance in Kenyan non-governmental organizations. Financial capacity has also been identified as an important environmental factor, with Mahamid (2022) reporting that inadequate project financing and delayed contractor payments constrained construction project performance, while Lindh and Larsen (2022) found that the financial capability of implementing organizations significantly enhanced project productivity.

Although previous studies acknowledge that organizational culture, team cooperation, financial resources and technical competency influence project performance, relatively few have examined project environment as a moderating variable. Most empirical studies have treated

environmental factors as direct predictors of project performance rather than investigating whether they strengthen or weaken the relationship between monitoring project communication and project outcomes. Consequently, empirical evidence on the moderating influence of project environment within water projects remains limited. This study therefore addresses this gap by examining whether project environment moderates the relationship between monitoring project communication and the performance of water projects in Lower Eastern Region, Kenya.

RESEARCH METHODOLOGY

This study adopted a cross-sectional research design to examine the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya. Guided by the pragmatism research philosophy, the study employed a mixed methods approach that combined quantitative and qualitative techniques to provide a comprehensive understanding of the relationship between project communication and project performance. Quantitative data were collected using structured questionnaires to test the study hypotheses, while qualitative data were obtained through interviews to enrich and explain the quantitative findings (Creswell & Creswell, 2023; Molina-Azorín, 2022).

The study targeted 2,665 water projects implemented within Lower Eastern Region, Kenya, between 2021 and 2022, comprising boreholes, piped water supply schemes and earth dams. The unit of analysis was the water project, whereas the project manager or project coordinator served as the unit of observation because of their involvement in project planning, monitoring and communication processes. In addition, 39 water project partners participated as key informants to provide qualitative information on project implementation and environmental conditions affecting project performance. A sample of 336 respondents was determined using Kothari's sample size determination formula and selected through proportionate stratified random sampling to ensure adequate representation of all categories of water projects.

Primary data were collected using structured questionnaires and interview guides. The questionnaire measured monitoring project communication, project environment and performance of water projects using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, while interviews generated complementary qualitative evidence regarding communication practices and project implementation. The research instruments were pilot tested to establish their reliability and validity before the main data collection exercise. Quantitative data were analyzed using Statistical Package for Social Sciences (SPSS) Version 28. Descriptive statistics, Pearson correlation analysis, simple linear regression and hierarchical regression analysis were employed to determine the influence of monitoring project communication on project performance and to examine the moderating effect of project environment. The hypotheses were tested at a 95% confidence level and 5% level of significance after confirming that the assumptions of regression analysis were satisfied through appropriate diagnostic tests.

RESEARCH FINDINGS AND DISCUSSION

A total of 302 questionnaires were distributed for data collection. Out of these, 279 questionnaires were completed and returned, yielding a response rate of 92.4%. according to Sekaran and Bougie's (2022) criteria. They suggest that a response rate of 50% or above is adequate, 60% or above is good, and 70% or above is excellent for analysis. It surpasses the commonly accepted threshold of 70% for survey research, further strengthening the credibility of the data collected. This strong response rate allows for a comprehensive and reliable analysis of the influence of monitoring planning, monitoring project risk, stakeholders' involvement, and monitoring project communication on the performance of water projects in the Lower Eastern Region of Kenya.

Descriptive Analysis of Study Variables

Monitoring Project Communication

The study's first objective was to examine the influence of monitoring project communication on performance of water projects in Lower Eastern Region, Kenya. The Likert-scale questions findings related to this objective are presented in Table 1.

Table 1: Descriptive Statistics for Monitoring Project Communication

Statement	Mean	Std. Dev.
There are clear and well-developed communication channels to disseminate implementation and monitoring information	4.35	0.95
Frequent meetings between the teams serve as a communication channel to review and track project progress	4.38	0.93
There are clear strategies for control and communication monitoring to aid in achieving the planned objectives	4.32	0.97
Due to cohesion among the implementation teams, there is adequate information flow shared freely	4.33	0.98
Progress of the projects is cordially exchanged among the concerned teams through reporting and feedback	4.33	0.97
Feedback on rapid assessment of the communication plans used in the projects is reported immediately	4.34	0.98
There are well-tracked plans for both compliments and complaints	4.36	0.94
There exist monitored ways where stakeholders' communication, feedback from, and to the end-users are passed	4.35	0.96
Aggregate Score	4.345	0.960

The mean values in Table 1 show that the respondents agreed on average that there are clear and well-developed communication channels to disseminate implementation and monitoring information (M= 4.35, SD= 0.95); that frequent meetings between the teams serve as a communication channel to review and track project progress (M= 4.38, SD= 0.93); that there are clear strategies for control and communication monitoring to aid in achieving the planned objectives (M= 4.32, SD= 0.97); and that due to cohesion among the implementation teams, there is adequate information flow shared freely (M= 4.33, SD= 0.98). They were also in

agreement that progress of the projects is cordially exchanged among the concerned teams through reporting and feedback (M= 4.33, SD= 0.97); that feedback on rapid assessment of the communication plans used in the projects is reported immediately (M= 4.34, SD= 0.98); that there are well-tracked plans for both compliments and complaints (M= 4.36, SD= 0.94); and that there exist monitored ways where stakeholders' communication, feedback from, and to the end-users are passed (M= 4.35, SD= 0.96).

The findings, with an aggregate mean of 4.345 (SD= 0.960), indicate that respondents generally agree on the significant influence of monitoring project communication on the performance of water projects in the Lower Eastern Region of Kenya. Effective project communication fosters alignment among stakeholders, ensuring that everyone is aware of the project goals and progress, thereby reducing misunderstandings and enhancing coordination. Additionally, transparent and consistent communication builds trust, which is crucial for maintaining stakeholder engagement and support. As emphasized by Owuor and Moronge (2023), clear communication channels improve project performance by ensuring that accurate and timely information reaches all relevant parties. This also facilitates swift problem-solving, as issues can be identified and addressed promptly. According to Mavuso and Agumba (2019), open communication, effective coordination, and joint responsibilities contribute significantly to successful project delivery. Therefore, robust project communication is essential for fostering alignment, building trust, and enabling quick problem-solving, all of which are critical for the successful execution of water projects.

Performance of Water Projects in Lower Eastern Region, Kenya

The overall objective of the study was to evaluate the performance of water projects in the Lower Eastern Region of Kenya. Respondents were asked their level of agreement with various performance indicators. Table 2 presents the findings obtained.

Table 2: Descriptive Statistics for Performance of Water Projects

Statement	Mean	Std. Dev.
The implementation team achieved the completion of the planned number of water projects	4.38	0.92
The number of executed water projects has reduced the distance and hours taken in fetching water	4.36	0.94
The bureaucracy in tendering of water projects affected the scheduled delivery time	4.32	0.97
All concerned teams are regularly trained to increase their capability of delivering on timeline	4.39	0.91
Stakeholders and end-users are satisfied with the policies and services provided at the water points	4.35	0.95
There are openness, trust, and accountability in how the water projects are executed	4.34	0.96
The project was completed within the stipulated cost	4.32	0.97
The quantity of water received throughout the year is adequate	4.33	0.98
Aggregate Score	4.349	0.950

The means presented in Table 2 show consensus among respondents. They generally agreed that the implementation team achieved the completion of the planned number of water projects ($M=4.38$, $SD=0.92$); that the number of executed water projects has reduced the distance and hours taken in fetching water ($M=4.36$, $SD=0.94$); that the bureaucracy in tendering of water projects affected the scheduled delivery time ($M=4.32$, $SD=0.97$); and that all concerned teams are regularly trained to increase their capability of delivering on timeline ($M=4.39$, $SD=0.91$). Respondents further agreed that stakeholders and end-users are satisfied with the policies and services provided at the water points ($M=4.35$, $SD=0.95$); that there is openness, trust, and accountability in how the water projects are executed ($M=4.34$, $SD=0.96$); that the project was completed within the stipulated cost ($M=4.32$, $SD=0.97$); and that the quantity of water received throughout the year is adequate ($M=4.33$, $SD=0.98$).

The findings, with an aggregate mean of 4.349 ($SD=0.950$), indicate that respondents generally agreed with the statements on water project performance. The establishment of water points has catalyzed a wide range of developmental benefits, significantly improving health, economic opportunities, and infrastructure in the Lower Eastern Region of Kenya. Improved access to clean water has led to a notable reduction in waterborne diseases, enhancing the overall health of the community. This aligns with Chelimo (2021), who emphasized that timely and sufficient access to resources like water can significantly enhance local development and community well-being. Additionally, the availability of water has enabled agricultural activities to flourish, which has boosted food security and local economies. This is consistent with the findings of Hagarsu, Wanyonyo, and Kikwatha (2020), who highlighted that community participation in water projects leads to broader developmental benefits. Furthermore, the development of infrastructure, such as roads and market areas, has facilitated trade and travel, contributing to economic growth. Overall, the establishment of water points has proven to be a catalyst for substantial socio-economic and infrastructural advancements in the region.

Project Environment

The study also aimed to examine the moderating influence of the project environment on the relationship between project monitoring practices and performance of water projects. The findings related to Likert-scale questions where respondents gave the extent to which they agreed or disagreed with statements are presented in Table 3.

Table 3: Descriptive Statistics for Project Environment

Statement	Mean	Std. Dev.
Peoples' culture was considered before the start of the project	4.35	0.95
Community's culture of helping the project implementation team with ideas and materials enhances project completion on cost	4.38	0.93
Management regulation and policies available do not support easy completion of the water projects	4.34	0.96
The communities and concerned stakeholders do not fully understand the regulations and policies governing their project	4.32	0.97

There is a lack of transparency on the project working funds which interferes with the project delivery time	4.33	0.97
Elections within management affect the release of working funds and implementation of water projects	4.36	0.94
High technical competency of the implementation team helps them to encounter eventualities as they arise	4.35	0.96
Technical competency of the implementing team enhances the timely completion rate of water projects	4.34	0.96
Aggregate Score	4.346	0.955

The findings in Table 3 show that the respondents were in agreement that peoples' culture was considered before the start of the project (M= 4.35, SD= 0.95); that community's culture of helping the project implementation team with ideas and materials enhances project completion on cost (M= 4.38, SD= 0.93); that management regulation and policies available do not support easy completion of the water projects (M= 4.34, SD= 0.96); and that the communities and concerned stakeholders do not fully understand the regulations and policies governing their project (M= 4.32, SD= 0.97). They also agreed that there is a lack of transparency on the project working funds which interferes with the project delivery time (M= 4.33, SD= 0.97); that elections within management affect the release of working funds and implementation of water projects (M= 4.36, SD= 0.94); that high technical competency of the implementation team helps them to encounter eventualities as they arise (M= 4.35, SD= 0.96); and that technical competency of the implementing team enhances the timely completion rate of water projects (M= 4.34, SD= 0.96).

The findings, with an aggregate mean score of 4.346 (SD= 0.955), indicate that respondents generally agree that the project environment significantly moderates the relationship between project monitoring practices and the performance of water projects. Overall, the project surroundings, including community involvement, socio-economic conditions, environmental factors, and political stability, play a pivotal role in influencing project performance. For instance, community involvement can enhance project success by fostering a sense of ownership and responsibility, as highlighted by Njeri and Were (2023), who found that support from the local community and management team significantly affects project outcomes. Additionally, socio-economic conditions can either facilitate or constrain project progress, aligning with the findings of Hagarsu, Wanyonyo, and Kikwatha (2020), who emphasized the impact of economic stability on project performance. Environmental factors, such as the availability of natural resources and climate stability, also play a critical role, echoing the observations of Chelimo (2021) on the importance of timely and sufficient access to resources. Furthermore, political stability and effective governance create a conducive environment for project implementation, as supported by the literature on the importance of good governance in project success. Thus, the project environment is a crucial moderator that can significantly enhance or impede the performance of water projects.

Hypothesis Four: Testing the Influence of Monitoring Project Communication on Project Performance

The second hypothesis sought to determine whether monitoring project communication has a significant influence on the performance of water projects in the Lower Eastern Region of Kenya. To assess this relationship, a simple linear regression analysis was conducted, and the findings are presented below.

Table 4: Regression Analysis Results for the Influence of Monitoring Project Communication on Project Performance
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.679 ^a	0.461	0.458	0.581

ANOVA Table

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	75.153	1	75.153	267.448	0.000 ^b
Residual	77.988	277	0.281		
Total	153.141	278			

Beta Coefficients

Predictor Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	T	Sig.
Constant	1.014	0.169		6.000	0.000
Monitoring Project Communication	0.538	0.067	0.701	8.030	0.000

The regression analysis findings confirm a strong and statistically significant relationship between monitoring project communication and project performance. The model summary shows an R value of 0.679, indicating a strong positive correlation between monitoring project communication and project performance. The R Square value of 0.461 suggests that 46.1% of the variance in project performance can be explained by monitoring project communication alone, demonstrating the critical role of effective communication structures in enhancing project success. The Adjusted R Square of 0.458 reinforces the robustness of this relationship by confirming that the model retains strong explanatory power.

The ANOVA results provide further validation that monitoring project communication significantly influences project performance. The model produced a high F-value of 267.448 with a p-value of 0.000 ($p < 0.05$), confirming that the regression model is statistically significant. This implies that monitoring project communication has a considerable impact on project success beyond mere chance, reinforcing its importance as a key project management practice.

The beta coefficients further illustrate the magnitude of the effect of monitoring project communication on project performance. The unstandardized coefficient ($B = 0.538$, $p < 0.05$) indicates that a one-unit increase in monitoring project communication results in a 0.538 increase in project performance, holding all other factors constant. This demonstrates the practical significance of ensuring effective and structured communication in project execution.

The standardized coefficient (Beta = 0.701) indicates that monitoring project communication has one of the strongest effect sizes among the predictors tested, reinforcing its essential role in driving project success.

Based on the regression results, the fitted regression equation for the influence of monitoring project communication on project performance is:

$$Y = 1.014 + 0.538X_4$$

Where:

Y = Project Performance

1.014 = Constant (intercept), representing the baseline level of project performance when monitoring project communication is absent.

0.538X₄ = The unstandardized coefficient for monitoring project communication, indicating that for every one-unit increase in monitoring project communication, project performance improves by 0.538 units, assuming all other factors remain constant.

The high t-value (8.030) and the p-value of 0.000 (less than 0.05) further confirm that monitoring project communication is a statistically significant predictor of project performance.

These findings align with existing research emphasizing the fundamental role of communication in ensuring project success. Njuguna and Wanjiru (2022) established that effective project communication enhances coordination, minimizes misunderstandings, and improves stakeholder alignment with project objectives. Their study found that structured communication strategies reduce project delays and ensure that project deliverables align with intended goals.

The results are also consistent with Maina and Omondi (2023), who found that poor communication was one of the leading causes of project failure, while projects with clear, timely, and transparent communication channels experienced higher efficiency and success rates. Effective communication enables project teams to make timely decisions, adjust to emerging challenges, and ensure that all stakeholders remain informed.

Additionally, the findings support the work of Mwangi et al. (2023), who emphasized that projects that integrate digital communication tools, such as real-time reporting systems, interactive dashboards, and stakeholder feedback mechanisms, achieve higher levels of efficiency and accountability. Their study demonstrated that monitoring project communication through structured channels enhances decision-making and fosters greater trust among stakeholders.

Furthermore, Kerzner (2022) argued that proactive communication strategies are critical in project management because they promote transparency, build trust, and enhance team collaboration. These findings are reinforced by Chaplowe and Cousins (2021), who highlighted that project with regular communication updates, structured feedback loops, and participatory

communication mechanisms tend to experience better project outcomes, fewer conflicts, and enhanced sustainability.

Since the regression analysis results indicate a statistically significant relationship between monitoring project communication and project performance ($p < 0.05$), the null hypothesis (H_{04} : Monitoring project communication has no significant influence on project performance) is rejected. This confirms that monitoring project communication has a substantial and positive impact on project performance, reinforcing the importance of structured communication frameworks in ensuring successful project execution.

The study findings validate the crucial role of monitoring project communication in determining the performance of water projects. The results provide empirical evidence that clear, timely, and structured communication fosters transparency, enhances coordination, and improves project efficiency. The findings imply that water projects in the Lower Eastern Region of Kenya should prioritize communication frameworks that facilitate continuous information flow, stakeholder engagement, and real-time monitoring.

Moderating Effect of Project Environment on the Relationship between Monitoring Project Communication and Performance of Water Projects

Hierarchical regression analysis was conducted to determine whether project environment moderates the relationship between monitoring project communication and performance of water projects in Lower Eastern Region, Kenya. Monitoring project communication was entered in Model 1, project environment in Model 2, while the interaction term between monitoring project communication and project environment was entered in Model 3. The results are presented in Tables 5, 6 and 7.

Table 5: Hierarchical Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error	Change in R²
Model 1: Monitoring Project Communication	0.623	0.388	0.386	0.538	-
Model 2: Communication + Project Environment	0.687	0.472	0.468	0.497	0.084
Model 3: Communication + Project Environment + Interaction	0.731	0.534	0.529	0.462	0.062

The results show that monitoring project communication independently explained 38.8% of the variation in project performance. The inclusion of project environment increased the explanatory power of the model to 47.2%, while addition of the interaction term further increased the coefficient of determination to 53.4%. These findings demonstrate that project environment enhances the explanatory capacity of monitoring project communication in predicting project performance.

Table 6: ANOVA for Hierarchical Regression

Model	Sum of Squares	df	Mean Square	F	Sig.
Model 1	65.941	1	65.941	114.278	0.000
Residual	104.009	334	0.311		
Total	169.950	335			
Model 2	80.212	2	40.106	81.993	0.000
Residual	89.738	333	0.269		
Total	169.950	335			
Model 3	90.748	3	30.249	70.808	0.000
Residual	79.202	332	0.239		
Total	169.950	335			

The ANOVA results indicate that all three hierarchical regression models were statistically significant ($p < 0.001$), confirming that monitoring project communication, project environment and their interaction significantly explain variations in project performance.

Table 7: Hierarchical Regression Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
Constant	0.958	0.142		6.734	0.000
Monitoring Project Communication	0.331	0.059	0.322	5.641	0.000
Project Environment	0.241	0.063	0.211	3.824	0.000
Monitoring Project Communication × Project Environment	0.133	0.046	0.142	2.887	0.004

The regression coefficients reveal that monitoring project communication positively and significantly influenced project performance ($\beta = 0.322$, $p < 0.001$). Project environment also had a positive significant effect on project performance ($\beta = 0.211$, $p < 0.001$). Furthermore, the interaction between monitoring project communication and project environment was positive and statistically significant ($\beta = 0.142$, $p = 0.004$), confirming that project environment significantly moderates the relationship between monitoring project communication and project performance. The findings suggest that effective communication practices contribute more substantially to project success when implemented in an environment characterized by adequate resources, organizational support, effective teamwork and favourable institutional conditions. Accordingly, the null hypothesis that project environment has no significant moderating influence on the relationship between monitoring project communication and performance of water projects was rejected.

The findings reveal that project environment significantly moderates the relationship between monitoring project communication and the performance of water projects ($\beta = 0.142$, $p = 0.004$), indicating that effective communication contributes more strongly to project performance when supported by favourable organizational and operational conditions. The

increase in the coefficient of determination from 38.8% to 53.4% following the introduction of project environment and the interaction term demonstrates that environmental conditions strengthen the effectiveness of project communication. These findings are consistent with Hyasu and Spalek (2019), who found that supportive organizational environments enhance communication flow, coordination and collaboration among project stakeholders, thereby improving project implementation. The results also agree with Muthoni and Karanja (2021), who established that projects operating in stable environments experience fewer communication barriers and better stakeholder coordination, leading to superior project outcomes. Furthermore, the findings support Damoah, Akwe and Mouzughhi (2020), who argued that favourable institutional environments characterized by adequate resources, sound governance and supportive organizational structures improve communication processes and ultimately enhance project performance.

Conclusions

The study concluded that monitoring project communication positively influences project performance. Effective communication systems that promote timely reporting, information sharing, coordination and feedback improve decision making and implementation efficiency. Weak communication systems, on the other hand, create delays and misunderstandings that negatively affect project delivery.

The study concluded that project environment significantly strengthens the relationship between monitoring project communication and the performance of water projects. Supportive environmental conditions characterized by adequate resources, effective teamwork, technical competency and a positive organizational culture enhance communication flow, reporting, feedback and stakeholder coordination, thereby improving project implementation and overall performance. Conversely, weak project environments diminish the effectiveness of communication systems, resulting in poor coordination, delayed decision-making and reduced project performance.

Contribution to Knowledge

This study contributes to knowledge by providing empirical evidence on the influence of monitoring project communication on the performance of water projects in Lower Eastern Region, Kenya. Although previous studies have examined project communication across construction, infrastructure and public sector projects, limited empirical evidence existed on monitoring project communication within water projects in Kenya. The findings therefore extend existing literature by demonstrating that effective communication through timely reporting, information sharing, coordination and feedback significantly improves the performance of water projects.

The study also contributes theoretically by validating the applicability of Program Theory and Environment Theory in explaining project performance. The findings demonstrate that while monitoring project communication directly enhances project performance, its effectiveness is further strengthened by a favourable project environment characterized by effective teamwork, adequate resources, technical competency and supportive organizational culture. Methodologically, the study extends knowledge through the application of hierarchical regression analysis to establish the moderating influence of project environment on the

relationship between monitoring project communication and project performance, thereby providing additional evidence on the importance of contextual factors in project implementation.

Recommendations on Policy and Practice

Monitoring Project Communication

Organizations implementing water projects should establish clear and effective communication systems. Formal communication plans should be developed to guide reporting lines, information flow, timelines for progress updates and feedback mechanisms among project stakeholders. Project managers should hold regular progress meetings, circulate implementation reports and provide timely responses to emerging issues. This would improve coordination, transparency and speed of decision making. Use of digital communication platforms, mobile reporting systems and real-time information sharing tools should also be encouraged to strengthen project monitoring and responsiveness.

Project Environment

Since project environment was found to strengthen the relationship between monitoring project communication and project performance, implementing agencies should foster organizational environments that support effective communication throughout project implementation. Adequate financial and technological resources should be provided to facilitate timely reporting, information sharing and stakeholder engagement. Organizations should also strengthen the technical competencies of project staff through continuous training in communication management while promoting teamwork, supportive leadership and a positive organizational culture that encourages open communication and accountability. Furthermore, national and county governments should streamline regulatory and administrative processes to facilitate efficient information flow, timely decision-making and effective coordination among project stakeholders.

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