

Project Communication Strategies and Performance of Entreprise De Construction, Etude Et Surveillance Des Travaux (Ecesut) Ltd inn Southern Province, Rwanda

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Abstract: In the evolving landscape of Rwanda's construction industry, communication inefficiencies remain a major constraint to project performance despite the existence of formal strategies and digital transformation policies. Persistent delays, scope deviations, and stakeholder misalignment, especially within local construction firms, underscore the need for context-specific investigation into communication practices. Against this backdrop, this study examined the influence of project communication strategies on the performance of construction projects implemented by Entreprise de Construction, Etude et Surveillance des Travaux Ltd (ECESUT) in the Southern Province of Rwanda. The study focused on three communication dimensions, communication frequency, feedback mechanisms, and communication channels, and assessed their effects on time adherence, budget compliance, quality of deliverables, and beneficiary satisfaction. Using a correlational research design with a mixed-methods approach, data were collected from 140 respondents selected from a target population of 215 project participants across Nyanza, Nyamagabe, and Nyaruguru districts. Quantitative data were analyzed using correlation and multiple regression analysis, while qualitative data were thematically analyzed to complement statistical findings. The findings revealed that communication frequency and communication channels are statistically significant independent predictors of construction project performance ($\beta = .312$, $p = .001$; $\beta = .310$, $p = .002$ respectively). Communication frequency demonstrated significant positive relationships with time adherence ($r = .453$), budget adherence ($r = .500$), quality performance ($r = .476$), and beneficiary satisfaction ($r = .546$). Similarly, communication channels were significantly correlated with all performance indicators, with particularly strong influence on budget adherence ($r = .524$) and beneficiary satisfaction ($r = .540$). Feedback mechanisms showed strong positive correlations with performance ($r = .677$ overall), especially beneficiary satisfaction ($r = .607$), but did not independently predict performance in the regression model ($\beta = .193$, $p = .112$), indicating that feedback operates synergistically within broader communication systems. Collectively, the communication variables explained 53.4% of the variance in project performance ($R^2 = .534$), confirming communication management as a central determinant of construction project success. The study concludes that structured and integrated communication strategies significantly enhance construction project outcomes at ECESUT Ltd. It recommends institutionalizing standardized communication schedules, formalizing communication management frameworks, integrating digital platforms into governance systems, strengthening stakeholder engagement mechanisms, and embedding communication effectiveness indicators within project evaluation systems.

Keywords: Project Communication Strategies, Communication Channels project Performance, Communication Strategies.

1. INTRODUCTION

Effective project communication is a cornerstone of success in the global construction sector, enabling coordination, timely decision-making, and stakeholder alignment. Taleb, Ismail, Wahab, Rani, and Amat (2024) stress that project managers spend up to 90% of their time communicating, yet many still face unclear objectives and ineffective feedback loops, causing misaligned expectations, delays, and weakened collaboration. Embedding structured communication management plans,

covering roles, content, frequency, and channels, has become a necessity, not a luxury, in today's complex construction environments.

Globally, regions have embraced advanced tools to address these gaps. In North America, technologies like Building Information Modelling (BIM), project dashboards, and integrated delivery platforms have cut rework by 40% and enhanced collaboration (McKinsey & Company, 2020). Similarly, the European Construction Industry Federation (FIEC, 2021) reported a 30% rise in cost and schedule adherence among firms that implemented structured communication strategies. In Asia, Japan's Total Quality Management (TQM) integrates standardized communication checklists across project phases, while China's "Made in China 2025" agenda enabled real-time monitoring in over 75% of national infrastructure projects, reducing disputes by 25% (World Bank, 2022).

Communication breakdowns remain prevalent across many developing nations. The African Development Bank (AfDB, 2021) observed that 60% of Sub-Saharan infrastructure projects face delays due to weak communication frameworks and unclear stakeholder roles. In Nigeria, Akintelu, Oyebola, Tihamiyu, and Olateju (2023) found that despite the presence of communication strategies in road projects, poor implementation often led to cost overruns and delays. Abdul-Fatawu, Adjei-Kumi, and Acheamfour (2024) found similar results in Ghana, linking performance setbacks to poor listening, vague communication goals, weak leadership, and language barriers.

In Rwanda, Umuhoza (2024) examined the effect of different communication types in Gasabo construction projects. Her findings revealed that pull communication contributed 36.1% ($\beta = .361$; $t = 4.833$) to project performance, push communication 21.6% ($\beta = .216$; $t = 4.440$), and interactive communication 15.9% ($\beta = .159$; $t = 3.581$). While interactive communication had a lower percentage, it was critical for real-time issue resolution, underscoring the importance of tailoring strategies to different project phases. Further, the Ministry of Infrastructure (MININFRA, 2023) reported that 35% of public construction projects in Rwanda are delayed due to ineffective communication, poor stakeholder engagement, and delayed feedback. Singirankabo and Wanjiku (2024), studying INGOs, concluded that multi-channeled communication, leveraging formal and informal tools, digital platforms, and participatory methods, improves schedule adherence, cost control, and quality outcomes.

Usanase and Irechukwu (2022), in their study on the PROFIFA Project in Kigali, also confirmed that structured communication planning (81.3%) and frequency design (71.8%) were significantly associated with timely project delivery ($r = 0.206$; $p = .000$). Their findings emphasized the impact of written ($\beta = 0.140$; $p = 0.016$) and non-verbal ($\beta = 0.138$; $p = 0.019$) communications on service quality, further supported by the value of feedback mechanisms for timeliness ($r = 0.105$; $p = 0.071$). These insights apply directly to construction projects where coordination, responsiveness, and adaptability are critical.

Entreprise de Construction, Etude et Surveillance des Travaux Ltd (ECESUT Ltd) is a licensed Rwandan firm offering construction, engineering, and consultancy services across public and private sectors. With projects in Nyanza, Nyaruguru, and Nyamagabe Districts, the company has proven its capacity in delivering complex infrastructure aligned with Rwanda's Vision 2050 (RDB, 2024; MININFRA, 2022). Services range from architectural design and structural engineering to project supervision and environmental assessments.

While ECESUT Ltd emphasizes quality and sustainability, communication related challenges persist, particularly in project execution phases. Informal assessments reveal issues in communication frequency, unclear feedback loops, and inconsistent use of communication channels, factors that have contributed to delayed project handovers and scope misalignments. These issues resonate with findings by Usanase and Irechukwu (2022), who emphasize that poor communication structures compromise construction project performance. As Rwanda advances its construction sector through Smart Rwanda Master Plan initiatives, examining the influence of these communication strategies on project outcomes is both timely and essential.

In an ideal construction project environment, communication is expected to flow seamlessly across all stakeholders, clients, consultants, contractors, and regulators. Global best practices, as outlined by the Project Management Institute (PMI, 2021), emphasize that structured communication strategies significantly enhance project performance. In developed economies, such strategies have reduced rework by up to 40% and improved on-time delivery by more than 30% (FIEC, 2021). Aligned with this vision, Rwanda's Smart Rwanda Master Plan and Vision 2050 advocate for a digital, data-driven construction industry where participatory planning and stakeholder communication are central to service delivery and infrastructure development (MININFRA, 2023).

However, the practical realities on the ground reflect a contrasting picture. Despite Rwanda's policy reforms and increasing investment in infrastructure, communication-related inefficiencies remain a persistent barrier to project success. MININFRA (2023) reports that over 35% of public construction projects in Rwanda face delays and cost overruns due to poor information flow, limited stakeholder engagement, and delayed feedback during execution phases. Empirical studies such as Umuhoza (2024) have shown that push, pull, and interactive communication types significantly influence project outcomes, yet their application across construction projects remains inconsistent. Similarly, Usanase and Irechukwu (2022) noted that although 81.3% of project stakeholders acknowledged the importance of communication planning, gaps in implementation still lead to misalignment, quality issues, and missed deadlines.

The magnitude of this communication-performance gap is evident at Entreprise de Construction, Etude et Surveillance des Travaux Ltd (ECESUT Ltd), a prominent Rwandan construction firm operating in the Southern Province. While ECESUT Ltd has proven its technical capacity through key infrastructure projects across Nyanza, Nyamagabe, and Nyaruguru Districts, internal reviews and informal assessments reveal that communication challenges persist. These include irregular message frequency, unclear feedback channels, and inconsistent stakeholder updates. Projects such as the Kigoma Sector Building and Groupe Scolaire Gasaka have experienced execution slowdowns and scope deviations directly linked to communication inefficiencies, despite the presence of communication plans and diversified tools (MININFRA, 2022).

From this background, this research, therefore, seeks to address this critical gap by examining how project communication strategies, specifically frequency, feedback mechanisms, and communication channels, affect the performance of construction projects managed by ECESUT Ltd. While existing literature has explored communication in the context of NGOs and government-led initiatives, limited empirical research focuses on private local construction firms in Rwanda. By generating context-specific, evidence-based insights, this study aims to inform practice and policy by proposing adaptable communication frameworks tailored to local realities.

1.1 Purpose of the Study

The main purpose of this study was to examine the influence of project communication strategies on the performance of construction projects implemented by Entreprise de Construction, Etude et Surveillance des Travaux Ltd (ECESUT) in the Southern Province of Rwanda.

1.2 Research Objectives

This study was guided by the following specific objectives:

- i. To assess the influence of communication frequency on the performance of construction projects implemented by ECESUT Ltd in the Southern Province of Rwanda.
- ii. To determine the influence of feedback mechanisms on the performance of construction projects implemented by ECESUT Ltd in the Southern Province of Rwanda.
- iii. To examine the influence of communication channels on the performance of construction projects implemented by ECESUT Ltd in the Southern Province of Rwanda.

2. LITERATURE REVIEW

2.1 Literature Review

2.1.1 Communication Frequency and Project Performance

In their study titled "Assessing Effective Project Communication Management on Construction Projects in Ghana", Abdul-Fatawu, Adjei-Kumi, and Acheamfour (2024) explored how communication frequency and practices influence the performance of construction projects in the Ghanaian context. The purpose of the study was to examine how frequently and effectively construction professionals communicate and how these practices influence project outcomes such as cost, time, and quality delivery. The study employed a descriptive research design with both qualitative and quantitative elements. The target population consisted of 97 construction professionals working with consultants, clients, and contractors classified under Ghana's D1K1 construction category. Data collection involved structured questionnaires focusing on the frequency and modes of communication, types of communication challenges experienced, and perceptions of communication effectiveness (Abdul-Fatawu *et al.*, 2024).

The study revealed that although communication occurred frequently across various stakeholders, clients, consultants, and contractors, challenges such as unclear communication objectives, language barriers, ineffective reporting systems, and inconsistent information flow severely disrupted project execution. Quantitative analysis demonstrated that poor communication frequency and clarity were associated with project delays and cost overruns, while frequent and structured communications were linked to improved project timelines and reduced rework (Abdul-Fatawu *et al.*, 2024). The study highlighted that regular and transparent updates among construction stakeholders reduce uncertainty and enhance coordination, which are essential to project success.

Scholars Nzuki and Mutuku (2023) conducted a study titled “Influence of Communication on Implementation of Roads Construction Projects by Kenya Urban Roads Authority in Nairobi City County, Kenya”, with the primary aim of examining the role of communication in the execution of urban road construction. The researchers employed a descriptive research design and focused on five ongoing projects under the Kenya Urban Roads Authority (KURA) between 2018 and 2022. The target population comprised 75 respondents including 5 project managers and 70 project team members. Nzuki and Mutuku (2023) used the structured questionnaires in data collection, and the validity was tested using content and construct validity approaches, while reliability was measured using Cronbach’s Alpha. Inferential statistics, including correlation and regression analysis, were utilized. The findings showed that effective communication had a significant and positive impact on project implementation and timeliness. Projects experienced fewer delays and improved coordination when communication occurred frequently and was customized to project teams’ needs. The study recommended that organizations understand the location, personality traits, and resource strengths of their teams to improve communication frequency and effectiveness (Nzuki & Mutuku, 2023).

Similarly, Wasike, Namusonge, Makokha, and Karamunya (2023), in their study titled “Project Communication and Road Construction Projects Performance in Kenya”, assessed how communication affects construction outcomes. They employed a mixed-method research design targeting a population of 475 individuals across various infrastructure projects, selecting a sample size of 143 using stratified random sampling. The data collection instrument was a validated questionnaire, and SPSS Version 27.0 was used for analysis (Wasike *et al.*, 2023). The study confirmed a significant positive correlation between frequent communication and improved project outcomes in terms of quality, cost, and schedule. A multiple regression analysis yielded a p-value of 0.000, indicating a statistically significant relationship. The authors concluded that regular and two-way communication is fundamental for successful project performance, recommending its integration into Total Quality Management (TQM) systems to ensure timely and within-budget delivery (Wasike *et al.*, 2023).

Akhwale and Ombui (2018), in their study titled Factors Influencing Project Management Leadership Skills on the Performance of Construction Industry: A Case of Selected Construction Companies in Nairobi City County, aimed to assess the impact of communication skills, among other leadership competencies, on construction project performance. The study employed a descriptive research design targeting a population of 111 staff working in construction firms, from which 33 were sampled using purposive techniques. Data were gathered through structured questionnaires and analyzed both quantitatively and qualitatively. One of the key findings revealed that insufficient and irregular communication among project stakeholders hindered timely decision-making, causing delays and cost overruns. The study emphasized that communication frequency was vital in reducing misunderstandings, fostering collaboration, and enhancing workflow efficiency across construction teams (Akhwale and Ombui, 2018).

2.1.2 Feedback Mechanisms and Project Performance

Investigators Singirankabo and Wanjiku (2024), in their study titled "Effect of Project Communication Practices on Performance of the International Non-Governmental Organizational Projects in Rwanda", examined various dimensions of communication, including feedback mechanisms and how they influence project outcomes. The objective of the study was to assess how participatory communication, results-driven communication, and multi-channelled communication contribute to the performance of INGO projects in Rwanda (Singirankabo & Wanjiku, 2024).

The research adopted a descriptive-correlational design, incorporating both qualitative and quantitative data collection and analysis. The target population included 170 staff from various international NGOs implementing projects in Rwanda. The researchers utilized stratified sampling techniques and collected primary data using structured questionnaires and interview guides. Four theoretical lenses guided the study, Participatory Communication Theory, Gratifications Theory, Goal-Oriented Communication Theory, and Implementation Theory.

Specifically, regarding feedback mechanisms, the study found that results-driven communication, which emphasized providing feedback on cost efficiency, performance timelines, and quality outcomes, was strongly correlated with improved project performance. Feedback mechanisms fostered better accountability, allowed real-time adjustments, and encouraged learning across project phases (Singirankabo & Wanjiku, 2024). Statistical analysis showed significant relationships between feedback communication and project indicators such as schedule adherence ($r = 0.643$, $p < 0.01$) and cost performance ($r = 0.597$, $p < 0.01$). Qualitative findings also suggested that project teams that engaged in structured review meetings and open feedback exchanges demonstrated higher levels of stakeholder involvement and ownership of results.

Scholars Parham and Li (2023) explored the “Effects of Communication Management on Infrastructure Projects in Jamaica” to assess how feedback and general communication practices influence project quality, timeliness, and cost management. Adopting a quantitative research design, the study gathered data using structured questionnaires from a sample of 140 professionals including project managers, civil engineers, architects, and contractors. Analytical tools included the Relative Importance Index (RII), Frequency Index (FI), and IBM SPSS Version 23. Parham and Li (2023) identified that ineffective communication, characterized by poor feedback systems, vague objectives, and limited reporting channels, was a major cause of project delays, cost overruns, and even project abandonment. Conversely, the study found that structured feedback loops and clearly defined communication responsibilities led to better decision-making, improved stakeholder coordination, and project success. The authors recommended integrating active listening, conflict resolution, and stakeholder feedback into the early stages of infrastructure projects (Parham & Li, 2023).

Similarly, Kipyegon, Muchelule, and Okello (2025) conducted a study titled “Project Communication and Performance of Road Infrastructure Projects in Kenya” that aimed to investigate how barriers such as feedback limitations affected road infrastructure delivery. Using a descriptive survey research design, they examined 89 road projects across Kenya, targeting project managers selected through simple random sampling. Data collection involved both questionnaires and data sheets, and the study adopted the Project Management Maturity Model, Stakeholder Theory, and Transparency Theory as its theoretical underpinnings (Kipyegon *et al.*, 2025). The findings revealed that poorly structured feedback mechanisms significantly impeded project transparency, reporting accuracy, and timely decision-making. The study emphasized the importance of implementing scheduled feedback channels, standardized reporting formats, and interactive communication systems. It concluded that effective project feedback systems directly contribute to better resource utilization and stakeholder coordination, thereby enhancing project performance (Kipyegon *et al.*, 2025).

2.1.3 Communication Channels and Project Performance

In the same study by Singirankabo and Wanjiku (2024), the dimension of multi-channelled communication was examined as a core component influencing project performance. The authors investigated how using various channels, written, verbal, digital, and face-to-face interactions, affects clarity, consistency, and execution efficiency in INGO projects. The multi-channelled communication strategy was empirically tested for its correlation with project delivery outcomes. The study found that communication channels that allowed synchronous (real-time) and asynchronous (delayed) exchanges helped accommodate diverse project roles and decision timelines (Singirankabo & Wanjiku, 2024). The researchers reported a positive correlation ($r = 0.601$, $p < 0.01$) between multi-channelled communication and the consistency of project schedules. They also found that messages delivered across more than one channel, such as face-to-face briefings followed by digital documentation, reduced misinterpretations and enhanced alignment among stakeholders.

Moreover, qualitative findings of Singirankabo and Wanjiku (2024) indicated that reliance on a single channel often led to gaps in information and delayed responses, particularly when technical issues arose. Communication channels such as email, WhatsApp groups, site meetings, and performance dashboards were cited as effective tools for layered communication strategies that reinforce project goals and updates. These findings are directly relevant to the current study’s objective on communication channels, as they illustrate the strategic importance of selecting and integrating communication tools that suit project needs, stakeholder preferences, and the urgency of information (Singirankabo & Wanjiku, 2024).

In the study by Wasike, Namusonge, Makokha, and Karamunya (2023), previously mentioned under communication frequency, the researchers also addressed the role of clarity in communication. The study specifically assessed whether clear, confident, and unambiguous project communication correlated with the performance of road projects. Using a multiple regression model, the researchers found that ambiguous communication led to misunderstandings, lack of trust, and delays. The analysis of variance (ANOVA) showed that unclear communication significantly disrupted coordination among multiple teams. Based on these findings, the authors recommended that project managers ensure two-way communication systems, provide adequate feedback channels, and eliminate jargon to foster shared understanding and

alignment with project goals. Communication clarity was found to be as crucial as frequency in maintaining project performance across quality, budget, and timelines (Wasike *et al.*, 2023).

Scholars Cakir, Kaya, Dikmen, Atasoy, and Birgonul (2023) investigated Communication Complexity in Mega Construction Projects using qualitative semi-structured interviews with 18 professionals across 11 international megaprojects. The study focused on identifying the impact of distributed communication channels among multiple stakeholders. The researchers established a causal structure with three major elements, project complexity, stakeholder diversity, and communication management. Their findings highlighted that communication complexity significantly hindered the clarity of instructions and coordination, especially in large-scale, multinational projects (Cakir *et al.*, 2023). The study concluded that selecting appropriate communication channels, formal and informal, synchronous and asynchronous, was fundamental in reducing communication failures and project delays. Structured communication platforms, such as centralized digital dashboards, were recommended as tools to mitigate information asymmetry.

2.2 Theoretical Framework

Effective communication is a cornerstone of successful project execution, particularly in the construction sector where multiple stakeholders are involved, timelines are strict, and resource coordination is vital. To ground this study in a solid theoretical foundation, this section reviews three relevant theories that explain the dynamics between communication strategies and project performance. These theories provide a lens through which communication frequency, feedback mechanisms, and communication channels can be examined to understand their influence on project outcomes. The selected theories are the Shannon-Weaver Model of Communication, the Media Richness Theory, and the Stakeholder Theory. Each theory is examined in detail for its origin, contemporary application, and relevance to the study objectives.

2.2.1 Shannon-Weaver Model of Communication

The Shannon-Weaver Model, developed by Claude Shannon and Warren Weaver in 1949, is one of the earliest and most influential models of communication. Originally created for telecommunications, the model has since been widely adopted across multiple disciplines, including project management, business communication, and organizational studies. The model identifies key components of communication: sender, encoder, channel, noise, decoder, and receiver, emphasizing the linear flow of information and potential disruptions along the pathway.

In recent studies, including one by Li and Huang (2021), the Shannon-Weaver Model was applied in analyzing communication breakdowns in construction projects in East Asia, revealing that disruptions often stem from noise (technical or human), which reduces project clarity and performance outcomes. The model is particularly relevant to this study's first objective on communication frequency, as it highlights how regular and uninterrupted messages reduce the risk of distortion (noise) and delays in construction execution (Li & Huang, 2021). In the context of ECESUT Ltd, the Shannon-Weaver Model helps conceptualize the importance of consistent and clear information flow between project stakeholders including engineers, foremen, suppliers, and supervisors. By ensuring regular communication through appropriate channels, the likelihood of misunderstandings is reduced, thereby improving project timelines, quality, and cost control. Conclusively, this model supports the argument that effective and frequent communication enhances project coordination, minimizes errors, and contributes to higher construction performance, key intended outcomes of this study.

2.2.2 Media Richness Theory (MRT)

Media Richness Theory, proposed by Daft and Lengel in 1986, suggests that the effectiveness of communication depends on the richness of the communication medium. Rich media (face-to-face meetings, video conferencing) can convey more nuanced information and provide immediate feedback, while lean media (emails, memos) are better suited for simple, routine messages. The theory posits that matching the complexity of a message with the richness of the medium improves understanding and project decision-making. Recent applications of MRT have emerged in studies, including that of Turner and West (2020), who analyzed project performance across European infrastructure projects. They found that construction teams utilizing richer media for complex problem-solving experienced fewer disputes and improved stakeholder alignment, especially in multi-site or cross-functional project settings.

The theory is particularly relevant to the study's third objective on communication channels. It offers a conceptual foundation for evaluating whether ECESUT Ltd selects appropriate channels to deliver different types of project information (Turner & West, 2020). For instance, technical updates requiring instant clarification are best delivered through synchronous methods (e.g., calls, site meetings), while documentation can be shared via email or project management software. In ECESUT's context, the theory reinforces the need for channel appropriateness, suggesting that a misalignment between

message complexity and communication medium can impair performance outcomes. MRT provides a strategic guide for selecting and optimizing communication tools in construction environments to improve project delivery and stakeholder coordination.

2.2.3 Stakeholder Theory

Stakeholder Theory, introduced by Edward Freeman in 1984, emphasizes the role of all stakeholders in the management and success of projects. The theory posits that organizations must consider the interests and input of various parties affected by the project, clients, contractors, workers, local authorities, and community members, to ensure sustainable success and performance. This theory has been increasingly applied in project management studies. For example, a study by Mwangi and Odongo (2022) in the East African construction sector demonstrated that stakeholder engagement, feedback incorporation, and transparent communication mechanisms significantly influenced project outcomes in terms of timeliness, quality, and cost-effectiveness.

Stakeholder Theory aligns strongly with the study's second objective on feedback mechanisms, as it encourages inclusive and reciprocal communication, where stakeholders are not just passive recipients but active participants (Mwangi & Odongo, 2022). Within ECESUT projects, integrating continuous feedback loops, from on-site workers to government inspectors, can surface operational challenges early and support iterative improvements. Moreover, Stakeholder Theory contributes to the achievement of this study by reinforcing the principle that project performance is enhanced when communication strategies include two-way feedback, mutual trust, and participatory approaches, all of which are critical in the dynamic construction environment of Southern Province, Rwanda.

2.3 Conceptual Framework

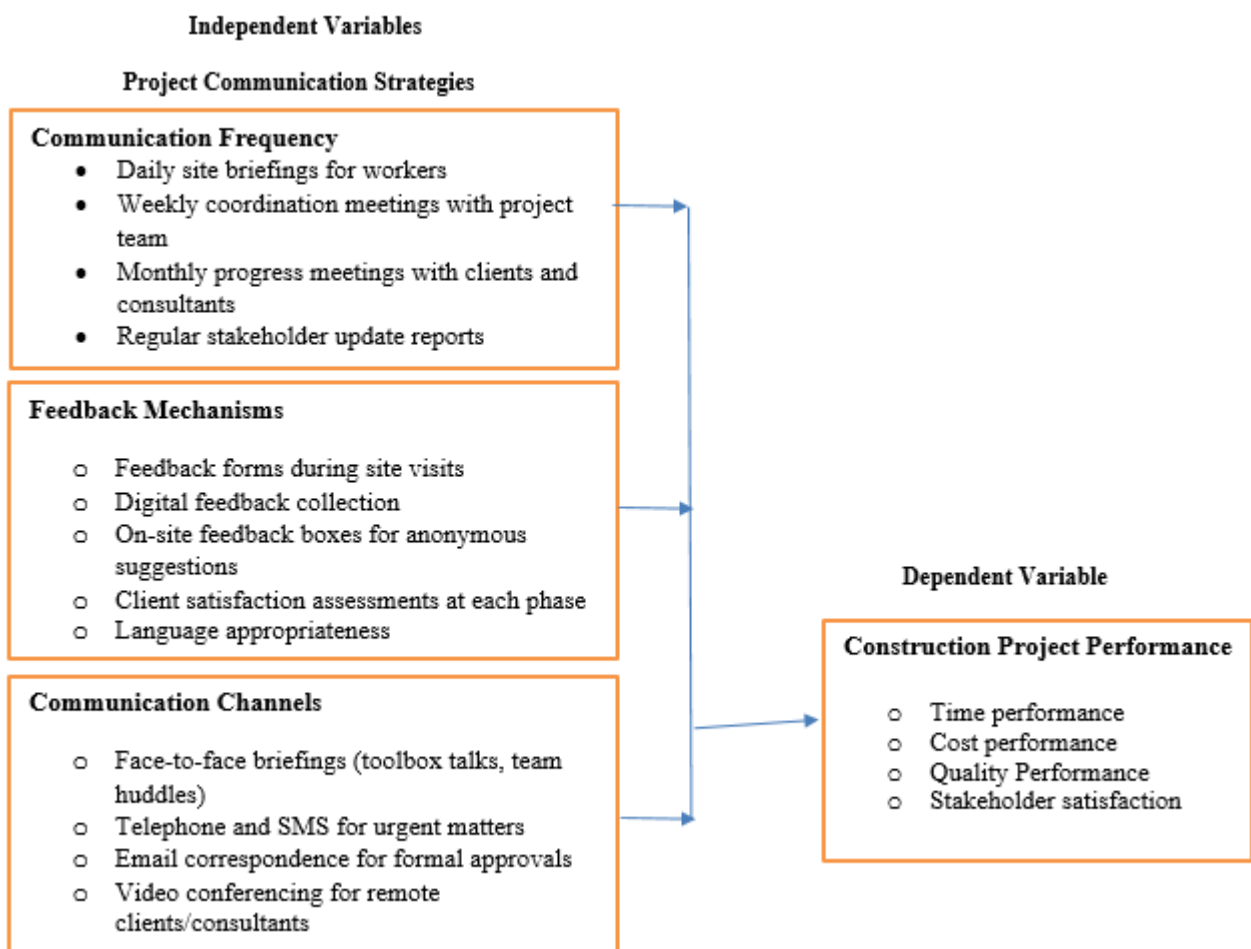


Figure 1. Conceptual Framework

Source: Researcher (2026)

The conceptual framework in Figure 1 illustrates the hypothesized relationships among the three independent variables: communication frequency, feedback mechanisms, communication channels, and their collective influence on the dependent variable, performance of construction projects.

3. RESEARCH METHODOLOGY

3.1 Research Design and Population

The study adopted a cross-sectional research design, which is appropriate for collecting data at a single point in time to examine existing conditions and relationships between variables (Kimemia, 2024). This design enabled the researcher to investigate the influence of project communication strategies on project performance without manipulating the study environment. The cross-sectional design allowed for an efficient assessment of patterns and relationships across various categories of participants involved in the selected construction projects.

In his recent book, Kimemia (2024) affirms that cross-sectional designs are commonly employed in project management research because they allow researchers to gather both quantitative and qualitative data simultaneously. This design supported the achievement of the study objectives by providing a snapshot of the effectiveness of communication strategies within ECESUT Ltd projects during the 2020–2025 implementation period.

3.2 Target Population

The target population for this study comprised individuals directly involved in the planning, execution, supervision, and management of construction projects implemented by ECESUT Ltd in Rwanda’s Southern Province between 2020 and 2024. This includes project managers, site engineers, supervisors, quantity surveyors, administrative staff, and general construction staff. These categories of personnel are best positioned to provide reliable insights into how internal communication practices affect project performance outcomes such as cost adherence, quality delivery, and schedule compliance. According to the ECESUT Ltd Southern Province Project Implementation Report (2024), 215 personnel were involved across three selected projects: the Kigoma Sector Office Building (Nyanza District), Groupe Scolaire Gasaka (Nyamagabe District), and Kibeho Health Post Project (Nyaruguru District).

Table 1. Target Population Distribution

Participant Category	Project Site	Estimated Population
Project Managers	All Sites	5
Site Engineers	All Sites	12
Supervisors	All Sites	18
Administrative Staff	All Sites	25
General Construction Staff	All Sites	155
Total		215

Source: Human Resources ECESUT records (2025)

These participants collectively represent the internal stakeholders whose communication experiences and strategies are central to the investigation. The study focused only on ECESUT employees or contracted personnel directly engaged in the selected projects.

3.3 Sample Design

This section presents sample size determination and sampling techniques used for the study.

3.3.1 Sample Size Determination

To determine the appropriate sample size from the target population of 215, the study applies Slovin’s formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

- n = Sample size
- N = Total population (215)
- e = Margin of error (0.05)

By substituting the values into the formula, $n = \frac{215}{1 + \frac{215(0.05)^2}{1 + 0.5375}} = \frac{215}{1.5375} = 140$

Therefore, the required sample size became 140 participants. This number ensured statistical representativeness and feasibility given the population size.

an equal chance of selection.

For categories with fewer but highly specialized participants, project managers, site engineers, and supervisors, convenience sampling was used. This choice is justified by their strategic involvement in communication-related decision-making and their hands-on experience with project performance outcomes (Kimemia, 2024). According to Kothari and Garg (2023), targeted sampling of key informants can provide nuanced insights that purely random selection might overlook. This combination of probability and non-probability sampling ensured statistical rigor while also capturing critical expertise. The final sample distribution is shown in Table 3.

Table 2. Sample Size Distribution

Participant Category	Target Population	Proportion (%)	Sample Size	Sampling Technique
Project Managers	5	2.9%	4	Convenient
Site Engineers	12	7.1%	10	Convenient
Supervisors	18	10.7%	15	Convenient
Administrative Staff	25	14.3%	20	Simple random
Construction Staff	155	65.0%	91	Simple random
Total	215	100%	140	

Source: HR ECESUT records 2025

This multi-stage sampling strategy increased the reliability and depth of findings while ensuring a manageable sample size in line with project resources

4. RESEARCH FINDINGS AND DISCUSSION

4.1. Response Rate

4.2 Demographic characteristics

This section presents the background characteristics of respondents, including gender, age, role in project implementation, project site exposure, and years of experience in construction projects. These characteristics are important in interpreting the findings because demographic factors may influence perceptions of communication practices and project performance.

Table 3. Gender of Participants

	N	%
Female	47	34.6%
Male	89	65.4%

Source: Research findings (2026)

From Table 6, out of the 136 respondents, 89 (65.4 percent) were male and 47 (34.6 percent) were female. The results indicate that construction project implementation at ECESUT Ltd is predominantly male-driven, which is consistent with the traditional structure of the construction industry. However, the presence of over one-third female respondents reflects increasing gender inclusion within the organization.

From a communication perspective, gender diversity can influence communication styles, team interactions, and conflict resolution approaches. The relatively significant female representation suggests that communication strategies at ECESUT Ltd must be inclusive and responsive to diverse communication preferences. This demographic composition also enhances the reliability of the study findings, as they reflect perspectives from both male and female employees engaged in project activities.

Table 4. Age group for participants

	N	%
25-34	57	41.9%
35-44	56	41.2%
45 and above	6	4.4%
Below 25	17	12.5%

Source: Research findings (2026)

The majority of respondents fall within the age brackets of 25–34 years (41.9 percent) and 35–44 years (41.2 percent). A smaller proportion comprises individuals below 25 years (12.5 percent) and those aged 45 years and above (4.4 percent). The data reveal that the workforce involved in project implementation is largely composed of individuals in their prime working age. This suggests a workforce that is energetic, technologically adaptable, and likely to be responsive to structured communication systems. The relatively low proportion of employees aged 45 and above may indicate limited senior-level experience within operational teams.

Table 5. Role at Project implementation

	N	%
Admin Staff	20	14.7%
General Construction Staff	90	66.2%
Project Manager	4	2.9%
Site Engineer	9	6.6%
Supervisor/ Foreman	13	9.6%

Source: Research findings (2025)

The supervisors or foremen represent 9.6 percent, site engineers account for 6.6 percent, and project managers constitute 2.9 percent of respondents. This distribution indicates that the data primarily reflect operational-level perspectives. Since construction project performance is largely executed at the site level, the dominance of general construction staff provides valuable insight into how communication strategies function in daily project activities. The relatively small proportion of project managers suggests that managerial viewpoints are less represented; however, operational staff are directly affected by communication frequency, clarity of instructions, and feedback processes. The hierarchical distribution of roles highlights the importance of vertical communication within ECESUT Ltd, where effective transmission of information from management to operational teams is critical for project success.

Table 6. Project Site distribution

	N	%
GS Gasaka construction	56	41.2%
Kibeho Health Post construction	42	30.9%
Kigoma Sector Office construction	38	27.9%

Source: Research findings (2026)

Respondents reported experience across three major project sites: GS Gasaka construction (41.2 percent), Kibeho Health Post construction (30.9 percent), and Kigoma Sector Office construction (27.9 percent). The distribution indicates balanced representation across different project environments. Exposure to multiple sites enhances the comprehensiveness of the findings, as communication practices may vary depending on project size, complexity, and stakeholder involvement. The relatively even distribution across sites strengthens the generalizability of the study conclusions within ECESUT Ltd's operations.

Table 7. Years of Experience

	N	%
1-3 years	28	20.6%
4-6 years	65	47.8%
7+ years	32	23.5%
Less than 1 year	11	8.1%

Source: Research findings (2026)

Nearly half of the respondents (47.8 percent) have between 4 and 6 years of experience, while 23.5 percent have more than 7 years of experience. Those with 1–3 years account for 20.6 percent, and 8.1 percent have less than one year of experience. The data suggest that most respondents possess moderate to substantial experience in construction projects. This enhances the reliability of their responses regarding communication effectiveness and project performance. Experienced employees are more likely to accurately evaluate the adequacy of communication frequency, feedback mechanisms, and communication channels. The presence of both moderately experienced and highly experienced staff provides balanced insights into the organization’s communication systems.

4.3 Presentation of Findings

This section presents the descriptive and inferential statistical results corresponding to the three specific objectives of the study, namely the influence of communication frequency, feedback mechanisms, and communication channels on construction project performance at ECESUT Ltd. The quantitative findings are interpreted using mean scores and standard deviations and are triangulated with qualitative data obtained from interviews with key informants as well as document review. This integrated approach strengthens the credibility of the findings and provides contextual depth to the statistical results.

Table 11 presents descriptive statistics for communication frequency items. The overall mean score of 4.10 indicates that respondents generally agreed that communication frequency significantly influences construction project performance at ECESUT Ltd. The relatively low standard deviations across items, ranging between 0.570 and 0.779, demonstrate a high level of consensus among respondents regarding the regularity and effectiveness of communication practices.

The item with the highest mean score (Mean = 4.12, SD = 0.731) relates to the belief that communication frequency enhances coordination and overall project performance. This suggests that employees perceive frequent communication as directly contributing to improved teamwork, timely task execution, and better project outcomes. Similarly, consistent progress reporting to stakeholders (Mean = 4.09, SD = 0.745) reflects structured information sharing practices that promote transparency and accountability. The lowest mean, though still strongly positive (Mean = 3.97, SD = 0.570), concerned the regular conduct of daily site briefings. The narrow dispersion indicates that most respondents uniformly acknowledged that daily briefings are a routine part of project implementation..

4.3.1 Findings at influence of communication frequency on project performance

Table 8. Descriptive Statistics for communication frequency items

Statements concerning communication frequency	SD	D	N	A	SA	Mean	S.D
At ECESUT Ltd, daily site briefings are consistently conducted before tasks begin to ensure clear instructions.	2 (1.5%)	-	12 (8.8%)	108 (79.4%)	14 (10.3%)	3.97	0.570
Weekly coordination meetings are held to monitor progress and address technical issues on time.	2 (1.5%)	-	17 (12.5%)	89 (65.4%)	28 (20.6%)	4.04	0.682
Monthly progress meetings with clients and consultants enhance transparency in project execution.	2 (1.5%)	-	17 (12.5%)	87 (64.0%)	30 (22.1%)	4.05	0.692

The project team receives timely communication about changes in schedules or designs.	2 (1.5%)	-	26 (19.1%)	74 (54.4%)	34 (25.0%)	4.01	0.760
Communication updates are frequent enough to minimize confusion among team members.	2 (1.5%)	-	21 (15.4%)	79 (58.1%)	34 (25.0%)	4.05	0.734
Regular communication enables early detection of risks or delays in project activities.	4 (2.9%)	-	15 (11.0%)	86 (63.2%)	31 (22.8%)	4.03	0.779
Progress reports are shared on a consistent schedule with relevant stakeholders.	3 (2.2%)	-	14 (10.3%)	84 (61.8%)	35 (25.7%)	4.09	0.745
I believe the frequency of communication enhances coordination and overall project performance.	2 (1.5%)	-	17 (12.5%)	78 (57.4%)	39 (28.7%)	4.12	0.731
Overall Mean						4.10	

Source: Research findings (2026)

Key: 1= **SD**, strongly Disagree, 2= **D**, Disagree, 3= **N**, Neutral, 4= **A**, Agree, 5= **SA**, strongly Agree, S.D= standard deviation.

Qualitative data from interviews further reinforced these quantitative results. One site engineer in his own words explained that “morning briefings help us clarify the day’s targets and avoid confusion before work starts,” emphasizing that structured daily communication reduces misinterpretation of technical instructions. A project supervisor similarly observed that “when updates are shared quickly after any design change, we avoid costly rework,” highlighting the preventive role of timely communication. Another respondent noted that “weekly meetings allow us to identify risks early and adjust our work plan,” demonstrating how frequent communication supports proactive risk management.

4.3.2 Findings at influence of feedback mechanisms on project performance

Table 9. Descriptive Statistics for feedback mechanisms items

Statements concerning feedback mechanisms	SD	D	N	A	SA	Mean	S.D
ECESUT Ltd provides channels (e.g., feedback boxes, digital tools) for employees to share suggestions or complaints.	1 (0.7%)	-	16 (11.8%)	95 (69.9%)	24 (17.6%)	4.04	0.601
Feedback from project staff and stakeholders is collected at every milestone or phase.	2 (1.5%)	-	23 (16.9%)	72 (52.9%)	39 (28.7%)	4.07	0.766
The management team responds promptly to feedback received from workers and clients.	2 (1.5%)	-	19 (14.0%)	82 (60.3%)	33 (24.3%)	4.06	0.718
Feedback discussions are conducted in a language and manner understandable to all team members.	2 (1.5%)	-	22 (16.2%)	70 (51.5%)	42 (30.9%)	4.10	0.772
Client satisfaction assessments are conducted regularly during project implementation.	4 (2.9%)	-	14 (10.3%)	84 (61.8%)	34 (25.0%)	4.06	0.787

I have observed that feedback provided by staff or clients often results in improvements in project operations.	3 (2.2%)	-	13 (9.6%)	84 (61.8%)	36 (26.5%)	4.10	0.743
There is a culture that encourages open and constructive feedback without fear of blame.	3 (2.2%)	-	16 (11.8%)	82 (60.3%)	35 (25.7%)	4.07	0.757
The feedback system enhances teamwork and helps correct mistakes early in project execution.	1 (0.7%)	-	13 (9.6%)	80 (58.8%)	42 (30.9%)	4.19	0.661
Overall Mean						4.09	

Source: Research findings (2026)

Key: 1= **SD**, strongly Disagree, 2= **D**, Disagree, 3= **N**, Neutral, 4= **A**, Agree, 5= **SA**, strongly Agree, S.D= standard deviation.

-enriched communication cultures contribute to better project outcomes in construction environments.

Interview responses provided practical insights into how feedback operates at ECESUT Ltd. A project manager stated that “after each milestone review, we discuss what went wrong and what should improve in the next phase,” indicating structured reflection processes. A foreman remarked that “workers are encouraged to report issues immediately, and management usually responds quickly,” reflecting responsiveness and openness. Another key informant observed that “client feedback during site visits often leads to adjustments before final inspections,” demonstrating how feedback improves compliance with specifications.

4.3.3 Findings at influence of communication channels on project performance**Table 10. Descriptive Statistics for communication channels items**

Statements concerning communication channels	SD	D	N	A	SA	Mean	S.D
At ECESUT Ltd, face-to-face briefings such as toolbox talks are regularly held to clarify daily tasks.	-	-	11 (8.1%)	97 (71.3%)	28 (20.6%)	4.13	0.523
Phone calls and SMS are effectively used to communicate urgent or emergency issues.	2 (1.5%)	-	9 (6.6%)	83 (61.0%)	42 (30.9%)	4.20	0.687
Email is the preferred medium for sharing formal communications and project documentation.	3 (2.2%)	-	11 (8.1%)	82 (60.3%)	40 (29.4%)	4.15	0.746
Online platforms such as WhatsApp and Microsoft Teams are used to coordinate activities among staff and consultants.	2 (1.5%)	-	7 (5.1%)	88 (64.7%)	39 (28.7%)	4.19	0.661
Video conferencing tools are utilized for remote coordination with clients and project partners.	1 (0.7%)	-	10 (7.4%)	86 (63.2%)	39 (28.7%)	4.19	0.627
Printed memos and letters are distributed for formal internal communication when necessary.	2 (1.5%)	-	11 (8.1%)	81 (59.6%)	42 (30.9%)	4.18	0.701
Overall Mean						4.17	

Source: Research findings (2026)

Key: 1= **SD**, strongly Disagree, 2= **D**, Disagree, 3= **N**, Neutral, 4= **A**, Agree, 5= **SA**, strongly Agree, S.D= standard deviation.

Table 13 presents descriptive statistics for communication channels. The overall mean score of 4.17 indicates strong agreement that the selection and use of diverse communication channels positively influence project performance. Standard deviations between 0.523 and 0.746 indicate consistency in respondents' perceptions.

The highest mean score (Mean = 4.20, SD = 0.687) relates to the effective use of phone calls and SMS for urgent communication, suggesting that real-time channels are critical in managing emergencies and immediate technical issues. Online platforms such as WhatsApp and Microsoft Teams (Mean = 4.19, SD = 0.661) also scored highly, reflecting integration of digital tools in coordination efforts. Face-to-face briefings, including toolbox talks (Mean = 4.13, SD = 0.523), demonstrate strong reliance on interpersonal communication for clarity of daily tasks. The relatively low standard deviation for this item indicates strong agreement among respondents.

These findings are consistent with Singirankabo and Wanjiku (2024), who found a positive correlation ($r = 0.601$, $p < 0.01$) between multi-channelled communication and schedule consistency. Wasike et al. (2023) similarly emphasized that clarity and appropriateness of communication channels significantly influenced project performance. Cakir et al. (2023) concluded that appropriate channel selection reduces communication complexity and prevents coordination failures in large-scale projects. The present findings affirm that ECESUT Ltd's use of diverse and complementary channels enhances coordination and minimizes information gaps.

4.4 Correlation Analyses

Table 11. Correlation between communication frequency and project performance

		Time adherence	Budget adherence	Quality deliverables	ofBeneficiaries' satisfaction	Communication frequency
Communication frequency	Pearson Correlation	.453**	.500**	.476**	.546**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	136	136	136	136	136

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Research findings (2026)

The findings in Table 14 reveal that communication frequency is positively and significantly correlated with time adherence ($r = .453$, $p < .001$), budget adherence ($r = .500$, $p < .001$), quality of deliverables ($r = .476$, $p < .001$), and beneficiaries' satisfaction ($r = .546$, $p < .001$), based on a sample size of 136 respondents. All relationships are statistically significant at the 0.01 level (2-tailed), indicating consistent associations across all performance dimensions.

These results imply that increased communication frequency enhances overall project performance outcomes. The relatively stronger correlation with beneficiaries' satisfaction ($r = .546$) and budget adherence ($r = .500$) suggests that frequent communication improves stakeholder alignment and financial coordination, thereby reducing misunderstandings and cost inefficiencies. Moderate positive relationships with time adherence and quality further indicate that regular information exchange facilitates timely decision-making and adherence to technical specifications.

Table 12. Correlation between feedback mechanisms and project performance

		Time adherence	Budget adherence	Quality deliverables	ofBeneficiaries' satisfaction	Feedback mechanisms
Feedback mechanisms	Pearson Correlation	.420**	.536**	.494**	.607**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	136	136	136	136	136

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Research findings (2026)

The results in Table 15 indicate that feedback mechanisms have significant positive correlations with time adherence ($r = .420$, $p < .001$), budget adherence ($r = .536$, $p < .001$), quality of deliverables ($r = .494$, $p < .001$), and beneficiaries' satisfaction ($r = .607$, $p < .001$), with all relationships statistically significant at the 0.01 level based on 136 observations.

Table 13. Correlation between communication channels and project performance

		Time adherence	Budget adherence	Quality deliverables	ofBeneficiaries' satisfaction	Communication channels
Communication channels	Pearson Correlation	.416**	.524**	.494**	.540**	1
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	136	136	136	136	136

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Research findings (2026)

Table 16 analysis findings show that communication channels are positively and significantly correlated with time adherence ($r = .416$, $p < .001$), budget adherence ($r = .524$, $p < .001$), quality of deliverables ($r = .494$, $p < .001$), and beneficiaries' satisfaction ($r = .540$, $p < .001$). All coefficients are statistically significant at the 0.01 level (2-tailed), based on a sample of 136 respondents. These results indicate that the appropriateness and effectiveness of communication channels play a vital role in project performance. The relatively strong correlations with budget adherence ($r = .524$) and beneficiaries' satisfaction ($r = .540$) suggest that selecting suitable communication platforms enhances clarity, reduces information distortion, and strengthens stakeholder engagement. Moderate correlations with time and quality imply that efficient channels support coordination and accurate dissemination of technical information.

The results in Table 17 show strong positive interrelationships among the independent variables, with communication frequency significantly correlated with feedback mechanisms ($r = .774$, $p < .001$) and communication channels ($r = .606$, $p < .001$), while feedback mechanisms are also strongly correlated with communication channels ($r = .784$, $p < .001$). Furthermore, all communication variables exhibit strong and significant correlations with project performance: communication frequency ($r = .649$, $p < .001$), feedback mechanisms ($r = .677$, $p < .001$), and communication channels ($r = .650$, $p < .001$), based on 136 observations.

These findings imply that project communication strategies operate as an integrated system rather than independent elements. The strong inter-correlations among communication variables suggest the presence of complementary and reinforcing effects, where improvements in one dimension enhance the effectiveness of others. Notably, feedback mechanisms demonstrate the strongest relationship with overall project performance ($r = .677$), indicating their central role in driving project success through continuous information exchange and adjustment. The high correlations also signal potential multicollinearity, justifying the need for regression analysis to isolate independent effects. Overall, the results confirm that a holistic and coordinated communication approach is essential for optimizing construction project performance.

Table 14. Multiple correlations matrix

		Communication frequency	Feedback mechanisms	Communication channels	Project performance
Communication frequency	Pearson Correlation	1			
	N	136			
Feedback mechanisms	Pearson Correlation	.774**	1		
	Sig. (2-tailed)	<.001			
	N	136	136		
Communication channels	Pearson Correlation	.606**	.784**	1	
	Sig. (2-tailed)	<.001	<.001		
	N	136	136	136	
Project performance	Pearson Correlation	.649**	.677**	.650**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	136	136	136	136

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Research findings (2026)

4.5 Regression Analysis

Multiple regression analysis was conducted to examine the combined and individual influence of communication frequency, feedback mechanisms, and communication channels on project performance at ECESUT Ltd. While correlation analysis established significant associations between the variables, regression analysis was necessary to determine predictive strength, isolate independent effects, and assess the overall explanatory power of communication practices on construction project performance. The regression results are presented through the Model Summary, ANOVA results, Regression Coefficients, diagnostic tests, and hypothesis testing.

Table 15. R-Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731a	.534	.524	.30898
a. Predictors: (Constant), Communication channels, Communication frequency, Feedback mechanisms				
b. Dependent Variable: Project performance				

Source: Research findings (2026)

The model summary results from Table 18 indicate a strong positive linear relationship between the independent variables and project performance, as reflected by a multiple correlation coefficient of $R = 0.731$. This value suggests a substantial collective association between communication frequency, feedback mechanisms, communication channels, and project performance within ECESUT Ltd. In practical terms, the strength of 0.731 implies that communication practices are highly intertwined with performance outcomes in construction projects, particularly in relation to time adherence, budget compliance, quality of deliverables, and beneficiary satisfaction.

The coefficient of determination ($R^2 = 0.534$) demonstrates that 53.4% of the variance in project performance is explained by the three communication variables combined. After adjusting for sample size and number of predictors, the Adjusted R^2 slightly decreases to 0.524, indicating that 52.4% of the variability in project performance remains accounted for even after correcting for model complexity. This minimal reduction between R^2 and Adjusted R^2 confirms the stability and robustness of the model, suggesting that the predictors meaningfully contribute to explaining performance variations rather than inflating explanatory power.

The explanatory strength of 53.4% is considerable when compared with similar empirical studies in construction and infrastructure contexts. For instance, Singirankabo and Wanjiku (2024) reported that communication practices explained approximately 49% of performance variance ($R^2 = 0.49$) in INGO projects operating in Rwanda. Similarly, Nzuki and Mutuku (2023) found statistically significant regression results in Kenyan road construction projects, although with slightly lower explanatory power than the current study. Wasike et al. (2023) also confirmed significant predictive capacity of communication variables with a regression model yielding $p = 0.000$; however, the proportion of explained variance was lower than 53%. Comparatively, the present findings suggest that communication practices exert an even stronger structural influence on project performance within ECESUT Ltd than reported in some regional studies.

Furthermore, the standard error of the estimate (0.30898) is relatively small, indicating that the predicted values of project performance closely approximate observed values. This low dispersion of residuals enhances confidence in the predictive accuracy of the model. Overall, the model summary demonstrates that communication-related variables constitute a major explanatory block in determining construction project performance within the ECESUT context.

Table 16. ANOVA Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14.457	3	4.819	50.479	<.001b
	Residual	12.602	132	.095		
	Total	27.059	135			
a. Dependent Variable: Project performance						
b. Predictors: (Constant), Communication channels, Communication frequency, Feedback mechanisms						

Source: Research findings (2026)

Table 19 ANOVA results further confirm the statistical validity of the regression model. The model produced an F-statistic of 50.479 with a significance level of $p < .001$. This highly significant F-value indicates that the regression model provides a significantly better fit to the data than a model without predictors. In statistical terms, this means that at least one of the independent variables significantly predicts project performance.

The magnitude of the F-statistic (50.479) reflects strong collective explanatory power. When compared with previous empirical findings, the strength of this F-value is noteworthy. Wasike et al. (2023) reported statistically significant ANOVA results ($p = 0.000$) confirming communication's influence on road project performance, but the F-values reported in similar regional studies were generally lower in magnitude. Likewise, Parham and Li (2023) found significant F-statistics linking communication management to infrastructure project performance in Jamaica, reinforcing the importance of communication structures in project environments. Singirankabo and Wanjiku (2024) similarly established statistically significant ANOVA outputs confirming that communication dimensions significantly influenced performance indicators such as schedule and cost efficiency. The present study's F-value of 50.479 therefore indicates not only statistical significance but also comparatively strong predictive contribution of communication practices in the ECESUT construction context. This reinforces the argument that structured communication systems are not peripheral managerial tools but core determinants of project success in developing country construction environments.

Table 17. Regression Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.264	.236		5.357	<.001
	Communication frequency	.254	.076	.312	3.323	.001
	Feedback mechanisms	.146	.091	.193	1.602	.112
	Communication channels	.272	.084	.310	3.240	.002

a. Dependent Variable: Project performance

Source: Research findings (2026)

The regression equation derived from the model is:

Project Performance = **1.264** + **0.254**(Communication Frequency) + **0.146**(Feedback Mechanisms) + **0.272**(Communication Channels)

The constant (1.264, $p < .001$) indicates the baseline level of project performance when all communication variables are held constant. More importantly, the standardized beta coefficients provide insight into the relative predictive strength of each independent variable.

Communication frequency emerged as a statistically significant predictor of project performance ($\beta = 0.312$, $t = 3.323$, $p = 0.001$). This indicates that, holding other variables constant, a one-unit increase in communication frequency leads to a 0.254-unit increase in project performance. The standardized beta value of 0.312 shows that communication frequency contributes substantially to performance variation. These findings are consistent with Abdul-Fatawu *et al.* (2024), who reported that frequent and structured communication significantly reduced project delays and rework in Ghanaian construction projects. Nzuki and Mutuku (2023) similarly found statistically significant regression coefficients demonstrating that communication frequency improved project timeliness and coordination in Kenyan road projects. Lubis (2021) further reported that inconsistent communication contributed to a 69.61% decline in time performance, highlighting the performance risks associated with irregular communication. The present study empirically confirms these findings within ECESUT Ltd, demonstrating that communication frequency significantly enhances time adherence, budget control, and quality delivery.

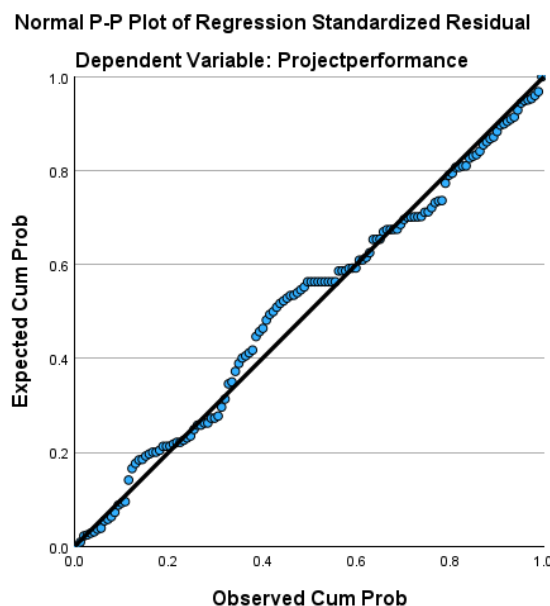
Feedback mechanisms, although positively related to project performance, did not achieve statistical significance in the regression model ($\beta = 0.193$, $t = 1.602$, $p = 0.112$). While earlier correlation results showed strong associations between feedback mechanisms and performance ($r = 0.677$, $p < .001$), the regression results suggest that when other communication variables are controlled, feedback mechanisms do not independently predict performance outcomes. This may be attributed to multicollinearity, as feedback mechanisms were strongly correlated with communication frequency ($r = 0.774$) and

communication channels ($r = 0.784$). These high inter-correlations indicate overlapping explanatory contributions among communication dimensions.

This finding contrasts somewhat with Singirankabo and Wanjiku (2024), who reported strong correlations between results-driven communication and schedule adherence ($r = 0.643$, $p < 0.01$). Similarly, Kipyegon et al. (2025) found significant regression influence of structured feedback systems on road infrastructure performance. The divergence in findings may suggest contextual differences, whereby feedback mechanisms at ECESUT Ltd operate synergistically rather than independently, reinforcing other communication practices instead of serving as standalone predictors.

Communication channels were also found to significantly influence project performance ($\beta = 0.310$, $t = 3.240$, $p = 0.002$). A one-unit increase in effective communication channel utilization leads to a 0.272-unit increase in project performance. The standardized beta coefficient of 0.310 indicates that communication channels are nearly as influential as communication frequency in predicting performance outcomes. This finding aligns with Singirankabo and Wanjiku (2024), who found a positive correlation of $r = 0.601$ between multi-channeled communication and project schedule consistency. Wasike et al. (2023) similarly established that clear and appropriate communication channels significantly improved road construction performance. Cakir et al. (2023) further emphasized that structured communication channel selection reduces complexity and coordination failures in mega construction projects. Within ECESUT Ltd, the effective integration of meetings, digital platforms, written reports, and face-to-face communication appears to significantly strengthen coordination efficiency and execution effectiveness.

Table 18. Normal P-P Plot



The Normal P–P Plot demonstrates that the observed cumulative probabilities closely align with the expected diagonal line. The absence of systematic deviations or extreme outliers confirms that residuals are normally distributed and that the regression model is statistically appropriate for inference. These diagnostic results strengthen confidence in the validity and reliability of the regression findings.

4.6 Hypothesis Testing

The regression results provide empirical evidence for hypothesis testing. The null hypothesis stating that communication frequency does not significantly influence project performance was rejected because communication frequency demonstrated a statistically significant effect ($\beta = 0.312$, $p = 0.001$). This confirms that communication frequency significantly enhances construction project performance at ECESUT Ltd. The null hypothesis regarding feedback mechanisms was not rejected because feedback mechanisms did not achieve statistical significance in the regression model ($\beta = 0.193$, $p = 0.112$). Although feedback mechanisms are positively associated with performance, they do not independently predict performance when other communication variables are considered simultaneously.

Table 19. One sample t-test

Test Value = 0.05							
	t	Df	Significance		Mean Difference	95% Confidence Interval of the Difference	
			One-Sided p	Two-Sided p		Lower	Upper
Communication frequency	84.648	135	<.001	<.001	3.995037	3.90170	4.08838
Feedback mechanisms	79.602	135	<.001	<.001	4.037316	3.93701	4.13762
Communication channels	94.321	135	<.001	<.001	4.122794	4.03635	4.20924

Source: Research findings (2026)

The null hypothesis stating that communication channels do not significantly influence project performance was rejected because communication channels showed a statistically significant effect ($\beta = 0.310$, $p = 0.002$). This confirms that effective channel selection and utilization significantly contribute to improved project outcomes. The one-sample t-test further supports the strength of communication practices within ECESUT Ltd. Communication frequency ($t = 84.648$, $p < .001$), feedback mechanisms ($t = 79.602$, $p < .001$), and communication channels ($t = 94.321$, $p < .001$) all had mean values significantly higher than the test value, indicating strong respondent agreement regarding the presence and importance of these communication practices.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion of the Study

Based strictly on the empirical findings, the study draws the following conclusions aligned to the research objectives. First, communication frequency significantly influences construction project performance at ECESUT Ltd. Regular briefings, structured meetings, and timely updates enhance coordination, risk anticipation, schedule compliance, cost management, and stakeholder satisfaction. Communication frequency emerged as a statistically significant independent predictor of performance.

Second, feedback mechanisms positively relate to project performance, particularly in enhancing beneficiary satisfaction and quality assurance. However, feedback mechanisms do not independently predict project performance when other communication variables are considered simultaneously. This suggests that feedback operates as an integrated component of broader communication systems rather than as a standalone determinant.

Third, communication channels significantly influence construction project performance. The use of diverse and appropriate communication platforms enhances clarity, responsiveness, documentation integrity, and operational coordination. Communication channels emerged as a statistically significant independent predictor of project performance. Communication strategies collectively explain more than half (53.4%) of the variance in construction project performance at ECESUT Ltd. This confirms that structured communication management is a central determinant of construction project success.

5.2 Recommendations of the Study

Management should institutionalize standardized communication schedules, including mandatory daily briefings, weekly technical reviews, and structured monthly client coordination meetings. A formal communication management framework should be developed to clearly define reporting lines, escalation procedures, documentation standards, and digital communication protocols. Structured monitoring mechanisms should be introduced to evaluate communication effectiveness as a key performance indicator in project evaluation systems. Clients and beneficiaries should actively participate in structured milestone review meetings to ensure alignment between expectations and project outputs. Consultants and supervising engineers should harmonize reporting formats and communication protocols with contractors to reduce information inconsistencies. Regulatory authorities should encourage structured communication documentation as part of compliance audits. Future research should examine communication strategies across multiple construction firms to enhance generalizability beyond a single organizational context. Comparative studies between public and private construction companies would provide deeper insight into contextual variations in communication effectiveness.

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