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PROJECT QUALITY: AN EMPIRICAL ANALYSIS OF PROJECT COMMUNICATION STRUCTURE AND CLIMATE AMONG CONSTRUCTION FIRMS IN NORTH CENTRAL NIGERIA

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ABSTRACT

Effective communication remains one of the critical success factors in projects, especially since construction firms engage many stakeholders within a tight schedule. This paper investigates the influence of project communication structures and climate on the project quality of construction firms in North-Central Nigeria. This research adopts a quantitative research design through a physical administration of 5-point Likert-scale structure questionnaires to respondents in the industry. The statistical analysis was done using multiple regression with the aid of SPSS 27. Findings indicate that both dimensions of communication significantly determine project quality and overall project success. Results depict that clear communication structures enable the avoidance of misunderstandings and proper articulation of the project milestones. Also, an appropriate climate, one of communication indicative of trust, openness, and shared cooperation, reduces project delays. Consequently, the research recommends establishing clear, hierarchical communication channels to minimize ambiguities. This ensures critical information flows through designated pathways, reducing delays and misunderstandings. Also, the research recommends that construction forms foster a supportive communication environment by promoting transparency, trust, and active listening.

Keywords: *Project Communication, Project Communication Structure, Project Communication Climate, Project Success, Project Quality*

INTRODUCTION

Active infrastructural development, driven by construction firms, is critical to national prosperity since it contributes to economic growth through job creation, sectoral expansion, and increased GDP (Alu et al., 2024; Satoinong et al., 2024). Despite the benefits, Nigeria faces huge infrastructural deficits because of project failures (Stretton, 2023). Projects were abandoned or stalled, amongst others, by the Abuja-Keffi-Makurdi road, awarded to China Harbour Engineering Company and was never completed. Recently, the Federal Ministry of Works has terminated some contracts in Kogi, Nasarawa, and Abuja over non-performance by construction firms. Punch Newspaper, July 2, 2024.

The project quality assessment criteria comprise three important attributes defining its performance: time, budget, and stakeholders. Factors contributing to project success entail the main constraints: quality, cost, time, and environmental circumstances (Albtoush et al., 2022). As explained above, communication lies in the very basis of effective implementation and a well- developed concept of the final project outcomes as suggested by Duale & Ahmed (2024). Vertical, horizontal, formal, informal, and collaborative communication structures define how the project is executed. Early stages of structured interactions mean better coordination and fewer misunderstandings. In this regard, Abdallah et al. (2024) and Hassan et al. (2023) observed that most causes of project failure in Nigeria had a root cause traced to a lack of open dialogue and poor information sharing.

Poor communication methods further complicate project coordination and leave stakeholders uninformed about progress (Stretton, 2023). Confusing communication patterns, sparse updates, and an unfriendly project communication climate create disruptions throughout the project timeline and impede quality in total (Yap et al., 2017; Tadayon et al., 2021). Also, ineffective communication, scheduling, and delivery mechanisms challenge sequential project coordination (Wabomba, 2021; Shazali et al., 2024). Wu et al. (2017) attributed it to inadequate communication at the time of delivery, unless proven otherwise, because projects have increasingly failed.

Moreover, projects are inherently vulnerable to risks like financial constraints, regulatory issues, and unexpected delays that may impede their success (Alabdullah & Hussein, 2023). Communication media, patterns, and climate risks add to the complexity that threatens to compromise project quality (Selvakumara et al., 2024). Integrating risk management into project communication strategies can mitigate these challenges and improve project outcomes. Against this background, the present study examines the influence of project communication through structure and project communication climate on project quality in North Central Nigeria. The rest of the work is organised into five sections: literature review, methodology, results and discussion, conclusion, and recommendations.

LITERATURE REVIEW

CONCEPTUAL REVIEW

Project communication is one of the very important components in project management since it guarantees timely and appropriate information delivery. Manuputty and Nursin (2023) asserted that effective project communication influences a project's content, direction, and overall result. It forms the heart of project implementation (Nixon & Afrizal, 2023), and is vital in building shared understanding among the stakeholders (Ruuska, 1996, as cited in Abraham & Abdurazak, 2019). Project Communications Management includes the processes that are required for creating, collecting, distributing, storing, and finally disposing of project information. These processes provide critical links among people, ideas, and information that are required for project success (PMI, 2009, as cited in Abraham & Abdurazak, 2019). It is important to ensure that the project participants can conveniently send and receive communications in the "language" of the project for smooth operation (Singirankabo & Wanjiku, 2023).

Communication, broadly defined, is the exchange of information between a sender and a receiver (Lusajo & Angelus, 2024). It consists of the message, the transmission and/ or communication channel, and the receiver; these must ensure clarity and comprehension. Successful communication practices are critical to organizational success (Belout & Gauvreau, 2023). In modern times, communication is essential for spreading information needed for command execution to develop bonds of trust and commitment (Sahil, 2023). Organizational communications take clear-cut directions, ranging from upward, downward, vertical, and horizontal channels, driven by the chain of command (Signe, 2018). In all these forms of communication across any organization, the values, goals, client relationships, operations processes, and reporting structures are reversed. The proper means of communication to involve various stakeholders in a corporate context, including all these factors, is gradually surfacing to meet complex stakeholder expectations (Laif et al., 2024).

A project is a temporary initiative aimed at creating a distinct product, service, or outcome (PMBOK, 2017). In the same vein, BS 6079-2:2000 Project Management Vocabulary defines a project as "a unique process made up of a series of coordinated and controlled activities with defined start and finish dates, carried out to meet objectives aligned with specific requirements, including limitations in time, cost, and resources." Project management involves the careful planning, organisation, and direction of project-related activities to maximise outcomes while addressing various challenges and risks (Stanisław, 2024). Effective communication within projects plays a crucial role in quality assessment and overall

understanding (Belout & Gauvreau, 2023). A well-organised communication structure helps team members clearly express both verbal and nonverbal information, fostering professional relationships and boosting performance (Abdul- Fatawu et al., 2024). Ongoing communication facilitates knowledge sharing, problem identification, and collaborative decision-making, all of which contribute to a higher success rate in projects (Patrashkova et al., 2019).

Project communication management encompasses various processes that facilitate the accurate delivery of information to relevant stakeholders, ensuring that recipients understand the information shared (Akintelu et al., 2023). These processes include planning, collecting, creating, distributing, storing, managing access, controlling, and monitoring project information, all of which lead to eventual disposal (Abdul-Fatawu et al., 2024). Communication in projects goes beyond mere information transfer; it involves collaboration among professionals engaged in interdependent tasks (Belout & Gauvreau, 2023).

When project members are regularly informed about objectives and expectations, work efficiency provides significant benefits to the overall project (Abdul-Fatawu et al., 2024). Managers typically spend a large portion of their time communicating, often consulting with internal and external stakeholders across various levels of the organization (Akintelu et al., 2023). Effective communication fosters relationships with stakeholders from diverse cultural and economic backgrounds, ultimately promoting shared understanding and common goals for successful project execution (Shazali et al., 2024).

Project communication management involves three primary processes: planning communications, managing communications, and monitoring communications (PMBOK, 2017). In this context, planning communications management entails developing a structured communication strategy that addresses stakeholder needs, project requirements, and organizational resources (Almashhadani & Almashhadani, 2023). Project managers should create a communication management plan that delineates objectives, target audiences, messaging content, communication channels, and timelines. Additionally, it must take into account stakeholders' preferences to avoid both excessive communication and insufficient communication, which can lead to disengagement or misunderstandings (Nixon & Afrizal, 2023). Ineffective communication significantly contributes to project failures, often resulting in financial losses for organisations. Sahil (2023), Lusajo, and Angelus (2024) emphasise that high-performing organisations maintain frequent communication to enhance project performance.

A well-structured communication management plan ensures project alignment by clearly establishing expectations, providing visibility for stakeholders, creating feedback mechanisms, and enhancing productivity. The project communication management process encompasses creating, collecting, disseminating, storing, retrieving, and disposing of project information. This plan should, however, be continuously reviewed and adapted to the changing dynamics of the project and the evolving needs of stakeholders (Shazali et al., 2024). By monitoring communication, project managers can ensure that planned messages are sent, received, and understood by the audience, incorporating their feedback (PMI, 2023).

Effective project communication is crucial for ensuring project quality; conversely, ineffective communication often leads to project failure (Sahil, 2023). Various channels and techniques enhance message delivery and comprehension, contributing to project success. Project managers should prioritise communicative skills, including active listening, writing, speaking, conflict resolution, and managing expectations (Udeh, 2024). Effective communication remains vital for fostering cohesion, collaboration, and achieving favourable project outcomes, especially in teams with diverse backgrounds and expertise.

Hashim (2024) highlighted several dimensions of project communication that this study examines as key indicators: communication patterns, structure, medium, climate, delivery methods, and communication scheduling. This study specifically focuses on the structure and climate of project communication.

Sarimah et al. (2024) noted that communication networks possess distinct characteristics, including their structure. Each network has a unique arrangement of ties that characterise the flow of communication. Employee interconnections influence performance and organisational viability (Sarimah et al., 2024). The organisational communication structure shapes information flow within the entity. Ding et al. (2023) assert that this structure is linked to the overall organisational framework, which facilitates information sharing and defines communication dynamics within the organisation. Thus, an organisation's communication structure impacts employee performance.

While project organisations establish their communication frameworks, there are four primary directions in which communication occurs among employees: downward, upward, horizontal, and diagonal communication (Spaho, 2012). Nonetheless, the most commonly implemented structures are downward, upward, and horizontal communications (Atambo & Momanyi, 2016). The downward and upward forms are typically classified as vertical communication, whereas

diagonal communication is less prevalent in organisations (Hikmah, 2015).

Widhiastuti (2012) defined vertical communication as the exchange of information through certain organisational hierarchies and influences the organisation's members because there are interactions between employees, managers, and employees in a formal organisation. For instance, Widhiastuti (2012) explained that managers provide important information to employees through the organisation's communication structure. This flow of communication is usually referred as the downward communication. Similarly, employees communicate about work-related issues such as work problems, things to be done, how to be done, and work reports to the managers (Malia et al., 2024). This flow of communication can also be referred to as upward communication. Therefore, the communication structure that consists of vertical (downward and upward), horizontal, and diagonal communication interconnects employees and thus affects employee performance in an organization (Kovacic & Luzar, 2011). Therefore, communication structures of an organisation can influence employee performance because they determine the flow of information within the organisation.

In projects, the communication climate is shaped by the environment (Shazali et al., 2024). Additionally, it can be influenced by the actions of stakeholders on site. This climate develops from relationships and is enhanced through moments of support, praise, and appreciation. The way project managers and stakeholders define this climate reflects shared perceptions within project teams (Frazier & Bowler, 2015). Consequently, it plays a crucial role in facilitating effective communication in projects. According to Meron (2022), the communication climate can impact colleagues either positively or negatively based on the atmosphere created. A favourable climate leads to positive effects, whereas a hostile environment results in negative consequences. For example, the communication climate influences how project stakeholders either share information freely or hoard it.

It is viewed as a vital aspect of project communication. Within projects, the communication climate significantly affects the ease or difficulty of collaboration among team members, contributing to both certainty and disputes that may arise (Shazali et al., 2024). Therefore, the quality of the communication climate can vary across projects. This climate influences project success through the presence of support and encouragement, or through tensions that can hinder positive working relationships. In some cases, negative sentiments within project organisations can lead to specific exchanges of words among team members, potentially triggering project failure.

CONCEPT OF PROJECT SUCCESS AND QUALITY

Various stakeholders view project success in distinct ways, including project owners, funders, governments, project managers, and consultants. According to Volden & Welde (2022), project success is defined by the extent to which technical performance specifications are met and the initial mission requirements are satisfied. In contemporary research, project success is measured as project quality and is defined (Silva et al., 2016) as the achievement of pre-established performance objectives and stakeholder expectations for construction projects. These expectations, which include timely completion, efficient delivery, and overall project usefulness, have been explored in several previous studies (Goshu et al., 2024; Almashhadani & Almashhadani, 2023). Therefore, project quality hinges on meeting these effective expectations.

The traditional definition of project quality has progressed beyond simply fulfilling constraints of cost, time, and specifications (Kerzner, 2013, cited in Kenan & Maru, 2020). It now includes a broader array of performance indicators, such as project efficiency, usefulness, and stakeholder

satisfaction (Kandelousi et al., 2011, cited in Kenan & Maru, 2020). As an aggregate measure of performance, project quality is often associated with achieving both business objectives and technical project requirements (Lysons & Farrington, 2006, cited in Kenan & Maru, 2020). These elements contribute to a comprehensive definition of project quality, moving away from the conventional triple constraint model of cost, time, and scope.

Project success is frequently determined by critical success factors (CSFs) alongside project quality criteria (Müller & Jugdev, 2012, cited in Kenan & Maru, 2020). Project quality criteria are the standards for evaluating project success, while CSFs are the components that influence project outcomes (Savolainen et al., 2012, cited in Kenan & Maru, 2020). The shift from the basic "Iron Triangle" model (cost, time, quality) to a more complex and multidimensional framework reflects a growing understanding of project success (Shenhar & Dvir, 2007, cited in Kenan & Maru, 2020). Modern models include stakeholder satisfaction, knowledge management, and continuous improvement as fundamental elements of project quality assessment.

Shenhar et al. (2019) proposed a multidimensional approach to project quality, which includes short-term efficiency, medium-term effectiveness, long-term organizational impact, and future business opportunities. The first dimension evaluates project completion against traditional constraints of cost, time, and quality. The second dimension pertains to the benefits realized by users and stakeholders; the third reflects the organization's preparedness for future challenges, and

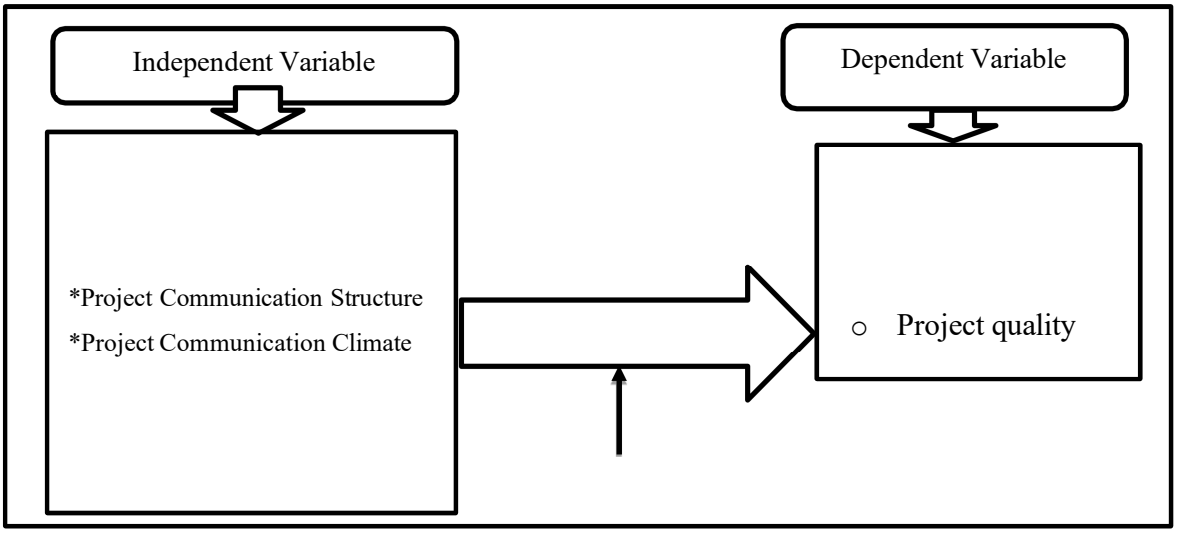
lastly, the fourth encourages innovative business development. These dimensions illustrate different aspects of Project Success Assessment, evolving from a static evaluation framework to a dynamic one.

In contemporary discussions, project quality is recognised as a strategic management concept that aligns project efforts with broader organizational aims (Atkinson, 1999). While the Iron Triangle remains a valuable tool for quick performance assessments, subsequent research suggests incorporating additional elements such as stakeholder engagement, risk management, and a focus on continuous improvement (Rodrigues & Bowers, 2019; Dweiri, 2021). ShenHar et al. (2017) argue that evaluating project quality should extend beyond mere compliance with time, cost, and scope, advocating for a focus on the project's long-term impacts. This broader viewpoint provides a more accurate basis for assessing success and effectiveness. Given the multifaceted nature of project quality, robust assessment methodologies are necessary, considering various performance indicators (Hussain et al., 2022; Okuden et al., 2022).

In general, the quality of construction projects is evaluated based on time and cost performance, client satisfaction, and adherence to project specifications (Habibi et al., 2018). Neyestani (2016) and Albtoush et al. (2022) identify success factors in construction projects including cost management, scheduling efficiency, contract management, and external factors. Cleary and Lamanna (2022) emphasise client satisfaction as a key indicator of project quality, management efficiency, and profitability. Together, these studies highlight the importance of both technical and stakeholder perspectives in defining what success in a project entails.

CONCEPTUAL FRAMEWORK

Figure 2.1: Review Framework



Source: Researcher's Conceptual Review (2025).

Figure 2.1 provides a pictorial representation of the conceptual review of this study. From left to right, the independent variable 'project communication' with the two proxies, project communication structure and project communication climate, links up to the dependent variable 'project success,' which is proxied with project quality.

THEORETICAL FRAMEWORK

The Communication Accommodation Theory, formulated by Howard Giles, examines how individuals adjust their communication styles, either converging or diverging, to reflect a reduction or emphasis on social distinctions. This theory highlights that people modify their speech, gestures, and language to enhance understanding with their conversational partners or to stress differences. In the context of organizational communication at the Nigerian Law School, this theory suggests that effective communication and improved employee performance rely on the flow of communication across departments and the strategic adjustments made by individuals. With the rise of globalization and increased inter-group interactions, CAT has generated significant research interest focused on understanding how motivations for convergence and divergence differ across various contexts.

Giles expanded the application of CAT by underscoring its importance in both intergroup and interpersonal communications. He noted that accommodation fosters an interplay between intergroup and interpersonal dialogue,

allowing individuals to either bolster social integration or highlight distinctions. Gasiorek and Giles identified four guiding principles of communication accommodation: striving for a social identity framework, understanding interlocutors, expressing disfavor, and conveying negative intent. These principles shape how people adapt their communicative styles in different situations, with convergence enhancing similarity and positive interactions, while divergence can either hinder or aid understanding, depending on the context.

The mechanisms of accommodation are contingent upon communicative objectives. Speech rate, clarity, and topic selection can enhance comprehension and engagement. Slower speech or heightened volume can improve understanding, while ensuring topic appropriateness maintains the relevance of interactions. Emphasizing expressive forms further contributes to effective communication. As noted by Dragojevic (2016), "Speakers often use multiple strategies simultaneously to optimize their communication." CAT outlines three main adjustment forms: convergence, divergence, and maintenance. Convergence fosters likability and social acceptance, whereas divergence can act as a barrier or a method to reinforce group distinctions. Divergence isn't inherently negative; Street and Giles observed that it can further understanding in specific circumstances. For instance, bilingual speakers might feign forgetfulness of certain terms to encourage their partner to modify their speech. However, inappropriate communicative adjustments result in non-accommodation, manifesting as either over-accommodation or under- accommodation.

Over-accommodation, such as overly modifying speech when addressing the elderly, may lead to ineffective communication, while under-accommodation occurs when one or both parties fail to make necessary adjustments, resulting in divergence and inadequate dialogue. Gasiorek and Giles explain that non-accommodation arises from "an intention to establish a social distance or reduce understanding." The current research integrates CAT into project communication, emphasizing its role in mitigating project risks and ensuring high-quality outcomes. Effective project communication facilitates convergence, helping team members steer clear of conflicts, foster collaboration, and align efforts toward achieving shared goals. Conversely, divergence can prevent conflicts during project execution by averting communication breakdowns and collaboratively addressing emerging issues. Thus, convergence, divergence, and maintenance promote accountability, resource mobilization, mutual respect, and trust throughout the project communication process. In conclusion, CAT offers a comprehensive framework for understanding the intricate interactions that impact project quality and performance.

EMPIRICAL REVIEW

Noticeably, previous studies have investigated the impact of communication practices on project performance (Abdul-Fatawu et al., 2024; Lusajo & Angelus, 2024; Satoinong et al., 2024; Akintelu et al., 2023; Meron, 2022; Malik et al., 2021). Utilizing a mixed-method approach, Satoinong et al. (2024) examined the stakeholders involved in the construction industry by surveying and interviewing them about their practices concerning communication. The study established that structured communication improves performance, reduces delays, and enhances cost efficiency. The major barriers noted are language differences, inconsistent information flow, and delayed updates. This study elaborated on the necessity of digital tools and standardized protocols to optimize effectiveness in communication.

Similarly, Abdul-Fatawu et al. (2024) assessed project communication in Ghana's construction industry based on a survey of 97 professionals from consultant firms, project clients, and contractors. The study established that critical issues relating to communication in the industry include unclear communication channels, ineffective reporting systems, stereotyping, and political interference. These issues have resulted in time delays, cost overruns, and project abandonment, highlighting the need for better communication strategies.

Lusajo and Angelus (2024) examine the role of stakeholder communication in building construction projects in Arusha City. The cross-sectional study's design adopted a multistage sampling approach, with 100 respondents completing the questionnaire. The findings indicated that project communication is influenced by simplicity and quick responses from phone calls and meetings. In a related case, Laif et al. (2024), in their mixed-method study titled "Construction Project Communication Practices Establish that clarity in communication enhances both project performance and cost efficiency, but language barriers and an inconsistent flow of information hinder effectiveness."

Akintelu et al. (2023) examined how project communication management drives project delivery in Lagos State by using 133 structured questionnaires and a regression technique to interpret the data. The results show that communication plans and mediums significantly influence project success, although at different levels of influence. By applying regression analysis in studying project communication management strategies, Manuputty and Nursin (2023) found that effective communication management improves time performance with a 69.6% coefficient of determination. Their research suggested optimizing major communication variables as appropriate to the needs of stakeholders.

Singirankabo and Wanjiku (2023) studied communication in international NGOs during project implementation in Rwanda. In a descriptive research design using a sample population of 170 workers, the study revealed that participative

communication was significantly related to project schedules and efficiency. Nixon and Afrizal (2023) applied the design-build project approach to identify the leading determinants of project communications and reinforced that proper communication management positively affects project performance. These studies complement each other by illustrating the critical role of structured communication in improving project outcomes across different industries.

Effective communication is one of the critical components of project management according to Wisdom (2021). This is because communication is one of the most important aspects of project quality. Communication in MPM is crucial, as auditors like Owen et al. (1996) and McHugh (1998) unanimously agreed that without a proper communication plan, there would be no free flow of information, leading to many misunderstandings. Best practices in managing communications within MPM call for prioritizing the development of an integrated management information system and a structured communication plan.

Meron (2022) examined 19 effects of bad communication and introduced 17 suggestions to enhance communication within teams. Usanase and Irechukwu (2022) explained the role of the project communication management process in projects run by Non- Governmental Organizations in Rwanda, focusing on communication planning, implementation, and control. Utilising qualitative and quantitative approaches added value for future research on project communication management. A longitudinal survey of 108 capital projects by Chen (2021) reported that project technical and managerial competencies mediate project communication performance. Team innovative behavior also contributed to project success, moderating the relationship between technical competence and performance. This research showed that while project communication had the greatest impact on project performance, it had the smallest direct effect, whereas managerial competence had the largest direct effect.

Mbonigaba (2022) examined the project communication strategies in EDCL- EARP, assessing stakeholder involvement and the relationship between communication strategies and project success. The results indicated that effective communication strategies positively affect project quality, as proven by F- Tests for statistical significance. Furthermore, Azizm (2021) studied the role of communication in the successful implementation of Gauteng' s SANRAL e- toll project in South Africa and found that effective communication planning significantly impacts stakeholder engagement and project outcomes. Malik et al. (2021) investigated the effect of communication on project quality, noting that formal communication creates conflicts. However, informal communication fosters trust and likely leads to better project outcomes.

Yakubu et al. (2021) evaluated communication issues in construction projects and determined that there is a critical relationship between poor communication and project underperformance. Abraham and Abdurazak (2019) analyzed the management of project communication in water projects in Ethiopia, establishing that project performance effectiveness was highly influenced by the methods and channels of communication, while communication barriers were reduced simultaneously. Oral communication was the most frequently used method, with bottom- up communication being predominant. Andre et al. (2021) studied the use of communication planning in construction projects in Jakarta. In that study, 78. 02% of total responses confirmed its implementation and indicated that it significantly impacted project performance. Finally, Hong- Long (2021) supported Chen (2021) by arguing that project competencies and team innovation are mediating factors in the relationship between communication and performance. The results indicated that communication planning and managerial competencies significantly affect project outcomes.

METHODOLOGY

RESEARCH DESIGN

The survey research design was employed in this study. Survey research allowed the researcher to have first-hand information over the data that was collected and used for analysis in this study. Survey research design was considered appropriate, efficient, and flexible because it enabled the researcher to minimize bias and maximize the reliability of data that was collected and further used for analysis.

POPULATION, SAMPLE AND SAMPLING TECHNIQUE

The study focuses on 97 registered Housing Estates Construction Firms, each with a minimum of three project managers or management personnel. This leads to a total of 291 decision-makers accountable for project execution within these firms. The selection of these firms is due to their direct involvement in construction projects. A census sampling method was utilised for this study, meaning all 97 registered firms, totalling 291 project managers and management staff, were included in the sample.

METHODS OF DATA COLLECTION

The source of data was primary, and the questionnaire was the instrument used to collect the primary data. The questionnaire was divided into two parts that is the personal data of respondents and project communication, project risk

management and project quality later had eight sub-parts in which the items were placed on a five-point Likert scale such that strongly agreed is represented by 5, agreed by 4, undecided by 3, strongly disagreed by 2 and disagreed by 1. Copies of the questionnaire were administered across the construction firms and filled by the target respondents within three months. This was achieved with the help of experienced and trained research assistants in each area of the study with adequate monitoring. Each of the research assistants were paid for engaging them.

METHODS OF DATA ANALYSIS

The analysis made use of descriptive statistics (tables, frequencies, and percentages) and inferential statistics (multiple regression). The statistical tool is regression which was used to indicate the causes and effect relationship between the dependent variable and the independent variable. The multiple regression model was estimated to establish a fit a model is given a set of variables. This was carried through the software statistical package of SPSS.

TEST OF SIGNIFICANCE

The output of the regression results shows whether there is linear effect of technology innovation and performance taken together. Also, the output shows the t-statistics, standard error value, f- statistic value, and p-value for the co-efficient which result in either rejection or failure to reject the null hypothesis. The p-value which is the probability of getting a result that is at least as extreme as the critical value and it help in accommodating the error factors in this research. The co-efficient of determination (R2) was also revealed.

MODEL SPECIFICATION

The study adapted a similar model by Ahmed et al (2021) and for this study the sign of the relationship between project communication and project quality is tested using statistical method of regression. The dependent variable is project quality proxy as quality while the independent variable is project communication which is proxies as stakeholders' communication, message, project schedule, project delivery method, project status and project comment. The model is stated as follows:

$$PQ = \alpha + \beta 1PCS + \beta 4PCC + \mu 1 \quad 1$$

Where PQ = project quality, which is the dependent variable, and α is the intercept β1, β2, β3, β4, β5 and β6 are the parameters to be estimated as the independent variable and as such project communication medium, project communication pattern, project communication climate, project communication delivery method, project communication schedule and project communication structure and Risk management.

Where:

PQ= Project Quality

PCS= Project communication Structure PCC = Project Communication Climate

RESULTS AND DISCUSSION

Table 4.1: Distribution of Respondents' Demographic Characteristics

Respondent's Characteristics	Frequency	Percentage	Cumm. Percentage
Gender			
Male	203	78.7	78.7
Female	55	21.3	100.0
Age			
Below 30 years	59	22.9	22.9
31 – 40 years	190	73.6	96.5
41 – 50 years	9	3.5	100
Qualification			

Diploma	28	10.9	10.9
HND/bachelor's degree	147	57.0	67.8
Masters	74	28.7	96.5
Doctorate Degree	9	3.5	100.0
Marital Status			
Single	70	27.1	27.1
Married	172	66.7	93.8
Divorced	12	4.7	98.5
Separated	4	1.5	100.0
Position/Role in the Company			
Project Manager	57	22.1	22.1
Risk Manager	48	18.6	40.7
Construction Manager	57	22.1	628
Quality Assurance Specialist	55	21.3	84.1
Others	41	15.9	100.0

Source: Field Survey, 2025

MEAN AND STANDARD DEVIATION

Table 2: Descriptive Statistics

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Communication Structure (CS)	*171*	*15.00*	*20.00*	*17.6491*	*1.12445*
Communication Climate (CC)	*171*	*17.00*	*20.00*	*18.6901*	*.90285*
Project Quality (PQ)	*171*	*15.00*	*20.00*	*18.1813*	*1.23045*
Valid N (listwise)	*171*				

Source: Author's Computation, 2025

The table presents descriptive statistics for various communication-related factors in a project, including CS, CC, and PQ. Each variable is based on a sample size of 171, with minimum and maximum values ranging between 15 and 20. The mean values vary slightly, with PCC having the highest mean (18.6901). Standard deviations range from .90285 (CC) to 1.23045 (PQ), indicating varying levels of dispersion in responses. Overall, the data suggests relatively high and consistent ratings across all factors, implying a generally positive perception of project communication and quality.

INSTRUMENTATION

RELIABILITY OF INSTRUMENTATION

Table 4.3: Item Loading, Internal Consistency and Average Variance Extracted (AVE)

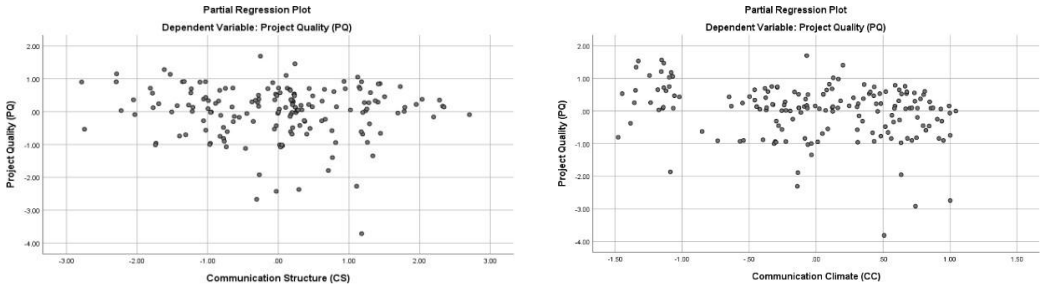
Construct	Indicators	Loadings	AVE	CR
Communication Structure (CS)	CS1 CS2 CS3 CS4	0.768 0.686 0.726 0.515	0.46	0.77
Communication Climate (CC)	CC1 CC2	0.637 0.807	0.54	0.76
	CC3 CC4	0.641 0.836		
Project Quality (PQ)	PQ1 PQ2 PQ3 PQ4	0.537 0.847 0.979 0.656	0.60	0.85

Note: (n=171)
Source: Author's Computation, 2025

Table 4.3 presents item loadings, internal consistency, and average variance extracted (AVE) for the constructs used to assess the effect of project communication on project success in construction firms across North-Central Nigeria. The constructs include CS, CC, and PQ. The table provides evidence of the measurement model's reliability and validity, ensuring the robustness of the statistical analysis. Overall, the constructs demonstrate acceptable to strong reliability and convergent validity, with most AVEs exceeding the 0.50 threshold and CR values surpassing 0.70. The findings highlight the critical role of project communication—through structures and climate—in driving project success. Clear, consistent, and well-structured communication significantly enhances risk management, collaboration, and quality outcomes in construction projects across North-Central Nigeria.

ASSUMPTION OF MULTIPLE REGRESSION

Linearity: Fig. 1: Partial Regression Plots



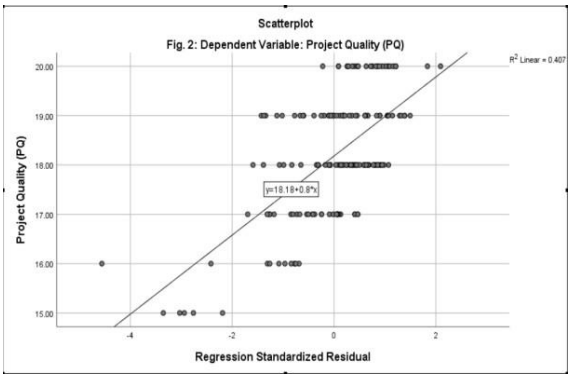
Based on the visual information provided, the *Partial Regression Plots* illustrate the linear relationships between Project Quality (PQ) as the dependent variable and several independent variables related to Project Communication.

INDEPENDENCE OF RESIDUALS

The Durbin-Watson statistic of 1.968, is a key diagnostic measure for assessing the independence of residuals in the regression model. The value lies close to the ideal range of 2.0, indicating that there is no significant autocorrelation among the residuals (Field, 2013). This suggests that the error terms are independent and not systematically correlated, which satisfies one of the critical assumptions of multiple regression analysis. For the study on the *Effect of Project Communication on Project Success of Construction Firms in North-Central Nigeria*, this finding validates the reliability of the model in predicting project quality (PQ). Independent residuals further affirm that the predictors, such as communication structure, and climate, provide unbiased estimates of their effect on project success outcomes.

HOMOSCEDASTICITY

The scatterplot presented in Figure 2 illustrates the relationship between regression standardized residuals and project quality (PQ), serving as an indicator for examining linearity and residual distribution in the regression model. The R^2 value of 0.407 indicates that approximately 40.7% of the variation in project quality can be explained by the predictors, such as communication patterns, structure, medium, and schedule, highlighting a moderate relationship.



The fitted regression line, expressed as y=18.18+0.8x, shows a positive linear trend, implying that improvements in project communication positively contribute to project quality in construction firms across North-Central Nigeria. However, the clustering of data points suggests areas of homoscedasticity, where residuals appear constantly along the regression line, thus validating one of the assumptions of regression analysis.

MULTICOLLINEARITY

Table 4: Coefficients[a]

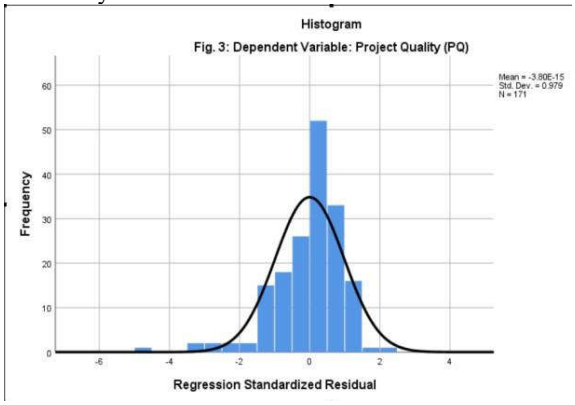
Model		Collinearity Statistics	
		Tolerance	VIF
	Communication Structure (CS)	**.937**	**1.068**
	Communication Climate (CC)	**.551**	**1.814**

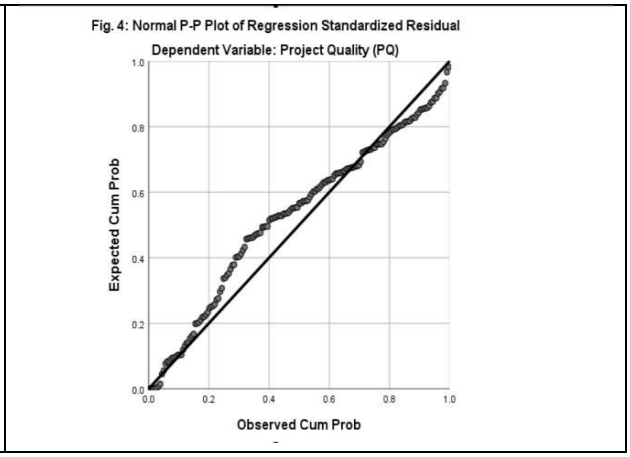
a. Dependent Variable: Project Quality (PQ)

Source: Author's Computation, 2025

The collinearity statistics presented in Table 4.6 provide insight into the degree of multicollinearity among the independent variables in the regression model. In this study, all VIF values range between 1.068 and 1.814, while Tolerance values are well above 0.10. This suggests that there is no significant multicollinearity among the predictors.

Normality of Residuals





The histogram illustrates a bell-shaped curve with residuals symmetrically grouped around zero, closely matching the overlaid normal distribution curve. The mean value of -3.80E-15 and a standard deviation of 0.979 confirm that the residuals are centered near zero and show acceptable variation. Additionally, the P-P plot reinforces the validity of the conclusions that effective communication significantly affects project quality and success in construction firms. Implementing proper communication strategies, such as structured delivery methods and schedules, leads to better project outcomes, as evidenced by the well-behaved residuals in the regression model.

REGRESSION ANALYSIS

Table 5: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.770[a]	.593	.576	.80131	1.968

a. Predictors: (Constant), Communication Structure (CS), Communication Climate (CC),
b. Dependent Variable: Project Quality (PQ)

Source: Author's Computation, 2025

The model summary shows an R-value of 0.770, indicating a strong correlation between predictors and project quality (PQ). The R-Square value of 0.593 means that 59.3% of the variation in PQ is explained by the predictors. The Adjusted R-Square of 0.576 suggests a good model fit after adjusting for the number of predictors.

Table 6: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.206	2.593		-1.236	.218
	Communication Structure (CS)	.052	.056	.048	4.926	.006
	Communication Climate (CC)	.318	.092	.233	3.466	.001

a. Dependent Variable: Project Quality (PQ)
Source: Author's Computation, 2025

The coefficients table shows that all predictors significantly impact project quality (PQ), with p- values < 0.05. Project Communication Delivery Method (β = 0.862, p < 0.001) has the highest influence, followed by Project Communication Schedule (β = 0.360, p < 0.001) and Communication Climate (β = 0.233, p = 0.001). Communication Structure, Patterns, and Medium also contribute significantly, though with lower beta values.

TEST OF HYPOTHESES

Using the regression results presented in Table 4.10, the hypotheses can be evaluated based on the significance levels (Sig.) and standardized Beta coefficients. Each hypothesis is tested against the p-value threshold of 0.05. If the p-value (Sig.) is less than 0.05, the null hypothesis is rejected, indicating a significant effect.

H01: Project communication structures have no significant influence on the project quality of construction firms in North Central, Nigeria.

The standardized Beta coefficient for Communication Structure (CS) is 0.048, with a p-value of 0.016. Since the p-value is less than 0.05, the null hypothesis (H01) cannot be accepted.

H02: Project communication climate is of no significant effect on project quality of construction firms in North Central, Nigeria.

The standardized Beta coefficient for Communication Climate (CC) is 0.233, with a p-value of 0.001. Since the p-value is less than 0.05, the null hypothesis (H02) is rejected.

DISCUSSION OF FINDINGS

Two key findings emerged from testing the hypotheses. First, this study shows that communication structures greatly affect project quality, underscoring the importance of clearly defined frameworks for information flow within an organization. These structures represent the formal systems, processes, and channels that manage the information exchange between stakeholders. A well-organized communication system guarantees the accurate and efficient conveyance of vital project details, including timelines, responsibilities, and progress updates. Weak or fragmented communication structures can lead to misunderstandings and delays, ultimately harming project quality. Conversely, strong communication structures facilitate coordination, minimize errors, and promote transparency, which helps ensure projects are completed efficiently and meet the desired standards.

The study's findings are consistent with previous research. For instance, Manuputty and Nursin (2023) found that effective communication structures significantly impact project outcomes by decreasing ambiguity and improving coordination in Nigerian construction projects. Likewise, Malik et al. (2021) emphasized that formal communication frameworks, such as established reporting lines and scheduled updates, enhance accountability and project quality. Mbonigaba (2022) also noted that construction firms with clear communication systems face fewer delays and project failures, as stakeholders remain aligned on goals and responsibilities. However, some studies, such as Mohammed et al. (2019), argue that the effectiveness of communication structures hinges on team members' willingness to engage with these systems. Without a culture of communication, structures alone may not lead to improved project outcomes.

Secondly, the study discovered that the project communication climate significantly and positively influences project quality. Communication climate refers to the overall environment in which communication occurs, characterized by openness, trust, mutual respect, and active information sharing among stakeholders. A positive communication climate enhances transparency, minimizes misunderstandings, and strengthens collaboration. Conversely, a negative communication climate, marked by mistrust, hostility, and a lack of openness, often results in delays, errors, and compromised project outcomes. The findings suggest that fostering a supportive and open communication climate is crucial for project success, allowing stakeholders to freely express ideas, share concerns, and clarify expectations.

This study's results corroborate those of prior research. For example, Nseful et al. (2021) found that a positive communication climate significantly improves team collaboration and project performance by fostering trust and reducing ambiguity. Similarly, Obonadhuze et al. (2021) highlighted that a supportive communication environment promotes the free flow of information, ensuring that project challenges are addressed quickly. Yakubu et al. (2021), along with Usanase and Irechukwu (2022), also reported that construction projects with a positive communication climate experience fewer conflicts and delays, leading to higher quality outcomes. However, Whyte and Jimoh (2021) argued that while communication climate is indeed important, its effects may be diminished if team members lack the skills or willingness to communicate effectively, underscoring the need for training and capacity building. This finding emphasizes the vital role of a positive project communication climate in enhancing project quality for construction firms in North-Central Nigeria. An environment of openness, trust, and mutual respect encourages effective communication, enabling stakeholders to align their efforts, share pertinent information, and collaboratively tackle project challenges.

CONCLUSION AND RECOMMENDATION

CONCLUSION

Consequently, it confirms that effective project communication can significantly enhance success in construction projects, particularly in North Central Nigeria. Here, the quality of a project often relies on specific critical aspects of communication and risk management strategies. This research emphasises the importance of different communication media, patterns, structures, climates, schedules, delivery methods, and risk management practices as influential factors affecting quality performance in construction projects.

RECOMMENDATIONS

It is recommended that the following be done to improve project communications and, consequently, project outcomes in construction projects in North-Central Nigeria:

i. Communication pathways should be clearly and hierarchically defined to reduce ambiguities and delays. Clearly defining roles and responsibilities within the structure simplifies accountability and reporting. Feedback mechanisms should be introduced to ensure that problems are solved proactively and that improvement is continuous.
ii. Transparency, trust, and active listening will be encouraged to help create a positive communication environment. Team-building sessions and workshops may provide immense help in building such relationships and allowing cooperation among stakeholders. Management would espouse inclusiveness and be committed to dialogue.

CONTRIBUTION TO KNOWLEDGE/POLICY IMPLICATION AND SUGGESTION FOR FUTURE STUDY

CONTRIBUTION TO KNOWLEDGE

This research adds to the existing literature by offering empirical evidence on how various dimensions of project communication affect the quality of projects in construction firms located in North Central Nigeria. Additionally, it enhances previous studies by demonstrating that well- structured communication frameworks are vital for ensuring project success. Moreover, the results indicate that the communication climate plays a crucial role in fostering stakeholder collaboration, an area that has not been extensively examined in construction project management literature.

POLICY IMPLICATION

The findings indicated that policymakers and project managers should focus on effective communication strategies for construction projects. The regulatory agencies should establish guidelines on the structured communication framework, including compulsory communication schedules and delivery methods for improved quality projects. In addition, construction companies should incorporate risk management strategies into the communication plan to reduce the occurrence of project failure caused by miscommunication.

RECOMMENDATIONS FOR FUTURE STUDY

Future studies need to investigate how technological improvements, including artificial intelligence and blockchain, will moderate the facilitation of project communications toward better effectiveness. Further, studies can be made on sectoral differences by looking at other major industries like health and manufacturing and seeing how such a framework will affect their activities. A longitudinal approach could be used to assess how fluctuating communication pattern trends impinge on project performance changes over time.

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