

## Communication Pathways and Project Success: Analyzing Stakeholder Coordination Impacts on Construction Outcomes

Mohit Mojindra<sup>1\*</sup>, J.R. Pitroda<sup>2</sup>, Jagruti P. Shah<sup>3</sup>, Jayendrasingh Gohil<sup>4</sup>

### Abstract

*It is very critical to have effective communication and coordination among stakeholders for the successful delivery of the projects. Effective communication keeps stakeholders well-informed about project progress, promoting transparency, trust, and collaboration. Coordination ensures that responsibilities and resources are efficiently allocated, reducing the risk of misunderstandings and enhancing decision-making processes. Inadequate stakeholder engagement can lead to confusion, delays, rework, and the failure to meet key project milestones. The impact of communication on project outcomes goes beyond the traditional success criteria of cost, time, and quality it also plays a significant role in securing stakeholder satisfaction and project acceptance. In complex construction environments, strong stakeholder communication has been shown to reduce project failure rates associated with miscommunication. Disputes and budget overruns often stem from conflicting stakeholder interests, which can be mitigated through effective coordination and early engagement, particularly during the pre-construction phase. Evidence from case studies in Malaysia and New Zealand demonstrates that early stakeholder involvement contributes to improved project outcomes. Similarly, having a clearly defined project scope and robust internal communication structures positively affects performance in terms of budget control, scheduling, and stakeholder alignment. Research on Turkish international projects also reveals that communication barriers hinder stakeholder management processes (SMP), while proactive communication and strategic coordination enhance them, reinforcing the importance of communication in global project success. Furthermore, critical failure factors (CFFs) in high-rise construction such as inexperienced contractors, weak consultant performance, and poor sequencing are closely linked to inadequate stakeholder coordination. Interviews with industry professionals highlight that organizational structure, stakeholder roles, and collaborative practices are key determinants of project success. Based on these insights, a structured framework has been developed to assess project success across three levels of stakeholder management performance. For this study, 115 questionnaires were distributed to various stakeholders in Central Vadodara, with 50 valid responses collected. The results identified the top five factors affecting stakeholder communication and coordination: lack of a centralized communication system, ineffective communication flow between project management and site staff, general communication inefficiencies, poor communication practices, and stakeholder miscommunication. These issues adversely impact safety, timelines, and quality in building project management. To address these challenges, the adoption of digital technologies, standardized*

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*procedures, and continuous training is essential. These strategies can enhance project efficiency, reduce risks, and lead to more successful outcomes in construction projects.*

**Keywords:** Stakeholder, communication, factors, project, management

## INTRODUCTION

Stakeholder communication and coordination involve the systematic exchange and alignment of information, responsibilities, and resources among all project participants to achieve shared objectives. Effective communication ensures that all stakeholders, such as clients, project teams, investors, and regulatory authorities, are regularly updated on project developments, challenges, and changes. This continuous flow of information promotes transparency, aligns expectations, and strengthens trust among participants. Coordination, on the other hand, focuses on the organized assignment of tasks, responsibilities, and resources to facilitate seamless and efficient project execution. Strong coordination significantly improves the likelihood of project success by reducing misunderstandings, preventing conflicts, and enabling informed decision-making through proactive collaboration.

In construction projects, which typically involve a wide range of stakeholders with varying interests and responsibilities, both communication and coordination are critical. The way information is shared and activities are synchronized directly impacts the project's performance and outcome. Effective coordination ensures that schedules, tasks, and resources are properly aligned, helping to avoid delays, disputes, and cost overruns. When managed well, communication and coordination lead to streamlined workflows, more accurate decisions, and higher levels of stakeholder satisfaction key elements in delivering projects on time and within budget. Conversely, poor stakeholder engagement can lead to miscommunication, repeated work, and missed deadlines, emphasizing the critical nature of these processes in achieving successful project outcomes.

### Significant Contribution to Construction Projects

Stakeholder communication and coordination are essential to the successful delivery of construction projects, ensuring clarity, efficiency, and collaboration across all project phases. Construction projects typically involve a wide range of stakeholders such as clients, contractors, architects, engineers, suppliers, and regulatory authorities each with specific roles, responsibilities, and expectations. Effective communication keeps all parties informed about project goals, schedules, budgets, and potential risks. This not only minimizes misunderstandings but also builds transparency and trust among stakeholders. At the same time, coordination ensures that the efforts of all participants are synchronized, enabling tasks to be carried out in the correct order, resources to be allocated efficiently, and conflicts to be identified and addressed early. When communication and coordination are effectively combined, they reduce delays, control costs, and uphold quality standards key factors for ensuring projects are completed on time and within scope. Given the complexity, tight deadlines, and interdependent tasks characteristic of construction projects, these processes are fundamental to achieving overall success.

Clear and consistent communication fosters alignment among all stakeholders by defining expectations, clarifying roles, and allowing for timely resolution of issues or changes. Coordination complements this by structuring workflows, optimizing resource use, and sequencing activities to avoid duplication or oversight. This significantly minimizes the risk of delays, rework, and cost overruns. Moreover, strong communication and coordination enhance risk management by allowing for the early identification of potential problems and supporting collaborative problem-solving. Together, these practices improve teamwork, ensure regulatory compliance, maintain quality standards, and ultimately contribute to the efficient and successful completion of construction projects.

### Issues Arising in the Phase of Stakeholder Communication and Coordination

The communication and coordination phase of a construction project often presents significant challenges, primarily due to the complexity and diversity of the stakeholders involved.

Miscommunication is a common issue, stemming from language barriers, cultural differences, and varying levels of technical expertise. When updates are not shared promptly or comprehensively, stakeholders may miss critical information, leading to delays and poorly informed decisions. Conflicting interests and priorities among stakeholders can also hinder coordination, creating friction and reducing the effectiveness of collaboration. A lack of clearly defined roles and responsibilities often results in overlapping tasks or accountability gaps, making it difficult to align all parties toward common goals. Ineffective information exchange may also arise from outdated communication tools or incompatible software systems. Furthermore, inadequate documentation of meetings and decisions can lead to confusion and make tracking project progress difficult. Delays in receiving feedback or approvals, along with limited stakeholder engagement or resistance to change, can further derail coordination efforts. These challenges underscore the need for well-structured communication strategies and proactive coordination mechanisms to reduce disruptions and support successful project delivery.

#### **Approaches to Reduce Difficulties During the Stakeholder Communication and Coordination Phase**

To overcome communication challenges in construction projects, it is crucial to establish clear and standardized communication protocols. This includes specifying the methods and timing for information exchange, utilizing uniform formats to reduce misunderstandings, and ensuring that all stakeholders have access to appropriate communication tools and platforms. Regular meetings either in person or virtual are essential for maintaining alignment and providing opportunities to address issues in a timely manner. Bridging linguistic and cultural gaps can be achieved through multilingual communication tools or by involving intermediaries who understand the perspectives of all parties. Additionally, training stakeholders in project-specific terminology and relevant technologies can enhance comprehension and clarity. Effective coordination also depends on a solid organizational structure with well-defined roles and responsibilities. A detailed stakeholder management plan that outlines workflows, expectations, and escalation procedures can further support this structure. The adoption of centralized project management platforms or collaborative software facilitates real-time tracking, efficient information sharing, and access to up-to-date data for all stakeholders. Promoting a collaborative environment through regular engagement sessions and conflict resolution workshops can help reconcile competing priorities by fostering trust and open communication. Moreover, maintaining detailed records of meetings, decisions, and approvals reduces the likelihood of misunderstandings and reinforces accountability. Proactively implementing these measures lays a strong foundation for improved stakeholder collaboration and communication, ultimately enhancing project outcomes.

#### **Essential Stakeholders Facilitating Successful Communication and Coordination**

Project managers, clients, and lead contractors are pivotal stakeholders who play a significant role in shaping the coordination and communication within a construction project. As the central point of contact among all involved parties, project managers are entrusted with the critical responsibility of establishing and sustaining effective communication channels. This includes organizing regular updates, ensuring the timely and accurate exchange of information, and facilitating transparency across all stakeholder levels. An experienced project manager not only anticipates potential challenges but also addresses them proactively, aligning stakeholder efforts to meet project objectives efficiently. Fostering collaboration and providing clear, strategic guidance are key to ensuring smooth project progression. Clients also contribute substantially by actively participating in the project and clearly articulating their expectations. Through the provision of comprehensive specifications and prompt decision-making, clients help reduce uncertainty and enhance the project team's operational efficiency. Their ongoing involvement in meetings and approval processes underscores their commitment, encouraging other stakeholders to remain engaged and focused. Lead contractors, on the other hand, are instrumental in managing day-to-day on-site operations and aligning those activities with the broader project schedule. Their hands-on involvement ensures timely task execution and facilitates the quick resolution of any issues encountered on site through effective communication with the project manager. Furthermore,

their ability to coordinate seamlessly with labor teams, subcontractors, and suppliers contributes to optimal resource utilization, reducing the likelihood of delays and budget overruns. Collectively, the active and coordinated engagement of these key stakeholders establishes a solid foundation for effective project communication and coordination, ultimately driving the successful and timely completion of construction projects.

#### **How Stakeholder Communication and Coordination Influence the Success of a Project**

Effective stakeholder communication and coordination are fundamental to the success of construction projects, as they ensure that all participants are aligned in working toward shared objectives. This alignment minimizes risks and enhances overall efficiency. Construction projects often involve a diverse group of stakeholders, including clients, contractors, designers, suppliers, and regulatory authorities, each with unique responsibilities and expectations. When communication is inadequate, it can lead to misunderstandings, delays, and conflicts, ultimately threatening both the progress and the outcome of the project. Clear and consistent communication fosters transparency and builds trust by keeping stakeholders informed about project objectives, ongoing developments, potential changes, and emerging challenges. In parallel, coordination plays a crucial role by harmonizing the efforts of all involved parties, ensuring that tasks are performed in the correct sequence, and facilitating the efficient use of resources. By managing the interdependencies among various teams and project activities, coordination significantly reduces the likelihood of delays, rework, and inefficiencies. It also enables proactive problem-solving through collaborative stakeholder engagement when issues arise. When effectively implemented together, communication and coordination create a structured and cooperative project environment one that is essential for delivering the project on time, within budget, and in accordance with quality standards.

#### **Selecting the Appropriate Stakeholders for Specific Activities in a Construction Project**

Selecting appropriate stakeholders for specific activities in a construction project necessitates a strategic and structured approach to ensure that each stakeholder's expertise, responsibilities, and influence are effectively aligned with the project's requirements. The process begins with the identification of all relevant stakeholders, including clients, contractors, engineers, architects, suppliers, and regulatory authorities. Once identified, these stakeholders should be assessed based on their roles, competencies, and interests to evaluate their suitability for particular project tasks. Tools such as stakeholder mapping, responsibility matrices, or models like RACI (Responsible, Accountable, Consulted, Informed) can support the clear assignment of roles and responsibilities. For example, architects and engineers are best positioned to handle technical functions such as design and planning, while contractors and suppliers are more suited for resource management and on-site execution. Regulatory compliance tasks should involve consultants or agencies with the appropriate legal and environmental expertise. Aligning stakeholders with activities that correspond to their knowledge, authority, and decision-making capacity enhances project efficiency, promotes accountability, and strengthens coordination across all phases of the project. This systematic approach also helps prevent role conflicts and overlaps, contributing to smoother workflows and improved overall project performance.

Traditionally, project success has been evaluated based on technical criteria such as adherence to timeframes, budget constraints, and quality standards. However, some projects, despite being completed on schedule and within budget, fail to meet the broader expectations of clients or other key stakeholders. True project quality encompasses more than just technical performance; it involves fulfilling both the explicit and implicit needs of all stakeholders involved. The outcome of a project can therefore produce a range of positive or negative impacts on individuals and organizations. At the heart of project execution lies communication, the interpersonal exchange of information, which serves as the essential "glue" that binds the project's distribution channels. Despite the fact that project managers reportedly spend up to 90% of their time engaged in various forms of communication, the direct impact of communication on project quality has not always been clearly understood. To explore this relationship,

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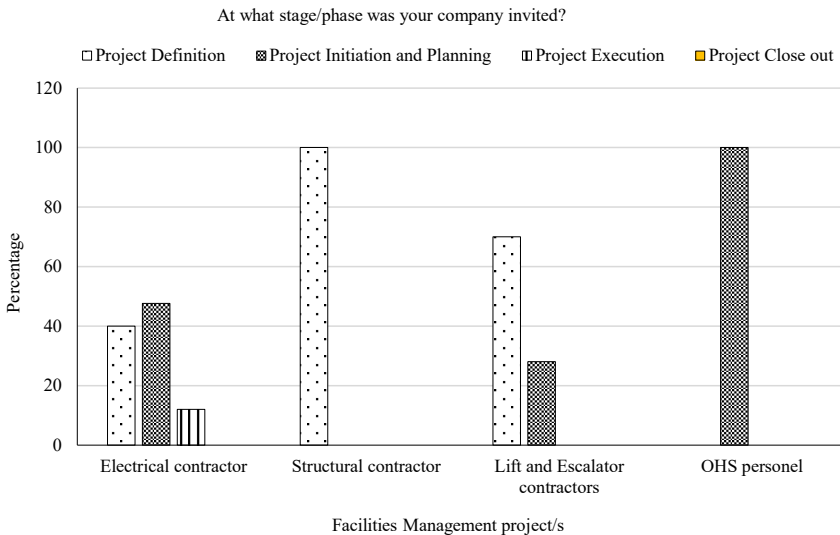
the researcher employed two key primary data sources: interviews and personal communications conducted as part of the study. Additionally, participant responses gathered through surveys were analyzed using SPSS software to identify trends and insights. It is important to recognize that communication channels established by stakeholders or organizations play a pivotal role in the exchange of both tangible and intangible resources, including human capital, all of which are critical to the success of a project. Stakeholders are typically responsible for initiating and maintaining communication throughout the project lifecycle to ensure desired outcomes are achieved. Notably, according to the collected data, all stakeholder groups representing structural engineers indicated that their involvement commences during the project's defining phase, as depicted in Figure 1 [1].

**Factors Affecting Stakeholders Communication & Coordination**

In construction projects, a complex interaction of organizational, technological, interpersonal, and project-related elements affects effective stakeholder communication and coordination. The number of stakeholders in a project is directly impacted by its complexity and magnitude, which raises the possibility of misunderstandings and coordination issues. The type and frequency of communication must change as projects move through the planning, execution, and closure phases. Diverse stakeholder backgrounds, interests, and power structures frequently lead to contradictory expectations that need to be properly addressed. Building cooperative working relationships also requires early stakeholder participation, trust, and clarity in roles and duties. Information flow and decision-making processes are also impacted by organizational factors like staff turnover, management hierarchy, and team experience. In order to ensure information accuracy and streamline communication, technological technologies such as Project Management Information Systems (PMIS) and Building Information Modeling (BIM) are becoming more and more important. However, integration procedures and stakeholder familiarity determine how effective they are. Coordination efforts are frequently hampered by obstacles including linguistic barriers, a lack of feedback systems, and insufficient data accessibility. External factors can also alter stakeholder priorities and interfere with communication, such as community opposition, political unpredictability, and regulatory restrictions. Achieving successful project outcomes requires addressing these variables through proactive planning, digital integration, inclusive participation tactics, and ongoing feedback loops.

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**Figure 1.** The stage(s) or phase(s) at which companies were invited to participate in the FM project.

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***Clarity of Roles and Responsibilities***

One of the main causes of misunderstandings and disputes is ambiguity in stakeholder responsibilities. Stakeholders may duplicate efforts or overlook important duties because they think others are in charge when responsibilities are not clearly defined. Delays, miscommunications, and conflicts are frequently the results of this misperception. A clear organizational structure where all stakeholders are aware of their respective responsibilities and reporting lines is essential for effective communication.

***Timeliness and Frequency of Information Exchange***

Project coordination is greatly impacted by how quickly and consistently stakeholders exchange information. Inadequate communication or delayed updates may cause decisions to be made based on out-of-date information, which could result in errors, rework, and mismatched objectives. To keep everyone in sync and on the same page, regular meetings, progress reports, and real-time data sharing are helpful.

***Trust and Interpersonal Relationships***

For stakeholders to communicate honestly and openly, trust is essential. When there is a lack of trust, stakeholders may refuse to cooperate, conceal information, or doubt one another's motives. Conversely, solid interpersonal bonds based on respect for one another promote collaboration, lessen conflict, and create a feeling of group ownership over the project.

***Cultural and Language Barriers***

Communication can be hampered in worldwide or diversified initiatives by linguistic and cultural barriers. Misunderstandings may result from differences in work ethics, communication styles, and how instructions are interpreted. To close these gaps, it's critical to implement inclusive communication techniques, use interpreters or multilingual resources as needed, and give stakeholders cross-cultural training.

***Communication Tools and Technology Used***

Stakeholder involvement can be improved or hindered by the choice and application of communication technologies, such as emails, mobile apps, video conferencing, and project management software. Outdated or inadequate communication technologies might result in ineffective workflows, missed messages, or lost data. Better documentation and quicker coordination are guaranteed when suitable, user-friendly digital platforms are selected.

***Project Complexity and Size***

Coordination becomes more difficult in larger and more complicated projects because they involve more parties, longer schedules, and increased risk. The challenge of controlling expectations, coordinating goals, and making sure everyone is informed grows with the number of participants. For complex projects to run smoothly, established coordination procedures and planned communication plans are necessary.

***Leadership and Management Style***

The project manager's leadership style has a big impact on how coordination and communication work out. While participatory leaders promote dialogue and group problem-solving, authoritative leaders may restrict feedback and decrease transparency. Throughout the course of a project, a transparent and inclusive management style fosters trust, guarantees stakeholder engagement, and makes collaboration easier.

***Availability of Stakeholders***

During crucial stages of the project, some stakeholders could not be easily accessible, which could hinder timely decision-making and advancement. Coordination attempts are halted by unreliable

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feedback loops, lost approvals, or delayed inputs. Keeping stakeholders engaged and reachable throughout the project helps boost productivity and communication.

**Conflict Resolution Mechanisms**

Construction projects will inevitably involve disagreements and conflicts, but the lack of defined conflict resolution protocols might make matters worse. When disagreements are neglected or handled improperly, effective communication is frequently broken. Better coordination and project continuity are supported by the establishment of organized procedures for swiftly and equitably resolving conflicts.

**Legal and Regulatory Requirements**

Multiple parties, including government agencies and compliance officials, are frequently involved in regulatory requirements pertaining to safety, the environment, labor laws, and procurement. Project halts and violations may result from a lack of clarity regarding these standards. Legal compliance and more efficient operations are guaranteed when regulatory demands are communicated clearly and integrated into coordinating procedures.

Following Table 1 shows top five factor affecting stakeholders communication & coordination in different countries.

**LITERATURE REVIEW**

**Stakeholder Management**

Zungu et al. (2014) studied the impact of communication on the quality of Facility Management (FM) projects employed a qualitative research design supported by survey questionnaires. Quantitative analysis of the collected data was conducted using the Statistical Package for the Social Sciences (SPSS). The findings highlighted stakeholder communication as one of the most critical factors influencing FM project quality. The study emphasized that communication is essential throughout every phase of a project from initiation to handover and that no project can commence or succeed without some form of communication. Effective communication, which clearly defines what needs to be done, when, by whom, and how, is crucial for meeting project scope and objectives. If this information is not communicated clearly, the project's quality is likely to suffer.

**Table 1.** Top five factors in different countries.

Country	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
India	Hierarchical decision-making	Lack of technological integration	Cultural diversity	Delays in approvals	Limited stakeholder engagement
USA	Coordination across large teams	Overreliance on digital tools	Legal and liability concerns	Communication overload	Frequent team turnover
UK	Regulatory complexity	Contractual ambiguities	Fragmented project structures	Inconsistent information sharing	Stakeholder misalignment
Turkey	Informal communication dominance	Trust issues between parties	Limited knowledge sharing	Language barriers	Weak feedback mechanisms
China	Centralized project control	Language and dialect variations	Power distance in teams	Government interference	Formal but inflexible communication
Australia	Geographic dispersion of projects	Technological adaptability	Multicultural teams	Varying communication styles	Conflicting stakeholder expectations
UAE (Middle East)	Multi-national workforce	Language and religious factors	Cultural hierarchy	Labor communication difficulties	Short-term stakeholder commitment

Additionally, the study identified scope documents, technical drawings, phone calls, emails, and faxes as key communication tools used to engage various project stakeholders [1].

Yitmen (2015) investigated a survey of Turkish overseas stakeholders, including financial advisors, insurance brokers, consulting engineers, and contractors. Data from Turkish stakeholders was used to demonstrate the applicability of Structural Equation Modeling (SEM) as an effective method for analyzing the relationships between various dimensions of cross-cultural communication (CCC) and the stakeholder management process (SMP). The study found that "communication barriers" had a significantly negative impact on SMP, whereas "communication behaviors" and "communication strategies" had strong, positive correlations with effective stakeholder management. All proposed hypotheses regarding the validity and reliability of CCC constructs, as well as their positive and negative effects on SMP, were supported. The research underscores that communication barriers can critically hinder SMP. Projects, being temporary organizational structures, bring diverse stakeholders together who rely on various communication tools and platforms for both individual and group engagement. The study emphasizes that cross-cultural communication is one of the most complex challenges in international project management. In global settings, miscommunication among colleagues can negatively affect project outcomes. Therefore, effective communication particularly one that leverages multiple channels to deliver relevant information is integral to successful stakeholder management [2].

#### Stakeholder Performance

Kamalirad et al. (2017) explored effective internal communication has been identified as a key contributor to project success. In a study that collected 44 survey responses, researchers used various statistical methods including the two-sample t-test, chi-square test, and analysis of variance (ANOVA) to examine project parameters influencing communication efficacy among primary stakeholders: owners, designers, and contractors. The findings revealed that the clarity of the project scope significantly impacts internal communication among these key parties. The study suggests that improving internal communication can help construction managers minimize misunderstandings that often lead to project failure, particularly in complex projects. Furthermore, by identifying communication barriers early in the project lifecycle, the study enables stakeholders such as owners, consultants, and contractors to predict communication quality and proactively address issues before they escalate into major conflicts. These findings assist project managers and stakeholders in recognizing potential communication breakdowns and taking corrective actions to avoid poor performance or project failure resulting from stakeholder disputes. Overall, the effectiveness of communication among project participants is shown to be a critical factor influencing not only stakeholder relationships but also the project's cost, schedule, and overall success [3].

Nguyen et al. (2020) studied a high-rise building project's performance may suffer from a lack of coordination between stakeholders throughout the completion phase. To better understand the underlying relationships between construction failure factors (CFFs) and stakeholder coordination performance (SCP) in the final phase of high-rise building projects, a focused analysis was conducted. Using factor analysis, four key CFF variables were identified: antagonistic stakeholder relationships, poor project planning and organization, involvement of incompetent parties, and delays in construction activities. Among these, the most critical CFFs affecting stakeholder coordination based on respondent feedback were found to be "consultants' lack of capability," "overlapping construction sequences," and "contractors' lack of experience and competence." The study suggests that improving SCP is closely tied to addressing these specific failure factors. Notably, the findings caution against selecting consultants and contractors based solely on cost, as this practice often results in the engagement of under qualified professionals. Such decisions can lead to significant challenges during project execution, including design errors, planning deficiencies, and the use of improper construction methods. These issues, in turn, hinder effective stakeholder coordination and compromise overall project performance [4].

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### Infrastructure Project

Ghaleb et al. (2021) researched Effective communication is a critical factor that significantly influences the relationship between project complexity and project success. This study contributes to the field by empirically examining how construction project complexity affects project outcomes, while highlighting the moderating role of effective communication with all stakeholders. The key contribution lies in introducing stakeholder communication as a moderating variable in the link between project complexity and success. Research indicates that inadequate communication is a primary cause of failure in complex construction projects. Conversely, maintaining strong communication channels among all stakeholders in such projects enhances the likelihood of successful outcomes [5].

Baharuddin et al. (2022) researched stakeholder conflicts during construction were frequently caused by conflicting interests among project parties. Issues such as rework, disputes, cost overruns, and poor communication commonly affect infrastructure projects. To address these challenges, effective stakeholder involvement direct and indirect early in the pre-construction phase is essential. This was examined through a comparative qualitative analysis of two case studies from Malaysia and New Zealand, utilizing data collected from interviews and project documentation, including project records and public engagement reports. The comparative analysis highlighted key characteristics observed during the preliminary planning stages of major infrastructure projects in both countries. It emphasized the diverse interests, perceptions, expectations, and values of multiple stakeholders involved in the projects. Additionally, the study illustrated different approaches to stakeholder engagement during early planning between Malaysia and New Zealand. The findings offer valuable insights into strategies project owners can adopt to improve stakeholder engagement processes at the initial stages [6].

Prebanic et al. (2023) explored it is often acknowledged that stakeholder involvement is crucial to the success of infrastructure projects. The study aimed to explore practitioners' understanding of stakeholder engagement, identify who is responsible for engagement activities and how they are conducted, examine organizational factors influencing the process, and determine how success is achieved in infrastructure projects. Initially, eight experienced professionals with extensive backgrounds in complex infrastructure projects were interviewed, followed by four additional interviews to validate the findings. The interviews comprehensively addressed all aspects of stakeholder interaction, and a thematic analysis was performed to identify factors contributing to the success and failure of stakeholder engagement processes. Based on this analysis, a framework model was developed that incorporates three levels of management and three degrees of project success to better understand the relationship between stakeholder involvement and infrastructure project outcomes [7].

Senescu et al. (2013) researched the architecture, engineering, and construction (AEC) industry faces challenges in leveraging information technology for communication. To address this, researchers have developed a method for assessing product, organization, and process (POP) complexity and a communication assessment method through project team interviews. The authors confirm the relevance of these methods to the Architecture, Engineering, and Construction (AEC) industry and identify a trend showing that as project organizational process (POP) complexity increases, communication challenges also escalate. The study aims to motivate future research to develop more effective communication tools and interventions that decouple the relationship between complexity and communication [8].

Cheung et al. (2013) studied the relationship between trust and communication in construction project management. The study identifies five mediation models illustrating how trust impacts communication, which in turn influences project performance. Effective information flow is identified as a versatile mediator among these models, suggesting that improving information flow could improve project performance. The findings suggest that managers should prioritize directing efforts and resources toward effectively managing information flow within the project management system. This paper contributes to construction communication research by highlighting its mediating role in the relationship between trust and project performance. It suggests that project practitioners can promote

effective information flow to minimize project risk, mitigate delays, and promote collaborative work environments. Communication study is under-researched in construction engineering and management, with two primary streams of study being document communication patterns and computerized communication systems. This paper aims to extend the study of communication in examining its roles in trust-performance relationships and provides a valuable methodological addition to the application of analytical tools for in-depth analysis of intervening variables [2].

Yang et al. (2015) explained a systematic framework for stakeholder management in the construction industry, based on empirical studies conducted in Hong Kong, Australia, and six interviews. The framework comprises six activity groups: precondition, project data identification, stakeholder estimation, decision making, action and evaluation, and sustainable support. Its applicability was confirmed through validation in five real-life construction projects. Serving as a valuable reference, the framework guides project management teams in effectively managing stakeholders. It is essential for project teams to familiarize themselves with the framework's structure, activity groups, their outcomes, and interrelationships, while also considering their economic, legal, environmental, cultural, and ethical responsibilities. The selection of activities within the framework should be tailored based on the project's nature and the decisions of the project management team. Notably, the decision making, and action and evaluation groups generate the primary outcomes of stakeholder management, while the sustainable support group should be initiated at the outset and maintained throughout the project lifecycle to ensure ongoing stakeholder engagement [9].

Xia et al. (2017) researched a more accurate model for assessing stakeholder-related risks by integrating risk attributes and stakeholder influences. The model comprises three dimensions: Risk Attribute Index (RA), Stakeholder Attribute Index (SA), and Risk Manageability (RM). Tested on a real-world subway project, its applicability was validated through expert judgment and consensus. The model effectively quantifies risk attributes alongside the influence of stakeholders, addressing a previously underestimated aspect of construction risk assessment. It contributes to the field by integrating stakeholder-related risks and can be applied broadly in contexts involving multiple stakeholders with complex risk profiles. The case study demonstrates the model's practical utility, offering valuable insights for bridging risk management and stakeholder management in both theory and practice two longstanding focal areas in construction and project management [10].

Yu et al. (2018) explained Construction development projects often involve multiple stakeholders with different requirements and interests. Public engagement (PE) is crucial for collecting and involving them in decision-making processes. However, identifying and managing stakeholders is challenging due to their different power and interests. This study investigates the relationships between stakeholder attributes and PE outcomes through a questionnaire survey. An integrated model examining stakeholder power, interest, and public engagement (PE) outcomes was developed using structural equation modeling. The results revealed that various forms of power and interest impact PE outcomes both directly and indirectly. To enhance PE outcomes, it is crucial to involve government departments and project teams actively, while ensuring the satisfaction of affected local residents and the broader community. The study emphasizes the need for a systematic value management approach to logically analyze projects, incorporate public opinions, and identify shared interests. Additionally, transparent communication with nongovernmental organizations and the media is essential to monitor the PE process effectively. Including reputable stakeholders is recommended to offer guidance and sustain positive social relationships throughout the project [11].

Safapour et al. (2019) studied effective project-based communication indicators (EPCIs) in a construction project. The study identified 50 potential EPCIs, which were categorized into eight key areas: legal requirements, authority levels, stakeholder management, location, project objectives, project resources, fiscal planning, and design and technology. The results showed that inexperienced project management teams, clear project scope, goals, and objectives, and EPCIs associated with

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stakeholder management, project resources, and project targets significantly impacted internal communication. Inefficient use of workforce, machinery, and material resources also affected communication. The findings can help practitioners and project managers design proactive plans for effective communication [12].

Townsend et al. (2020) researched the social mechanisms used by project managers and teams to achieve success in construction projects. The study includes a comprehensive literature review and a two-part qualitative investigation involving thirty semi-structured interviews with current or former project managers. It emphasizes project personnel and communication as key success factors, with antecedents such as planning, selection, and retention, and causal social mechanisms including frequency, understanding, and inclusivity. The research offers practitioners valuable insights into the “how” of critical success factors during the execution phase, typically when a general construction contractor is engaged by the client. Grounded in project management theory and prior research, the findings are broadly generalizable and applicable across project-based industries and beyond. It fills a gap in the literature by straddling the two end users of the knowledge [13].

Colling (2020) suggested stakeholder engagement in construction project management, revealing its complexity and theorizing its role as a complex process of responsibility, organizational action, and work package requirements. The highlights unique aspects of stakeholder engagement in construction, including the binding of party interests, the impact of subcontractor involvement, and the dynamics of collective blame or praise. It recommends conducting periodic reviews of engagement activities to ensure alignment between corporate social responsibility (CSR) strategic objectives and stakeholder engagement efforts. It also highlights the importance of communication between parties at multiple levels and the need for a framework for assessing stakeholder management issues. The findings suggest further research to expand understanding and use of stakeholder engagement in different engineering and project management contexts [14].

Pamidimukkala et al. (2023) researched the impact of project-based communication indicators (EPCIs) on communication in construction projects. Data from 40 case studies was collected and analyzed using Cohen's d method. The findings revealed that factors such as limited financial resources, high turnover of skilled labor, owners' lack of clarity regarding project goals, the extensive number of stakeholder approvals required, and the complexity of quality standards significantly impact communication quality. The study aims to help project management teams assess communication effectiveness and support construction supervisors in allocating resources toward structured communication frameworks, innovative technologies, and preventive strategies to minimize miscommunications. However, the study has limitations, such as the use of previous studies and the limited data collected [15].

Kunkcu et al. (2025) studied the main patterns influencing communication in construction projects, focusing on collaboration and trust. The model, based on five constructs (trust, attitude toward knowledge sharing, collaboration, reciprocal feedback, and social ties), comprises 26 items. The findings suggest that collaboration and trust are the most critical constructs, while frequency in information exchange and consistent behavior of team members are vital. The study offers insights into the communication mechanism among project team members in the construction industry, providing remedial solutions for high-quality communication and rethinking project team management. The findings are expected to benefit new practitioners in the industry [16].

#### **Major Findings from Literature Review**

The following are outcomes based on textile sludge waste utilization in research:

1. Project quality can be achieved when stakeholders communicate effectively about the utilization and sharing of resources, time, and other project elements to meet the desired outcomes.
2. Communication is essential throughout all stages of a project, from inception to handover. Without some form of communication, a project cannot even begin.

3. The project can only be achieved if there is clear communication between Stakeholders.
4. Poor communications in complex construction project is the main reason cause project failure.

## RESEARCH METHODOLOGY

### Research approach

This study aims to assess the practice of stakeholder communication and coordination in relation to project outcomes, with a primary focus on identifying and ranking the critical factors that influence these processes. To achieve this, relevant literature was reviewed to establish a theoretical foundation. Furthermore, to gain insight into actual practices within building construction projects, the following research methodology was implemented. Therefore the actual data is collected and analyzed to find the actual practices in relation to stakeholder's communication & coordination on project outcome and the critical factors affecting the stakeholder's communication & coordination.

Data can be gathered in a variety of ways. The methods of observation, interviews, surveys, and timetables are important. We use questionnaires to gather data for this study. This approach to gathering data is quite well-liked, especially for large requests. This approach involves sending a questionnaire to the person in issue, asking them to respond and send the form back. A questionnaire is made up of several questions that are typed or printed on a form or series of forms in a specific order.

Both primary and secondary sources were used to gather data for this investigation. A questionnaire sent to stakeholders working on construction projects was used to collect the primary data. The secondary data was gathered from books, journals, the internet, and earlier studies. The secondary data served as a criterion for creating and evaluating the primary data as well as a source for identifying problems. A questionnaire is used as a research tool to collect information.

### Survey Questionnaires

The research tool utilized in this study is a questionnaire that was created to guarantee that it addresses the study's goals, which are divided into various sections. Questions in the initial section of the questionnaire were designed to collect information about the respondents and the firm profile, including contact details for projects, work experience, and employment status. The purpose of the questionnaire's second section is to gather information regarding contractors' knowledge and comprehension of stakeholders communication & coordination in building projects. The third section includes the different stakeholders communication & coordination affecting factors that the respondents are asked to rank, along with general experiences that have been used to prevent project delays due to poor communication & coordination between stakeholders.

The parameters found in earlier studies will serve as the foundation for creating a questionnaire that will examine their impact on the stakeholder's communication & coordination. The questionnaire's design was predicated on the requirement that it be easy for respondents to grasp, straightforward, and clear while still being interpretable by the researcher.

### Research Population and Sampling

Stakeholders of various building sites in Central Vadodara, Gujarat, comprise the study populations for this research project.

### Data Analysis

Data from questionnaires has been processed through analysis using a basic statistical method, which includes looking at, tabulating, and classifying according to the measurement scale of choice. For ease of understanding and to clearly illustrate the results, the majority of the findings were presented as tables, pie charts, and bar graphs.

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**Ranking Methods**

Ordinal scales were employed in this study. As seen in Table 2, an ordinal scale is a rating or ranking of data that typically employs numbers in either ascending or decreasing order. The allocated numbers 1, 2, 3, 4, and 5 are only labels.

The effect level in this investigation was ascertained using an ordinal measurement scale ranging from 1 to 5. Respondents were requested to rank the elements influencing stakeholder coordination and communication by degree of relevance (5 = very large degree affects, 4 = large degree affects, 3 = average degree affects, 2 = small degree affects, and 1 = not affected).

The following formula was utilized to assign a Relative Importance Index (RII) to each element in order to analyze the data using an ordinal scale:

$$\text{Relative Important Index} = \frac{5n_1 + 4n_2 + 3n_3 + 2n_4 + n_5}{5(n_1 + n_2 + n_3 + n_4 + n_5)}$$

Where,

- n<sub>1</sub> = number of respondents who answered "Critical effect"
- n<sub>2</sub> = number of respondents who answered "High effect"
- n<sub>3</sub> = number of respondents who answered "Medium effect"
- n<sub>4</sub> = number of respondents who answered "Low effect"
- n<sub>5</sub> = number of respondents who answered "No effect"

As indicated in Table 3, an ordinal measuring scale ranging from 1 to 4 was employed to ascertain the level of the effect in order to investigate the frequency of occurrence. Respondents were asked to rate the elements influencing stakeholder communication and coordination based on the significance level (4 = incredibly large degree frequency, 3 = substantial degree frequency, 2 = small degree frequency, and 1 = nil occurrence frequency).

The following formula was used to assign a relative significance index (RII) to each element in order to analyze the data using an ordinal scale.

$$\text{Frequency Index} = \frac{4n_2 + 3n_3 + 2n_4 + n_5}{4(n_1 + n_2 + n_3 + n_4)}$$

Where,

- n<sub>1</sub> = number of respondents who answered "Very often"
- n<sub>2</sub> = number of respondents who answered "Often"
- n<sub>3</sub> = number of respondents who answered "Sometimes"
- n<sub>4</sub> = number of respondents who answered "None"

**Questionnaire Design**

The questionnaire is created using the study methodology that will be applied following a comprehensive review of the literature and the identification of numerous elements influencing stakeholder coordination and communication during building development.

**Table 2.** Ordinal scale used for measuring of the level of effect.

Item	Critical Effect	High Effect	Medium Effect	Low Effect	No Effect
Scale	5	4	3	2	1

**Table 3.** Ordinal scale used for measuring of the frequency of occurrence.

Item	Very often	Often	Sometimes	None
Scale	4	3	2	1

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There are two sections to the questionnaire. The company and responder profile information is covered in the first section, while the primary questionnaire is covered in the second. It includes a few elements that impact the coordination and communication of stakeholders in building construction, and respondents are required to select only one option to express their viewpoint on that element based on their comprehension, expertise, and experience.

The questionnaire was created such that respondents would have to rate the frequency of occurrence on a scale of one to four and the intensity of effect on a scale of one to five in order to rate both factors.

#### **Survey Work and Data Collection**

The survey will be conducted among the sample's chosen respondents and within the parameters of the study. Respondents will receive the questionnaires, and information will be gathered once they have completed them. These surveys will be used to ascertain respondents' opinions about the elements influencing coordination and communication.

### **DATA COLLECTION & ANALYSIS**

#### **Stakeholder Details**

Three categories of stakeholders are the focus:

1. Owner/client
2. Engineer, Architect, PMC firm etc.
3. Users/End users

The cities in which survey is to be carried out are

1. Central Vadodara

#### **Questionnaire Distribution and Collection**

Distributing the questionnaire to different stakeholders involved telling them about the goal of the study and asking whether they would be interested in taking part. The responders were given a questionnaire after demonstrating their initial willingness.

A total of 115 questionnaires were given out to various respondents in Central Vadodara. For this study, a total of 50 respondents submitted their responses. Appendix C is a list of the 50 stakeholders who responded to the survey. The distribution of responses across the research area is shown in Table 4.

The following analysis was done for stakeholder interpretation using Microsoft Excel. Figures 2 through 9 display the respondents' overall ranking for each individual component.

#### **Data Analysis by Relative Importance Index (RII) Method**

The Relative Importance Index approach was used to rate each aspect from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users to examine the primary data gathered from the questionnaire survey.

The computed RII and responses from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users are shown in Appendices D-1, D-2, and D-3, respectively.

**Table 4.** Distribution of responder.

Stakeholders	City
	Vadodara
Owner/client	08
Engineer, Architect, PMC firm etc.	34
Users/End users	08
Total	50

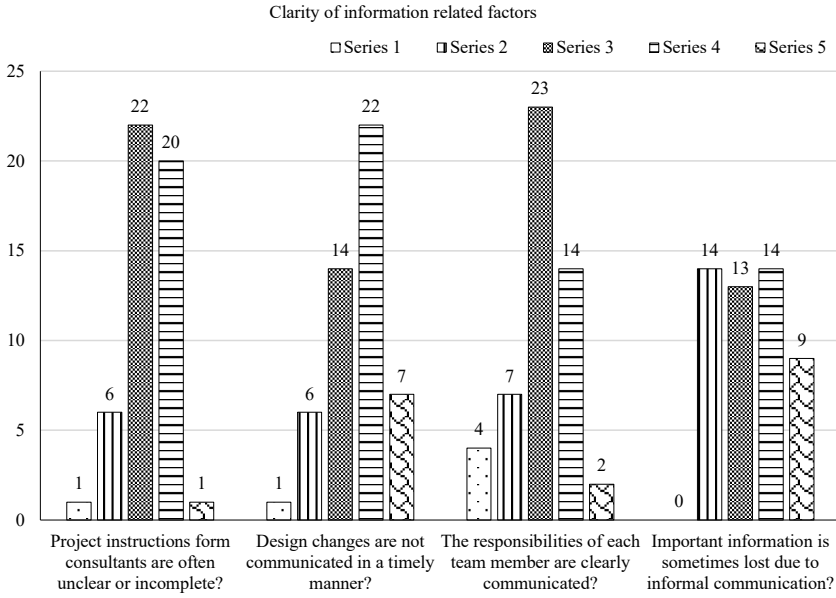


Figure 2. Rating for clarity of information related factors.

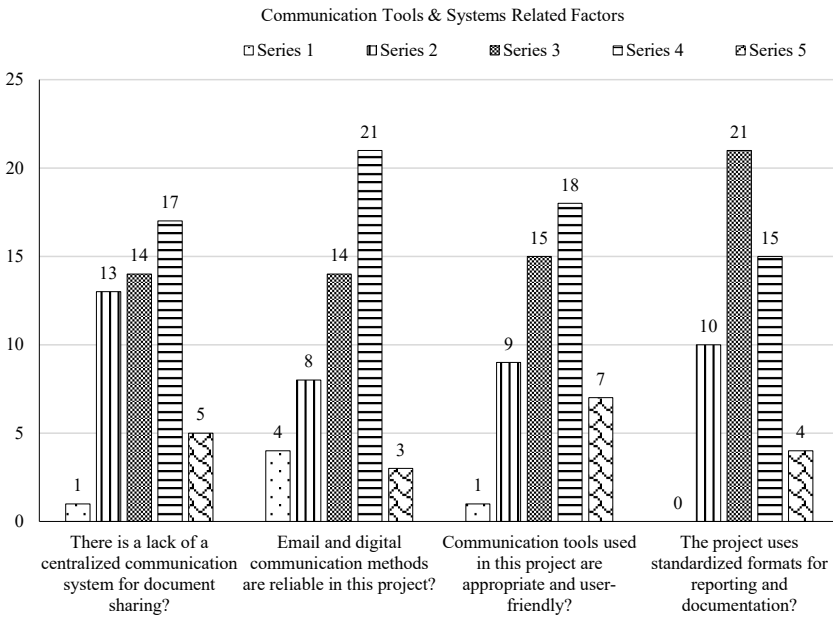


Figure 3. Rating for communication tools & systems related factors.

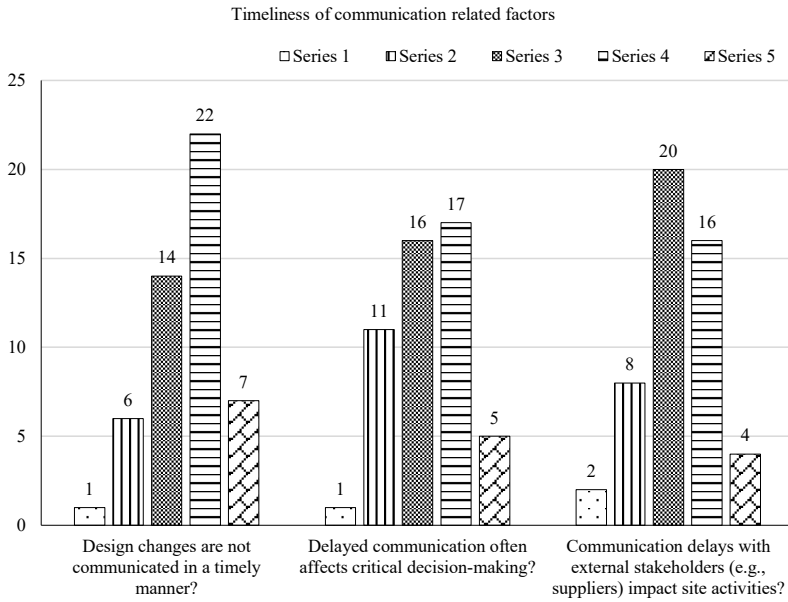


Figure 4. Rating for timeliness of communication related factors.

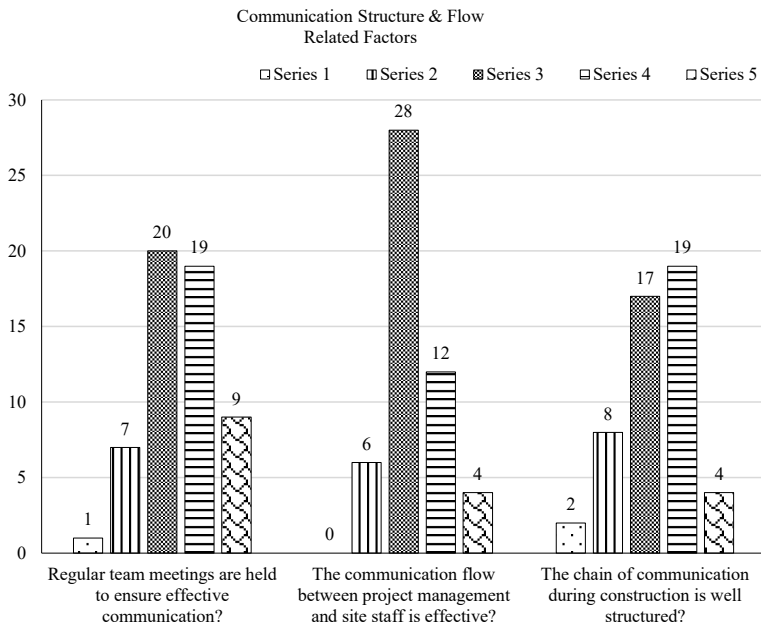


Figure 5. Rating for communication structure & flow related factors.

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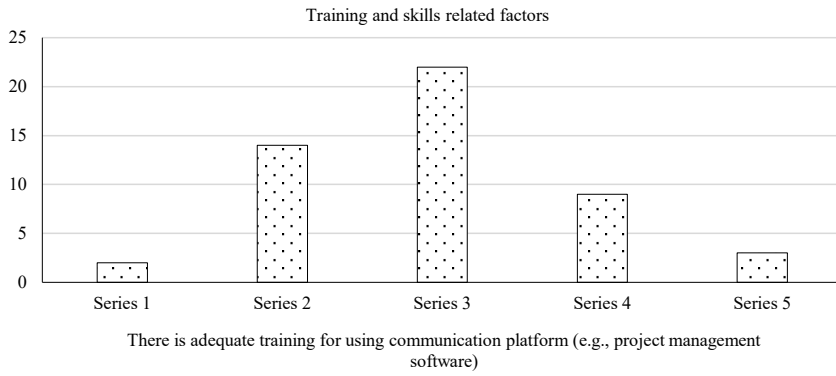


Figure 6. Rating for training and skills related factors.

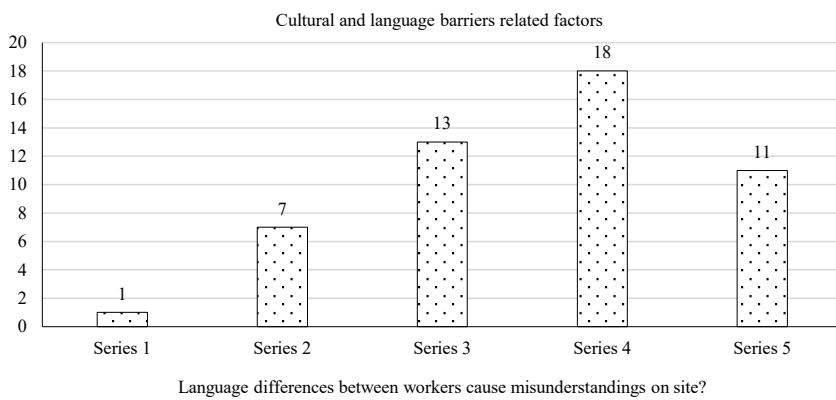


Figure 7. Rating for cultural and language barriers related factors.



Figure 8. Rating for trust and relationship issues related factors.

### Ranking of Overall Response by RII Method

The study's RII was computed by taking into account the respondents' rates for the 20 parameters influencing stakeholder's communication & coordination in building construction. RII values are used to rank the factors. The most significant element influencing stakeholder's communication & coordination in building construction can be determined from the rankings given to each component. The entire answer is ranked using the RII approach in Table 5.

### Major Factors Affecting Stakeholder's Communication & Coordination with Respect to Level of Effect

Below is a list of the top five factors influencing stakeholder's communication & coordination,

1. The communication flow between project management and site staff is effective? – 1.304
2. Ineffective communication increases safety risks on site? – 0.848
3. Poor communication has led to construction errors on site? – 0.792
4. Miscommunication among stakeholders frequently causes project delays? – 0.772
5. Regular team meetings are held to ensure effective communication? – 0.744

**Table 5.** Ranking of overall response by RII method.

Factors	RII	Rank
<i>Clarity of Information Related Factors</i>		
Project instructions from consultants are often unclear or incomplete?	0.656	13
The responsibilities of each team member are clearly communicated?	0.612	17
Design changes are not communicated in a timely manner?	0.712	7
Important information is sometimes lost due to informal communication?	0.672	11
<i>Communication Tools &amp; Systems Related Factors</i>		
There is a lack of a centralized communication system for document sharing?	0.648	15
Communication tools used in this project are appropriate and user-friendly?	0.684	9
Email and digital communication methods are reliable in this project?	0.644	16
The project uses standardized formats for reporting and documentation?	0.652	14
<i>Timeliness of Communication Related Factors</i>		
Delayed communication often affects critical decision-making?	0.656	13
Communication delays with external stakeholders (e.g., suppliers) impact site activities?	0.648	15
Design changes are not communicated in a timely manner?	0.712	7
<i>Communication Structure &amp; Flow Related Factors</i>		
The communication flow between project management and site staff is effective?	1.304	1
The chain of communication during construction is well structured?	0.66	12
Regular team meetings are held to ensure effective communication?	0.744	5
<i>Training and Skills Related Factors</i>		
There is adequate training for using communication platforms (e.g., project management software)?	0.588	18
<i>Cultural and Language Barriers Related Factors</i>		
Language differences between workers cause misunderstandings on site?	0.724	6
<i>Trust and Relationship Issues Related Factors</i>		
Conflict among team members is often caused by poor communication?	0.692	8
<i>Impact of Miscommunication Related Factors</i>		
Miscommunication among stakeholders frequently causes project delays?	0.772	4
Poor communication has led to construction errors on site?	0.792	3
Communication breakdowns often lead to rework?	0.676	10
Ineffective communication increases safety risks on site?	0.848	2

### Data Analysis by Frequency Index (FI) Method

The Frequency Index approach was used to rank each element from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users in order to examine the primary data gathered from the questionnaire survey.

The computed FI and answers from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users are shown in Appendices E-1, E-2, and E-3 respectively.

### Ranking of Overall Response by FI Method

To determine how frequently a factor occurs in a building project, its frequency index (FI) is calculated. The frequency index values are used to rank the factors. One can determine the most common factors influencing stakeholders' communication & coordination by looking at the rankings given to each one. The overall response is ranked using the FI approach in Table 5.3.

**Table 6.** Ranking of overall response by FI method.

Factors	FI	Rank
<i>Clarity of Information Related Factors</i>		
Project instructions from consultants are often unclear or incomplete?	0.67	8
The responsibilities of each team member are clearly communicated?	0.57	15
Design changes are not communicated in a timely manner?	0.65	9
Important information is sometimes lost due to informal communication?	0.625	10
<i>Communication Tools &amp; Systems Related Factors</i>		
There is a lack of a centralized communication system for document sharing?	4.09	1
Communication tools used in this project are appropriate and user-friendly?	0.625	10
Email and digital communication methods are reliable in this project?	0.73	5
The project uses standardized formats for reporting and documentation?	0.605	12
<i>Timeliness of Communication Related Factors</i>		
Delayed communication often affects critical decision-making?	0.72	6
Communication delays with external stakeholders (e.g., suppliers) impact site activities?	0.59	13
Design changes are not communicated in a timely manner?	0.65	9
<i>Communication Structure &amp; Flow Related Factors</i>		
The communication flow between project management and site staff is effective?	0.575	14
The chain of communication during construction is well structured?	0.535	17
Regular team meetings are held to ensure effective communication?	0.535	17
<i>Training and Skills Related Factors</i>		
There is adequate training for using communication platforms (e.g., project management software)?	0.55	16
<i>Cultural and Language Barriers Related Factors</i>		
Language differences between workers cause misunderstandings on site?	0.7	7
<i>Trust and Relationship Issues Related Factors</i>		
Conflict among team members is often caused by poor communication?	0.65	9
<i>Impact of Miscommunication Related Factors</i>		
Miscommunication among stakeholders frequently causes project delays?	0.765	4
Poor communication has led to construction errors on site?	0.795	2
Communication breakdowns often lead to rework?	0.61	11
Ineffective communication increases safety risks on site?	0.785	3

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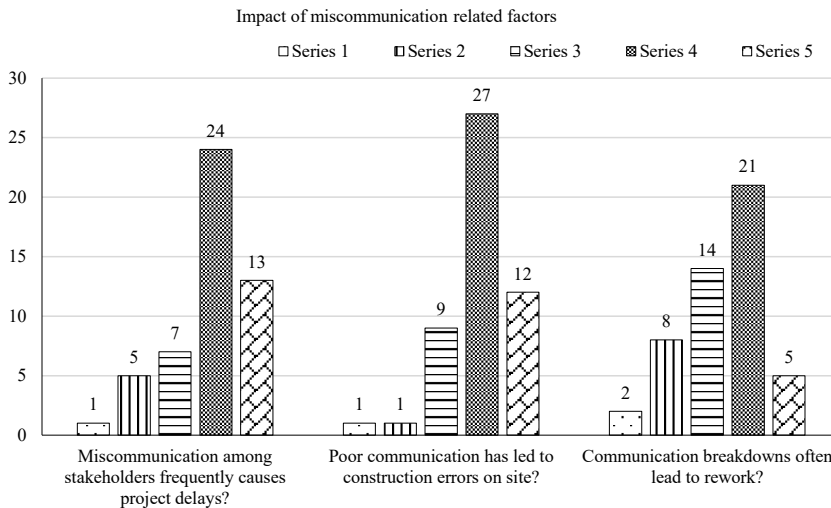


Figure 9. Rating for impact of miscommunication related factors.

**Major Factors Affecting Stakeholder’s Communication & Coordination with Respect to Frequency of Occurrence**

Below is a list of the top five factors influencing stakeholder’s communication & coordination,

1. There is a lack of a centralized communication system for document sharing? - 4.09
2. Poor communication has led to construction errors on site? – 0.795
3. Ineffective communication increases safety risks on site? – 0.785
4. Miscommunication among stakeholders frequently causes project delays? – 0.765
5. Email and digital communication methods are reliable in this project? – 0.73

**Data Analysis by Severity Index (SI) Method**

The Severity Index approach was used to rate each element from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users in order to examine the primary data gathered from the questionnaire survey.

The computed SI and responses from the viewpoints of Owner/client, Engineer, Architect, PMC firm, contractors, and Users/End users are shown in [Appendices F-1, F-2, and F-3, respectively.](#)

**Ranking of Overall Response by SI Method**

To determine which factors are the most severe, the severity index (SI) is calculated for each factor. The severity index values are used to rank the factors. It is feasible to determine the most significant factors influencing stakeholder’s communication & coordination in building construction based on the rankings given to each component. The entire answer is ranked by the SI method in [Table 5.4.](#)

**Major factors affecting labour productivity with respect to severity**

The five most significant factors influencing stakeholder’s communication & coordination,

- There is a lack of a centralized communication system for document sharing? – 2.650
- The communication flow between project management and site staff is effective? – 0.750
- Ineffective communication increases safety risks on site? – 0.666
- Poor communication has led to construction errors on site? – 0.630
- Miscommunication among stakeholders frequently causes project delays? – 0.591

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**Table 7.** Ranking of overall response by SI method.

Factors	SI	Rank
<i>Clarity of Information Related Factors</i>		
Project instructions from consultants are often unclear or incomplete?	0.440	11
The responsibilities of each team member are clearly communicated?	0.349	19
Design changes are not communicated in a timely manner?	0.463	9
Important information is sometimes lost due to informal communication?	0.420	13
<i>Communication Tools &amp; Systems Related Factors</i>		
There is a lack of a centralized communication system for document sharing?	2.650	1
Communication tools used in this project are appropriate and user-friendly?	0.428	12
Email and digital communication methods are reliable in this project?	0.470	8
The project uses standardized formats for reporting and documentation?	0.394	16
<i>Timeliness of Communication Related Factors</i>		
Delayed communication often affects critical decision-making?	0.472	7
Communication delays with external stakeholders (e.g., suppliers) impact site activities?	0.382	17
Design changes are not communicated in a timely manner?	0.463	9
<i>Communication Structure &amp; Flow Related Factors</i>		
The communication flow between project management and site staff is effective?	0.750	2
The chain of communication during construction is well structured?	0.353	18
Regular team meetings are held to ensure effective communication?	0.398	15
<i>Training and Skills Related Factors</i>		
There is adequate training for using communication platforms (e.g., project management software)?	0.323	20
<i>Cultural and Language Barriers Related Factors</i>		
Language differences between workers cause misunderstandings on site?	0.507	6
<i>Trust and Relationship Issues Related Factors</i>		
Conflict among team members is often caused by poor communication?	0.450	10
<i>Impact of Miscommunication Related Factors</i>		
Miscommunication among stakeholders frequently causes project delays?	0.591	5
Poor communication has led to construction errors on site?	0.630	4
Communication breakdowns often lead to rework?	0.412	14
Ineffective communication increases safety risks on site?	0.666	3

## CONCLUSION

- The previous section presents the results of the questionnaire survey and analysis, draws a conclusion from the study findings, and forwards pertinent recommendations and future directions.
- The goal of this study is to determine the variables influencing stakeholder's communication & coordination in the construction industry. This study uses a standardized questionnaire that was given out in the central Vadodara to look into every potential element influencing stakeholder's communication & coordination.
- The Relative Important Index (RII), Frequency Index (FI), and Severity Index (SI) methods are used to rank the factors once the survey findings have been analyzed.
- Clarity of Information, Communication Tools & Systems, Timeliness of Communication, Communication Structure & Flow, Training and Skills, Cultural and Language, Trust and Relationship, Impact of Miscommunication. The 8 aspects that were taken into consideration for the study. 50 of the 115 surveys that were sent were completed.

- According to their degree of influence and frequency of occurrence, the top 5 factors affecting stakeholder's communication & coordination are lack of a centralized communication system, communication flow between project management and site staff, Ineffective communication, Poor communication, Miscommunication among stakeholders.
- According to the data, poor communication can have a major negative impact on safety, schedules, and quality in building project management.
- Adopting technology, implementing established procedures, and providing continuous training to address the most important communication concerns can improve project efficiency, lower risks, and produce better results overall. The findings of the comparison study on the key variables influencing stakeholder's communication & coordination were examined in central Vadodara.

#### Future Scope

Both residential and commercial developments are taken into consideration for this study's research objectives. Thus, work can be expanded to include various kinds of construction projects, such as infrastructure and industrial projects.

Research can be expanded to create frameworks or predictive models that evaluate communication hazards at different phases of a project. Project managers may find these models useful in anticipating and resolving possible communication failures.

Long-term studies that assess the efficacy of communication improvement techniques during the course of a project will yield important information about their viability and effect on project performance.

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