

Evaluating the Efficiency of Construction Documents Coordination Among Building Industry Professionals in Abeokuta, Ogun State: Challenges and Opportunities

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Abstract- Effective coordination of construction documents among building industry professionals play a crucial role in successful project delivery. The study made a comprehensive exploration of the importance of coordination and communication in the construction industry, as well as its specific impact on the coordination of construction documents. The study combines the results of several studies and concludes with a focus group discussion with experts in the building sector. The vital significance of efficient coordination in improving project outcomes, lowering errors, and increasing stakeholder satisfaction is among the key lessons. The study emphasizes the significance of clear and concise documentation, timely information dissemination, and seamless collaboration among professionals. Additionally, it addresses the challenges faced in coordinating construction documents and their effects on project delivery. The research underscores that efficient coordination methods, open communication lines, and a collaborative culture are essential for mitigating the adverse effects of communication breakdowns and inadequate coordination. This comprehensive analysis contributes to a better understanding of current coordination practices in the construction industry, providing valuable insights for industry professionals and stakeholders alike.

Index Terms: Communication, Construction Documents, Construction Industry, Coordination, Project Delivery

I. Introduction

Coordination are essential elements in the construction industry to ensure efficient project delivery. For a project to be successfully completed, effective coordination are essential in the construction sector. Clear communication and seamless coordination among building industry professionals contribute to improved project outcomes, reduced errors, and enhanced stakeholder satisfaction [38]. The construction industry involves complex and dispersed planning, design, and construction processes that require the collaboration and input of numerous experts and non-professionals. Effective coordination among building industry professionals are crucial for successful project delivery. However, the inclusion of non-value-adding activities and processes in the supply chain often leads to inefficiency and low productivity [31], the authors further expressed that, effective coordination streamline project workflows, avoiding delays and cutting down on downtime. In order to keep projects on schedule, effective communication can assist detect and handle problems as soon as they arise.

Effective coordination of construction documents among building industry professionals, contractors, and subcontractors, is crucial for the successful execution of construction projects. In addition, it was further asserted that effective communication and coordination of construction documents require clear and concise documentation, timely dissemination of information, and seamless collaboration among professionals [29],[27].

Several studies have emphasized the importance of communication and coordination in the construction industry. For instance, [18] the role of effective communication in reducing conflicts and enhancing project performance. Similarly, [28] the significance of coordination in achieving construction project success. [39] poor communication can lead to misunderstandings and mistakes, resulting in rework and additional costs. Coordinated efforts reduce the chances of errors, saving both time and resources. While in another study, [30] the authors illustrated effective communication as a measure that ensures that all stakeholders are aligned with project goals and expectations. It was further analyzed that, well-coordinated teams are more capable of identifying and addressing potential risks early in the project life cycle [36]. Effective communication enables timely risk mitigation strategies to be implemented. In another study [21], Clear communication keeps all stakeholders informed about project progress, changes, and decisions. This transparency fosters trust and satisfaction among clients, investors, and other involved parties. For effective collaboration, [24] Effective communication and coordination encourage knowledge sharing and collaboration among professionals. This can lead to innovative solutions and practices that benefit the entire industry. On consideration of legal and regulatory compliance, Clear documentation and communication help ensure that projects adhere to legal and regulatory requirements. Proper coordination facilitates the submission of accurate reports and necessary permits [27].

There are limited research specifically focusing on the assessment of coordination of construction documents and its impact on project delivery [29]

In view of the importance of construction documents, this study is aimed at evaluating the efficiency of construction documents coordination among building industry professionals in Abeokuta, Ogun state, with the view of providing guidelines to mitigate

challenges and proffer solutions for better application in the construction industry. Consequently, the research questions poised in achieving this aim are:

How are building industry professionals currently coordinating during the production and exchange of construction documents?

What are the challenges faced by building industry professional in effectively coordinating construction documents?

What are the main determinants of effective coordination of construction papers among professionals in the building industry?

What effects do the recognized construction documents have on how construction projects are delivered?

The goal of the focus group discussion is to examine and enhance the processes of collaboration and communication that are involved in construction documentation, this study intends to identify the key factors influencing coordination, assess the methods used to evaluate these processes, and understand the implications of effective or ineffective coordination on project outcomes.

The findings of this discussion and recommendations will contribute to a better understanding of the current state of coordination practices in the construction industry and their impact on project delivery. Investigating the impacts of a well coordinated construction documents is vital for several reasons, by examining the effects and consequences of construction documents, professionals can better understand their significance and potential outcomes.

II. Literature Review

Construction Documents Coordination

Coordination of construction documents are crucial aspects of the construction process. They play a significant role in ensuring the successful completion of a construction project. The authors have listed some reasons why communication and coordination affect the success of construction project deliveries [9].

Accuracy and Clarity:

Construction documents serve as a crucial communication tool between the design team, contractors, and other stakeholders [19]. Investigating their impacts ensures that the documents are accurate, clear, and effectively convey the design intent. This helps minimize misunderstandings, errors, and costly rework during the construction process [9].

Compliance and Legal Requirements:

Construction documents often need to comply with building codes, regulations, and legal standards. Investigating their impacts helps ensure that the documents meet these requirements, reducing the risk of legal issues, fines, or project delays [18]. It also helps in adhering to environmental, safety, and accessibility standards [32].

Coordination and Integration:

Construction projects involve multiple disciplines, such as architecture, engineering, and construction management. Investigating the impacts of construction documents helps identify potential conflicts, inconsistencies, or coordination issues between different disciplines [22]. This allows for better integration and coordination of design elements, leading to a more efficient construction process [32].

Cost and Time Management:

Construction documents play a crucial role in estimating project costs and timelines. Investigating their impacts helps identify potential design changes, material substitutions, or construction methods that could affect project costs and schedules. By understanding these impacts early on, project teams can make informed decisions to manage budgets and timelines effectively [24],[9].

Quality and Performance:

Investigating the impacts of construction documents helps assess the quality and performance of the final built environment. By examining the documents, professionals can identify potential design flaws, constructability issues, or performance gaps. This allows for proactive measures to ensure that the constructed facility meets the desired standards and performance criteria [32].

Communication Quality:

Adequate communication of construction documents plays a crucial role in the successful delivery of construction projects. Effective communication ensures that all project stakeholders are on the same page, resulting in improved coordination, reduced errors, and increased efficiency. The authors further analyzed clear communication of construction documents, such as drawings, specifications, and contracts, helps all parties involved in the project to have a common understanding of the project scope, requirements, and expectations. This clarity minimizes confusion and reduces the likelihood of errors or rework [17]. In addition, Clear communication of construction documents helps in ensuring that all parties involved, including architects, engineers, contractors, and subcontractors, have a shared understanding of the project requirements. It minimizes misinterpretations and reduces the likelihood of errors or rework [12]. analyzed whether communication channels (such as meetings, emails, and project

management software) are enough and appropriate for successfully and efficiently transferring information. The use of appropriate communication tools (such as project documentation, drawings, specifications, and progress reports) to promote precise and clear communication is further evaluated by the authors [24],[37].

Professionals must ensure that messages are clear and contain all relevant information by evaluating the clarity and completeness of the information shared across project stakeholders [14]. They also assess the accuracy, consistency, and thoroughness of project paperwork, including contracts, drawings, and specifications. The promptness of communication exchanges, taking into account how quickly messages are sent and answered. He also evaluates the project stakeholders' receptivity to questions, issues, and concerns that arise throughout the course of the project [16],[21]. In another study [29], the level of collaboration and coordination among project stakeholders to influences effective teamwork and alignment of project objectives and enhances the extent of information sharing, joint problem-solving, and decision-making processes within the project team. How well communication works in managing conflicts and settling disagreements among project stakeholders. could be achieved by evaluating the existence of formal channels of communication and dispute resolution procedures, such as conferences, negotiations, and mediation [4].

Collaborative communication is crucial for improving coordination in the construction process. Effective communication among all stakeholders, including owners, architects, engineers, contractors, and subcontractors, helps streamline the workflow, prevent delays, minimize errors, and enhance overall project performance. It was further mentioned that, the collaborative nature of Business Information Modeling (BIM) makes it possible for all stakeholders to share and coordinate project information. It offers a single digital platform for the exchange and storage of design, construction, and operation-related data. Real-time cooperation, fewer disagreements, and more effective communication are all made possible with BIM [34],[15]. In another narrative [35], Integrated Project Delivery (IPD) is a team-based project delivery approach that promotes early participation from all significant stakeholders. It places a focus on project participants sharing risk and working toward common objectives together. Throughout the construction process, IPD promotes open lines of communication, builds trust, and boosts cooperation. In another analysis [7] the author mentioned lean construction method as a means of waste reduction, increased productivity, and improved teamwork and communication. Daily huddles, the Last Planner System, and visual management boards are examples of lean techniques that enhance communication, transparency, and coordination. Also, [6] there are numerous software programs available that are made expressly to assist collaborative communication in building projects. These solutions make it easier for stakeholders to share documents, collaborate in real time, and communicate information. The author further expressed that, if there is to be effective communication and coordination, all stakeholders must participate in regular meetings, workshops, and coordination sessions. These meetings offer a chance to discuss problems, make expectations clear, settle disputes, and guarantee team members' alignment.

Inadequate Communication and Coordination:

The completion of a project may suffer significantly from inadequate coordination and communication. Project delivery delays can be brought on by a lack of collaboration and communication among team members [33]. It is challenging to pinpoint and quickly address difficulties when team members are not effectively communicating their progress, concerns, or dependencies. Project delays and missed deadlines may follow from this. One of the main reasons projects fail, according to the Project Management Institute (PMI), is poor communication, which results in delays and cost overruns. In another report by CII, Project expenses may rise as a result of ineffective collaboration and communication. When there is a breakdown in communication or lack of coordination, it may be necessary to redo work, make additional efforts, or use more resources to remedy problems that could have been avoided with better communication. Poor coordination and communication are factors in cost overruns in construction projects, according to a report by the Construction Industry Institute. [33] further mentioned that, the quality of project deliverable may suffer when team members are unable to communicate and coordinate properly. Errors, omissions, or the completion of work of inferior quality may come from a lack of clarity, misunderstandings, or misalignment of expectations.

Further, inadequate communication could lead to stakeholders dissatisfaction, when clients or end-users, are not kept informed about project progress, changes, or challenges, it can erode their confidence in the project and the team. This can result in negative feedback, strained relationships, or even the cancellation of the project. CEM lastly analyzed Increased risk of conflicts and misunderstandings as a result of Ineffective communication and coordination which can increase the likelihood of conflicts and misunderstandings among team members. When there is a lack of clear communication channels, misinterpretation of messages, or insufficient collaboration, it can lead to disagreements, confusion, and strained working relationships [3].

It is essential to develop efficient coordination methods, create open lines of communication within project teams, and cultivate a culture of collaboration in order to lessen these effects. To promote efficient information sharing among team members, project managers should give priority to communication planning, encourage frequent updates and feedback, and use the right communication methods and technologies.

Information Flow Performance:

In another study, [5] the used social network analysis (SNA) to evaluate information flow performance in construction projects can reveal important information about how well project stakeholders collaborate and communicate. SNA is a methodological technique that looks at the connections and interactions between different people or things in a network. SNA can be used to

examine the information flow between various project participants, including owners, contractors, subcontractors, and suppliers, in the context of building projects. More so, [2] it was indicated that there is a positive monotonic association between each of the centrality indices (representing network influence on each crew) and each of the work plan variability indices (representing crew's performance). The more influences a crew receives from the network, the more work plan variation it will have. A better understanding of the existing job site inter-dependencies will help project managers to control it through better planning and leadership, consequently increasing job site productivity. Further, the best way to coordinate is to involve project participants in all activities throughout the duration of project, lack of collaboration in projects' early stages could result in a great deal of waste in the design, rework in construction, and delay or even failure to achieve initial goals [23].

Accurately communicated and well coordinated construction documents helps to minimize rework and delays in the construction process. When all stakeholders have access to the latest revisions and updates, potential conflicts or issues can be identified and resolved early, preventing costly rework and schedule disruptions [10]. Additionally, the impact of construction documents as a reference for making critical decisions throughout the project life cycle. Effective coordination ensures that all stakeholders have access to the necessary information at the right time. This facilitates prompt decision-making, which can help avoid delays and keep the project on track [38].

Effect of Communication Breakdown:

Communication breakdowns can have a significant impact on construction project performance. Effective communication is essential in construction projects, as they involve multiple stakeholders, complex processes, and coordination among various teams. When communication breaks down, it can lead to delays, errors, conflicts, and increased costs. [29]. The authors further mentioned that, communication breakdowns were found to be a major cause of delays in construction projects, which can result in delays in decision-making, approvals, and coordination among different teams. Inadequate communication contributed significantly to rework in building projects. Miscommunication or lack of communication can lead to misunderstandings, resulting in rework and errors [5]. This can be especially critical when project specifications, design changes, or safety instructions are not effectively communicated. (CII) also states that poor communication is a major cause of project cost overruns. That, Communication breakdowns can lead to cost overruns due to delays, rework, and inefficiencies [11].

Communication breakdowns as a major reason in poor building quality. The quality of building work can be harmed by inadequate communication. poor quality work may be the consequence of unclear instructions, a failure to address design or technological flaws, or a breakdown in communication regarding quality standards [3]. In addition, [2] the importance of communication in the safety of construction sites in another study. The authors mentioned that, safety on construction sites depends on effective communication. Accident and injury risk may rise as a result inadequate communication of safety instructions, hazard warnings, or emergency response protocols.

Impacts of Communication Quality & Rework

In building projects, the effectiveness of communication is vital and can significantly affect the amount of rework. As a result of clear understanding of requirements, expectations, and instructions, project teams are better able to coordinate, make fewer mistakes, and do less rework. On the other hand, ineffective communication can lead to misunderstandings, erroneous interpretations, and errors that call for redoing [5]. The importance of clear communication channels in reducing rework. Clear and concise communication helps in conveying project requirements, design specifications, and construction details accurately. Effective instructions leave less room for misunderstanding, which lowers the probability of rework [22].

Conflicts and discrepancies in design can result from poor communication amongst project stakeholders, including architects, engineers, and contractors. Rework is frequently necessary to fix these problems. For decreasing design-related rework, effective communication channels and regular design coordination meetings are essential [39]. Further, the importance of clear communication during change management processes to minimize rework. The authors also mentioned that, Design, scope, and client requirements modifications are common in construction projects. Effective communication guarantees that all pertinent stakeholders are promptly informed of changes. Poor communication during the change management process can cause change orders to be overlooked or misunderstood, which necessitates rework [23].

In addition, good communication between project participants enhances collaboration and reduces rework. The authors also emphasized that Many parties are involved in construction projects, and they collaborate to achieve a common objective. Effective communication encourages teamwork and collaboration, which lowers the risk of mistakes and rework [27].

More so, the role of information sharing in reducing rework, emphasizing the need for effective communication channels. It is crucial for project teams to exchange timely, reliable information in order to make decisions and solve problems efficiently. Ineffective information transfer can lead to mistakes and more work [1].

III. Materials and Method:

This paper adopted a qualitative approach with the aid focus group discussion. Concepts discussed were sourced from review of relevant literature in line with as the aim of the study. A review of literature helps to identify, select and critically appraise research in order to answer clearly formulated question(s). It is also expected to follow a clearly defined protocol or plan where

the criteria are clearly stated before the discussion is conducted, as presented with research questions in this study [13]. In addition, effective communication among project stakeholders, including clients, contractors, architects, engineers, and suppliers as it plays an essential role in coordinating activities, resolving conflicts, and achieving project goals. The following assessment framework outlines key factors to consider and provides references to support the evaluation [37].

This study aims to identify the key factors influencing coordination, assess the methodologies used to evaluate these processes, and comprehend the implications of effective or ineffective coordination on project outcomes. The focus group discussion's objective is to examine and improve the processes of collaboration and communication that are involved in construction documentation.

Objectives related questions were set. Professionals that align with the questions were selected based on their demographic and experiences. They were thereafter reached out to, to confirm their availability and interest. Getting participants that would provide meaningful insights and contribute to the research objectives was tasking. The final group of eight participants were assembled based on their availability, diversity and desire to engage in open discussion and share their opinions. The stakeholders were informed about the purpose and use of their information and that, the personal information collected is relevant to the discussion and would be handled with care and confidentiality.

The discussion is aimed to gather insights on the current practices, challenges, and opportunities to help facilitate a fruitful discussion among building industry professionals and shed light on their experiences and perspectives regarding coordination of construction document.

The discussion took place at an on going construction site in Abeokuta on August 8th, 2023, starting at 10am. The discussion lasted for 47 minutes, the session was recorded using a mobile phone recorder. The content was later transcribed.

IV. Results and discussions

Information on Respondents

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Coordination in exchange of construction documents

Construction documents were expressed to be beyond drawings. It comprises drawings, site instructions, correspondence, advertisement, and specification. The Quantity Surveyor further analyzed the modalities used in sharing constitution documents. He expressed that communication mediums like emails and other social media platforms like WhatsApp can be used for easy communication responses. The contractor opined on the required need of construction documentation as it relates to cost. That is, The source of the information must be clearly identified, same to the recipient, and also there must be feedback for communication to be effective and efficient on items that require cost and those that require ordinary instructions.

Challenges of document coordination

The subcontractor identified the lapses between the contractor and the consultant as the lack of detailed specification and technical data before the project is carried out. He further mentioned that there will always be challenges if the requisite information is not well detailed. In support, the Contractor and the Quantity Surveyor mentioned that a long delay in seeking approval on contractors' requests does amount of time lost, especially when the chain link is much longer than necessary.

The Quantity Surveyor further mentioned that lack of synergy among the professionals automatically amounts to inadequacies in organizing and coordinating the professionals. That is, As a result of a lack of synergy among professionals, there may be conflicting information in the document, which makes it difficult for implementation.

According to the contractor, distance and delay in response to correspondence were some of the highlighted challenges. He sighted a situation where floor tiles samples were sent to the client from Abeokuta to Abuja for assessment and further directives. Unfortunately, there was no response to date, as the client claimed no receipt of the tiles. That automatically caused work delay.

Determinants of effective coordination of construction documents.

The stakeholders agreed to have been communicating via all available means; verbal, electronic, hardcopies. When asked which one is the most efficient means of coordinating construction documents, the contractor suggested that a few means of communication should be adopted so as to have the information efficiently coordinated. It could be via social media email,

printed documents, and verbal instruction. However, verbal information should also be documented for the record alongside the blueprints. In addition, to avoid assumptions of delivery while the sent message might have been diverted to spam mail, the Quantity Surveyor suggested backing up shared documents with phone calls to confirm if it has been successfully delivered and received.

To be pro-activeness, sharing documents electronically could be the most efficient for fast and proper coordination, while the hardcopies can be delivered when seen physically. One of the most efficient platforms identified is One Drive. On one drive, stakeholders will be linked to a designated folder via their one drive account. Any information dropped by one would be seen by all.

Impacts of construction documents on project delivery

Timely response, pro-activeness to shared documents, and regular technical sessions were alighted by the contractor as some of the key factors that could contribute to a successful coordination of construction documents. The Quantity Surveyor also identified proper dating of referenced documents and revised drawings as a key to a successfully delivered project.

According to the contractor, he suggested the adoption of artificial intelligence and cloud-based information would help reduce some of the faced challenges regardless the distance. Varieties of application such as zoom, Google meet, WhatsApp group chats could aid proper coordination of projects without physical presence of personnel. The adoption of drones could also aid in conducting site inspection and collating data for valuation. Although, it is capital intensive but achievable. Continuous training of personnel and development programme also help in future. Lastly, as a mentor, it was suggested lay a good legacy of how efficiently and effectively to coordinate construction documents for the future professionals to follow suit.

The electrical engineer was of the opinion that proper communication has to be right from the design stage, There must be proper communication between the consultants and the client, as well as not disregarding the input of the end user. To juxtapose his point, he sighted a project he had worked on. That, After the building had been completed, the end users were complaining that the windows were too small. He concluded that there must be proper coordination among the stakeholders right from inception of the project to the delivery stage. The Mechanical Engineer, in his opinion, confirmed that the implementation of projects will have a lot of challenges if not properly conceived.

He further analyzed what needs to be considered right from inception for a project to be well thought out;

- i. The need of the end user must be considered
- ii. The project size.
- iii. The project cost and
- iv. and the project duration

The contractor suggested the adoption of artificial intelligence, such as email, Google drive, clouding to mention but a few in the dissemination of information. In a contrary opinion, the QS suggested the duty of sharing information on projects should be saddled on a selected individual, by so doing, adequate coordination can be enhanced among the stakeholders. He further opined that every project must have a project manager who must ensure proper coordination among the stakeholders. However, The structural engineer identified improper coordination among building industry professionals as a result of a lack of synergy among the stakeholders.

V. Conclusion

The focus group discussion highlighted several important points regarding construction document coordination within among the construction industry professional. The participants emphasized that construction documents encompass more than just drawings, including site instructions, correspondence, advertisement, and specifications. Effective communication mediums, such as emails and social media platforms, were suggested for sharing documents. Challenges identified included insufficient detailed specifications, long approval processes, lack of synergy among professionals, and language barriers.

VI. Recommendations

Communication channels can be enhance with the utilization of various communication platforms, including emails, social media, and cloud-based solutions, for efficient document sharing and coordination. Provide comprehensive and detailed specification to avoid coordination issues and challenges during project execution. Promote collaboration among professionals to avoid conflicts and enhance document accuracy. Engage stakeholders early on, including end-users and clients, during the design phase to address potential issues and ensure project success. Appoint a dedicated project manager to oversee document sharing and streamline communication among stakeholders. Overcome language barriers by utilizing translators and considering cultural values. Conduct regular technical sessions to tackle challenges and facilitate effective communication. Reinforce electronic document sharing with backup phone calls for critical instructions. Prioritize electronic sharing for speed, with hardcopies as supplementary. Centralize document sharing on platforms like OneDrive for accessibility. Timely responses and proactive engagement contribute to successful coordination. Ensure accurate dating and revisions of documents. Embrace AI and cloud

solutions to improve efficiency in remote sharing. Explore drone usage for remote inspections, acknowledging the required investment. Invest in ongoing training for personnel to stay updated. Experienced professionals should set an example for efficient document coordination. Implementing these recommendations enhances construction document coordination, minimizing delays and improving project quality.

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