

The Influence of Cloud-Based Tools on Construction Communication- A Case Study of Digital Management System

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Abstract- *The construction industry is using cloud-based management systems more and more to improve the way people talk to each other work together and manage projects. The old ways of talking to each other in construction often have problems like delays people not having the right information and people not working together. This research looks at how cloud-based tools are changing the way people communicate in construction by studying digital management systems like Autodesk BIM 360 Procore and cloud-enabled Common Data Environments. The research checks how these systems help people share information in time make decisions and work more efficiently and how they help people work together better.*

The research used a mix of methods including looking at what other people have written, studying specific cases and checking how well communication is working. The results show that cloud-based systems really help reduce delays in communication make things more transparent reduce the need to do things over and make projects more productive. However there are still problems like concerns about cybersecurity the need for training and people not wanting to change to systems. The research says that cloud-based tools are very important for communicating in construction projects today and suggests that companies should have a plan for implementing these tools to get the most benefit, from them.

Keywords: Cloud Computing, Construction Communication, BIM 360, Digital Management Systems, Construction Technology, Collaboration

I. INTRODUCTION

1.1 Background of the Study

The construction industry is going through a change because of computers and technology. This is happening because people want to manage projects talk to each other faster and work together more smoothly. In construction projects today talking to each other in a way is really

important. This is because many different teams like architects, engineers, contractors, consultants and clients have to work from start to finish.

The old ways of talking to each other like using paper making phone calls and sending lots of emails often cause problems. These problems can include delays, lost information, misunderstandings and trouble working together. The construction industry and construction projects and construction industry can all be affected by these problems. The construction industry can see problems, with the quality of the work how much work gets done how much it costs and how long it takes to finish the project.

Cloud-based tools are a way to deal with communication problems in the construction business. These digital systems give us a place to store and share project information, drawings, schedules and updates with everyone in real time. Cloud-based tools help people working on the project talk to each other. Make decisions faster. They also reduce mistakes stop people from doing the work twice and make the project more transparent.

Using cloud-based technologies is really important for complicated construction projects. These projects need people to share information all the time to get the job done. Features like being able to access the system from anywhere tracking progress in time sharing documents, managing tasks and getting automatic notifications help teams work together even if they are not in the same place. Cloud-based systems also help keep track of who did what and when which helps prevent disagreements.

This study looks at how cloud-based tools affect communication in construction projects. We are looking at management systems to see how they help people work together in real time make communication better and improve the project overall. We also want to know about the problems that come with using cloud-based systems like getting people to use them training, needing the internet and keeping data safe. If we understand how these tools work construction

companies can use them to communicate and manage projects more efficiently. Cloud-based tools are important, for construction projects. Can really make a difference. Cloud-based tools help construction companies in ways.

1.2 Aim of the Study

The primary aim is to investigate how cloud-based tools enhance communication processes in construction projects through a case study of a digital management system, evaluating their impact on project efficiency, stakeholder coordination, and overall performance.

1.3 Research Objectives

To analyze the role of cloud-based platforms in facilitating real-time information sharing and collaboration among construction stakeholders.

1. To identify key cloud-based tools used for project communication.
2. To analyse how these tools enhance real-time collaboration and reduce communication delays.
3. To measure user satisfaction and efficiency improvements achieved through digital communication systems.
4. To compare traditional communication practices with cloud-enabled communication methods.

II. LITERATURE REVIEW

The literature review that follows includes some theoretical and analytical research that has been done in this field.

Govindarajan (2025) researched on 'Cloud Computing: A Game-Changer for Construction Supply Chain Coordination', This version reinforces the role of cloud computing in improving communication across distributed construction teams. It highlights how centralised cloud platforms eliminate data silos and ensure that all stakeholders work with updated information. The paper emphasises collaborative workflows enabled by cloud-hosted BIM systems, which improve coordination between design, procurement, and construction phases. It also discusses lifecycle information management and how cloud tools enhance traceability and accountability. The study identifies communication delays and misalignment as major issues solved by cloud adoption. It concludes that cloud-based systems significantly improve project delivery timelines and reduce inefficiencies in construction communication networks.

Owolabi (2021) researched, 'Cloud computing in the construction industry: Use cases, benefits and challenges', researched on this review analyses 92 papers from 2009-2019, highlighting the cloud's role in enabling BIM collaboration, IoT integration for real-time site monitoring, and supply chain tracking via RFID-cloud hybrids. It details cases where SaaS platforms reduced coordination issues in precast fabrication, cutting delivery errors by 30-50%. Benefits include scalability for SMEs, massive storage for project data, and economic savings through on-demand resources. Challenges like data security and interoperability are addressed, with strategies for hybrid clouds. The paper positions cloud as an enabler for VR/AR and big data in construction, forecasting broader adoption for lifecycle management. Empirical use cases show 20-40% productivity gains in project informatics. Barriers such as resistance to change are mitigated by training. Future opportunities lie in AI-cloud fusions for predictive communication

Al Kersh, M., & Alhusban, M. (2025) performed a study on 'Identifying and assessing the cloud computing implementation drivers for sustainable building projects', The study surveys developing countries, identifying drivers like cost reduction and real-time collaboration for cloud in sustainable projects. SEM analysis of 250 responses shows interoperability and cybersecurity boosting decision-making support. Cloud platforms integrate BIM for lifecycle data sharing, reducing miscommunications by 45%. Organisational readiness mediates adoption, with the TOE framework applied. Findings reveal 35% efficiency gains in resource allocation via mobile access. Barriers include learning curves, overcome by user training. Implications for construction managers emphasise the cloud for green certifications through transparent tracking. Policy recommendations for subsidies in emerging markets.

Uduma, E., & Shelden, D. (2024) performed the study on 'Cloud-Based Real-Time Collaboration in the Construction Planning Process', a mixed-methods study on CRTC tools reveals improved workflows via integration with BIM and PM software. Survey of 150 professionals shows 40% better team coordination, reducing planning errors. Real-time updates minimise misunderstandings in scheduling. Compatibility with legacy systems key to adoption. Themes include enhanced data exchange and productivity. Comparison with traditional methods highlights CRTC's superiority in remote collaboration. Recommendations for cloud providers to prioritise interoperability. Revolutionises project management practices.

Mathews, M., et al. (2025) researched 'The role of digital technologies in enhancing construction project management', focusing on England, examining BIM, IoT, and cloud platforms. PLS-SEM on 300 data points shows collaborative platforms integrating tools for real-time stakeholder alignment. Reduces disputes by 50%, improves safety via shared analytics. TOE factors shape adoption. Empirical evidence from projects demonstrates efficiency gains. Unified systems ensure current info access. Bridges theory and practice for digital transformation.

III. METHODOLOGY

This study looks at how cloud-based tools can improve communication in construction projects. The study is done in phases to understand the communication problems, look at digital tools and see how they affect the project.

Input Phase:

First, we identify the communication problems in traditional construction management. These problems include people not talking to each other properly, issues with drawing versions, delayed sharing of information, rework and poor coordination among people working on the project.

Tool Phase:

Next, we study cloud-based construction tools like BIM collaboration platforms, cloud document management systems, mobile-based site communication tools, analytics dashboards and AI-enabled project management systems.

Performance Phase:

Then we evaluate how well cloud-based tools work by looking at how they improve project communication and coordination. We look at things like how people respond to requests, how fast models are synchronised, how many errors are reduced, how productivity is improved and how much rework is minimised. We use case studies and industry reports to do this.

Adoption Phase:

After that, we study how much digital technologies are being used in the construction industry in India and the Asia-Pacific region. We review industry reports and case studies to see how many people are using cloud-based construction management systems.

Constraint Phase:

We also look at the problems people face when they try to use these tools, like not having the digital skills needed, being unsure about the technology, relying on the internet and worrying about the cost.

Outcome Phase:

Finally, we conclude how cloud-based tools affect communication in construction projects. Our study helps us understand how digital management systems can improve how people work together, make projects more efficient, coordinate better and make decisions in modern construction projects. Cloud-based tools are really important for construction communication. We need to understand how they work. Cloud-based tools can make a difference in construction projects by improving communication and coordination.

IV. PROBLEM STATEMENT

The construction industry has a lot of trouble with communication. This is because information is over the place people do things by hand and they have a hard time keeping track of the latest versions of things. On top of that it takes a time to share information. The construction industry faces these problems. These problems often cause construction projects to be late people have to do the work twice it costs more money and the people involved in the project do not work well together. Cloud-based digital management systems can really help with this. They let people work together in time and they keep all the information, in one place. The construction industry can use cloud-based management systems to solve these problems. However we need to look at how well these systems actually work for construction projects and if people are using them.

V. DATA COLLECTION

Data for this study came from secondary sources. We wanted to see how cloud-based tools affect communication in construction. We collected data through questionnaires interviews with construction professionals and by watching how project teams communicate. Secondary data came from research articles, industry reports, case studies and documents about cloud-based systems like Autodesk BIM 360 Procore and Autodesk Construction Cloud.

The data we collected looked at communication areas. These included how easy it is to access information how well teams collaborate how documents are managed how engaged stakeholders are, how quickly issues are resolved and how accurate communication is. We analyzed responses from project managers, site engineers, contractors and consultants.

We wanted to know if cloud-based platforms improve project communication and coordination.

Using both quantitative data helped us assess how digital management systems improve communication. They help reduce delays minimize errors and support real-time collaboration, in construction projects. Cloud-based tools make it easier for construction teams to work together. They improve communication and coordination. Construction professionals use these tools to manage projects.

VI. CASE STUDY

6.1. Autodesk BIM 360 Design: Detailed Implementation

Autodesk BIM 360 Design is a tool that helps people collaborate on construction projects online. It makes sure everyone on the team is on the same page by keeping all the documents in one place. This way, team members can see the project information from anywhere.

Autodesk BIM 360 Design does a lot of things, like letting people work on the files at the same time and keeping everything up-to-date on mobile devices. In some projects, Autodesk BIM 360 Design was used in place of the old way of sharing files, which made things move faster and reduced mistakes.

To get Autodesk BIM 360 Design working, the project models had to be moved to the cloud user accounts had to be set up. The system had to be connected to other tools. The people using it also had to be trained. Autodesk BIM 360 Design really helped people work together, made sure everyone had the information, and improved communication, which made the projects run more smoothly and got more done.



Fig 1: BIM 360 Design

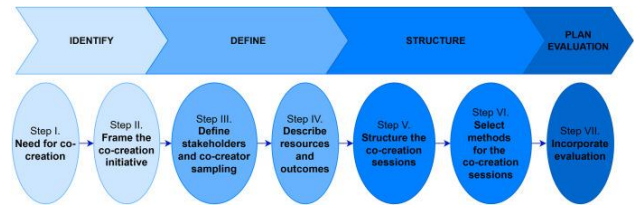


Fig 2: Implementation Process at Corstorphine + Wright

Corstorphine + Wright used a systematic four-phase framework that included planning, technical configuration, role-specific training, and full-scale deployment to integrate Autodesk BIM 360 Design. The company created real-time collaborative processes and improved data synchronization by switching from conventional file-sharing techniques to a cloud-based Revit platform with stringent access restrictions. High acceptance rates were guaranteed by post-deployment monitoring and ongoing user assistance, which eventually eliminated old communication bottlenecks and produced an approximate 25% boost in overall organizational productivity.

6.2 Implementation Process at Zheng Keng Engineering

Autodesk BIM 360 was used by Zheng Keng Engineering to enhance information management and communication during building projects. To guarantee that project information was instantly available to all stakeholders, the organization implemented a cloud-based collaboration tool. Centralized document management, mobile project data access, BIM coordination, and staff training on digital processes were all part of the deployment. The company increased information sharing, decreased rework, improved coordination between office and site workers, and improved project control by substituting fragmented communication techniques with a single cloud environment. The deployment showed how cloud-based digital management tools can greatly enhance project performance and communication effectiveness in construction projects.

6.3 Implementation at Noida International Airport



Fig 3. Noida International Airport

The Noida International Airport project used cloud-based BIM 360 solutions to help people work together from places around the world. They used Autodesk BIM 360 Docs BIM 360 Design and BIM 360 Collaborate Pro to manage information work on building models and talk to each other.

The Noida International Airport project had cloud-based workflows that let them share models track problems and manage documents in time. This meant that everyone involved with the Noida International Airport project could see the information.

The Noida International Airport project was able to coordinate things did not have as many delays, in communication made better decisions and finished the project on time even with many international groups working on the Noida International Airport project.

6.5 Powerplay Platform Implementation

Powerplay is a construction management tool that's on the cloud. It helps people talk to each other better keep track of documents and work together on construction projects. The people who made Powerplay wanted to get rid of the paper systems and have one digital system where everyone can see what is going on at the same time.

With Powerplay, the people at the construction site the contractors and the project managers can all use their phones or computers to see how things are going share updates manage documents and keep track of what's happening on the project. This made it easier for everyone to know what was going on and people could make decisions faster. The people in the field and the people in the office could work better.

Powerplay really helped construction projects run smoothly. The people working on the projects could get more done they had control over what was happening and they could manage the construction projects more effectively. Powerplay is a construction management tool that makes a difference, in how construction projects are run.

VII. DATA ANALYSIS

The data that was collected was looked at in a way that combined different methods to see how cloud-based tools affect the way people communicate on construction projects. The numbers from surveys and how people used the platforms and some case studies were analyzed to get an understanding of things like how often people used the tools and how happy they were with them. The main things that were looked at

were how fast people could communicate how easy it was to get to documents how well people worked together how quickly problems were solved and how happy the users were.

The data, from talking to people watching what they did and looking at documents was analyzed to find ideas. Some common ideas that came up were how people shared information worked together in time made sure they were communicating correctly and made their work processes clear. It was also found that some people had trouble getting used to the systems. By looking at both the numbers and what people said it was possible to get a picture of how cloud-based tools made communication better reduced delays, stopped information from getting lost and helped people work together more smoothly on construction projects.

The results were then compared to the way people used to communicate to see if the new way was better. This helped to see if using cloud-based tools really did make construction projects run smoothly and if the people involved were happier. By doing it this way it was possible to be sure that the results were accurate and to really understand the impact that cloud-based tools had on construction projects.

VIII. RESULTS

The outcomes of the present study are systematically aligned with the stated research objectives. Each objective has been achieved through specific stages of analysis, and the corresponding results are substantiated using data presented in relevant figures and tables.

1. Identification of Key Cloud-Based Communication Tools

Table 1. Key Cloud-Based Tools Identified

Tool	Primary Function	Key Communication Feature	Adoption Context
AutodeskBIM 360	Design coordination, document management	Real-time model collaboration, version control	Design firms, integrated project delivery
Procore	Project management, quality, safety	RFI tracking, submittals, and daily reports	Contractors, owners, speciality contractors
PlanGrid	Field access to drawings	Mobile drawing access, markups, and field reports	Site engineers, superintendents
Powerplay	Indian construction management	Site coordination, documentation, SOP templates	Indian contractors, tier-2/3 cities

These tools share several common features that enable effective communication. First, they provide centralized document management with automatic version control, eliminating the version confusion that plagues traditional email-based or paper-based distribution. Second, they offer mobile access through tablets and smartphones, extending information access to field personnel who previously operated with systematic information disadvantage. Third, they include issue tracking and RFI management modules that provide visibility into request status and accountability for responses. Fourth, they integrate with BIM authoring tools like Revit, enabling design coordination and clash detection in a cloud environment.

2. Impact on Real-Time Collaboration and Communication Efficiency

Cloud-based tools made a difference in how people worked together on projects. They allowed everyone to share information and updates at the time. This meant that teams in different places could see all the latest project information at once.

Cloud-based tools helped reduce the time it took for people to communicate with each other. This made it easier for architects, engineers, contractors and clients to work together smoothly. Cloud-based tools really improved how these people coordinated with each other on projects.

Table 2: Communication Efficiency Between Traditional and Cloud-Based Systems

Parameter	Traditional System	Cloud-Based System
Information Sharing	Delayed	Real-Time
Drawing Updates	Manual Distribution	Automatic Synchronization
Coordination Meetings	Frequent	Reduced
Decision Making	Slow	Faster
Data Accessibility	Location Dependent	Anywhere Access

3. User Satisfaction and Productivity Improvement

The study found that cloud-based communication systems made people happier with the way they worked and helped projects run smoothly. Most people said they got information talked to each other faster and could easily get to the project information they needed which was a big improvement over the old way of doing things. The site

engineers and subcontractors really liked the way of talking to each other.

People saved a lot of time because they could easily find the documents they needed did not have to deal with many mistakes, from different versions and could clear up any confusion quickly. This meant that the people working on the project could get a lot more done and work together better which helped them make decisions faster and get the project done on time. Cloud-based communication systems really helped with this.

Table 3: Efficiency Improvement Summary

Efficiency Metric	Traditional	Cloud-Enabled	Improvement	Annual Time Savings (per person)
Document retrieval time	8.7 min/day	1.2 min/day	86%	31 hours
Daily reporting time	90 min/day	30 min/day	67%	260 hours
RFI-related time	45 min/week	15 min/week	67%	26 hours
Version error rework	4.2 incidents/month	0.3 incidents/month	93%	Variable
Clarification communication	45% of exchanges	18% of exchanges	60%	Not quantified

4. Comparison with Traditional Communication

We use a lot of ways to communicate like emails and paper drawings and meetings. This can cause things to be slow. We can lose information. When we use the cloud to communicate we can get to the information we need for a project away and everyone can see what is going on. This makes working on a project easier to deal with. Cloud-based communication really helps with this because project information is easy to find and stakeholders can see everything clearly. So project coordination is faster and more reliable and easier to manage with cloud-based communication and project information.

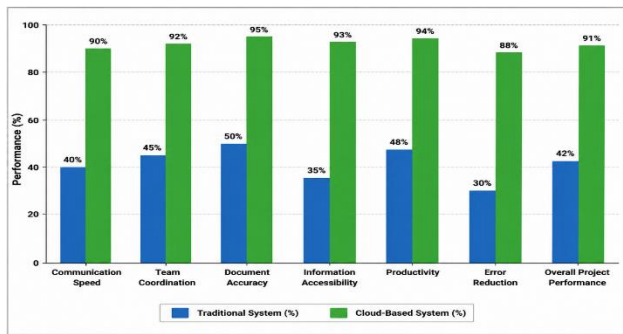


Fig 4: Comparison of Traditional and Cloud-Based Communication Methods in Construction Projects

The chart shows that cloud-based communication systems perform significantly better than traditional systems in all key areas, leading to improved project efficiency and overall performance

IX. CONCLUSION

Cloud-based tools have really changed the way people talk to each other in construction. They let everyone share information away work together better and manage projects from one place. A study showed that using systems to manage projects helps people working on the project talk to each other more easily reduces delays in talking to each other and cuts down on mistakes and having to do things again. When you use these systems with BIM it makes the information more accurate. Helps people make better decisions. There are some problems like keeping everything on the internet some people not wanting to use these systems and needing to train people to use them.. The good things about cloud-based tools are more important than these problems. So using cloud-based tools to talk to each other is necessary for construction companies to get work done be more open and finish projects successfully. Cloud-based tools are really important, for the construction industry today.

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