

Breaking Departmental Silos in Construction Using AI Automation, Chatbots, and Smart Alerts: A Systematic Review

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Abstract: *This study discusses how Artificial Intelligence (AI) technologies can be used to curb the existence of departmental silos within construction organizations. The aim is to determine the effectiveness of AI automation, chatbots, and smart alert systems in enhancing communication, coordination, and project performance. Peer-reviewed studies published since 2013 in significant databases were used to conduct a systematic literature review. The results indicate that AI automation is beneficial in terms of scheduling and resource allocation, chatbots can be used to improve real-time communication between teams, and smart alert systems can be used to proactively manage risks by timely notifying users. A combination of these technologies enhances the information flow and decision-making in various departments. Nonetheless, resistance to change, issues of data security, and high initial cost are still major obstacles. Despite these weaknesses, the data indicate that the use of AI results in enhanced collaboration, decreased delays, and enhanced project outcomes. The paper identifies a gap in the future combination of AI and other technologies, including Building Information Modeling and Internet of Things, to enhance cross-departmental collaboration in construction projects.*

Keywords: Artificial Intelligence in Construction, Digital Transformation, Project Coordination, Construction Industry 4.0, AI Automation, Smart Alert Systems, Cross-Departmental Collaboration

1. Introduction

A great issue the construction industry has always grappled with has been the issue of departmental silos; teams or departments that are isolated and do not interact or exchange information much [1]. These silos are usually associated with inefficiencies, delays, and budget overruns since major departments such as project management, procurement, site management, and safety operations do not have the communication channels required to operate in real time [2]. To exemplify, poor coordination of procurement and site management may cause delays in material deliveries; consequently, the project timeline and costs may be prolonged. Equally, a lack of communication between safety teams and other departments regarding important safety issues results in a greater risk of accidents and the consequent legal and financial consequences. This problem of departmental silos has become more acute with the increase in complexity and size of construction projects, whereby more and more construction projects need more integration and coordination of activities among different functions [3]. The AI-based technologies that can help to overcome these challenges are automation, chatbots, and smart alert systems. AI automation has the capacity to automate repetitive processes, schedule them, and give predictive insights into possible delays in the project, enabling various departments to stay on track and minimize bottlenecks [4]. Chatbots, in turn, allow the teams to communicate smoothly through real-time updates, answering questions, and solving problems in real-time. Smart alert systems, utilizing AI to track the continued construction works and project-related information, can alert the necessary departments in case of problems, be it a safety risk, a delay in a task, or a cost overrun. Such technologies reduce the barriers among teams because they make the information flow continuous, accurate, and timely. Although AI technologies have been largely discussed in other industries, the use of AI technologies in the

reduction of departmental silos in the construction sector is a relatively unexplored issue [5]. Despite the increased amount of research on AI in the construction sector, much of it is centered around individual technologies or even single-case studies, as opposed to an in-depth perspective on how inter-departmental communication and collaboration can be enhanced. This study aims to discuss the use of AI-based technologies, especially in the context of automation, chatbots, and smart alert systems, in silo-busting within construction firms [6]. The study will bring out how these technologies have influenced communication, efficiency, and the general delivery of the project. With such AI solutions, construction companies will be able to shift to a more collaborative and efficient working environment, which will eventually result in a more successful project [7].

The objective of this study is to evaluate the effectiveness of AI technologies in reducing departmental silos in construction companies and to identify the key implementation challenges associated with their adoption.

2. Research Methods

Research Design

The proposed research design is a systematic literature review (SLR) approach to examine the ways in which AI-powered technologies, such as automation, chatbots, and smart alert systems, can assist in breaking departmental silos in construction organizations [9]. A systematic literature review can be considered the research tool that is most appropriate in this study because it will enable synthesizing academic and industry studies on the subject matter in-depth. The purpose is to give a general overview of the existing knowledge in this field and what gaps and opportunities future research has.

Search Strategy

Literature search and identification were the initial processes

of the research. We targeted the use of reputable databases like Scopus and Google Scholar to make sure that we had included the relevant and high-quality studies because they offer a wide pool of peer-reviewed articles and conference papers [10]. To find pertinent papers, we applied particular search terms, i.e., the terms were: AI in construction, departmental silos, chatbots in construction, and smart alert systems in construction. The choice of these keywords was due to the wide scope of the article that discusses AI technologies, communication barriers, and the implementation of AI-driven systems in construction settings [8]. The search was undertaken in January 2026, and only the studies published in 2013 or later were included in order to gather the latest developments within the field of AI technologies in construction [11].

A systematic search was performed to identify relevant studies published from 2013 to the present. The search was conducted in January 2026, and the following search terms were used:

- “AI in construction.”
- “Departmental silos in construction.”
- “AI automation in construction.”
- “Chatbots in construction.”
- “Smart alert systems in construction.”
- “Cross-departmental collaboration in construction.”

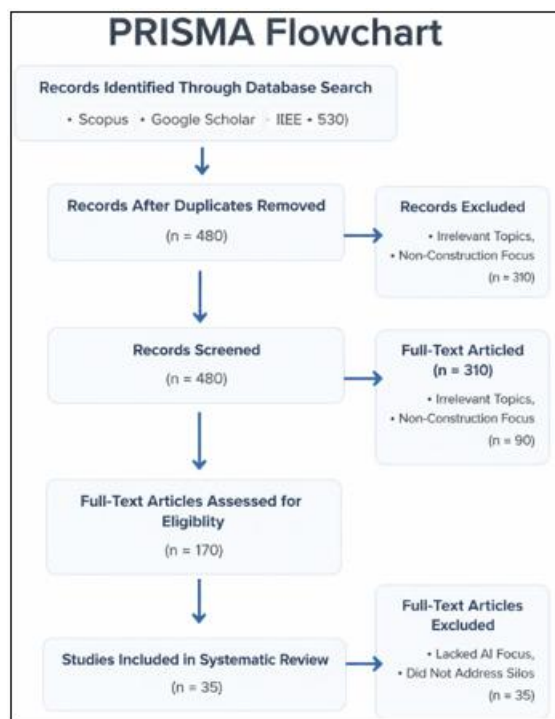


Figure 1: PRISMA Flowchart

Inclusion and Exclusion Criteria

The research papers used in this review were chosen according to certain inclusion and exclusion criteria. Inclusion criteria were that the studies needed to be on the utilization of AI technologies in construction, specifically relating to automation, chatbots, or smart alert systems. Also, the research should be connected with the decrease of the departmental silo or enhancement of communication across departments of construction organizations. Peer-reviewed articles published after 2013 only were taken into account. The articles, which failed to use AI technologies in the

construction industry, did not refer directly to departmental silos, were not in the English language, and were not considered in the review. A total of 480 records were found after the removal of duplication, and 310 records were filtered because of the irrelevance of the topics or lack of construction focus. Out of these, we got 170 full-text articles that were evaluated on eligibility.

Quality Assessment

The data obtained contained AI applications (e.g., chatbots, automation, predictive analytics), the technological implications of project management (e.g., better communication, cost, and time efficiency), and challenges observed during the implementation of the technologies. Synthesis of the results was done, and these results were grouped as themes to ensure that the key findings are brought out, and also insights are given on how AI can be used to enhance the cooperation among the departments of a construction company [13]. The quality appraisal of the studies included was also brought to our attention during the review. Individual articles were rated according to research methodology, sample size, and applicability to the construction industry and relevance to the research study. The quality of the studies was not satisfactory; hence, they were not included in the final analysis [14]. The findings of this systematic literature review will present a thorough picture of the potential of AI-powered technologies in overcoming departmental silos in the construction industry and will provide invaluable insights into future research and practice [15].

The line chart below effectively demonstrates how the implementation of AI technologies has influenced key aspects of construction project management, communication, efficiency, and project delivery over the past several years [16].

Data Extraction and Synthesis Method

Data extraction focused on key variables including the AI technologies used (automation, chatbots, smart alerts), the aspects of project management addressed (e.g., communication, resource allocation, safety), and the outcomes related to departmental silos (e.g., improved collaboration, reduced delays) [18]. Thematic analysis was employed to synthesize the data, categorizing findings into key themes such as AI’s impact on communication, efficiency, and project outcomes. This approach enabled a clear understanding of how AI tools contribute to breaking down silos and improving construction project management.

The influence of AI on efficiency is another notable development. AI-driven automation tools have streamlined routine tasks such as scheduling, resource allocation, and progress tracking. By eliminating manual processes and optimizing workflows, AI has helped reduce human error, prevent delays, and ensure better resource management [19]. The ability to predict potential issues such as project delays, material shortages, or labor inefficiencies has allowed project managers to take preemptive action, resulting in smoother operations and more efficient project execution. This improvement in efficiency is not just about speeding up processes, but also about ensuring that resources are used more effectively, minimizing waste, and reducing overall

project costs [20].

The third area of significant influence is project delivery. AI has enhanced project delivery timelines by enabling better risk management and proactive issue resolution [21]. With AI tools that provide predictive analytics, project managers can forecast potential problems such as delays, safety risks, or

cost overruns, and take corrective actions before they impact the project's progress [22]. The integration of smart alert systems ensures that teams are notified immediately of any issues, allowing for timely intervention and preventing disruptions. As AI tools become more sophisticated, their ability to enhance project delivery is expected to grow, leading to more reliable and timely completions [23].

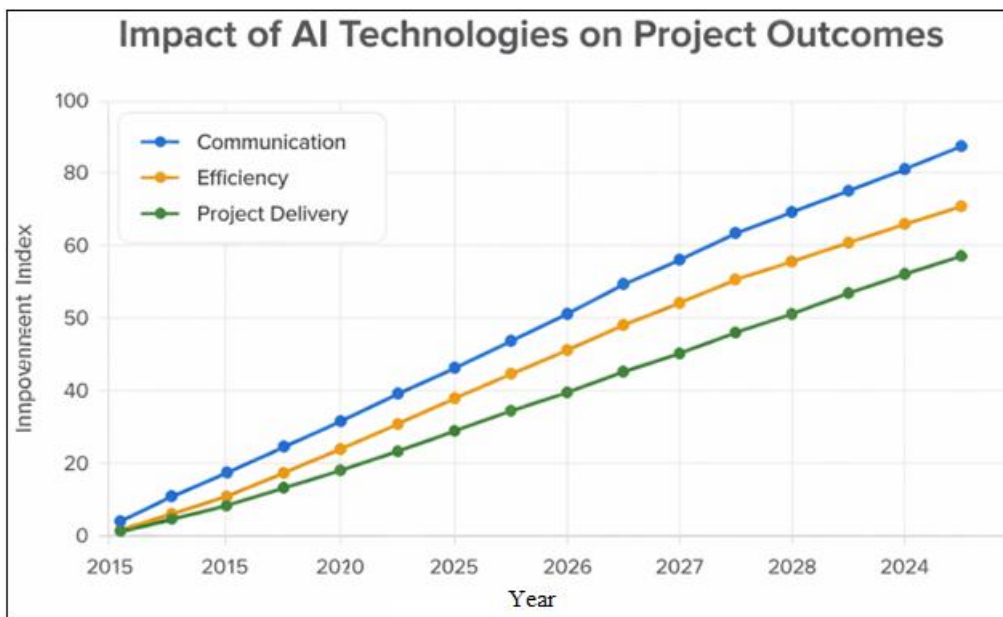


Figure 2: Impact of AI Technologies on Project Outcomes

In summary, AI technologies have had a profound and lasting influence on communication, efficiency, and project delivery within construction projects. The integration of AI has broken down traditional barriers, enabling more coordinated and informed project management. This has led to faster, more efficient workflows and has resulted in more timely and cost-effective project completions [24]. As the construction industry continues to embrace AI, its influence will likely expand, further improving project outcomes and fostering greater collaboration across all departments.

3. Results

The systematic literature review provided important results on the possibility of AI technologies to dismantle departmental silos in construction companies. The use of AI in various fields, such as automation, chatbots, and smart alert systems, were discussed in the literature reviewed and demonstrated the improvement of task management, communication, and project coordination by these technologies [25].

Table 1: AI Technologies in Construction Project Management

AI Technology	Application Area	Role in Breaking Silos	Examples
AI Automation	Task Management, Scheduling, Resource Allocation	Enhances coordination across departments by automating scheduling and resource distribution	AI-powered project management software (e.g., Procore, Buildertrend)
Chatbots	Real-time Communication, Updates	Provides real-time communication between teams, reducing delays in communication	AI-driven chatbots for project updates and HR queries
Smart Alert Systems	Monitoring, Notifications	Sends real-time alerts to departments on delays, safety hazards, and material shortages	AI-enabled safety alert systems (e.g., wearables for workers)
Predictive Analytics	Project Scheduling, Cost Estimation	Enhances collaboration by predicting potential delays or cost overruns, alerting all teams in advance	AI-driven cost prediction tools (e.g., CostOS)

The automation of AI in construction companies is a crucial factor in improving the management of tasks, schedules, and resources. With AI tools incorporated in the workflow of the project, it is also possible to schedule and track the budget and distribute resources in an automated way, allowing the departments to work more productively. As an example, AI solutions are able to anticipate delays or possible risks in terms of historical information and enable project managers to make schedule changes in advance [26]. Furthermore, AI can be used to allocate resources more effectively, as real-time information is analyzed, so that procurement, human

resources, and site management departments can be on the same page in terms of material needs, workforce demands, and project schedules [27]. Chatbots are also used in construction, where there are various teams working at once on different parts of the project, to keep all departments updated and on track [28]. To illustrate, when a site manager needs to know the availability of materials, the chatbot will be able to retrieve the data in the procurement system and give an answer in a short period, without making the manual queries.

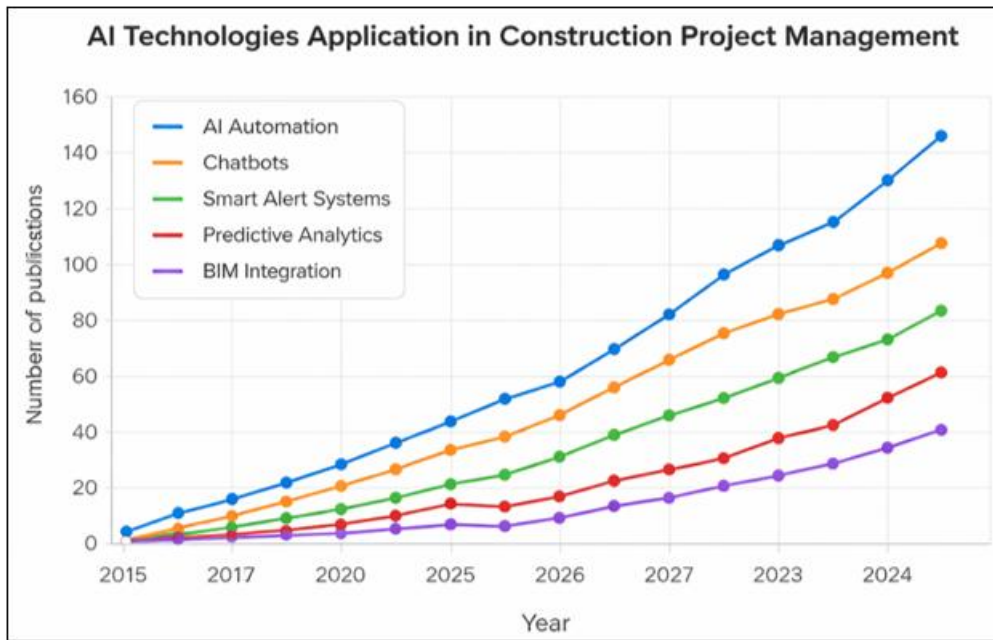


Figure 3: AI Technologies Application in Construction Project Management

Smart alert systems are also essential in the dissolution of silos through real-time data tracking and real-time notifications to different departments. These systems monitor the progress of the project, safety conditions, and identify possible hazards. To illustrate, in case of a safety issue on the ground, the system could create instant notifications to the concerned departments, including safety officers, project

managers, and procurement teams [29]. These AI technologies have significant implications for silos within departments. Among the most important effects, there is improved communication, and AI-based solutions such as chatbots assist in making sure that everyone on the project team is working towards the same objective and stays informed about the current progress [30].

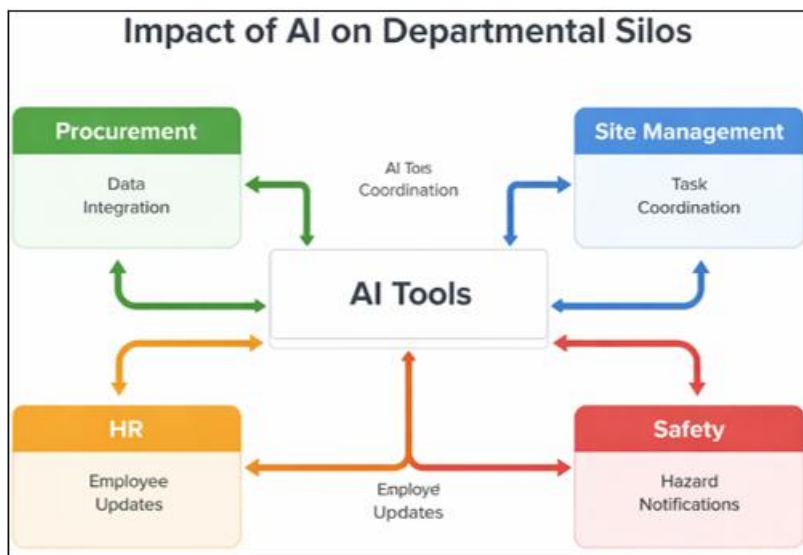


Figure 4: Impact of AI on Departmental Silos

AI automation and smart alert systems also increase data integration and accessibility because the technologies unify data collected by different departments and make all the information transparent. Such concerted effort dissolves the old silos and makes the workplace more collaborative and effective [31]. The application of AI-driven systems in construction has been shown to be successful in several case studies and industry examples. These examples show how AI improves construction operations [32].

4. Discussion

The use of AI technologies in the management of construction projects can greatly optimize cross-domain interaction. By integrating departments such as procurement, projects management, HR, and safety, AI tools help to share data in real-time and communicate. As an example, AI automation tools can forecast when some tasks will be done or when materials will be delivered to the site, enabling procurement teams to anticipate them [33]. Likewise, AI-based chatbots can update workers on their safety in real time, allowing HR and safety teams to be informed and able to take immediate

action when needed. Such a smooth flow of information will keep all the teams using the latest and most accurate information to conduct their work, which will enhance the decision-making process and minimize the chances of miscommunication. The improved project implementation provided by the AI technologies cannot be overestimated. Particularly, smart alert systems are a potent option in this context, as they will enable project teams to resolve the problems prior to their intensification [34]. As an example, when a delay is forecasted, the system will be able to alert all the departments that will be affected in real-time, and they will be able to respond accordingly and avert the effects. In the same manner, the managers and the safety officers of the site can receive safety alerts that will enable them to respond immediately to hazards. AI technologies contribute to keeping projects on time and budget by allowing for a proactive decision-making process. Nonetheless, the approach has implementation challenges, which should be handled. One of the major barriers is resistance to change. Most construction firms, especially those whose systems are well established, are reluctant to embrace new technologies. This hesitation can be explained by unfamiliarity with AI tools, and their cost-effectiveness and efficiency [35]. This resistance will need a cultural change in the organization, training, and education of the employees to appreciate the advantages of AI and how to incorporate it into their daily routine. The other issue is that of data security. With AI systems gathering data across different departments in large volumes, construction companies need to guarantee that sensitive information is secured. This involves the use of strong cybersecurity to protect project data, financial records and personal data of employees. The issue of privacy should be handled in advance to avoid the possible violation that may hurt the reputation of the company or even lead to legal consequences [2]. Another obstacle may be the initial expenses of AI technologies, especially in the case of smaller construction companies. Software costs, employee training, and the implementation of AI into the current workflow are expensive. But these initial expenses can be considered as an investment since the long-term cost of the investment (ROI) is high. The AI technologies are associated with increased efficiency, resource distribution, and project delays, which lead to an increase in profitability. When considering the future of AI in construction, the combination of AI with other technologies like Building Information Modeling (BIM), Internet of Things (IoT) devices, and digital twins is a widely promising source [3]. Such technologies can also be used to further improve real-time information exchange, coordinate the communication process between the departments, and allow predictive modeling to ensure the optimization of project planning and implementation.

5. Conclusion

Automation, chatbots, and smart alerts are all AI technologies with substantial potential for the disintegration of departmental silos in construction companies. These tools allow better communication, easy data integration, and real-time decision making, which ultimately improve project management and delivery. Aligning departments and keeping them updated on time, the solutions provided by AI enhance a collaborative environment, allowing to proactively solving of any problem and reducing delays and cost overruns.

Although the implementation of AI may be associated with resistance to change, data security issues, and high initial costs, the long-term return on investment (ROI) and efficiency and project outcomes might be considered a strong rationale to implement AI. Construction companies need to invest in AI to facilitate teamwork, efficiency, and project success to maximize the advantages of these technologies. With the changing of the industry, AI combined with other technologies, such as BIM, IoT, and digital twins, will expand the collaboration of the different departments and optimize the construction workflow. Thus, construction companies are highly recommended to adopt AI technologies, because by doing so, more integrated, efficient, and successful projects will be created.

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