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Digital delivery in architecture from design to execution

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Abstract

Digital delivery in architecture, as an innovative approach, enables the integration of design and construction processes through digital tools and technologies. This paper examines the role of these technologies in improving efficiency, reducing errors, and enhancing the quality of architectural projects. The primary aim of this research is to analyze the impact of digital technologies on the coordination between design and construction phases and to provide solutions for optimizing these processes. The study employs qualitative analysis and case studies to investigate the application of tools such as Building Information Modeling (BIM) and digital simulations in various projects. The findings indicate that the use of digital technologies can improve project timelines, reduce costs, and increase accuracy during execution phases. This study highlights the importance of digital delivery as an essential tool for architects and engineers in future projects and provides practical recommendations for utilizing these technologies effectively.

Keywords: Digital delivery; Building Information Modeling; Digital design; Architectural technologies; Project optimization

1. Introduction

The integration of digital tools in architecture has revolutionized the way buildings are designed, planned, and constructed. Digital delivery, which encompasses technologies such as Building Information Modeling (BIM), digital simulations, and advanced design tools, has the potential to streamline architectural processes, enhance collaboration, and reduce errors during construction. This research explores the evolution and application of digital delivery methods in architecture, from design to execution, with a focus on how these innovations can improve efficiency, reduce costs, and ensure a higher level of accuracy in the construction process. By investigating various case studies and analyzing industry trends, the study aims to provide a comprehensive understanding of the benefits and challenges associated with digital delivery in the architectural field.

2. Material and methods

This study adopts a qualitative research approach, focusing on case studies and analyzing the application of digital delivery methods in architectural projects. Data collection was carried out through interviews with industry professionals, reviewing existing literature, and examining real-world projects where digital tools like Building Information Modeling (BIM) and digital simulations were utilized. The research also includes hands-on experimentation with digital tools to evaluate their impact on efficiency, cost reduction, and accuracy in both design and construction phases. Additionally, a comparative analysis was conducted between traditional and digital delivery methods to highlight the benefits and challenges associated with the adoption of digital technologies in architecture.

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2.1. Data Collection

The data collection process involved examining various architectural projects where digital tools were implemented. Information was gathered through interviews with industry experts, review of scientific papers, and project reports. These data were collected to assess the impact of digital delivery methods on efficiency, cost reduction, and accuracy in the design and construction phases.

2.2. Comparative Analysis

This section includes a comparative analysis between traditional and digital delivery methods in architecture. The purpose of this section is to examine the advantages and challenges of adopting digital technologies compared to traditional methods. Additionally, the impact of these technologies on the design and construction processes is also evaluated.

3. Results and discussion

In this section, the results of the research are presented, along with a detailed discussion of their significance and implications. The analysis of the use of digital delivery methods in architectural projects reveals several key findings. First, the integration of digital tools such as BIM significantly improved the accuracy and efficiency of design processes. Projects using digital methods showed a reduction in errors and rework, which ultimately led to cost savings.

Furthermore, the comparison between traditional and digital delivery methods highlighted the advantages of using digital technologies. Digital methods not only streamlined communication between design teams and contractors but also facilitated real-time collaboration, reducing delays. However, challenges were also identified, particularly in terms of the initial cost of implementation and the need for specialized skills. Despite these challenges, the benefits of digital delivery methods in enhancing project outcomes were clearly evident.

3.1. Impact on Design Efficiency

One of the main results of the study was the significant improvement in design efficiency when digital tools were utilized. The use of BIM and digital simulations allowed for more precise modeling and visualization of projects, reducing the time spent on revisions and adjustments. This improvement in design efficiency was especially noticeable in large-scale projects, where complex details and coordination between different teams could easily lead to errors without the aid of digital tools.

3.2. Cost Reduction and Accuracy

The study also revealed that the adoption of digital delivery methods led to a noticeable reduction in costs. By reducing errors and improving the accuracy of design and execution, digital tools helped prevent costly mistakes during the construction phase. Additionally, the real-time data analysis provided by these tools enabled better decision-making, which contributed to further cost savings.

4. Conclusion

This study explores the impact of digital delivery in architecture from design to execution. The results indicate that the use of digital technologies in this process can enhance efficiency, accuracy, and speed, while also reducing costs. Given the positive effects of these technologies, they can significantly improve the processes of architectural design and project execution. This research can assist the architectural community in optimizing projects and utilizing digital technologies more effectively in the construction industry. In the future, further research is needed to implement and standardize digital tools in architectural projects to fully leverage their potential.

Compliance with ethical standards

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Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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