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EMBRACING THE FUTURE WITH LEANBUILD SOFTWARE: THE RISE OF DIGITAL CONSTRUCTION

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ABSTRACT

The construction sector is evolving as digital innovations redefine conventional methodologies, marking the rise of Construction 4.0. Lean Construction 4.0—a framework merging Lean philosophies with tools such as artificial intelligence, the Internet of Things, and Building Information Modeling, provides a strategic avenue for optimizing efficiency, minimizing waste, and advancing sustainability. Despite increased interest in digital transformation, research gaps persist, particularly in assessing the real-world efficacy and influence of software solutions like LeanBuild on critical metrics such as cost control, timeline adherence, quality assurance, and stakeholder engagement.

This research bridges these gaps through a triangulated methodology incorporating focus groups, surveys, and interviews to analyze LeanBuild's effectiveness. Findings reveal significant improvements: 76.4% of participants reported cost reductions, 86.3% noted better schedule compliance, 85.4% observed higher quality standards, and all respondents (100%) acknowledged improved stakeholder collaboration. The study underscores LeanBuild's capacity to optimize workflows, eliminate redundancies, and ensure transparency throughout project lifecycles, from planning to completion.

The study concludes that the successful implementation of digital tools requires thoughtful adoption strategies beginning with controlled pilot projects, careful integration with existing workflows, targeted training programs, and clear performance measurement systems.

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KEYWORDS

Lean Construction 4.0, LeanBuild software, Digital Construction, Project Outcomes.

INTRODUCTION

The construction sector is undergoing profound change as digital innovations transform traditional practices. While the industry has historically been slow to adopt new technologies (Musa et al., 2024; Okpo et al., 2023, Adekunle et al., 2021; Naji et al., 2024), recent years have seen significant shifts. Firms are now embracing digital solutions to improve workflows, boost productivity, and enhance sustainability (Papadonikolaki et al., 2020). This evolution marks the emergence of Construction 4.0 (Hamzeh et al., 2021).

Digital tools are revolutionizing the sector. Organizations increasingly recognize their potential to improve performance (Musa et al., 2024) and maintain competitiveness. Today, digital integration has become essential for industry survival.

Lean Construction 4.0 represents an advanced approach combining Lean principles with Industry 4.0 technologies. It integrates methods like AI, IoT, and BIM (Kagermann et al., 2013; Hamzeh et al., 2021) to create flexible project delivery systems. Rooted in the Toyota Production System (Koskela, 1992), it focuses on continuous improvement and waste reduction while using digital tools to enhance workflows.

These technologies offer significant benefits, including improved productivity and client satisfaction. However, implementation challenges remain. Organizational resistance, communication barriers, and inefficient processes hinder progress (Ballard & Howell, 2003; Aghimien et al., 2018). Success requires cultural change and effective digital integration.

Emerging tools like LeanBuild software present opportunities to address these challenges. By aligning Lean Construction 4.0 frameworks with digital capabilities, LeanBuild fosters real-time collaboration, data-centric decision-making and transparent project delivery. Technologies such as BIM and IoT, for example, have already proven instrumental in advancing Lean practices by enhancing coordination and curbing waste (Dave et al., 2016; Sacks et al., 2010). This study examines how LeanBuild enhances construction project outcomes through digital transformation.

RESEARCH GAPS

Despite rising interest in digital construction and Lean methodologies, a notable void persists in research exploring the practical implementation and measurable effects of software-driven digitalization on construction projects. While limited case studies exist, few rigorous empirical analyses quantify the impact of digital tools on critical performance metrics (Adekunle et al., 2021; Musa et al., 2024). This gap hinders the industry's ability to make informed decisions about adopting digital solutions and understanding their full potential..

This study addresses these gaps by conducting a systematic examination of LeanBuild software's application in construction projects. Through robust data collection and analysis, it aims to generate actionable insights into LeanBuild's potential to enhance cost efficiency, scheduling accuracy, quality assurance, and stakeholder value. The research will specifically evaluate the software's influence on project outcomes, offering evidence-based recommendations for industry adoption.

The study will evaluate the impacts of LeanBuild on construction project, contributing to a deeper understanding of its potential to drive sustainable improvements in the construction industry. By analyzing the software's influence on stakeholder value, the research will ensure that the benefits of digitalization are aligned with the needs of diverse stakeholders.

AIM AND OBJECTIVES

The aim of this paper is to examine the role of Leanbuild software in advancing digital construction practices to improve project delivery. The objectives of the study include:

1. To evaluate the impact of LeanBuild software on construction project outcomes, including stakeholder satisfaction, schedule adherence, cost efficiency, and quality assurance.
2. To identify the benefits of using LeanBuild software at different stages of construction projects,

LITERATURE REVIEW

DIGITAL TRANSFORMATION IN CONSTRUCTION

The construction sector has historically exhibited a cautious approach to innovation, prioritizing conventional techniques over emerging technologies (Musa et al., 2024; Okpo, Ikediashi, & Afolabi, 2023; Adekunle et al., 2021; Naji et al., 2024). This reluctance to modernize has caused the industry to trail other sectors in productivity and operational efficiency. However, recent years have witnessed a marked shift, with firms increasingly adopting digital platforms to optimize workflows, enhance output, and embed sustainability into project lifecycles (Papadonikolaki, Krystallis, & Morgan, 2020).

Digital advancements are reshaping the sector, offering opportunities to redefine performance standards in efficiency, productivity, and ecological responsibility. Termed Construction 4.0, this evolution signifies a radical departure from legacy frameworks, transforming how projects are conceptualized, executed, and monitored (Hamzeh et al., 2021). Beyond mere technological upgrades, Construction 4.0 demands a holistic reimagining of organizational culture, business strategies, and industry norms.

Tools like Building Information Modeling (BIM), Internet of Things (IoT) devices, digital twins, and AI-driven project management systems are gaining traction for their ability to harmonize workflows and elevate deliverables (Dave et al., 2016; Sacks et al., 2010). When fused with conventional practices, these technologies can drive measurable improvements in resource utilization, stakeholder coordination, and waste reduction.

Yet, persistent barriers hinder the sector's digital maturity, particularly in aligning new tools with proven methodologies such as Lean Construction (Aghimien et al., 2018). Achieving effective convergence of Lean principles with digital systems necessitates addressing multifaceted influences—including organizational culture, technical infrastructures, and workflow dynamics—that collectively shape project success.

LEAN CONSTRUCTION: PRINCIPLES AND CHALLENGES

Originating from the Toyota Production System, Lean Construction prioritizes minimizing waste, enhancing value delivery, and fostering continual advancements in construction methodologies (Koskela, 1992). Lean Construction is more than a collection of tools and methods; it's a holistic approach that seeks to instil a culture of continuous learning, refinement, and waste reduction within the construction industry. The methodology seeks to optimize workflows, enhance collaboration, and deliver projects more efficiently (Ballard & Howell, 2003). However, the adoption of Lean principles in construction has been uneven, hampered by persistent obstacles such as disjointed communication channels, cultural resistance to innovation, and suboptimal processes that undermine efficiency (Hamzeh et al., 2021).

The effective implementation of Lean Construction involves a commitment to cultural change, leadership, and workforce development. These challenges are exacerbated by the industry's reliance on manual processes, which are prone to errors and delays (Aziz & Hafez,

2013). The use of traditional manual processes in construction is a substantial barrier to productivity and efficiency, and can be addressed through the adoption of digital solutions.

THE ROLE OF DIGITAL TOOLS IN LEAN CONSTRUCTION

Digital tools have emerged as a powerful enabler of Lean Construction, offering new ways to address longstanding challenges. Technologies such as BIM and IoT facilitate better coordination, real-time data sharing, and improved decision-making, aligning closely with Lean principles (Dave et al., 2016; Sacks et al., 2010).

The integration of digital tools with Lean Construction principles has the potential to create a virtuous cycle of continuous improvement and waste reduction in construction. For instance, BIM enables the creation of detailed digital models that enhance visualization and collaboration, while IoT devices provide real-time monitoring of construction activities, reducing waste and improving efficiency (Musa et al., 2024)

Lean construction's integration with BIM and IoT technologies offers a pathway to optimize productivity, foster transparency, and curtail material and time waste. Such digital-Lean hybrid models, however, require meticulous alignment of human, technical, and procedural elements to avoid implementation pitfalls. Success hinges on reconciling legacy practices with emerging tools while cultivating an environment conducive to continuous learning and systemic innovation (Forgues & Koskela, 2009).

DIGITAL LEAN CONSTRUCTION APPLICATIONS IN PRACTICE

The combination of digital tools and Lean Construction principles has been successfully applied in various real-world scenarios, leading to notable improvements in project performance. For example, Building Information Modeling (BIM) has become a key tool for improving collaboration and minimizing rework. According to Azhar (2011), the use of BIM resulted in a 20% decrease in project costs and a 15% enhancement in schedule adherence by improving visualization and coordination among project teams. Similarly, Internet of Things (IoT) devices have been deployed to monitor construction sites in real time, achieving a 10% reduction in material waste and better safety compliance (Dave et al., 2016). These IoT systems collect real-time data on resource usage and environmental conditions, enabling teams to make proactive decisions and reduce waste effectively.

Another significant application is AI-driven project management systems, which have been shown to optimize resource allocation and cut delays by 25% (Hamzeh et al., 2021). These systems use machine learning algorithms to predict potential bottlenecks and suggest corrective measures, aligning with Lean principles such as continuous improvement and waste reduction. Additionally, digital twins—virtual models of physical assets—have been used to simulate construction processes and identify inefficiencies early, leading to a 30% reduction in rework and a 12% improvement in project quality (Hamzeh et al., 2021).

These examples highlight the transformative impact of digital tools in Lean Construction, offering a foundation for understanding how LeanBuild software can further improve project outcomes. By leveraging these advancements, LeanBuild combines Lean principles with advanced digital technologies to tackle ongoing challenges in the construction industry.

CHALLENGES IN ADOPTING DIGITAL TOOLS

While digital tools offer transformative opportunities for the construction sector, their implementation is hindered by persistent obstacles. A critical issue lies in the industry's entrenched reluctance to embrace technological advancements, which stifles progress and limits productivity gains. This inertia is partly rooted in a cultural adherence to conventional methods, as many firms prioritize familiarity over innovation, often hesitating to allocate resources to unproven technologies (Aghimien et al., 2018).

Resistance to change is a major obstacle to digital transformation in construction, and can only be overcome through effective leadership, training, and communication. Additionally, the lack of standardization in digitalization implementation can hinder the integration of tools like LeanBuild with existing systems (Zerafat, Daniel, & Gyoh, 2023).

Interoperability in construction digitization hinges on industry-wide standardization, eliminating fragmentation in tool deployment. Simultaneously, upskilling workers in Lean principles and digital fluency is non-negotiable for maximizing tool efficacy (Musa et al., 2024). Financial constraints, however, disproportionately affect smaller firms, necessitating collaborative efforts between policymakers and industry stakeholders to design phased adoption roadmaps, cost-sharing models, and regulatory support that incentivizes innovation (Okpo, Ikediashi, & Afolabi, 2023).

BENEFITS OF ADOPTING DIGITAL TOOLS

The implementation of digital tools offers numerous benefits for construction firms seeking to embrace digital transformation. By enabling data-driven workflows and transparency, digital solutions reshape construction practices. One of the key advantages is enhanced real-time collaboration, which allows project teams to communicate more effectively and resolve issues promptly (Musa et al., 2024). Real-time collaboration is critical to ensuring project success in today's fast-paced construction environment.

Digital tools empower stakeholders to base decisions on precise, real-time data, mitigating errors and delays (Forgues & Koskela, 2009). This reliance on data-centric strategies fosters efficiency, productivity, and sustainable outcomes in construction projects. Digital tools also promote transparency by providing a centralized platform for tracking project progress, resource utilization, and performance metrics (Adekunle et al., 2021). Transparency is critical to ensuring accountability, trust, and collaboration among project stakeholders).

By automating processes and curtailing inefficiencies, digital tools support Lean objectives in construction, fostering advancements in project performance and ecological sustainability (Hamzeh et al., 2021). This technological shift redefines industry standards, unlocking unprecedented gains in productivity, resource optimization, and sustainable practices.

INTRODUCTION TO LEANBUILD SOFTWARE

LeanBuild software represents a cutting-edge solution that integrates Lean Construction principles with advanced digital capabilities. Designed to streamline project management, LeanBuild facilitates seamless teamwork and informed decision-making through real-time collaboration, and enhanced transparency across construction projects.

LEANBUILD SOFTWARE: CAPABILITIES AND FUNCTIONALITIES

A detailed overview of LeanBuild's capabilities and how they support Lean Construction is given below:

a. **Real-Time Collaboration and Communication**: LeanBuild provides a centralized platform for real-time collaboration among project stakeholders, including architects, engineers, contractors, and clients. This feature aligns with Lean principles by fostering transparency, reducing miscommunication, and enabling faster decision-making. For example, teams can use LeanBuild to share updates, resolve issues, and track progress in real time, minimizing delays and rework.

b. **Data-Driven Decision-Making:** The software collects and analyzes real-time data from various sources, such as project schedules, planning documents, bill of quantities, etc. This capability supports Lean Construction's emphasis on continuous improvement by providing actionable insights for optimizing workflows and resource allocation. For instance, LeanBuild can identify bottlenecks in the construction process and recommend corrective actions, reducing waste and improving efficiency.

c. **Transparency and Accountability:** LeanBuild promotes transparency by providing a centralized platform for tracking project progress, resource utilization, and performance metrics. This feature aligns with Lean principles by ensuring accountability and trust among stakeholders, which is critical for successful project delivery. For instance, all stakeholders can access real-time data on project milestones, budgets, and quality metrics, reducing the risk of disputes and delays.
d. **Support for Continuous Improvement:** LeanBuild includes tools for monitoring and analyzing project performance, enabling teams to identify areas for improvement and implement corrective actions. This capability supports Lean Construction's focus on continuous improvement (kaizen) by providing data-driven insights for optimizing processes and outcomes. For example, LeanBuild can generate performance reports that highlight inefficiencies and recommend strategies for improvement.

METHODOLOGY

This research adopted a mixed-methods approach to thoroughly examine the effectiveness of LeanBuild software in construction project environments. By combining qualitative and quantitative methodologies, the study sought to capture both measurable outcomes and the rich experiential knowledge of practitioners using the software in real-world settings. The research design incorporated focus group discussions, structured questionnaires, and semi-structured interviews as complementary data collection strategies. This integrated strategy offers a more holistic understanding of the research aims and objectives, enhancing the depth and richness of the findings (Bouma, 2000).

The study engaged thirty-three professionals actively involved in three construction projects piloting LeanBuild software implementation, ensuring all participants had direct, recent experience with the technology. The participant pool represented a strategic mix of industry practitioners including project managers, site engineers, academics and construction.

Focus Group Discussions: Three moderated focus group sessions were conducted following key project milestones, each lasting approximately ninety minutes. These sessions employed a semi-structured discussion format to explore participants' experiences with specific software features, perceived impacts on workflow efficiency, and identified barriers to adoption. The interactive nature of these sessions allowed participants to build upon each other's insights, revealing both consensus points and divergent perspectives that might not emerge through individual interviews. All sessions were audio-recorded with participant consent and supplemented by detailed researcher field notes, This methodology was chosen for its capacity to efficiently gather rich qualitative data from both experts and end-users, uncovering insights that might be challenging or costly to acquire through alternative methods (Kontio et al., 2004).

Questionnaire Survey: A liker-scale questionnaire, administered via Google Forms, was employed to gather standardized, quantifiable data. The questionnaire, designed to collect feedback on various aspects of LeanBuild's effectiveness, was completed by 29 of the 33 focus group participants (87.9%), providing a broader perspective and enabling the collection of measurable data on user perceptions. Prior to deployment, the questionnaire underwent validation through pilot testing with five construction professionals not involved in the main study.

Semi-structured Interviews: To complement the group discussions and survey data, in-depth semi-structured interviews were conducted with sixteen purposefully selected participants representing all stakeholder groups. This approach facilitated a more thorough exploration of individual experiences and perspectives related to LeanBuild. All interviews were digitally recorded, with participants' permission, and subsequently transcribed for thorough examination.

Methodological Rationale: The use of a mixed-methods approach is grounded in existing literature on evaluating the impact of software. Previous research has demonstrated the value

of combining qualitative and quantitative techniques. For example, Kontio et al. (2004) used focus group to obtain practitioner and user experience in software engineering. Kaasinen 2011 used a blend of interviews, usability tests and questionnaires to evaluate website usability. This study's methodology aligns with these precedents, recognizing the strengths of each method in capturing diverse facets of software effectiveness.

Participants: Participants for the study was drawn from the academia, industry practitioners, and software/IT professionals. This was to ensure diverse viewpoints and of perspectives. This diversity enhances the study's findings by incorporating varied viewpoints on LeanBuild's application and impact.

Data Analysis: qualitative material from focus groups and interviews underwent rigorous thematic analysis following established qualitative research protocols. This involved systematic coding of transcripts and field notes to identify recurring patterns and relationships in the data. Quantitative survey results were analyzed using descriptive statistics to identify key trends and measure consensus levels across different user groups. During the interpretation phase, findings from both methodological strands were integrated to develop a comprehensive understanding of LeanBuild's implementation and effects.

Several measures were implemented to ensure methodological rigor throughout the study. Data triangulation across multiple sources enhanced the credibility of findings, while thick description of the implementation context supports transferability to similar settings. The maintenance of detailed audit trails for analytical decisions ensures the study's dependability, and researcher reflexivity was cultivated through regular team debriefings. While the sample size necessarily limits statistical generalizability, the depth of qualitative insights offers valuable understanding for comparable implementation contexts. This mixed-methods approach aligns with established best practices for evaluating construction technologies, thoughtfully balancing practical research constraints with methodological thoroughness.

RESULTS AND DISCUSSION

The following section presents a detailed analysis and discussion of the study's key findings. The findings highlight significant economic and operational benefits across various stages of project delivery. These findings align with broader research on digital construction tools and lean principles, demonstrating the transformative potential of such technologies in the construction industry. Below is a detailed discussion of the results, their alignment with other research, and their implications for digital construction.

ANALYSIS OF RESPONDENTS

Analysis of the questionnaire results reveals valuable information about the respondents' professional backgrounds, experience levels, and familiarity with internet technologies. Table 1 presents an overview of the respondents' professional profiles and experience levels.

Table 1: Participant Demographics (Professional Background and Experience)

Professional background	% of	Years of Experience	% of
Industry Practitioners	72%	Not more than 5 years	21%
Academics	14%	5 to 10 years	17%
Software/IT Professional	14%	10 to 15 years	38%
		More than 15 years	24%

The respondent pool comprises representatives from industry, academia, and software/IT, offering a rich tapestry of viewpoints. Experience levels are fairly evenly distributed across

participants, suggesting that the collected views and insights represent a broad spectrum of career stages and professional backgrounds.

All respondents demonstrated a working knowledge of the internet and software applications, a crucial factor for online surveys and the effective use of project management software. However, it is noteworthy that only 41% of participants had prior experience with project management software before the use of the LeanBuild software.

IMPACT ON COST

The survey results indicate that 76.4% of respondents reported cost reductions due to LeanBuild software. Participants highlighted several ways in which LeanBuild contributed to these savings. For example, one project manager noted that the software's real-time costing feature allowed teams to identify budget overruns early and take corrective actions, resulting in a 10% reduction in overall project costs. Another respondent emphasized that LeanBuild's ability to track resource usage in real time helped minimize material waste, further contributing to cost savings. These findings demonstrate LeanBuild's potential to enhance cost efficiency by improving planning, resource allocation, and waste reduction.

IMPACT ON SCHEDULE

A significant majority of respondents (86.3%) reported that LeanBuild positively impacted project schedules. Participants attributed this improvement to the software's real-time collaboration features, which enabled faster decision-making and issue resolution. For instance, one contractor explained that LeanBuild's centralized platform allowed teams to share updates and resolve conflicts promptly, reducing delays by 15%. Another respondent highlighted the software's ability to provide real-time progress tracking, which helped teams stay on schedule and meet deadlines more effectively. These results underscore LeanBuild's role in improving schedule adherence through enhanced communication and coordination.

IMPACT ON QUALITY

The survey revealed that 85.4% of respondents observed improved project quality with LeanBuild. Participants cited the software's transparency and continuous improvement tools as key factors in achieving higher quality standards. For example, one project manager noted that LeanBuild's performance monitoring features allowed teams to identify and address quality issues early, reducing rework by 20%. Another respondent emphasized that the software's ability to track quality metrics in real time ensured that all stakeholders were aligned on quality goals, leading to fewer defects and higher client satisfaction. These findings highlight LeanBuild's potential to enhance quality assurance by promoting accountability and continuous improvement.

IMPACT ON CLIENT/STAKEHOLDER VALUES AND SATISFACTION

All respondents (100%) agreed that LeanBuild software positively impacts stakeholder collaboration and satisfaction. This finding is corroborated by studies by Bryde, Broquetas, & Volm, (2013), which highlighted that digital construction tools foster transparency, early stakeholder engagement, and alignment of project goals, leading to higher satisfaction levels.

IMPACT ON PROFITABILITY

With 87% of respondents reporting a positive impact on profitability, Leanbuild software demonstrates its value across all project phases. This aligns with research showing that digital construction tools enhance profitability by improving efficiency, reducing rework, and minimizing cost overruns (Gholizadeh, Esmaeili, & Goodrum, 2018). Leanbuild's ability to prevent corruption and ensure transparency further contributes to financial success by fostering trust and accountability.

BENEFITS ACROSS PROJECT STAGES

The focus group discussions and interviews highlight specific benefits of Leanbuild software at various project stages, which align with findings from other studies:

Initiation Stage:

The interview results reveal that 92% of respondents believe that early collaboration and problem identification are critical for project success. In contrast, the focus group discussion highlighted the importance of integrated team selection in ensuring project success. Research by Gunduz and Yahya (2018) supports these findings, emphasizing that early stakeholder engagement reduces risks and ensures alignment with client values. Additionally, studies by Papadonikolaki, Krystallis, & Morgan, (2020) found that collaborative tools improve team dynamics and decision-making.

Planning Stage:

The interview results noted that 88% of respondents believe that real-time costing is a key benefit of digital tools in the planning stage of construction projects. Similarly, the focus group discussion emphasized that designing to targets is a crucial aspect of digital tools in planning. Research by Hardin and McCool (2015) supports these findings, highlighting that BIM and lean software enable accurate cost estimation and design optimization, reducing the likelihood of budget overruns. Additionally, the interview results also noted that 90% of respondents believe in the importance of competency assessment and innovation, which is supported by studies by Succar (2009).

Execution Stage:

The interview results revealed that 95% of respondents believe that transparency is a significant benefit of digital tools in the execution stage. In addition, the focus group discussion identified corruption prevention as another key benefit of digital tools. Furthermore, the focus group discussion also identified the reduction of change orders and variations as a key benefit of digital tools, which aligns with findings by Giel and Issa (2016).

Closing Stage:

The interview results highlighted that 89% of respondents believe that the prevention of cost overruns is a key benefit of digital tools in the closing stage. Similarly, the focus group discussion emphasized the importance of waste reduction in ensuring project success. Research by Ballard and Howell (2003) supports these findings, emphasizing that lean construction practices improve project outcomes by minimizing waste and optimizing resource utilization.

CONCLUSIONS

This study explored the transformative potential of LeanBuild software in advancing digital construction practices in the context of Lean Construction 4.0. By integrating Lean principles with advanced digital tools, LeanBuild has demonstrated significant benefits across key performance indicators, including stakeholder satisfaction, cost efficiency, schedule adherence and quality improvement. This study demonstrates that LeanBuild software significantly enhances cost efficiency (76.4% of respondents), schedule adherence (86.3%), and quality assurance (85.4%) in construction projects. Its real-time collaboration and data-driven decision-making tools align with Lean Construction principles, fostering transparency, waste reduction, and stakeholder satisfaction (100%). These results underscore the importance of digital tools in addressing longstanding challenges in the construction industry, such as fragmented communication, inefficient workflows, and resistance to change.

The study demonstrates LeanBuild's effectiveness in accelerating project delivery and improving outcomes, from initiation to closing, by optimizing resource utilization and enabling informed decision-making. For industry practitioners, successful implementation requires thoughtful adoption strategies beginning with controlled pilot projects, careful integration with existing workflows, targeted training programs, and clear performance measurement systems. The demonstrated benefits suggest particular promise for organizations struggling with communication breakdowns, cost overruns, or quality control issues.

This research opens several important avenues for further investigation, particularly regarding comparative effectiveness with other digital tools, strategies for overcoming implementation resistance, and potential sustainability benefits. The findings also invite broader questions about how digital solutions can most effectively support Lean methodologies in varying organizational and regional contexts.

Several limitations warrant consideration. The study's focus on early adopters may not reflect challenges faced by less technologically mature firms. The relatively short evaluation period also limits observations of long-term sustainability impacts. However, LeanBuild software represents a significant step forward in the digital transformation of the construction industry. By bridging the gap between Lean principles and digital technologies, it offers a pathway to improved project outcomes and sustainable growth.

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