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A SURVEY OF TECHNOLOGY ADOPTION AMONG GENERAL CONTRACTORS IN MISSISSIPPI'S CONSTRUCTION INDUSTRY

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Abstract

The construction industry is evolving with BIM, AI, VR, and robotics, yet traditional methods persist, with paper-based drawings and legacy software still widely used. Meanwhile, construction education is shifting towards advanced technologies, presenting challenges in balancing modern innovations with traditional skills. This study surveys 22 general contractors primarily working in the Mississippi area to assess information delivery methods and hardware and software used. Results reveal widespread reliance on paper-based and CAD files, and low utilization of advanced technologies. The findings inform recommendations for updating construction management curricula to balance cutting-edge and traditional approaches, ensuring graduates are industry-ready.

Introduction

The construction industry has undergone transformative advancements in recent years, driven by innovations in technologies such as Building Information Modeling (BIM) and its extensions like nD modeling, as well as virtual reality (VR), augmented reality (AR), mixed reality (MR), aerial and ground robotics, the Internet of Things (IoT), and artificial intelligence (AI), among others (Mahajan & Narkhede, 2024; Mortice, 2024; Pan et al., 2022; Ross, 2024). These tools can significantly improve project collaboration, inspections, design accuracy, and workflow efficiency, especially among large-scale construction firms.

However, despite these advancements, traditional methods and tools remain deeply ingrained in construction practices. For example, a survey of U.S. construction professionals found that some types of traditional methods, such as paper-based 2D drawings, continue to be widely used on construction sites due to their practicality and cost-effectiveness, and despite their weaknesses (Foroughi Sabzevar et al., 2024). On an international scale, many regions continue to use traditional methods. For instance, in the Colombian construction industry, studies indicate that 72.6% of construction companies have not adopted BIM procedures, particularly in small to mid-sized projects, where simplicity and familiarity often outweigh the perceived advantages of advanced tools (Osorio-Gómez et al., 2024). Similarly, in the Indonesian construction industry, processes remain predominantly paper-based, with conventional digital tools such as Microsoft Excel and Computer-Aided Design (CAD) still widely used (Ningsih & Fardila, 2024). In Malaysia, only 31% of firms use BIM or project management tools, 22% use drones, and just 12% use AR/VR, while 40% of firms report using no digital tools at all (Meor Gheda et al., 2025).

According to the EU Report (European Construction Sector Observatory, 2021), only 29% of companies in Europe used BIM 3D, while 61% had never used it. Adoption of VR and AR was also limited, with just 12% of EU construction firms incorporating these technologies into their workflows. Drone usage was similarly modest, with a 21% adoption rate across both large firms and SMEs. BIM 4D adoption was even lower, with only 6% of companies implementing it. The report also notes that Denmark and Austria had the highest BIM adoption rates, while Poland showed a more modest level, with only 12% of construction companies using BIM.

On the other hand, construction education is shifting its focus towards advanced technologies. As technologies become more accessible, construction management education has evolved to incorporate new technologies into curricula, preparing students to meet the demands of a technology-driven industry (Abouelkhier et al., 2024; Papuraj et al., 2025).

This dual reliance on advanced technologies and traditional methods presents a unique challenge for construction education curricula: balancing the integration of modern innovations while maintaining proficiency in established practices that remain relevant in the field. For instance, while curricula increasingly emphasize cutting-edge technologies like BIM, MR, and AI, removing courses such as Computer-Aided Design (CAD) from curricula could leave students underprepared for the realities of construction sites, where traditional methods still dominate. Addressing these types of gaps requires a comprehensive understanding of the tools, technologies, and methods currently used in the regional industry that hire graduates for construction positions.

This study aims to identify the current methods of information delivery, as well as the software and hardware commonly used on construction sites. By understanding these practices, instructors can update instructional materials to better align with industry needs, ensuring that students are adequately prepared for careers in construction. The research focuses on insights gathered from general contractors who participated in a construction career fair in Mississippi, key stakeholders in the region who frequently hire graduates for construction positions. Mississippi was selected for this study because it represents a unique intersection of traditional and emerging construction practices. Its reliance on conventional methods, coupled with a gradual shift toward digital adoption, makes it an ideal case for examining the balance between traditional workflows and advanced construction technologies. Additionally, Mississippi's construction industry is growing, and understanding local contractor perspectives can help align regional construction management education with industry needs. This research directly supports the preparation of students for the job market they will enter while also contributing to national and international discussions on regional differences in technology adoption

Methodology

To achieve the goal of this research, a structured survey questionnaire was developed and distributed to representatives of general contracting firms attending a construction career fair in Mississippi, United States. The purpose of the survey was to assess technology adoption trends, focusing on three key areas: (1) methods of delivering shop drawings and specifications to construction workers, (2) hardware and software commonly used on construction sites (3) opportunities for improving information delivery and on-site efficiency. The survey design process was guided by a review of literature identifying key technologies and ongoing challenges in construction technology adoption (Clark, 2021; Foroughi Sabzevar et al., 2024; Kurzinski et al., 2024; Mahajan & Narkhede, 2024; Mortice, 2024; Papuraj et al., 2025; Ross, 2024).

The final questionnaire comprised five sections: an introduction, demographics, methods of information delivery, types of hardware and software used, and two open-ended questions for additional recommendations. The technical section employed a 5-point Likert scale to assess the frequency of use, ranging from 1 ('Not used at all') to 5 ('Always used'). Open-ended responses were analyzed to identify common themes.

Of the distributed surveys, 22 were fully completed and included in the analysis. Respondents represented a range of roles and experience levels within general contracting firms in Mississippi and surrounding states. The study was reviewed by the University of Southern Mississippi Review Board in accordance with university guidelines and was deemed exempt from formal IRB review, as it did not meet the federal definition of human subjects research.

Demographics

The survey included 22 general contractors actively working in Mississippi and neighboring states across the southeastern U.S. (Refer to Table 1). The majority of respondents reported working in the Southeast region (19 respondents), covering states such as Mississippi (MS), Alabama (AL), Tennessee (TN), Florida (FL), Georgia (GA), South Carolina (SC), and North Carolina (NC). Additionally, 9 respondents indicated working in the Southwest (Texas, Louisiana, Nebraska), while smaller numbers reported working in the West Coast (3), Midwest (2), Northeast (1), and Nationwide (1).

Table 1: Demographics of respondents

Variables	Type	Frequency (Total # of Subjects = 22)
Participant Role/Position	Executive Manager	4
	Project Manager	5
	Project Engineer	4
	Construction Manager and Superintendent	3
	VDC/BIM Director	2
	Estimator	2
	Recruiter	2
Education	High school	3
	Associate	2
	Bachelor of Construction Management/Engineering	13
	MBA	4
Experience in Years	Less than 1 year	1
	Between 1 to 3 years	5
	Between 4 to 7 years	3
	Between 8 to 10 years	1
	More than 10 years	12
Contractor Work Region	Southeast (MS, AL, TN, FL, GA, SC, NC)	19
	Southwest (TX, LA, NB)	9
	West Coast (CA, OR, NV)	3
	Northeast (NY)	1
	Midwest (KS, AR)	2
	Nationwide	1
Type of Company	General Contractor	22

Participants represented a diverse range of roles in the construction industry. The most common positions were Project Manager (5), Executive Manager (4), and Project Engineer (4). Other roles included Construction Manager/Superintendent (3), VDC/BIM Director (2), Estimator (2), and Recruiter (2), reflecting a mix of field and office-based responsibilities. Educational backgrounds varied, with the majority (13 respondents) holding a bachelor's degree in construction management or engineering. Additionally, 4 respondents had an MBA, while others had an Associate degree (2) or a High School diploma (3). The participants' construction industry experience ranged from less than a year to over 10 years, with more than half (12 respondents) having over a decade of experience. The remaining respondents had 1 to

3 years (5), 4 to 7 years (3), and 8 to 10 years (1) of industry experience. This range showcases a balanced mix of early-career professionals and seasoned experts, contributing to a well-rounded perspective on construction technology adoption and industry practices. All 22 participants were general contractors, reinforcing the study's focus on understanding technology adoption and information delivery practices within this sector.

Results and Discussion

Mediums for Delivering Shop Drawings to Construction Site Workers

The first technical question aimed to explore the formats of shop drawings used by workers on construction sites. Participants were asked to rate the frequency with which different formats were used, based on a 5-point Likert scale ranging from "not used" (1) to "always used" (5). The results, summarized in Table 2, show that digital 2D copies are the most commonly used medium, with a mean score of 4.53, a median of 5.0, and a standard deviation of 0.99. This suggests a strong and consistent reliance on digital 2D formats, likely due to their accessibility and ease of distribution on construction sites. Printed hard copies follow, with a mean of 4.0, a median of 4.5, and a slightly higher standard deviation of 1.07, indicating that they remain widely used, particularly in situations where digital access is limited or physical plans are preferred for practical reasons.

Table 2: Mediums of shop drawings delivered to workers on construction sites

#	Statements	Mean*	Median	SD	Overall Ranking
1	Digital 2D copies	4.53	5.0	0.99	1
2	Printed hard copies	4.0	4.5	1.07	2
3	Digital BIM models	2.5	2.0	1.31	3

*Likert scale: 1= Not used to 5= Always used

In contrast, digital BIM models are the least frequently used format, with a mean score of 2.5, a median of 2.0, and the highest standard deviation (1.31) among the three methods. This implies that while BIM is increasingly important for project coordination and office use, it has not yet become a primary tool for on-site workers. The relatively low median and high variability suggest inconsistent adoption across projects and firms. Overall, the data indicate that while digital methods are prevalent, a blend of traditional and digital formats continues to meet the diverse needs of construction sites, where printed hard copies still offer practical advantages.

Mediums of Specifications Typically Delivered to Workers on a Construction Site

The second technical question aimed to explore the formats in which specifications are delivered to workers on construction sites. Participants rated the frequency of use for each format using a 5-point Likert scale, ranging from "not used" (1) to "always used" (5). As shown in Table 3, digital text emerged as the most frequently used format, with a mean score of 4.5, a median of 5.0, and a standard deviation of 0.96. These values suggest strong and consistent reliance on digital text formats, likely due to their convenience, portability, and compatibility with mobile devices. Printed hard copies remain a widely used alternative, with a mean of 4.0, a median of 4.5, and a slightly higher standard deviation of 1.2, indicating that physical documents continue to play an important role on-site, particularly where digital access may be limited or less efficient. Verbal explanations rank third in frequency, with a mean of 2.72, a median of 2.0, and the highest variability (SD = 1.56) among all formats. This suggests that while verbal communication is useful for clarifications and real-time updates, it is not commonly relied upon for formal specification delivery. Specifications attached to BIM models are the least used, with a mean of 2.1, a median of 1.0, and a standard deviation of 1.32, highlighting limited integration of this method in current job site practices. Overall, the results reflect a clear preference for traditional and straightforward formats (digital text and printed hard copies) despite the growing availability of advanced specification delivery options.

Table 3: Formats of specifications delivered to workers on construction sites

#	Statements	Mean*	Median	SD	Overall Ranking
1	Digital text	4.5	5.0	0.96	1
2	Printed hard copies	4.0	4.5	1.2	2
3	Verbal explanations	2.72	2.0	1.56	3
4	Specifications attached to BIM models	2.1	1.0	1.32	4

*Likert scale: 1= Not used to 5= Always used

Effectiveness of Current Information Delivery Methods in Facilitating Smooth Project Execution

The third question addressed the perceived effectiveness of current information delivery methods in facilitating smooth project execution. Participants responded using a 5-point Likert scale, where 1 represented "not effective at all" and 5 represented "very effective." As summarized in Table 4, the mean score was 4.1, with a median of 4.0 and a standard deviation of 0.62, indicating that most respondents find the current information delivery methods to be effective and relatively consistent across firms. The high mean and low variability suggest general satisfaction with existing communication practices and support the continued use of both traditional and digital methods currently in place. This finding reinforces earlier results, showing that workers and contractor personnel still rely heavily on printed and digital 2D documents, which are perceived as reliable and efficient. Consequently, the strong endorsement of current practices serves as further justification for maintaining traditional delivery methods, such as CAD and hard copy specifications within construction management curricula, while continuing to integrate emerging technologies.

Table 4: Effectiveness of the current information delivery methods in facilitating smooth project execution

#	Question	Mean*	Median	SD
1	How effective do you find the current information delivery methods in facilitating smooth project execution?	4.1	4.0	0.62

*Likert scale: 1= Not effective at all to 5= Very effective

Hardware Commonly Used by Workers on Construction Sites for Work Execution

The fourth question focused on identifying the types of hardware most commonly used by workers for executing tasks on construction sites. Participants rated each hardware type using a 5-point Likert scale, ranging from "not used at all" (1) to "always used" (5). As shown in Table 5, paper-based drawings remain the most frequently used hardware, with a mean score of 4.4, a median of 5.0, and a standard deviation of 0.79. This finding underscores the ongoing importance and reliability of traditional tools, despite the increasing availability of digital alternatives. Tablet computers and smartphones follow closely, with mean scores of 4.2 and 4.1, respectively both sharing a median of 5.0. These values suggest growing reliance on mobile digital tools for accessing plans, specifications, and communication platforms, reflecting a notable shift toward digital integration on job sites.

Table 5: Hardware commonly used by workers on construction sites for work execution

#	Statements	Mean*	Median	SD	Overall Ranking
1	Paper-based drawings	4.4	5.0	0.79	1
2	Tablet computers	4.2	5.0	0.92	2
3	Smartphones	4.1	5.0	1.38	3
4	Laptops	3.9	4.0	1.28	4
5	Site computer workstations	3.6	4.0	1.43	5
6	Aerial robots	2.6	3.0	1.43	6
7	Virtual reality headsets	1.7	1.0	1.08	7
8	Augmented reality headsets	1.6	1.0	1.11	8
9	Ground robots	1.6	1.0	1.0	8

*Likert scale: 1= Not used at all to 5= Always used.

Laptops (mean = 3.9, median = 4.0) and site computer workstations (mean = 3.6, median = 4.0) are also commonly used but rank slightly lower, likely due to their reduced mobility and less flexible placement on dynamic work sites. In contrast, emerging technologies such as aerial robots (mean = 2.6, median = 3.0), virtual reality headsets (mean = 1.7, median = 1.0), augmented reality headsets (mean = 1.6, median = 1.0), and ground robots (mean = 1.6, median = 1.0) show limited adoption. These low scores and medians of 1.0 for several tools suggest that such innovations are still in the exploratory or pilot phase and have not yet been fully integrated into daily site operations. Overall, the data indicate that while digital and mobile technologies are becoming more prevalent, traditional tools such as paper-based drawings continue to dominate. Adoption of cutting-edge hardware remains slow, highlighting a lag between technological potential and on-site implementation.

The Hardware Commonly Used by General Contractor Personnel for Construction Management Purposes

The fifth question focused on identifying the types of hardware most commonly used by general contractor personnel, such as project engineers, field engineers, construction managers, and superintendents for construction management activities. Responses were rated on a 5-point Likert scale, from "not used at all" (1) to "always used" (5). As shown in Table 6, tablet computers are the most commonly used hardware among general contractor personnel, with a mean score of 4.7, a median of 5.0, and a standard deviation of 0.89, indicating widespread and consistent usage. Smartphones follow closely, with a mean of 4.6, a median of 5.0, and a similar standard deviation (0.90), underscoring their importance for mobile communication, coordination, and task tracking in the field. Paper-based drawings also remain heavily utilized (mean = 4.5, median = 5.0), highlighting the continued relevance of traditional methods for quick reference and documentation on-site.

Table 6: The hardware commonly used by general contractor personnel

#	Statements	Mean*	Median	SD	Overall Ranking
1	Tablet computers	4.7	5.0	0.89	1
2	Smart phones	4.6	5.0	0.90	2
3	Paper-based drawings	4.5	5.0	1.01	3
4	Laptops	4.4	5.0	1.07	4
5	Desktop computers	4.0	5.0	1.50	5
6	Aerial robots	2.9	3.0	1.59	6
7	Virtual reality headsets	1.9	1.0	1.21	7
8	Ground robots	1.8	1.0	1.19	8
9	Augmented reality headsets	1.7	1.0	1.08	9

*Likert scale: 1= Not used at all to 5= Always used.

Laptops (mean = 4.4, median = 5.0) and desktop computers (mean = 4.0, median = 5.0) are also frequently used, particularly for project planning, documentation, and analysis, though slightly lower variability in laptop use (SD = 1.07) compared to desktop computers (SD = 1.50) suggests more consistent field application. In contrast, emerging technologies such as aerial robots (drones) are gradually gaining traction, with a mean score of 2.9, a median of 3.0, and a relatively high standard deviation of 1.59, indicating mixed adoption patterns. Meanwhile, virtual reality headsets (mean = 1.9), ground robots (mean = 1.8), and augmented reality headsets (mean = 1.7) all have median scores of 1.0, reflecting very limited use and early-stage experimentation. These results suggest that general contractor personnel rely heavily on mobile digital tools and traditional documentation, while more advanced and immersive technologies are still in the early adoption phase. The high median scores for commonly used tools and the consistently low medians for advanced technologies reflect a notable gap between technological innovation and practical implementation in day-to-day construction management.

The Software Applications Commonly Used by Workers on Construction Sites for Work Execution

The sixth question aimed to identify which software applications are most commonly used by workers on construction sites to support daily work execution. Participants evaluated each application using a 5-point Likert scale, ranging from "not used at all" (1) to "always used" (5). As shown in Table 7, Bluebeam Revu and Procore are the most frequently used applications among workers, each with a mean score of 3.6. Bluebeam Revu has a median of 4.0 and a standard deviation of 1.56, while Procore has a median of 5.0 and a slightly higher standard deviation of 1.71. These results suggest that while both tools are widely adopted for document markup, collaboration, and project management, usage patterns may vary more significantly for Procore, perhaps due to company-specific workflows or licensing accessibility. Acrobat Reader, with a mean of 3.3, median of 4.0, and standard deviation of 1.42, remains a commonly used tool for viewing and sharing PDF specifications and shop drawings an indication of continued reliance on universally accessible formats. In contrast, BIM 360 is the least frequently used among the listed applications, with a mean score of 2.6, a median of 2.5, and a standard deviation of 1.53. Although BIM 360 is increasingly used for coordination and document management at the project level, its direct use by on-site workers appears limited, possibly due to its complexity, training requirements, or organizational access constraints.

Table 7: The software applications commonly used by workers on construction sites for work execution

#	Statements	Mean*	Median	SD	Overall Ranking
1	Bluebeam Revu	3.6	4.0	1.56	1
2	Procore	3.6	5.0	1.71	1
3	Acrobat Reader	3.3	4.0	1.42	2
4	BIM 360	2.6	2.5	1.53	3

*Likert scale: 1= Not used at all to 5= Always used.

Overall, the data suggest that while digital project management and document handling platforms are becoming integral to on-site execution, tools such as BIM 360 are still in the early adoption phase among field personnel. Including both median and standard deviation values enhance the understanding of variability in usage and support more informed curriculum and training recommendations.

The Software Applications Commonly Used by General Contractor Personnel for Construction Management Purposes

The seventh question addressed the software applications most frequently used by general contractor personnel such as project engineers, field engineers, construction managers, and superintendents for construction management purposes. Participants responded using a 5-point Likert scale, where 1 represented "not used at all" and 5 represented "always used." As shown in Table 8, Excel is the most widely used software tool, with a mean score of 4.8, a median of 5.0, and a standard deviation of 0.49, indicating near-universal and consistent usage. Its continued dominance reflects its versatility in tasks such as estimating, budgeting, data tracking, and project documentation. Bluebeam follows with a mean of 4.2, a median of 5.0, and a higher standard deviation of 1.42, suggesting widespread adoption for document markup and drawing collaboration, though with slightly more variability in usage across firms. Procore, a major construction project management platform, ranks closely behind with a mean of 4.1, a median of 5.0, and a standard deviation of 1.42, reinforcing its role in communication, file sharing, and workflow tracking. AutoCAD (mean = 3.5, median = 4.0) and Acrobat Reader (mean = 3.3, median = 3.5) remain key tools for drafting, editing, and reading project documents and design files. Revit and BIM 360, both with mean scores of 3.0 and medians of 3.0, reflect moderate adoption levels, indicative of the gradual integration of BIM-based processes in construction management but also suggesting room for further implementation. MS Project (mean = 2.9, median = 2.0) and Primavera P6 (mean = 2.8, median = 2.0) are the primary scheduling tools referenced by respondents. While not as frequently used as Excel or Procore, their presence justifies their inclusion in construction management curricula, particularly for planning and scheduling instruction. At the lower end of adoption, Navisworks (mean = 2.5, median = 1.5) and large language models (e.g., ChatGPT) (mean = 2.0, median = 1.0) show limited current use. This suggests that while AI and simulation-based platforms hold potential, their role in daily construction management tasks is still evolving. Overall, the data highlight a strong reliance on traditional productivity and documentation tools such as Excel and Bluebeam, while newer technologies, particularly AI, BIM, and scheduling platforms, are gaining momentum but remain underutilized in routine operations. The inclusion of median and standard deviation values further clarifies variability in adoption, supporting informed decisions for training and curriculum development. Other software that were reported used were Solid Works, HCSS, Powerproject scheduling software, and 3D laser scanner.

Table 8: The software applications commonly used by general contractor personnel

#	Statements	Mean*	Median	SD	Overall Ranking
1	Excel	4.8	5.0	0.49	1
2	Bluebeam	4.2	5.0	1.42	2
3	Procore	4.1	5.0	1.42	3
4	AutoCAD	3.5	4.0	1.33	4
5	Acrobat Reader	3.3	3.5	1.39	5
6	Revit	3.0	3.0	1.61	6
7	BIM 360	3.0	3.0	1.56	6
8	MS Project (Microsoft Project)	2.9	2.0	1.91	7
9	Primavera P6	2.8	2.0	1.9	8
10	Navisworks	2.5	1.5	1.77	9
11	Large language models (e.g., ChatGPT)	2.0	1.0	1.33	10

*Likert scale: 1= Not used at all to 5= Always used.

Future Improvement and Recommendations

In addition to the Likert scale questions, two qualitative questions were asked. The first question invited participants to suggest improvements for current information delivery methods (shop drawings and specifications) on construction sites. The second question asked participants to recommend software and hardware to enhance efficiency and productivity on construction sites. Several suggestions were made, as follows:

- "The construction industry in the state is antiquated and not up to date with current software. A mix of paper drawings and digital take-offs is likely the best exposure for students."
- "No changes; believes paper and digital drawings/spec work are the best."
- "The industry is currently at its most efficient period in history." [i.e., No improvements needed]
- "Satisfied with current information delivery methods." [i.e., No improvements needed]
- "All contractors should be involved in BIM modeling/coordination on a job site to catch clashes before they occur in the field."
- "With technology on the rise, Integrated Project Delivery (IPD) has gained more acceptance in the construction industry."
- "Ensure that all parties are using a single, unified platform."
- "Implement a digital-based process with version history to track changes efficiently."
- "Learn […] how to read critical path items on schedules."
- "Learn Procore". [Recommended by four participants]
- "[Use] Revit, and Navisworks".
- "Use BlueBeam and hard copies."
- "All foremen should have tablets to improve communication and data tracking."

Thematic analysis of the open-ended survey responses revealed mixed perspectives on current information delivery methods. While some participants expressed satisfaction with existing practices, others recommended modernization through digital tools. Suggested improvements included greater use of BIM, adoption of Integrated Project Delivery (IPD), implementation of unified digital platforms, and providing tablets to foremen. In terms of software, Procore Revit, Navisworks, and Bluebeam were recommended. These responses reflect an ongoing shift in the construction industry from traditional methods to digital adoption, though resistance to change remains a notable challenge.

Exploratory Cross-Referencing of BIM and Advanced Technology Use

An exploratory analysis was conducted to examine whether general contractor personnel who reported using Building Information Modeling (BIM) also reported using other advanced technologies, such as aerial robots (drones), virtual reality (VR), augmented reality (AR) headsets, and ground robots. The results show that 9 out of 22 respondents reported using BIM at least "sometimes." Among these BIM users, 7 also used aerial robots at least occasionally, 4 used VR headsets, 3 used AR headsets, and 3 used ground robots. These findings suggest that a subset of general contractor personnel who adopt BIM are also engaging with a broader range of advanced technologies, particularly drones.

Research Limitations

This study has several limitations that should be acknowledged. First, its geographic focus on Mississippi may limit the generalizability of the findings to other regions, particularly those with higher technology adoption rates or different construction practices.

Second, the sample size of 22 general contractors, while diverse, may not fully capture the range of practices within the industry at large.

Third, the research was designed as a descriptive exploratory study rather than one grounded in hypothesis testing. While the findings provide valuable baseline insights into current practices, they do not support statistical inference or causal relationships. Future studies could build on this work by employing inferential techniques to examine correlations between factors such as company size, years of experience, or region and levels of technology adoption.

Finally, reliance on self-reported survey data introduces the possibility of response bias, although the survey participants remained anonymous throughout the study.

Nonetheless, the results offer important regional insights and establish a foundation for comparative research across other states or countries.

Conclusions

This study found that Mississippi's construction industry is characterized by a strong reliance on traditional tools such as paper-based drawings and CAD files, with limited adoption of advanced technologies like BIM, drones, and AR/VR headsets. Only about 41% (9 out of 22) of surveyed contractors reported using BIM at least "sometimes." Among these BIM users, 78% also used drones, 44% used VR, 33% used AR, and 33% used ground robots.

When compared to other regions, Mississippi's BIM usage is modest but still ahead of Colombia, where 72.6% of firms have not adopted BIM, particularly among small and mid-sized enterprises (SMEs). In Malaysia, 31% of firms use BIM or project management tools, while 22% use drones and only 12% use AR/VR, figures that align closely with Mississippi's technology profile. In Europe, the situation varies: only 29% of companies use BIM 3D, and 61% have never used it. AR/VR adoption is similarly low at 12%, and drone usage stands at 21%, which is lower than among BIM users in Mississippi.

These comparative results indicate that Mississippi's general contractors, though not leaders in digital transformation, are in line with many international peers, particularly in emerging markets or regions where traditional methods remain entrenched.

To bridge this gap, construction management curricula should integrate both traditional and digital workflows, preparing students for the diverse realities of the industry. These findings not only reflect regional practices but also contribute to a broader conversation about advancing construction education and practice in similar low-to-moderate adoption environments.

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