A Systematic Analysis of the Emerging Synergy:

Exploring the Integration of BIM & AI for the Future of Construction

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CitA25 Driving Digital Construction for 25 years

Introduction

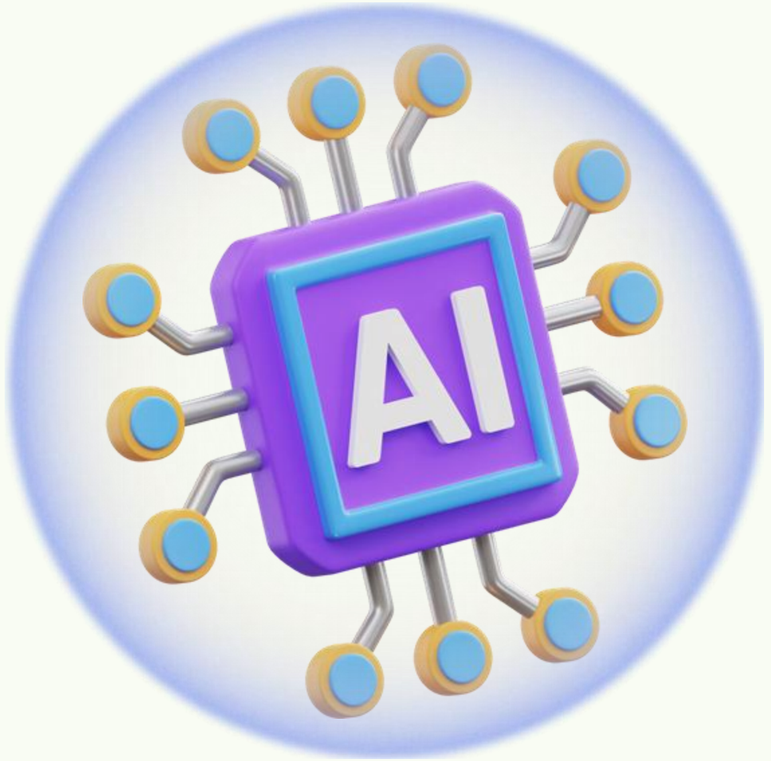
- The construction industry is experiencing a significant transformation through digitalisation.
- BIM and AI stand out as pivotal tools.
- This research addresses a critical gap in scholarly and practical discourse, how BIM & AI, when used in tandem, can revolutionise construction practices.

The Aim

The aim of this study is to examine the distinct roles of BIM and AI in construction and explore how their integration can drive innovation and advancement in the industry's future development.

History

BIM's historical trajectory was explored from its early CAD origins in the 1960s to its current use as a multidimensional digital model that manages data throughout a building's life cycle.



AI, in contrast, originated from the broader field of computer science in the 1950s, introduced through Alan Turing's seminal work on machine reasoning and John McCarthy's coining of the term 'Artificial Intelligence' in 1956.

Methodology

Qualitative data

- 5 semi-structured interviews with professionals with varied tenures from 5 to 20 years.
- The questions were structured around four core themes:

Quantitative data

- Collected via a structured online questionnaire comprising 12 close-ended and short-response questions.
- A total of 65 valid responses were received.

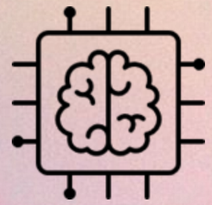
Systematic Literature Review (SLR)

- Planning the Review
- Conducting the Review
- Reporting and Dissemination
- Conducted using academic databases such as, Google Scholar, ScienceDirect, ResearchGate, and the Yeats Library etc.

Research Findings

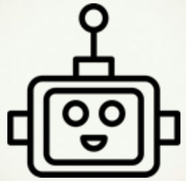
BIM	AI
• The survey results indicate a high level of industry familiarity with BIM, with a high rate of respondents reporting active use or working knowledge of BIM tools • Respondents identified Revit, Navisworks, and AutoCAD as the most frequently used BIM platforms.	• A lower margin of participants confirmed interest in the use of AI applications in their current workflow, with the remainder either unaware of its capabilities or reporting limited exposure. • AI technologies were referenced more generally often described in terms of automation, prediction, and machine learning without the same level of tool-

Barriers *highlighted by interviewees and survey respondents*



High Implementation Cost

Lack of In-House Expertise

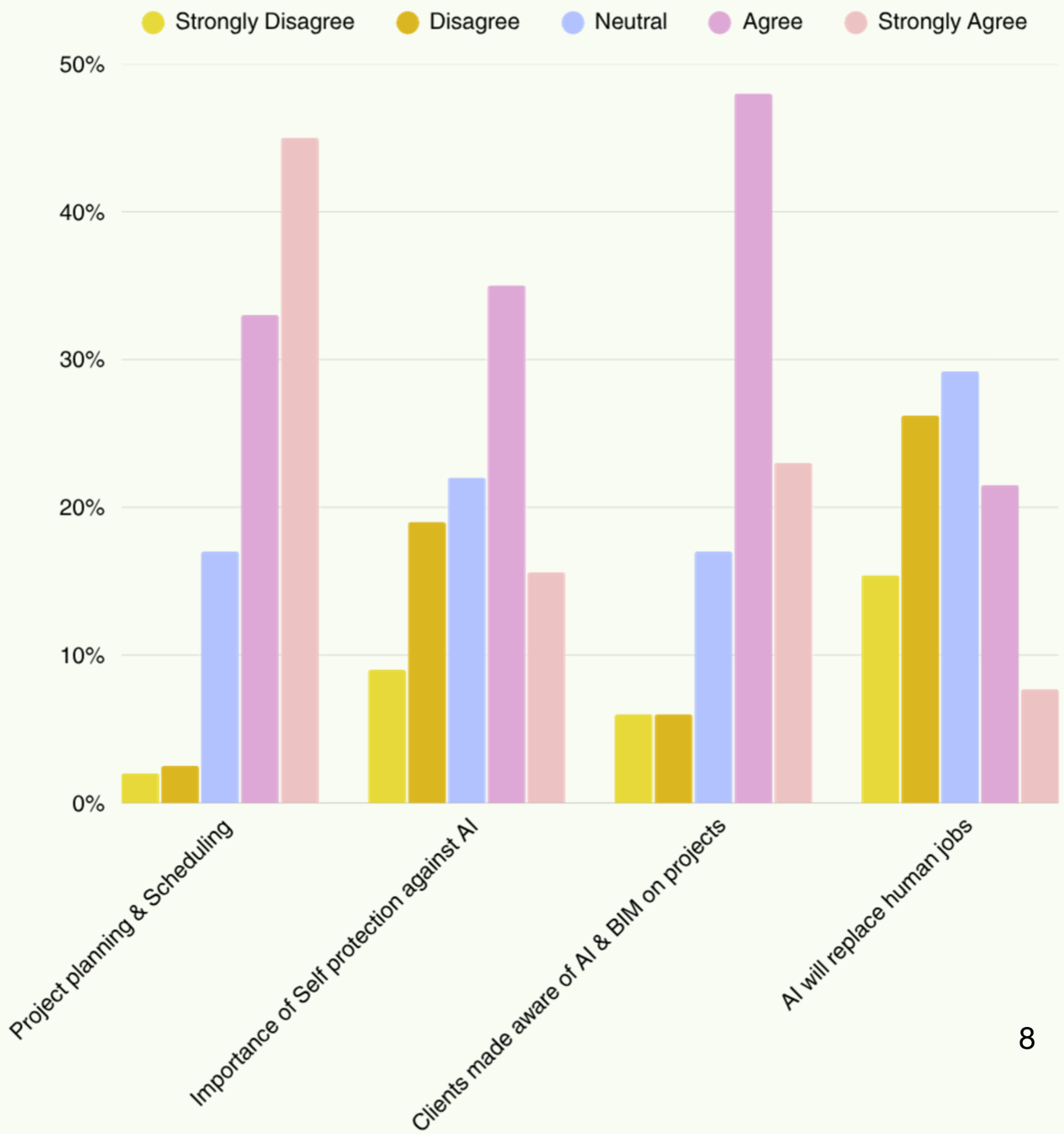


Fragmentation of Tools

Resistance to Change

- Interviewees referenced the current nascent stage of AI and BIM, expressing optimism about their transformative potential.
- Results reflect a young demographic (74% with 0–5 years' experience), suggesting openness to new technologies.
- A majority (57%) strongly agreed that AI and BIM improve project planning and scheduling.
- 78% believed clients should be informed about AI/BIM use.
- Ethical concerns were significant; 52% strongly a

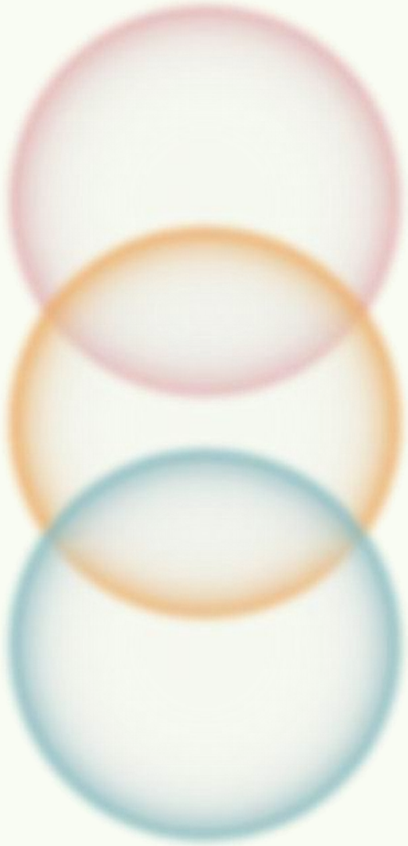
Factor	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Project planning &	2%	3%	17%	33%	45%
Importance of Self protection	9%	19%	22%	35%	16%
Clients made aware of AI &	6%	6%	17%	48%	23%
AI will replace	15%	26%	29%	22%	8%



Recommendations

- Training programs
- Updates regulatory frameworks
- Foster industry-wide collaboration.

Conclusion



- **BIM**

Is well-established as a foundational digital tool, widely used for coordination, visualization, and error reduction, with tools like Revit and Navisworks forming the core of digital workflows.

- **AI**

In contrast, remains emergent offering transformative potential but facing significant adoption barriers & although less visible. Is beginning to support predictive planning, safety monitoring, and automation.

The integration of BIM and AI is not only desirable but inevitable for a sector increasingly driven by data, sustainability, and performance outcomes. Yet this transformation must be approached with care.

This study contributes to that discourse by offering an empirical

Thank you!

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