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IMPLEMENTATION OF BIM AND LEAN CONSTRUCTION IN OFFSITE HOUSING CONSTRUCTION: EVIDENCE FROM THE UK

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AGENDA

- Introduction
- BIM, Lean construction and offsite construction
- Research method
- Results and discussion
- Conclusions and future research

INTRODUCTION

Limited adoption OSC

- Difficulties in identifying the value OSC for construction projects

BIM and Lean principles similarity

- Their principles seem to amalgamate in their intentions and ideals

OSC in the UK housing construction

- The UK needs approximately 345,000 new homes per year
- Increasing pressure from UK government for the emulation of the manufacturing sector

Implementation of BIM and LC in OSC projects in the UK

- What is the current status of implementation of BIM and LC in OSHC in the UK?
- What are the benefits of the implementation of the integrated BIM and LC in OSHC processes in the UK?

BIM, LEAN CONSTRUCTION AND OFFSITE

Lean Construction and Offsite construction

- OSC involves manufacturing components or modules in a controlled environment before their later installation on site.
 - LC focuses on minimizing activities that do not generate value for the project owner which are considered wastes.
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BIM and Offsite construction

- Accurate representation of geometry, behavior and properties of OSC components that can facilitate their incorporation into projects.
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RESEARCH METHOD

Literature review



Current status Implementation of BIM and LC in OSC in the UK construction industry.

Data collection



Questionnaire survey/Purposive sampling

Estimated Population: 228/ Ideal population sample:73/
Invitations sent: 80 / Responses received:32(44% ideal population sample).

Confidence level:90%/ Margin of error:8%

Data analysis



Microsoft Excel

**The authors observed that the COVID-19 pandemic of 2020 partly impacted the number of responses received as people were unsettled to participate in the study.*

RESULTS AND DISCUSSION

Which of the following methodologies have your organisation used or is currently implementing in construction projects?

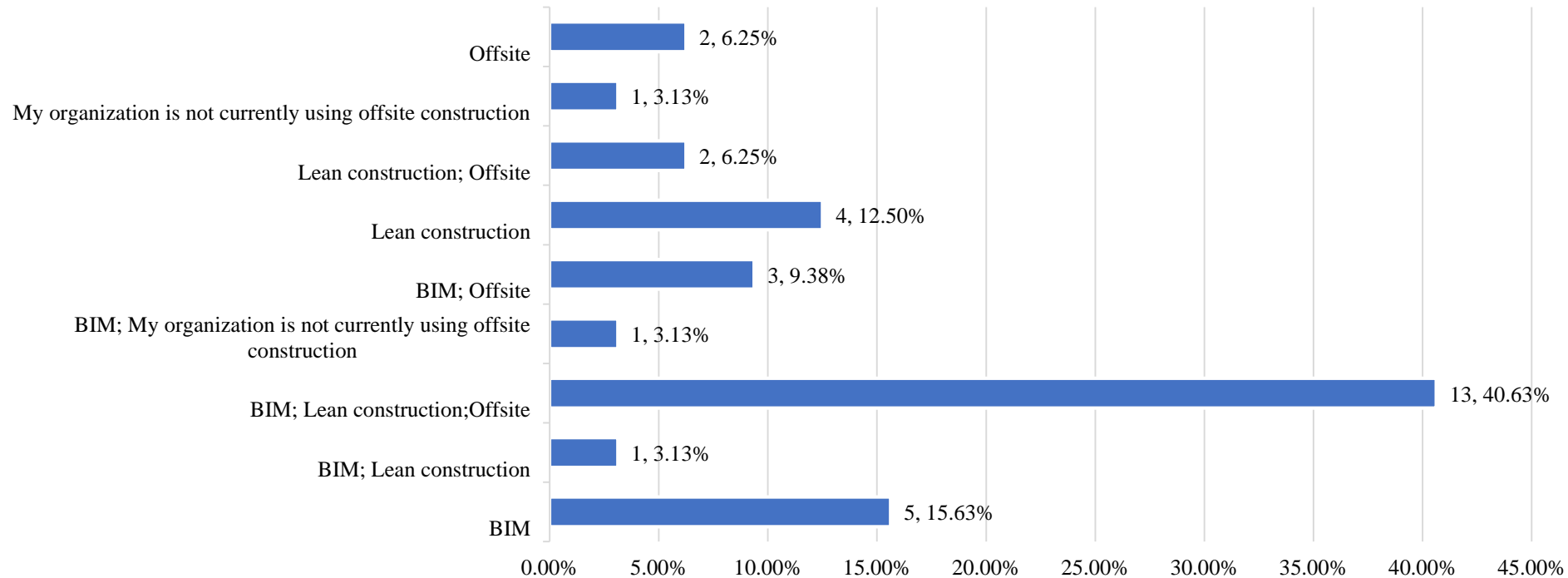


Figure 1. Methodologies implemented in offsite construction projects

RESULTS AND DISCUSSION

Which of the following offsite methods have you used or are currently implementing in the construction projects delivered by your organisation?

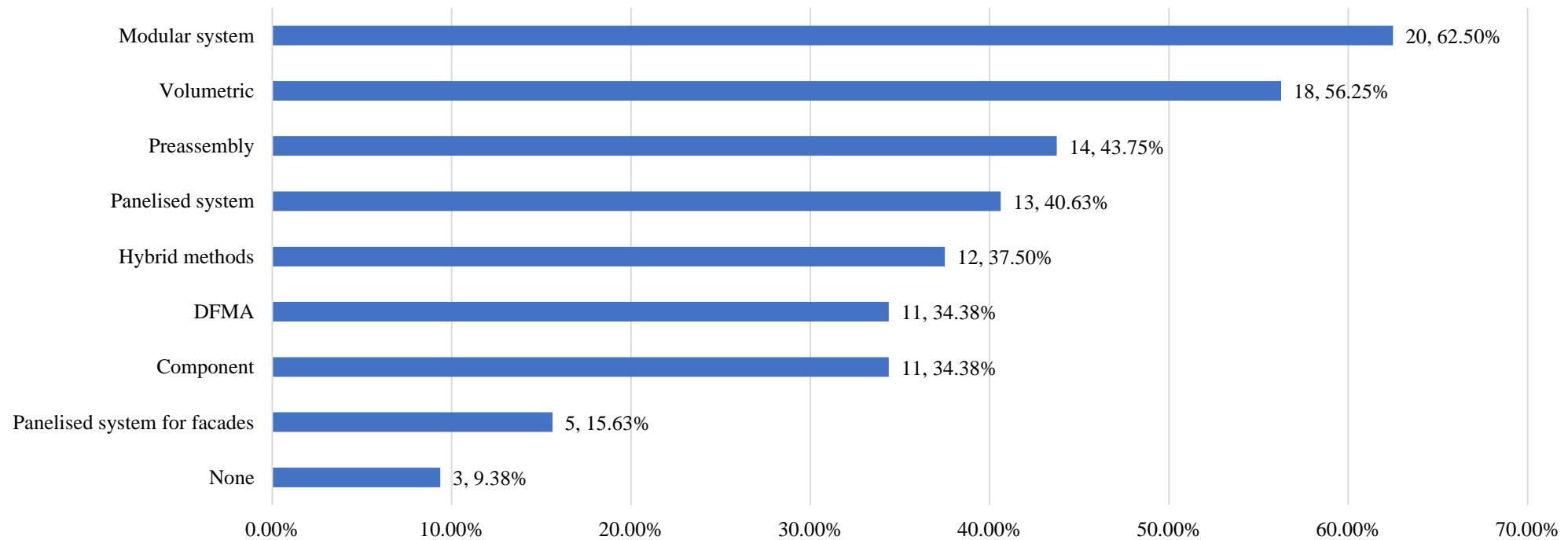


Figure 2. Offsite methods used in the delivery of construction projects

RESULTS AND DISCUSSION

Which of the following Lean construction techniques have you implemented or are you currently implementing in offsite construction?

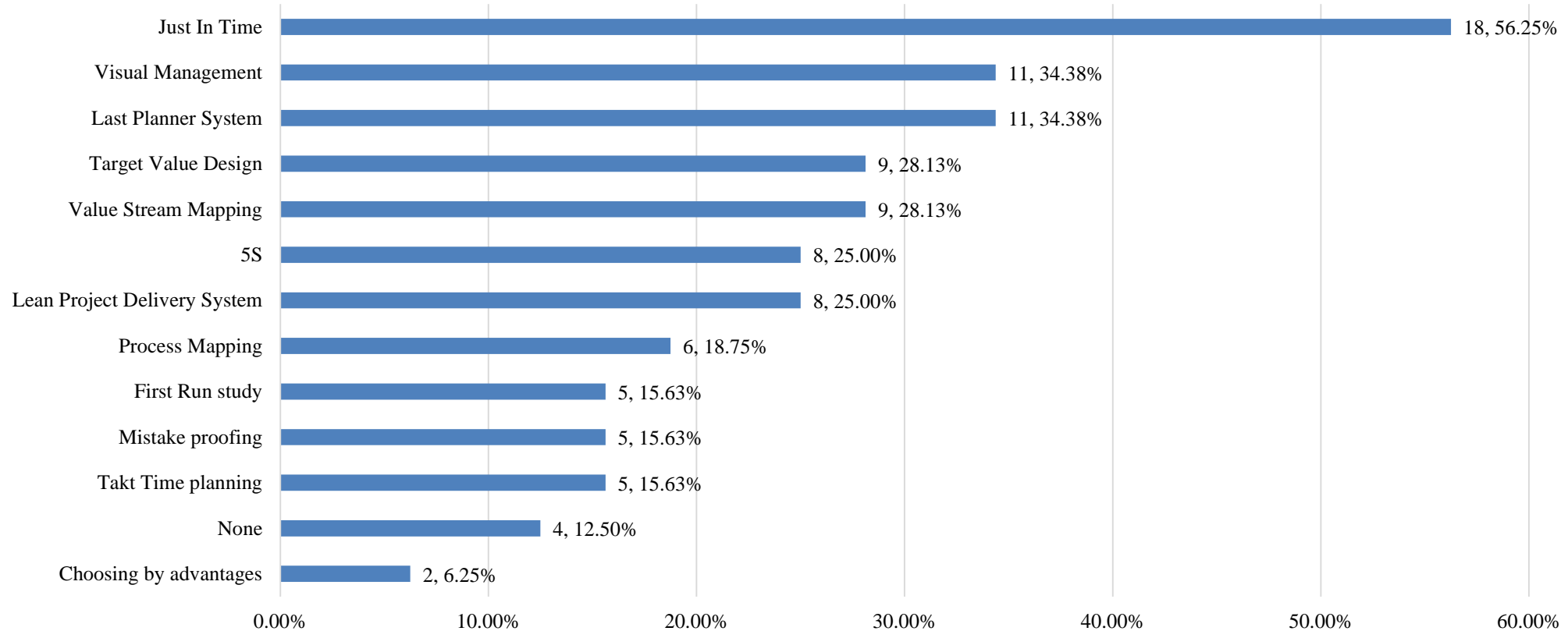


Figure 3. Lean techniques used in offsite projects

RESULTS AND DISCUSSION

In your opinion, what benefits do you understand that using BIM and Lean construction as integrated approach would bring into offsite construction that are not effectively achieved by implementing them separately?

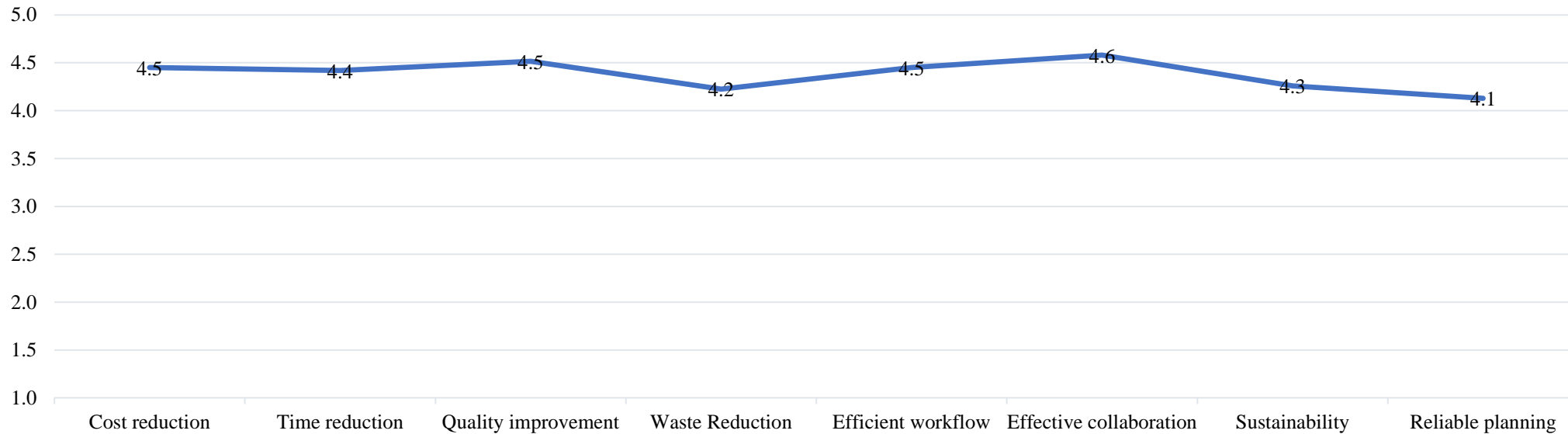


Figure 4. Benefits of integrated BIM-Lean for offsite projects

CONCLUSION AND FURTHER RESEARCH

- ❖ This study shows that the use of BIM in the delivery of OSHC projects in the UK has seen an increase in the last 5 years. Similarly, the implementation of LC in OSC has been increasing considerably over the last 5 years, with techniques such as JIT, Visual management and Last Planner System amongst the most implemented in OSC particularly.
- ❖ In terms of the benefits of the implementation of LC and BIM in OSHC projects, this study revealed that these two methodologies can bring benefits such as efficient collaboration and team integration, time reduction, cost reduction, quality improvements, efficient workflow, waste reduction and sustainability, customer's satisfaction, higher performance and risk reduction.
- ❖ The results of this study would enable further improvements on the implementation and synergies between these methodologies to effectively increase efficiency and quality in the AEC industry in the UK.

THANKS FOR YOUR ATTENTION!

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