IMPROVING BUILDABILITY THROUGH PROCUREMENT METHODS TO ENHANCE CONSTRUCTION PROJECT PERFORMANCE

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Degree of Doctor of Philosophy

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature: Date: 04 December 2024

P.L.I. Wimalaratne

The above candidate has carried out research for the PhD thesis under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisors:

1. Prof. (Mrs.) Udayangani Kulatunga

Signature of the supervisor: Date: 04 December 2024

2. A/Prof. Thayaparan Gajendran

Signature of the supervisor: Date: 05 December 2024

DEDICATION

I dedicate this research to my beloved parents, acknowledging their sacrifices in shaping a better future for me.

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ABSTRACT

The construction industry plays a crucial role in the economic growth of countries. Thus, research on improving construction project performance is often appealed. Over the years, 'buildability' has been considered as key to effective achievement of project performance – i.e. completing the project on time, within budget, and to the expected quality standards. Buildability refers to fostering knowledge in a timely manner and engaging the most appropriate knowledge sources throughout all stages of a construction project to enhance project performance. However, poor attention to the integration of buildability within conventional construction procurement practices hampers project performance. Inattentiveness to buildability in construction projects can lead to a plethora of problems, such as cost and time overruns, poor quality and performance, low profitability, productivity issues and poor health and safety.

As most of the knowledge in the construction industry is in tacit form, primarily sourced from the project team members' expertise, involvement of appropriate stakeholders in a timely manner is very important for improving buildability. Moreover, as the procurement method determines the overall framework of the project and how and when the key stakeholders interact functionally and contractually- integration of buildability into procurement is essential. Therefore, one of the ways to improve buildability in the construction industry is to integrate elements of buildability within the procurement method. Even though buildability can be improved through appropriate procurement methods, this has not been adequately explored. Therefore, this study aims to investigate ways to improve buildability through its integration with procurement methods to enhance construction project performance.

This research is embedded in the Interpretative Phenomenological Analysis (IPA) research methodology. The research's data collection approach is centred on three case studies. Initially, a literature review was conducted to build a theoretical framework to facilitate the data collection tool. Case studies were conducted, focusing on 'buildability integration' as the unit of analysis and 'procurement method' as the case boundary. Data was collected using phenomenological interview techniques. IPA was used for the analysis of semi-structured interviews, supported by NVivo 14 software.

The findings indicate six fundamental pillars that enhance buildability across various project stages, leading to improved project performance. These pillars encompass '**procurement method**', '**knowledge**', '**people**', '**processes**', '**technology**', and '**collaboration and communication'**. The findings have theoretical and practical implications. The key theoretical implication is that the buildability framework integrates the pillars across the stages of a construction project, taking the buildability discourse into the depths of elements and sub-elements while extending considerations into six pillars. Practical implications are that the procurement managers and project managers have the visibility of aspects that impact buildability in practice and will be able to consider integrating the key buildability elements in their procurement design.

Keywords: Buildability, Constructability, Construction, Interpretative Phenomenological Analysis, IPA, Knowledge Sharing, Procurement Method

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LIST OF ABBREVIATIONS

Abbreviation	Description
AR	Augmented Reality
BCA	Building and Construction Authority
BDAS	Buildable Design Appraisal System
BIM	Building Information Model
BVP	Best Value Procurement
CD	Competitive Dialogue
CIIA	Construction Industry Institute Australia
CIIUS	Construction Industry Institute United States
CIRIA	Construction Industry Research and Information Association
D&B	Design and build
DD&C	Design Develop and Construct
DfMA	Design for Manufacturing and Assembly
ECI	Early Contractor Involvement
EOI	Expression of Interest
EFSG	Education Facilities Standards and Guidelines
GET	Group Experiential Theme
IPA	Interpretive phenomenological analysis
IPD	Integrated Project Delivery
MEP	Mechanical, Electrical and Plumbing
PET	Personal Experiential Theme
PMC	Project Management Consultant
QA	Quality Assurance
QS	Quantity Surveyor
RFI	Requests for Information

LIST OF APPENDICES