

LEAN CONSTRUCTION INTEGRATED FRAMEWORK FOR MIXED DEVELOPMENT PROJECTS IN SRI LANKA

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Sri Lanka

February 2026

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Dissertation submitted in partial fulfilment of the requirements for the degree of
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DECLARATION

I declare that this is my own work and this dissertation 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).

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Date:

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

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Date:

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Mixed Development Projects (MDPs) are becoming increasingly popular in Sri Lanka, combining residential, commercial, retail, and hospitality functions within single developments. While these projects contribute to urban and economic growth, they face challenges such as cost overruns, delays, coordination issues, and stakeholder mismanagement. Lean construction, recognised globally for improving efficiency and minimising waste, has seen limited application in Sri Lankan MDPs.

This research aimed to develop a Lean construction integrated framework tailored for MDPs in Sri Lanka. A mixed-method approach was used, including a literature review, questionnaire survey of industry professionals, and expert interviews. Data analysis identified key problems in MDP delivery, potential benefits of Lean adoption, barriers to implementation, and strategies to overcome them.

Findings revealed that Lean practices can address major issues by improving workflow reliability, reducing waste, enhancing collaboration, and ensuring cost predictability. However, barriers such as lack of awareness, cultural resistance, weak leadership support, and unsupportive contractual frameworks limit its use. Based on these insights, a simple framework was developed, linking Lean tools and strategies to identified problems in MDPs.

The framework provides structured guidance for project managers, contractors, consultants, and policymakers. It also highlights the need for pilot projects, professional training, stakeholder collaboration, and government support to drive Lean adoption. Ultimately, the study demonstrates Lean construction's strong potential to improve MDP delivery in Sri Lanka.

ACKNOWLEDGEMENT

This research has been a rewarding journey, made possible through the support, guidance, and encouragement of many individuals and institutions. I wish to take this opportunity to express my deepest gratitude to all who contributed to the successful completion of this study.

First and foremost, my sincere appreciation goes to my dissertation supervisor, Dr. Tharusha Ranadewa, for her exceptional guidance, patience, and unwavering support throughout this research. Her insightful feedback, constructive criticism, and constant encouragement were invaluable in overcoming challenges and shaping this dissertation into its final form. I am truly grateful for her mentorship, which has been both inspiring and transformative, without whose help I wouldn't have been able to complete this research with the challenges and time constraints.

I would also like to extend my gratitude to the academic and non-academic staff of the Department of Building Economics, University of Moratuwa, for their continuous assistance and encouragement.

This research would not have been possible without the valuable contributions of the industry practitioners who willingly shared their time, knowledge, and experiences during the data collection process. Their insights provided the foundation upon which this work was built.

I am deeply indebted to my family for their unconditional love, sacrifices, and encouragement. To my wife Hirushika, parents, and my newborn little Rehan, thank you for believing in me and being my source of strength throughout this journey. I am equally grateful to my dear friends, whose unwavering support, advice, and motivation carried me through the most demanding stages of this study.

Finally, I wish to thank everyone who, in one way or another, supported and encouraged me during this endeavour. Your kindness, guidance, and belief in me have made this achievement possible.

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LIST OF ABBREVIATIONS

APIM	- Asia Pacific Institute of Management
BIM	- Building Information Modelling
CAD	- Computer-Aided Design
CBD	- Central Business District
CEA	- Central Environmental Authority
CI	- Construction Industry
CIDA	- Construction Industry Development Authority
GDP	- Gross Domestic Product
IoT	- Internet of Things
IPD	- Integrated Project Delivery
JIT	- Just-in-Time
KPI	- Key Performance Indicator
LC	- Lean Construction
LPS	- Last Planner System
MDP	- Mixed Development Project
MUD	- Mixed-Use Development
PDCA	- Plan-Do-Check-Act
PPC	- Percent Plan Complete
PPP	- Public-Private Partnership
ROI	- Return on Investment
SL	- Sri Lanka / Sri Lankan
SME	- Small and Medium-Sized Enterprise
TPS	- Toyota Production System
UDA	- Urban Development Authority
UN-Habitat	- United Nations Human Settlements Programme
VSM	- Value Stream Mapping