

**THE ADAPTABILITY OF CONSTRUCTION 4.0
THROUGHOUT THE PROJECT LIFE CYCLE OF
CONSTRUCTION PROJECTS IN SRI LANKA:
PROJECT MANAGER'S PERSPECTIVE**

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(209270B)

Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa

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

I declare that this is my work and this dissertation does not incorporate without acknowledgment 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 acknowledgment is made in the text.

Further, I acknowledge the intellectual contribution of my research supervisor Ch. QS. Dr. Suranga Jayasena for the successful completion of this research dissertation. I affirm that I will not make any publication from this research without the names of my research supervisor as contributing author unless otherwise I have obtained written consent from my research supervisor.

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.....
Date

The above candidate has carried out research for the Masters Dissertation under my supervision.

.....
Ch. QS. Dr. Suranga Jayasena
Dissertation Supervisor

.....
Date

*I dedicate this research
to my beloved parents
my sister
and all my teachers
for their endless love,
unwavering support,
invaluable encouragement
and precious guidance...*

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Somarathna K.K.G.P

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The construction sector has embraced the concepts associated with the Fourth Industrial Revolution, commonly known as Construction 4.0. This concept represents merging digital advancements and innovative methodologies to transform the construction sector. It revolutionises traditional practices through digital technologies, improving productivity, safety, and sustainability across the project lifecycle in construction. However, the adaptability of Construction 4.0 technologies throughout the project life cycle can vary significantly, largely due to differing regional and contextual factors. In developing nations, including Sri Lanka, evidence regarding adopting Construction 4.0 is scarce, although certain projects demonstrate the use of advanced technologies. As a result, this research focused on establishing a framework to assess the adaptability of Construction 4.0 technologies throughout the distinct phases of a project's life cycle. The assessment was conducted from the viewpoint of a project manager in the construction industry. Additionally, the study utilized a qualitative approach, incorporating an in-depth literature review and semi-structured interviews with 15 industries professional. Manual content analysis was applied to analysis the collected empirical data.

The research findings revealed thirty (30) PM roles, categorised as twelve (12) for the pre-construction phase, ten (10) for the construction phase, and eight (08) for the post-construction phase. Thirty-two (32) Construction 4.0 technologies were revealed through literature review and expert interviews, used across various stages of the project lifecycle. Consequently, this study aligned thirty (30) project manager roles with thirty-two (32) Construction 4.0 technologies, but only twenty (20) unique technologies were discussed due to overlaps across project life cycle phases. In addition, the study uncovered eighteen (18) barriers to adopting Construction 4.0 and highlighted twenty-two (22) strategies for successfully integrating these technologies throughout each phase of the project. Further study categorised the identified strategies (22) under each barrier. The findings of this research will support the Sri Lankan construction industry by offering a framework for integrating Construction 4.0 into project management across all phases of the project life cycle.

Keywords: Construction 4.0, Technologies, Project Manager, Project Lifecycle, Sri Lanka

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LIST OF ABBREVIATIONS

AI	- Artificial Intelligent
AR	- Augmented Reality
BIM	- Building Information Modeling
CMMS	- Computerised Maintenance Management System
EMS	- Energy Management System
GDP	- Gross Domestic Product
GIS	- Geographic Information System
GPS	- Global Positioning System
GSN	- Global System for Mobile Communication
ICT	- Information Communication Technology
IoT	- Internet of Things
LaDAR	- Laser Scanning/Laser Detection
LIDAR	- Light Detection and Ranging
MR	- Mixed Reality
NLP	- Natural Language Processing
PD	- Parametric Design
RFID	- Radio Frequency Identification
UAV	- Unmanned Arial Vehicle
VR	- Virtual Reality
WSN	- Wireless Sensor Network

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