

**ADOPTABILITY OF COMMUNITY MOBILISATION
CONCEPT FOR EFFECTIVE OPERATION AND
MAINTENANCE OF LOW-INCOME CONDOMINIUM
PROJECTS IN SRI LANKA**

Mihiri Subodha Vidyathilake Vipulaguna

(179043U)

Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa

Sri Lanka

September 2023

**ADOPTABILITY OF COMMUNITY MOBILISATION
CONCEPT FOR EFFECTIVE OPERATION AND
MAINTENANCE OF LOW-INCOME CONDOMINIUM
PROJECTS IN SRI LANKA**

Mihiri Subodha Vidyathilake Vipulaguna

(179043U)

Thesis/Dissertation submitted in partial fulfillment of the requirements for the
Degree of Master of Science in Project Management

Department of Building Economics

University of Moratuwa
Sri Lanka

September 2023

DECLARATION

"I declare that this is my own 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.

Also, I hereby grant to the University of Moratuwa the non-exclusive right to reproduce and distribute my dissertation, in whole or in part, in print, electronic or other mediums. I retain the right to use this content in whole or part in future works (such as articles or books)."

Signature:

Date: 26-09-2023

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

Signature of the supervisor:

Date:

ACKNOWLEDGEMENTS

I am immensely grateful to Professor (Mrs.) Nayanathara De Silva of the Facilities Management department at the University of Moratuwa for her invaluable guidance and unwavering support throughout my dissertation. Her dynamic approach, visionary insights, invaluable advice, and unwavering motivation have been a constant source of inspiration for me at every stage of this research.

I am also deeply thankful to Ch QS. Indunil Senevirathna, Director of the M.Sc Project Management Program, and Ch QS. Vijitha Disaratne, former director of the M.Sc Project Management Program, both from the Department of Building Economics. Their guidance and support have been instrumental in shaping this study.

I extend my sincere appreciation to Ch. QS. Dr. (Mrs.) Anuradha Waidyasekara, Head of the Department of Building Economics, and Professor (Mrs.) Yasangika Sandanayake, the former Head of the Department. Their leadership and encouragement have been invaluable.

I am also grateful to all the esteemed lecturers who generously shared their knowledge and expertise in relevant subjects, contributing significantly to the development of this study. My sincere thanks also go to the non-academic staff who played vital roles in ensuring the smooth progress of this research.

I would like to express my utmost gratitude to the experts and the low-income condominium dwellers who graciously dedicated their valuable time to participate in my interviews and the survey. Their active involvement has been crucial in gathering the essential data required for this study.

Furthermore, I want to extend my deep appreciation to my parents for their unwavering support throughout my academic journey. Their encouragement and guidance have been instrumental in my achievements. Finally, I want to thank my husband, Kapila Fernando, for his understanding, encouragement, and unwavering support, which allowed me to allocate sufficient time and resources to pursue this endeavor.

Mihiri Subodha Vidyathilake Vipulaguna.

ABSTRACT

Adoptability of Community Mobilisation Concept for Effective Operation and Maintenance of Low-Income Condominium Projects in Sri Lanka

Sri Lanka's housing policy has welcomed the integration of high-rise condominiums in response to the demand for housing of low-income residents in underserved settlements, aiming to enhance population density. However, inadequate maintenance practices in these condominiums have resulted in considerable deterioration, posing critical safety and health risks to occupants.

Community Mobilisation (CM) is recognized as an effective behavior-based strategy to foster behavioral change and active participation in regular maintenance activities. This research focuses on studying CM interventions that can influence the behaviors of low-income condominium dwellers regarding maintenance management and operational issues.

In order to fulfill the research goals, a mixed-methodology was utilized, including expert interviews and a structured questionnaire survey involving 391 condominium dwellers. A comprehensive literature review identified 12 common operational and maintenance management issues in low-income condominiums. A CM model was developed using the CM approach and Theory of Planned Behavior (TPB) to address attitudes, subjective norms, and perceived behavioral control. The CM model incorporated strategies such as bringing people together, raising awareness, assisting in resource delivery, and facilitating community participation to enhance attitudes, subjective norms, and perceived behavioral control, respectively.

The results illustrate that behavioral attitude, subjective norm, and perceived behavioral control exert significant influence on the behavioral intention and actions (behaviour) of occupants in operation and maintenance management. The study offers valuable insights for policymakers, condominium developers, and low-income residents to improve the sustainability and livability of high-rise condominiums in Sri Lanka.

Keywords: *maintenance management, low-income, condominiums, community mobilization, theory of planned behaviour.*

TABLE OF CONTENTS

DECLARATION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS	ix
INTRODUCTION	1
1.1 Background	1
1.2 Research Problem	3
1.3 Aim and Objectives.....	4
1.4 Research Methodology	5
1.5 Scope and Limitations.....	6
1.6 Chapter Breakdown	6
LITERATURE REVIEW	8
2.1 Introduction.....	8
2.2 Definition of High-rise Buildings	8
2.3 Definition of Low-income	9
2.4 Condominiums as a Solution for the Housing Issue	9
2.4.1 Emergence of condominiums in urban areas	11
2.4.2 Evolution of low-income condominiums	12
2.5 Maintenance Management and Operational Issues in Low-income Condominiums	13
2.5.1 Operational and maintenance issues faced by low-income condominium development agencies	16

2.5.2	Reasons for operational and maintenance management matters in high-rise low-income housing.	19
2.6	Overview of CM Concept	21
2.6.1	Impact of CM on behavioural and normative changes	25
2.6.2	Adoption of the CM concept for effective operational and maintenance practices	26
2.6.3	CM: strategies, challenges, and capacity building	28
2.7	Theories Related to Behaviour.	29
2.7.1	Theory of planned behaviour (TPB)	30
2.8	The application of TPB in the CM application.....	33
2.8.1	Operationalization of TPB in CM for operational and maintenance management of low-income condominium projects.	34
2.9	Chapter summary.....	38
RESEARCH METHODOLOGY		39
3.1	Introduction	39
3.2	Research Design	39
3.2.1	Research philosophy	40
3.2.2	Research approach	41
3.2.3	Research choice	42
3.2.4	Research strategy	42
3.2.5	Time horizon	43
3.2.6	Techniques and procedures	44
3.3	Conducting Interviews.....	44
3.3.1	Interview process: Gathering insights and perspectives	46
3.3.2	Designing the interview guideline	46
3.4	Data Collection.....	46
3.5	Questionnaire Survey	47

3.5.1	Population	47
3.5.2	Sample	49
3.5.3	Questionnaire design	51
3.6	Research Process	55
3.7	CM Model Development.....	55
3.8	Development of Hypotheses.....	58
3.9	Data Analysis.....	59
3.10	Description of the Study Area: Colombo Municipal Council Area.....	60
3.11	Chapter Summary	61
ANALYSIS AND RESEARCH FINDINGS		63
4.1	Introduction	63
4.2	Operational and Maintenance Management Issues in Low-income Condominium Projects	63
4.2.1	Findings of the expert interviews	64
4.2.2	Opinions of experts on the importance of low-income high-rise residential condominiums.	64
4.2.3	Common operational and maintenance issues	66
4.2.4	Factors contributing to operational and maintenance issues in low-income condominium projects	69
4.2.5	Strategies to overcome the issues	70
4.3	Findings of the Questionnaire Survey	71
4.3.1	Demographic characteristics of respondents of a questionnaire survey	71
4.4	Measuring the existing level of behaviour of occupants: Objective 3.....	72
4.5	Screening Data.....	74
4.6	Evaluation of Measurement Model	74
4.6.1	Indicator reliability	77
4.6.2	Internal consistency	80

4.6.3	Content validity	81
4.6.4	Convergent validity	81
4.6.5	Discriminant validity	83
4.6.6	The Fornell–Larcker discriminant validity criterion	83
4.6.7	Heterotrait-Monotrait Ratio (HTMT)	84
4.7	Assessment of Structural Model.....	84
4.7.1	Multicollinearity	85
4.7.2	The Standardized Root Mean Square Residual (SRMR)	85
4.7.3	The coefficient of determination (R^2) of the endogenous variables	86
4.7.4	f^2 Effect size of exogenous variables	87
4.8	The Structural Model and Hypotheses Testing	87
4.9	Hypotheses Testing	90
4.9.1	Behavioural attitude has an impact on behavioural intention of operation and maintenance management	90
4.9.2	Subjective norm has an impact on behavioural intention of operation and maintenance management	90
4.9.3	Perceived behavioural control has an impact on behavioural intention of operation and maintenance management	91
4.9.4	Perceived behavioural control has an impact on behaviour of occupants of operation and maintenance management	91
4.9.5	Behavioural intention has an impact on behaviour of occupants of operation and maintenance management	92
4.9.6	Behavioural attitude has an impact on behaviour of occupants of operation and maintenance management through behavioural intention	92
4.9.7	Subjective norm has an impact on behaviour of occupants of operation and maintenance management through behavioural intention	93
4.9.8	Perceived behavioural control has an impact on behaviour of occupants of operation and maintenance management through behavioural intention	93

4.10	Chapter Summary	94
CONCLUSIONS AND RECOMMENDATIONS		97
5.1	Conclusions of the Study.....	97
	5.1.1 Objective one	97
	5.1.2 Objective two	98
	5.1.3 Objective three	98
	5.1.4 Objective four	98
5.2	Recommendations	99
5.3	Limitations of the Research.....	99
5.4	Further research.....	100
REFERENCES		101
LIST OF ANNEXURES		125

LIST OF FIGURES

Figure 2-1: The evolution of new lives of the urban shanty dwellers due to the "Sahaspora" high-rise housing project	12
Figure 2-2: The theoretical relationship between the age of a dwelling, actual housing costs, and maintenance expenses	20
Figure 2-3: Four Steps of CM concept	23
Figure 2-4: Avahan's program theory for CM aims to change social norms and behaviors	26
Figure 2-5: Building Critical Mass	Error! Bookmark not defined.
Figure 2-6: The visual representation of the TPB conceptual model	31
Figure 3-1: Research Onion	40
Figure 3-2: Identified variables for the questionnaire survey	51
Figure 3-3: The research journey	55
Figure 3-4: The modified model of CM (for the effectiveness of operational and maintenance activities)	56
Figure 3-5: Theoretical model with hypotheses	58
Figure 3-6: Geographic Distribution of Wards Within the (CMA)	60
Figure 4-1: Experts' opinion on the importance of low-income high-rise condominiums	65
Figure 4-2: Measurement Model with inner loadings	75
Figure 4-3: Measurement Model with inner loadings and outer loadings	76
Figure 4-4: The structural model with path coefficients and T value	88
Figure 4-5: The structural model with path coefficients and P value	88

LIST OF TABLES

Table 1.1: Research methodology	6
Table 2.1: Challenges and Issues in High-Rise Public Housing Development	14
Table 2.2: Critical concerns in condominium developments designed for low-income families.	16
Table 2.3: Common operational and maintenance issues experienced by low-income condominium development organizations	17
Table 2.4: Behavior and attitudinal changes in CM projects.	26
Table 2.5: Overview of CM	29
Table 2.6: Individual, social, and technological theories and their first authors	30
Table 2.7: The visual representation of the TPB conceptual model	35
Table 3.1: Sample profile used for the structured interviews	45
Table 3.2: Government-built high-rise low-income condominium projects in Colombo	48
Table 3.3: Formulation of strata and proportional sampling method employed within each stratum	50
Table 3.4: Common Issues Identified in Low-Income High-Rise Condominiums for the Questionnaire	52
Table 3.5: Hypotheses	58
Table 3.6: Divisional Structure and Subdivisions within the CMA	60
Table 4.1: Opinions of experts on the importance of high-rise, low-income condominiums	65
Table 4.2: Verification of operational and maintenance issues identified in the literature review through expert interviews	66
Table 4.3: Experts' opinion on the causes of issues in high-rise, low-income condominiums.	70
Table 4.4: Expert's solutions to mitigate the operational and maintenance issues	71

Table 4.5: The synopsis of the sample's demographic features	72
Table 4.6: Existing level of behaviour of occupants	73
Table 4.7: Outer Loadings of Initial Model	77
Table 4.8: Outer Loadings of Final Model	79
Table 4.9: Internal consistency of variables	81
Table 4.10: Composite Reliability and AVE of variables	82
Table 4.11: Fornell–Larcker discriminant validity criterion	83
Table 4.12: Heterotrait-monotrait (HTMT) ratio	84
Table 4.13: Assessing the collinearity diagnostics (VIF) for latent variables	85
Table 4.14: The standardized root mean square residual (SRMR)	86
Table 4.15: The coefficient of determination (R Squared)	86
Table 4.16: f2 effect size of exogenous variables	87
Table 4.17: Path Coefficient with Mean, Standard deviation, T-Statistic, P – Values, and confidence intervals bias-corrected of direct effect	89
Table 4.18: Path Coefficient with Mean, Standard deviation, T-Statistic, P – Values, and confidence intervals bias-corrected of indirect effect	89

LIST OF ABBREVIATIONS

Abbreviation	Description
BAT	Behavioural attitude
BI	Behavioural intention
BO	Behaviour of occupants
CM	Community Mobilization
CMA	Colombo Municipal Area
MCs	Management Corporations
PBC	Perceived behavioral control
SEM	Structural Equation Model
SN	Subjective Norm
TPB	Theory of Planned Behaviour
UDA	Urban Development Authority
UN	United Nations
US	United States
URP	Urban Regeneration Project
USDA	Urban Settlement Development Authority
USS	Underserved Settlements