A FRAMEWORK FOR EFFECTIVE STAKEHOLDER MANAGEMENT WITHIN THE DECISION-MAKING PROCESS OF BUILDING ENERGY EFFICIENCY RETROFITS

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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.

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The above candidate has carried out research for the PhD thesis under my supervision.

Name of Supervisor: Dr. Sachie Gunatilake

Signature of the Supervisor: Date: 02.06.2024

ABSTRACT

Though currently many organisations are under pressure to adopt Building Energy Efficiency Retrofits (BEER) and minimise energy consumption, still there is comparatively low level of implementation of BEER. This has been attributed to, *inter alia*, lack of proactive guidance for project teams to ensure that they make the right decisions to achieve the desired Energy Efficiency (EE) outcomes, involvement of numerous stakeholders from different disciplines in BEER projects, existence of complex interrelations among such stakeholders and reluctance to involve all such stakeholders within the internal decision-making process. Thus, it appears that informed decision-making and effective Stakeholder Management (SM) are essential to ensure successful implementation of BEER. Hence, this study was aimed at developing a SM framework to ensure effective SM throughout the decision-making process of BEER.

A mixed method design following the "sequential exploratory" research design was adopted to achieve the research aim. Four Sri Lanka National Energy Efficiency Award (SLNEEA) winning hotel retrofit projects were selected from the Western province of the country, representing shallow and medium retrofit projects led by in-house teams and ESCO. Structured and semi-structured interviews were conducted with the stakeholders involved in the selected BEER projects. The collected qualitative data were analysed using the computer-based thematic and content analysis while the quantitative data were analysed using Social Network Analysis (SNA) and mathematical equations.

This research identified the decision-making processes followed in in-house led and Energy Service Company (ESCO) led BEER projects. Findings further revealed, 24 stakeholders involved in the decision-making process along with their functions. 7 roles reflective of the nature of their involvement in the BEER project (i.e. decision-maker, performer, monitor/ observer, supporter, advisor, consultant, and informer) were also discovered. Moreover, SNA results also revealed 6 roles of stakeholders in different relationship networks of BEER (i.e. recipient, disseminator, peripheral actor, isolate, gatekeeper/broker, and focal actor). The "Facilities Manager" (FM) was identified as the "key player" with the highest level of influence and interest in in-house led projects. On the other hand, in ESCO led BEER projects, both the "ESCO" and "FM" were revealed to be the "key players". Findings also revealed 20 CSFs and 62 strategies to ensure effective SM during different stages of BEER projects. These strategies include 8 strategies to effectively manage different stakeholder interests, 42 strategies to effectively deal with the identified CSFs for the effective SM, 9 suitable engagement approaches for managing stakeholders with different characteristics, and 3 strategies to improve stakeholder relationships.

This study is novel in offering a framework that could help in ensuring effective SM within the decision-making process of BEER. The proposed SM framework consists of four main sections, addressing the decision-making process of BEER, stakeholder involvement, SM process, and CSFs for effective SM. It is believed that the outcomes of this study will serve as a roadmap for industry practitioners in implementing BEER projects whilst effectively managing the stakeholders, which could in turn enhance the level of adoption of BEER in the long run.

Key words: Building Energy Efficiency Retrofits (BEER), Decision-making process, Hotel Sector, Social Network Analysis (SNA), Stakeholder Management (SM)

DEDICATION

This piece of work is wholeheartedly dedicated to my beloved family for their endless love, encouragement, and consistent support, which made me see this adventure through to the end.

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LIST OF ABBREVIATIONS

Abbreviation	Description
A/C	Air Conditioners
APM	Association for Project Management
BEER	Building Energy Efficiency Retrofits
BEMS	Building Energy Management System
BMS	Building Management System
BOQ	Bill of Quantities
CEO	Chief Executive Officer
CSFs	Critical Success Factors
CPDs	Continuous Professional Developments
DGM	Deputy General Manager
EE	Energy Efficiency
EEBH	Energy Efficient Buildings Hub
EPC	Energy Performance Contract
ESCO	Energy Service Company
ESCOs	Energy Service Companies
ESMAP	Energy Sector Management Assistant Programme
FM	Facilities Manager
FMgt	Facilities Management
GHG	Greenhouse Gas
GM	General Manager
HVAC	Heating Ventilation and Air Conditioning
IAQ	Indoor Air Quality

IEQ	Indoor Environmental Quality
IFCSL	International Finance Corporation Sri Lanka
M&V	Measurement & Verification
NGOs	Non-Government Organisations
NREL	National Renewable Energy Laboratory
PMI	Project Management Institute
PTF-EDSM	Presidential Task Force on Energy Demand Side Management
QS	Quantity Surveyor
REP	Renewable Energy Partners
ROI	Return on Investment
SEAI	Sustainable Energy Authority of Ireland
SF	Success Factor
SFs	Success Factors
SLEMA	Sri Lanka Energy Managers Association
SLNEEA	Sri Lanka National Energy Efficiency Award
SLSEA	Sri Lanka Sustainable Energy Authority
SLTDA	Sri Lanka Tourism Development Authority
SM	Stakeholder Management
SNA	Social Network Analysis
T&C	Test & Commissioning
VSD	Variable Speed Drives

LIST OF APPENDICES