Madanayake, B.W. and Nissanka, S., 2026. Exploring the current status of retrofitting or rebuilding in construction. In: Waidyasekara, K.G.A.S., Jayasena, H.S., Chandanie, H. and Tennakoon, G.A. (eds). *Proceedings of the 14th World Construction Symposium*, 10-11 July 2026, Sri Lanka. pp. 754-767. DOI: https://doi.org/10.31705/WCS.2026.56. Available from: https://ciobwcs.com/papers/

EXPLORING THE CURRENT STATUS OF RETROFITTING OR REBUILDING IN CONSTRUCTION

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ABSTRACT

In Sri Lanka, construction professionals face a recurring dilemma: retrofit an existing building or rebuild it from scratch. This decision is not merely technical, it involves cost, environmental impact, policy constraints and heritage. While international research offers retrofit first models, they rarely fit Sri Lanka's economic and regulatory reality. This study explores how global research addresses retrofit versus rebuild decisions and identifies the limitations of applying those frameworks locally. A mixed methods approach was used: semi structured interviews with ten Technical Officers (analysed via NVivo thematic coding) and a questionnaire survey of 26 industry professionals plus the same 10 Technical Officers (total N=36, analysed using Relative Importance Index). Results show that structural condition (RII=0.89), cost (RII=0.86) and sustainability (RII=0.71) are the top three decisive factors. Retrofitting is preferred for cost efficiency, shorter timelines and lower waste; rebuilding is chosen when structural safety or modern standards cannot be met. Key barriers include hidden defects, lack of skilled labour and weak institutional support. The study culminates in a local decision-making framework that integrates technical, economic, environmental and policy criteria, helping practitioners make transparent, data driven choices aligned with national climate resilience goals.

Keywords: *Decision making framework; Rebuilding; Retrofitting; Sri Lanka; Sustainability.*

1. INTRODUCTION

The construction industry is a major consumer of resources and contributor to carbon emissions. In developing economies like Sri Lanka, much of the building stock is ageing, structurally inadequate or functionally obsolete. Consequently, professionals constantly face a dilemma: retrofit an existing structure or demolish and rebuild. This decision is complex, involving economic, environmental, social and regulatory factors.

Retrofitting is promoted in sustainable construction because it reduces embodied carbon, cuts waste and extends building life. Rebuilding is seen as more reliable when a building is severely deteriorated or fails modern safety standards. However, most retrofit first guidelines come from developed countries with strong incentives, advanced skills and clear policies. Applying them directly in Sri Lanka is problematic.

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In Sri Lanka, decisions are often based on professional judgement, cost limits and perceived risk, not on structured tools. The lack of local guidelines, combined with skilled labour shortages and weak institutional support, leads to inconsistent outcomes. Rising sustainability expectations and pressure to preserve existing urban fabric add further complexity.

Therefore, this study aims to develop a structured decision-making framework specifically for retrofit versus rebuild decisions in Sri Lanka. It investigates current practices, identifies influencing factors, evaluates benefits and challenges, and extracts best practices. By combining literature, survey data and interviews, the study bridges international theory and local practice.

2. LITERATURE REVIEW

2.1 RETROFITTING VERSUS REBUILDING IN SUSTAINABLE CONSTRUCTION

International research consistently shows that retrofitting reduces embodied energy, carbon and waste compared to demolition and new build (Ferreira et al., 2015; Peng et al., 2021). Retrofitting also preserves community continuity and heritage (Josa & Borrion, 2025; Power, 2010). However, rebuilding is unavoidable when a building has extensive structural damage, very short remaining life, or cannot meet modern safety codes (Power, 2010; Rønning et al., 2009). Thus, the decision is context dependent.

2.2 KEY FACTORS INFLUENCING RETROFIT OR REBUILD DECISIONS

Economic feasibility is the dominant factor, retrofitting usually has lower upfront cost and faster payback (Bullen & Love, 2011). Environmental impact is second: studies from China and Ukraine show retrofitting cuts carbon significantly (Peng et al., 2021; Troian et al., 2024). Structural integrity and remaining lifespan also matter; a building with complex geometry or limited life may not justify retrofitting (Chen et al., 2024). Social and cultural aspects matter in historic areas (Dişli & Ankaralıgil, 2023). Policy and regulations strongly affect adoption – developing countries often lack incentives and clear guidance (Rønning et al., 2009). A systematic review by Liu et al. (2022) identified 689 factors grouped into seven categories, highlighting that homeowner characteristics and belief about energy retrofit consequences are as important as technical factors.

2.3 BARRIERS AND OPPORTUNITIES ASSOCIATED WITH RETROFITTING

Barriers include high upfront cost, hidden defects, lack of skilled labour, weak supply chains and fragmented policy (Fasna & Gunatilake, 2020; Jagarajan et al., 2017). Opportunities are long term savings, lower operational energy, better comfort and increased property value (Periyannan et al., 2023). In seismic contexts, Egbelakin et al. (2014) found that economic impediments (unattractive payback, uncertainty) are the strongest barriers to retrofit adoption, a finding that resonates strongly in Sri Lanka where disaster risk is real but financial buffers are small.

Table 1: Comparison between barriers/challenges vs. benefits/opportunities.

Aspect	Barriers and Challenges	Benefits and Opportunities
Financial	High upfront cost Unattractive payback schemes	Long term cost savings Increased property value

Aspect	Barriers and Challenges	Benefits and Opportunities
	Uncertainty over long-term savings	Reduced operational energy cost
Technical	Lack of skilled labour and expertise Weak supply chains Complexity of processes Limited availability of materials	Opportunities for technological innovation Improved building performance Modernized systems
Policy	Absence of strong incentives Fragmented regulations Poor government support	Potential alignment with climate policies Contribution to national sustainability targets
Social	Client reluctance Disruption to occupants Poor communication among stakeholders Low awareness of benefits	Improved occupant comfort and satisfaction Enhanced working and living environments Greater stakeholder value
Environmental	Uncertainty about effectiveness of green technologies Higher costs in some contexts	Reduced carbon emissions Resource efficiency Waste minimization Climate change mitigation

2.4 RESEARCH GAP AND NEED FOR A LOCAL DECISION FRAMEWORK

Most existing decision models (e.g., Menassa & Baer, 2014; Steskens et al., 2015) are built for high income countries with stable regulations, strong incentives and advanced technical capacity. They do not account for Sri Lanka's informal construction sector, weak enforcement of building codes, and very limited financial support for green retrofits. Although Jayarathne et al. (2024) and Ranawaka and Mallawaarachchi (2018) proposed decision frameworks relevant to sustainable retrofitting in Sri Lanka, their studies focus on specific aspects such as green retrofit implementation and smart retrofit decision-making. They do not provide a comprehensive framework that systematically guides practitioners in choosing between retrofitting and rebuilding under the technical, economic, environmental, and regulatory constraints commonly encountered in the Sri Lankan construction industry. Therefore, there remains a need for a practical, context-specific decision-making framework that integrates these multiple criteria into a single decision-support approach. This study fills that gap by developing a localised, multi criteria framework that works under Sri Lanka's real constraints – low budget flexibility, variable skill levels, and minimal policy support. Unlike generic models, our framework explicitly includes a rule for "structural safety first" and uses simple inputs (visual inspection, basic cost estimates) so that a Technical Officer can apply it without specialised software.

3. RESEARCH METHODOLOGY

A mixed methods design was used to capture both deep professional insights and broad industry trends.

3.1 LITERATURE REVIEW

A systematic review was conducted to identify decision factors, barriers, benefits and existing models. This informed the interview guide and questionnaire.

3.2 QUALITATIVE INTERVIEWS

Semi-structured interviews were conducted with ten Technical Officers (TOs) involved in ongoing building projects located in Colombo, Kandy and Galle. Participants were selected using purposive sampling based on two criteria: a minimum of five years of professional experience in building construction and direct involvement in at least two retrofit or rebuild decisions within the previous three years. The interviews explored participants' perceptions of retrofitting and rebuilding, decision-making factors, barriers, challenges and best practices. Prior to data collection, the interview protocol was pilot tested with two Technical Officers who were not included in the final sample. Interviews lasted between 45 and 60 minutes and were audio-recorded and transcribed verbatim. The qualitative data were analysed using NVivo 14 following Braun and Clarke's (2006) six-phase thematic analysis procedure. This process generated 31 initial codes which were subsequently consolidated into eight overarching themes. Reliability was enhanced through independent coding by two researchers, resulting in an agreement level of 86%, while validity was strengthened through member checking with three participants. Ethical procedures included obtaining informed consent, anonymising participants as TO1–TO10 and securely storing all research data on a password-protected university drive.

3.3 QUESTIONNAIRE SURVEY

A questionnaire survey was undertaken to obtain quantitative evidence regarding the factors influencing retrofit and rebuild decisions. Purposive sampling was employed through professional networks including IESL, CIOB Sri Lanka and CIDA. A total of 150 questionnaires were distributed, resulting in 87 returned responses and a response rate of 58%. Following data screening and matching with interview participants, 36 complete responses were retained for analysis, comprising 26 industry professionals and the ten Technical Officers interviewed during the qualitative phase. Respondents included engineers (42%), quantity surveyors (28%), architects (18%) and project managers (12%), with an average professional experience of 11 years. The questionnaire employed a five-point Likert scale ranging from 1 (not important) to 5 (extremely important). Prior to distribution, the questionnaire was pilot tested with ten industry professionals and revised for clarity. Data were analysed using the Relative Importance Index (RII), calculated as $RII = \Sigma(w)/(A \times N)$, where w represents the weighting assigned by respondents, A is the highest possible weighting (5), and N is the total number of respondents. RII values range from 0 to 1, with higher values indicating greater importance.

3.4 INTEGRATION OF QUALITATIVE AND QUANTITATIVE FINDINGS

The final stage of the study involved integrating the qualitative and quantitative findings to develop a comprehensive understanding of retrofit versus rebuild decision-making within the Sri Lankan construction industry. A triangulation approach was adopted whereby the themes emerging from the qualitative interviews were compared with the Relative Importance Index (RII) rankings obtained from the questionnaire survey. The qualitative findings provided contextual explanations for the quantitative results, enabling a deeper understanding of why certain factors were perceived as more important than others. For example, while sustainability emerged as an important consideration, interview participants consistently highlighted that structural safety and cost considerations remained the primary drivers of decision-making, which was subsequently confirmed through the higher RII rankings assigned to these factors.

Conversely, the quantitative findings were used to validate the prevalence and significance of the themes identified during the thematic analysis. This integration process ensured that the final conclusions were supported by both practitioner experiences and broader industry perceptions. The combined findings were subsequently synthesized to identify key decision criteria, barriers, benefits, and best practices associated with retrofit and rebuild projects. These empirical findings formed the basis for the development of the proposed integrated multi-criteria decision-making framework presented in this study.

4. RESULTS AND DISCUSSION

This section presents and discusses the findings derived from the qualitative interviews and questionnaire survey. The results are structured in accordance with the research objectives and interpreted through the integration of NVivo-based thematic analysis and Relative Importance Index (RII) rankings. The discussion also links the empirical findings with relevant literature to explain how retrofit versus rebuild decisions are shaped within the Sri Lankan construction context.

4.1 PERCEPTION OF RETROFITTING VERSUS REBUILDING

The interview findings indicate that practitioners generally adopt a "retrofit-first" position when the existing building is structurally sound and capable of accommodating the required functional improvements. Several Technical Officers viewed retrofitting as a practical option because it can reduce demolition-related disruption, lower project costs, shorten construction duration, and minimize material waste. For example, TO2 noted that "if the frame is good, retrofitting saves time and money", while TO5 explained that client confidence in retrofitting often improves once successful retrofit projects are experienced.

However, this preference for retrofitting was conditional rather than absolute. Rebuilding was considered necessary where the building exhibited severe deterioration, extensive reinforcement corrosion, inadequate foundations, or an inability to comply with current safety and performance standards. TO7 emphasized this point by stating that when concrete carbonation and exposed reinforcement are present, "rebuilding" becomes the safer option. This demonstrates that practitioners do not view retrofitting and rebuilding as competing solutions in all cases; rather, they regard them as context-dependent alternatives shaped primarily by structural feasibility and project constraints.

The questionnaire findings supported this interpretation. Most respondents agreed that retrofitting should be considered as the preferred option where structural assessment confirms its feasibility. This suggests that the industry recognizes the potential of retrofitting but remains cautious about its adoption in cases where safety and durability are uncertain.

4.2 FACTORS INFLUENCING THE RETROFITTING OR REBUILDING DECISION

The RII analysis identified structural condition and safety as the most influential factor affecting retrofit versus rebuild decisions, with an RII value of 0.89. This was followed by cost and budget constraints (RII = 0.86), sustainability considerations relating to energy, waste and carbon (RII = 0.71), project timeline (RII = 0.68), regulatory compliance (RII = 0.65), and availability of skilled labour (RII = 0.59). These results are presented in Table 2.

Table 2: Relative Importance Index (RII) of decision factors

Factors	RII Value	Rank
Structural condition / safety	0.89	1
Cost and budget constraints	0.86	2
Sustainability (energy, waste, carbon)	0.71	3
Project timeline	0.68	4
Regulatory compliance	0.65	5
Availability of skilled labour	0.59	6

The ranking demonstrates that retrofit versus rebuild decisions are strongly influenced by technical and financial priorities. Although sustainability ranked third, the interview data revealed that environmental considerations are often secondary to safety and affordability. TO4 explained that while sustainability is increasingly discussed, clients typically first ask whether the option is safe and financially viable. Similarly, TO9 observed that excessive emphasis on sustainability may reduce client confidence if it results in cost escalation.

This finding indicates a gap between sustainability awareness and sustainability-led decision-making. While most respondents acknowledged that retrofitting is environmentally preferable due to reduced demolition waste and lower embodied carbon, only a minority had selected retrofitting primarily for environmental reasons. This suggests that sustainability benefits alone are insufficient to drive retrofit adoption in the absence of clear financial incentives, regulatory support, and technical assurance. The finding is consistent with previous studies which suggest that retrofit uptake is often constrained by economic uncertainty, risk perception and limited policy support.

4.3 BARRIERS AND CHALLENGES IN RETROFITTING AND REBUILDING PROJECTS

The findings revealed that the main barriers to retrofitting and rebuilding can be grouped into technical, economic, and institutional challenges. From a technical perspective, hidden defects were the most frequently reported concern. Participants noted that defects such as reinforcement corrosion, termite damage, weak foundations, poor concrete quality, and concealed structural deterioration are often discovered only after work begins. TO1 explained that unexpected defects can significantly increase project cost and delay completion, making retrofitting more uncertain than rebuilding.

A further technical challenge concerns the lack of skilled labour and specialist expertise required for retrofit interventions. Techniques such as structural strengthening, fibre wrapping, foundation improvement, and careful integration of new building services into existing structures require specialized knowledge. Where such expertise is unavailable or costly, practitioners may consider rebuilding to be less risky and easier to manage.

Institutional and regulatory barriers were also significant. Participants observed that approval processes are often clearer for new construction than for retrofit projects. TO6 described retrofitting as a “grey area” within the approval process, indicating uncertainty in how such projects are assessed by relevant authorities. The absence of tax relief, fast-track approval mechanisms, or dedicated retrofit guidelines further discourages clients and professionals from prioritizing retrofit solutions.

Economic barriers were closely linked to these technical and institutional issues. Although retrofitting may reduce costs in many cases, the risk of unforeseen defects and uncertain long-term savings can make clients hesitant. The survey findings supported this concern, with lack of financial incentives emerging as a major barrier. These findings suggest that retrofit adoption in Sri Lanka cannot be improved through technical solutions alone; it also requires policy support, financial mechanisms, and institutional clarity.

4.4 BENEFITS AND OPPORTUNITIES OF RETROFITTING AND REBUILDING

Despite the identified barriers, practitioners recognized significant benefits associated with retrofitting. Retrofitting was valued for its potential to reduce project cost, shorten construction duration, minimize demolition waste, and limit disruption to occupants. Several participants indicated that retrofit projects can be completed in a shorter time than complete rebuilding, particularly when the structural frame remains sound. TO3 illustrated this advantage by explaining that a school retrofit was completed within three months, whereas rebuilding would have taken considerably longer and displaced many students.

Retrofitting also provides environmental benefits by reducing material consumption, demolition waste, and embodied carbon. In this respect, it aligns with sustainable construction principles and national climate resilience objectives. However, the findings show that these environmental benefits are more likely to influence decision-making when they are supported by cost savings, regulatory incentives, or client awareness.

Rebuilding, by contrast, was recognized for offering greater design flexibility, clearer regulatory compliance, improved structural performance, and reduced uncertainty regarding hidden defects. Participants considered rebuilding more appropriate where existing buildings are severely deteriorated, structurally unsafe, functionally obsolete, or unable to meet modern standards through retrofit interventions. TO8 described rebuilding as more predictable because the outcome can be designed and controlled from the beginning, whereas retrofitting involves greater uncertainty due to the condition of the existing structure.

The results therefore indicate that neither retrofitting nor rebuilding can be considered universally superior. Instead, the appropriate intervention depends on project-specific conditions, including structural feasibility, cost, timeline, sustainability objectives, regulatory requirements, and available technical capacity.

4.5 BEST PRACTICES AND IMPLICATIONS FOR DECISIONS-MAKING

The interview findings highlighted several practices that can improve the quality and reliability of retrofit versus rebuild decisions. The most frequently recommended practice was to undertake a detailed structural assessment, including non-destructive testing where possible, before committing to either option. This is essential because structural conditions were identified as the highest-ranked decision factor and directly determines whether retrofitting is feasible.

Participants also emphasized the importance of early multidisciplinary collaboration. Structural engineers, quantity surveyors, architects, MEP specialists, sustainability consultants, contractors, and client representatives should be involved at the initial decision-making stage to ensure that technical, financial, environmental, and regulatory implications are considered together. Such collaboration can reduce uncertainty, improve cost forecasting, and prevent decisions based solely on individual professional judgement.

Another important implication is the need for a structured decision-support mechanism. Practitioners recommended the use of a checklist or multi-criteria assessment tool to compare retrofit and rebuild alternatives across key criteria such as structural safety, cost, project duration, environmental impact, and regulatory compliance. This finding directly informed the development of the Integrated Multi-Criteria Decision Framework proposed in this study. The framework responds to the need for a transparent and practical tool that can support more consistent, evidence-based decisions in the Sri Lankan construction industry.

Finally, participants highlighted the importance of documenting successful retrofit and rebuilding case studies. A stronger evidence base of local project examples would improve professional confidence, support client decision-making, and contribute to the development of national guidelines for sustainable building intervention.

4.6 DEVELOPMENT OF THE INTEGRATED MULTI-CRITERIA DECISION FRAMEWORK

The proposed Integrated Multi-Criteria Decision Framework was developed through the systematic triangulation of findings obtained from the literature review, qualitative interviews, and quantitative survey analysis. Existing studies have proposed various decision-support frameworks for retrofit assessment; however, most focus primarily on energy performance, lifecycle cost optimization, or environmental sustainability. The findings of this study demonstrated that retrofit versus rebuild decisions in the Sri Lankan construction industry are influenced by a broader range of factors, including structural safety, affordability, project duration, regulatory constraints, and resource availability. Consequently, a context-specific framework was required to reflect the practical realities faced by local construction professionals.

The framework was developed through a three-stage evidence synthesis process. First, the literature review identified the key decision criteria, barriers, benefits, and best practices reported within previous retrofit and rebuild studies. Second, thematic analysis of interview data revealed the factors most frequently considered by Technical Officers when evaluating retrofit and rebuilding alternatives. Third, the Relative Importance Index (RII) analysis was used to prioritize these factors based on their perceived significance among construction professionals. The final framework therefore represents an empirical synthesis of theoretical knowledge and industry practice rather than a purely conceptual model.

The framework consists of three sequential stages: preliminary assessment, multi-criteria evaluation, and decision selection. The preliminary assessment stage evaluates the structural feasibility of the existing building. Buildings that exhibit severe deterioration, critical structural defects, or unacceptable safety risks are directed towards rebuilding considerations. Buildings that satisfy minimum structural requirements proceed to the multi-criteria evaluation stage.

The multi-criteria evaluation stage assesses both retrofit and rebuilding alternatives against five key criteria identified through the study findings: structural condition and safety, lifecycle cost, environmental impact, project duration, and regulatory compliance. The relative weighting assigned to each criterion was derived from the RII rankings obtained through the questionnaire survey, thereby ensuring that the framework reflects the priorities of industry practitioners.

Table 3: Framework criteria, weighting, input requirements and scoring scale

Criterion	Default Weight (%)	Scoring Scale (0–10)	Data Source
Structural condition / safety	30%	0 = collapse risk / severe deterioration; 5 = moderate repairable defects; 10 = fully sound	NDT assessment, engineer's report
Lifecycle cost (including maintenance)	25%	0 = >150% of rebuild cost; 5 = 75–150%; 10 = <50%	Quantity surveyor's estimate
Environmental impact (carbon + waste)	15%	0 = high emissions, large waste; 5 = moderate; 10 = near zero	Lifecycle assessment / waste estimation
Project duration	15%	0 = longer than rebuild; 5 = same as rebuild; 10 = <50% of rebuild time	Contractor's schedule
Regulatory compliance and approval ease	15%	0 = impossible to approve; 5 = possible with delays; 10 = fast-track eligible	Local authority consultation

Each alternative is scored from 0 to 10 against each criterion using the guidance provided in Table 3. The score assigned to each criterion is multiplied by its corresponding weighting, and the weighted scores are aggregated to generate an overall performance score. The framework applies two decision rules. First, retrofit can only be considered where the building achieves a minimum structural feasibility score of five or above. Second, where the total weighted retrofit score equals or exceeds the total weighted rebuild score, retrofit is recommended. Where the rebuild score is higher, or where structural feasibility requirements are not met, rebuilding is recommended.

To illustrate the practical application of the framework, Table 4 presents a sample scoring exercise comparing retrofit and rebuild alternatives. The example demonstrates how the framework converts multiple decision criteria into a transparent and evidence-based recommendation.

Table 4: Example application of the framework

Criterion	Weight	Retrofit Score	Retrofit Weighted Score	Rebuild Score	Rebuild Weighted Score
Structural condition and safety	0.30	8	2.40	9	2.70
Lifecycle cost	0.25	9	2.25	5	1.25
Environmental impact	0.15	8	1.20	4	0.60
Project duration	0.15	7	1.05	5	0.75
Regulatory compliance	0.15	6	0.90	8	1.20
Total			7.80		6.50

The expected output of the framework is a structured recommendation identifying whether retrofit or rebuild represents the most appropriate intervention strategy for a given project. In addition to the final recommendation, the framework enables decision-makers to understand the relative strengths and weaknesses of each alternative across technical, economic, environmental, and regulatory dimensions. Consequently, the framework promotes more transparent, objective, and sustainable decision-making within the Sri Lankan construction industry

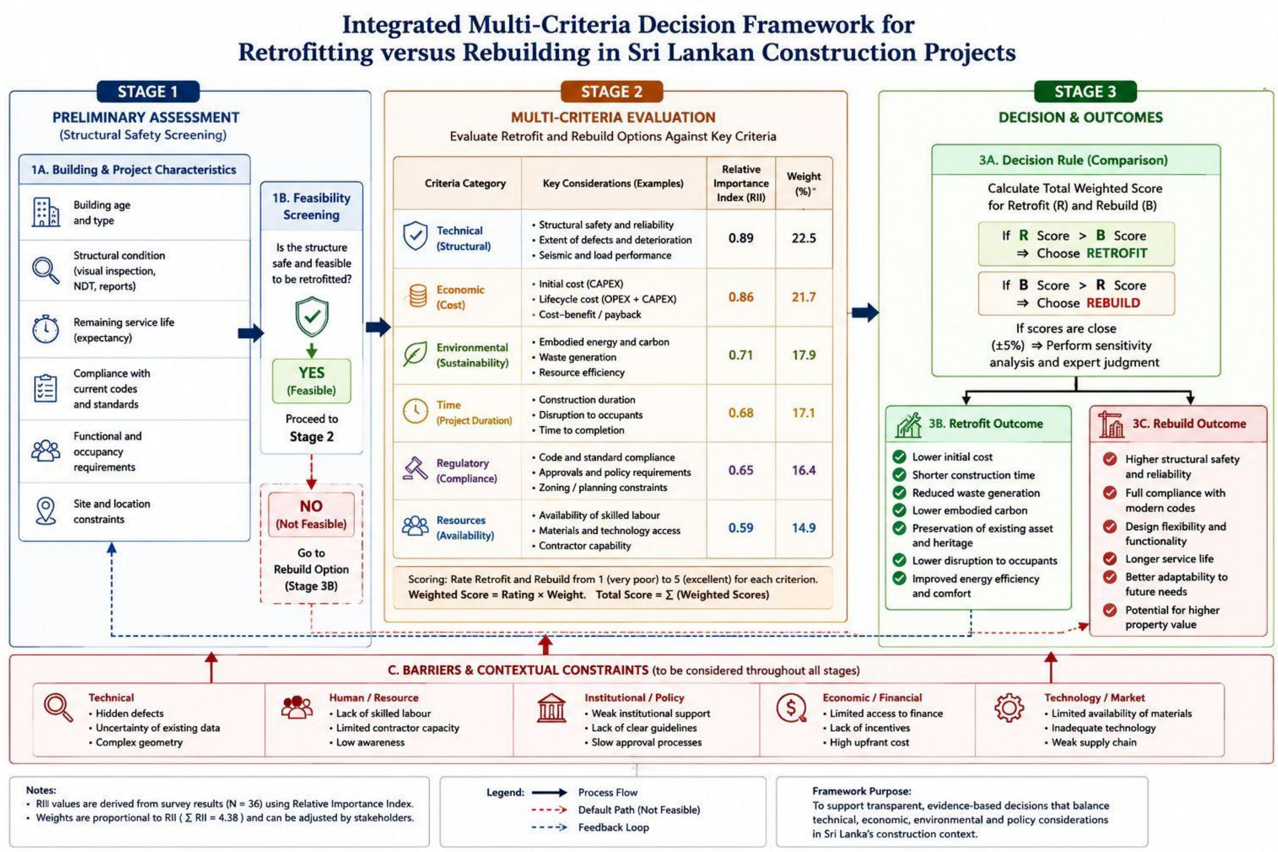

Figure 1: Decision-making framework

4.7 COMPARISON WITH EXISTING INTERNATIONAL FRAMEWORKS

To evaluate the contribution of the proposed framework, a comparison was undertaken with two established international decision-support models developed by Menassa and Baer (2014) and Steskens et al. (2015). Both frameworks are widely recognized within the retrofit decision-making literature and have contributed significantly to the development of systematic approaches for evaluating building retrofit alternatives. However, both models were developed within high-income contexts characterized by stronger institutional support, advanced technical capabilities, and well-established incentive mechanisms for sustainable construction.

Table 5: Comparison of the proposed framework with existing international models

Feature	Menassa and Baer (2014)	Steskens et al. (2015)	Proposed Framework
Primary Purpose	Retrofit optimisation	Energy-efficient retrofit evaluation	Retrofit versus rebuild decision-making
Focus	Energy performance	Energy and environmental performance	Safety, cost, sustainability and feasibility
Structural Screening	Not explicit	Limited	Mandatory structural assessment
Lifecycle Cost Assessment	Yes	Yes	Yes
Environmental Assessment	Yes	Yes	Yes
Regulatory Considerations	Limited	Limited	Explicitly included
Skilled Labour Considerations	No	No	Reflected through feasibility assessment
Developing Country Context	No	No	Yes
Input Complexity	High	Moderate to High	Low to Moderate
Software Requirements	Advanced simulation tools	Energy modelling tools	Basic project information and professional assessment

The proposed framework differs from existing international models in several important respects. First, it incorporates a mandatory structural feasibility assessment as a preliminary decision gate. This reflects the findings of the present study, where structural safety emerged as the most influential factor affecting retrofit versus rebuild decisions. Second, the framework assigns greater emphasis to affordability and practical feasibility, recognizing the budget constraints, resource limitations, and regulatory challenges commonly encountered within the Sri Lankan construction sector. Third, the framework has been specifically designed to support direct comparison between retrofit and rebuild alternatives rather than focusing exclusively on retrofit optimization.

Unlike the models developed by Menassa and Baer (2014) and Steskens et al. (2015), the proposed framework can be applied using information typically available during the early stages of project planning, including structural assessments, cost estimates, project schedules, and regulatory requirements. This reduces the need for advanced simulation software and specialist analytical tools, making the framework more accessible to engineers, Technical Officers, architects, quantity surveyors, and project managers operating in resource-constrained environments.

The comparison demonstrates that while existing international frameworks provide valuable methodological foundations, they do not fully address the practical constraints encountered in developing countries such as Sri Lanka. By integrating structural feasibility, affordability, regulatory considerations, and locally derived decision criteria, the proposed framework provides a more context-sensitive and practitioner-oriented decision-support tool for retrofit versus rebuild decisions.

5. LIMITATIONS OF THE STUDY

While the study provides valuable insights into retrofit versus rebuild decision-making within the Sri Lankan construction industry, several limitations should be acknowledged. First, the qualitative component was based on interviews with ten Technical Officers. Although thematic saturation was achieved, the relatively small sample size may limit the extent to which the findings fully represent the perspectives and experiences of all construction professionals across Sri Lanka. Future studies could expand the participant pool to include a broader range of stakeholders, such as engineers, architects, quantity surveyors, contractors, and policymakers, from different geographical regions.

Second, the questionnaire survey was primarily distributed through professional networks, resulting in a respondent profile that was concentrated within the Western Province. Consequently, the findings may be influenced by urban bias, potentially underrepresenting the challenges, resource constraints, and decision-making practices prevalent in rural and less-developed regions of the country. Future research should seek a more geographically balanced sample to improve the generalizability of the findings.

Third, the study adopted a cross-sectional research design, capturing industry perceptions and decision-making practices at a single point in time. However, retrofit versus rebuild decisions are influenced by dynamic factors such as construction costs, material prices, labor availability, regulatory changes, technological advancements, and economic conditions. As these factors evolve over time, decision-making priorities may also change. Therefore, longitudinal studies that examine how retrofit and rebuild decisions develop under changing market and policy conditions would provide a more comprehensive understanding of the decision-making process.

Finally, while the proposed framework was developed through the integration of empirical findings and existing literature, it has not yet been validated through application to real-world projects. Future research should focus on testing and refining the framework across different building types and project contexts to evaluate its practical applicability, reliability, and effectiveness as a decision-support tool.

6. CONCLUSIONS AND RECOMMENDATIONS

This study examined the status of retrofit versus rebuild decision-making within the Sri Lankan construction industry and developed a context-specific framework to support more structured decision-making. The findings indicate that structural condition and safety, lifecycle cost, and sustainability are the most influential factors affecting the selection of retrofit or rebuild strategies. While retrofitting is widely recognized for its environmental and economic benefits, concerns relating to hidden defects, limited skilled labor, and weak institutional support continue to constrain its implementation.

The study further revealed that practitioners often rely on professional judgement rather than structured decision-support tools when evaluating retrofit and rebuilding alternatives. To address this gap, an Integrated Multi-Criteria Decision Framework was developed based on literature findings, interview insights, and quantitative prioritization of decision criteria. The framework incorporates structural feasibility, lifecycle cost, environmental impact, project duration, and regulatory compliance to facilitate transparent and evidence-based decision-making.

The findings highlight the need for greater policy support, technical guidance, and capacity building to encourage sustainable retrofit practices within the Sri Lankan construction sector. The proposed framework provides a practical tool for construction professionals and policymakers while contributing to the limited body of knowledge on retrofit versus rebuild decision-making in developing-country contexts. Future research should focus on validating the framework through application to real-world projects and extending its applicability across different building types and geographical regions.

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