APPLICATION OF BAMBOO AS A SUSTAINABLE CONSTRUCTION MATERIAL IN SRI LANKAN CONSTRUCTION INDUSTRY

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Abstract: The construction sector is facing significant challenges related to resource depletion, environmental degradation, and rising costs, highlighting the importance of sustainable building materials. Bamboo has received global recognition as a low-cost and renewable resource; however, its application has often been limited within Sri Lanka. This research study explored the role of bamboo as a sustainable construction material through a mixed-method approach. To incorporate both in-depth and broad insights, empirical data were obtained through a mix of seven expert interviews and a questionnaire survey with 30 practitioners. Interview data were analysed through manual content analysis, and survey responses were analysed using the Weighted Mean Rating (WMR) approach. Based on the findings, the ecological sustainability, cost-effectiveness, and local job creation features were widely adopted by the participants. The barriers identified in this research included a lack of support from the government, competition with conventional materials, and limited technical knowledge. It is evident from this study that there is an area for policy support, industry development, and strengthening capacity to mainstream bamboo in the Sri Lankan building construction industry.

Keywords: *Bamboo; Sustainable Materials; Sri Lanka; Construction Industry*

1. Introduction

The construction industry is widely recognised as one of the cornerstones of the global economy, significantly contributing to infrastructure growth, national development, and wealth creation (Cucos & Turcan, 2025). Despite its significance, it has simultaneously given rise to a pool of issues encompassing excessive resource consumption, high energy use, environmental degradation, and large volumes of waste generation (Manan et al., 2025). Hence, sustainable construction has evolved as a solution that includes a multi-dimensional strategy to moderate the negative environmental effects of construction practices for the full life cycle of the building, from inception and through the operational phases (Dindorf & Wos, 2024). This includes appropriate land use, the creation of environmentally conscious structures, the selection of sustainable building materials, effective resource management, and a substantial reduction in construction waste (Datta et al., 2023).

Sustainable material selection, in particular, is a foundation of this approach, as it has a direct effect on a project's environmental footprint by promoting the use of alternatives that are renewable, low-carbon, and durable (Abera, 2024). Furthermore, this strategic shift toward sustainable construction materials is crucial to addressing the challenges posed by resource depletion and the insufficient incorporation of environmentally sound building practices within the industry (Chen et al., 2024). This trend is notably evident in Asian region as sustainable material selection has surfaced as one of the most emphasized practices in sustainable construction activities (Talpur et al., 2023). India has adopted a dual approach to sustainable materials by combining traditional materials such as bamboo, timber and mud in "Assam-type houses," and modern innovations including compressed stabilized earth blocks, fly ash bricks and hempcrete to increase affordability, durability, and sustainability in low-cost housing (Barbhuiya et al., 2024). Further, Singapore is advancing with a more comprehensive approach with the Sustainable Construction Masterplan that prioritizes five strategic thrusts including government support, legislative frameworks, and research and development focusing on recycled concrete aggregates (Makul et al., 2021). Similarly, other Asian countries, such as Malaysia, Indonesia, Thailand, and Vietnam, are also taking sustainable development seriously by providing rebates to the public and private sectors and promoting green construction materials, especially concrete mixes with recycled aggregates and supplementary cementitious materials (Liong et al., 2024).

Going along with this momentum, Sri Lanka has initiated the implementation of green technologies and the repurposing of several materials within its construction sector, with the intention to promote economic, social, and environmental sustainability (Madushika & Lu, 2025). While research and policy support focus on utilizing industrial by-products like fly ash and quarry dust as substitutes for conventional cement and sand, despite its abundance, usage of natural bio-based materials such as bamboo with respect to construction-related activities is very limited in Sri Lanka (Jayasinghe & Abeynayake, 2024; Suriyanarayanan et al., 2025). Bamboo is gaining worldwide recognition as a sustainable building material, offering an alternative for multiple areas of application (Dey, 2024). As a tropical country, Sri Lanka naturally hosts

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bamboo across all three major climatic zones (Wijewickrama et al., 2020). Even though bamboo is widely utilized as a bio-based construction material in the global context, in Sri Lanka, the usage is limited to lightweight applications such as ornaments (Allalagoda et al., 2022).

Several studies have been carried out with respect to bamboo usage in Sri Lanka with the aim of analysing various material properties such as structural properties, mechanical properties, and durability (Allalagoda et al., 2022; Madhushan et al., 2023). However, very limited research has been conducted in identifying the practical applications of bamboo as a construction material, revealing a clear knowledge gap, particularly in the Sri Lankan construction industry. Therefore, this study aims to evaluate the potential of bamboo as a sustainable construction material in Sri Lanka. This paper comprises an introduction to the research, a literature review, research methodology, research findings, discussion, and concluding remarks.

2. Literature Review

Sustainable construction practices represent an integrated perspective of construction that uses economic, ecological, and social judgments across the life cycle of a building (Firoozi et al., 2025). The selection of sustainable construction materials plays a vital role in reducing the ecological footprint of the built environment, improving durability, and enhancing structural performance (Chaturvedi et al., 2023). In this context, bio-based materials such as bamboo are gaining attention for their ecological advantages and structural reliability (Dey, 2024). Accordingly, this chapter provides an overview of the existing literature focusing on the usage of bamboo as a sustainable construction material and the benefits and barriers of using bamboo as a construction material.

2.1. BAMBOO AS A SUSTAINABLE CONSTRUCTION MATERIAL

Bamboo has emerged as a vital material within the discourse on sustainable construction due to its unique biological and mechanical characteristics (Yadav & Mathur, 2021). As a perennial grass, bamboo can grow to maturity in a few years, and it can be harvested in much shorter cycles than used to timber species (Speciale et al., 2025). Its anatomical properties include high concentrations of vascular bundles and axial fibres producing extraordinary tensile strength that has been considered comparable to steel, along with structural performance testing (Romboux & Trachte, 2025). The combination of fast renewability and mechanical characteristics makes bamboo a tactical material to assist with low-carbon construction practices in different locations around the world (Shiwani & Thangamani, 2023). More recent research has also highlighted its relevance in several different climatic situations and pilot projects in both tropical and temperate environments, exploring standardized use and adaptations with modern architectural design (Abhilash & Prathap, 2024).

2.2 BENEFITS OF USING BAMBOO AS A SUSTAINABLE CONSTRUCTION MATERIAL

Bamboo has significant environmental benefits compared to traditional building materials (Bhalla et al., 2023). Since it is a fast-growing woody grass, bamboo can obtain its full strength in about 3-5 years and grow to a height of 15-30 meters in a very minimal time period, making it a very efficient and sustainable alternative to non-renewable timber (Gholizadeh et al., 2023). The fast growth rate and large quantities of bamboo produced enable it to be an ecological substitute for wood species that are at risk of extinction (Kurniawan et al., 2023). This relieves stress on the global forest reserves and helps reduce deforestation (Hosseini et al., 2025). Additionally, bamboo acts as a carbon sink and traps carbon dioxide contained in the atmosphere during the growing cycle and is therefore effective for reducing carbon emissions in the construction industry (Altieri & Molari, 2024). Furthermore, bamboo requires minimal external inputs, such as fertilizers or pesticides, which contributes to reduced environmental impact from the materials compared to other resource-intensive materials such as steel and concrete (Buachart et al., 2023). In addition to environmental benefits, bamboo presents significant economic benefits, particularly for developing nations, as it is a low-cost, abundant, and high-strength structural material suitable for construction (Chaowana et al., 2021). Moreover, bamboo has a lower self-weight, has greater elasticity and lower cost, making it an even more attractive alternative to steel reinforcement in concrete, tackling the high cost and non-renewability of conventional building materials (Das et al., 2025).

2.3 BARRIERS TO USING BAMBOO AS A SUSTAINABLE CONSTRUCTION MATERIAL

Although the global interest in sustainable construction materials is on the rise, its further general adoption has been met with various barriers to implementation, especially in developing countries (Hailu, 2025). The barriers blocking the further adoption of bamboo construction materials tend to be economic, technical, regulatory, and socio-cultural, affecting the incorporation of sustainable materials into construction projects (Unegbu et al., 2024; Nikyema & Blouin, 2020). A thorough examination of these challenges reveals critical insights into the underlying causes of slow adoption, ranging from insufficient governmental support to prevailing market inefficiencies and a lack of specialized knowledge among construction professionals (Eze et al., 2023; Nikyema & Blouin, 2020). Despite its environmental advantages, bamboo has been unfortunately marginalized and is of little relevance within the construction market (Neha & Aravendan, 2023). The marginalization of bamboo in the construction market can be attributed to a combination of perceived low production rates, competitive pressures from materials of lesser sustainability and price, aesthetic and marketing factors (Neha & Aravendan, 2023). Furthermore, the limited awareness and negative perceptions regarding bamboo's durability and structural integrity contribute to its underutilization, despite evidence supporting its robust mechanical properties (Abera, 2024).

2.4 STRATEGIES TO PROMOTE BAMBOO AS A SUSTAINABLE CONSTRUCTION MATERIAL

The promotion of bamboo in construction requires coordinated activities surrounding three key areas: material recognition, policy support, and technology development. The standardisation of design standards and testing methods is an important aspect for developing confidence among engineers and architects to view bamboo as a mainstream building material rather than an alternative structural material (Speciale et al., 2025). Research into the preservative and treatable characteristics of bamboo, as well as crossbreeding with other materials, helps develop the technical reliability of this material and broaden its range of applications (Mengesha, 2025). At the policy level, promoting the use of low-carbon materials and establishing sustainable certification for bamboo products can help deepen market convergence (Romboux & Trachte, 2025). In conjunction, capacity building in terms of educating all stakeholders and working with builders, designers and communities helps to develop the local knowledge and cultural acceptance to initially build a workforce for a bamboo-based construction system (Unegbu, 2025).

3. Research Methodology

This research employed a mixed-method approach, which uses both quantitative and qualitative methods in a single study to enhance understanding of research problems (Nair & Prem, 2020). This approach leverages the strengths of both methodologies and allows for the exploration of a complex research question that either method alone could perform (Oranga et al., 2025). The research utilised expert interviews and a questionnaire survey to achieve the research objectives. Expert interviews target individuals who possess specialized knowledge acquired as part of their professional roles and can substantially improve research reliability and validity (Sharma, 2023). Accordingly, in this study, the findings from the literature review with respect to benefits and barriers of using bamboo as a sustainable construction material and strategies identified to promote the usage of bamboo as a construction material were validated to the Sri Lankan context through the expert interviews, where interviewees were selected using purposive sampling. Expert profiles are summarized in Table 1 below. Accordingly, 7 interviews were conducted. This sample size is supported by Pheng and Hou (2019), who argued that a minimum of 4 interviews is sufficient to validate qualitative findings. The participants were selected as experts based on two mandatory criteria: having more than five years of industry experience and holding a construction industry-related BSc degree. Then the questionnaire survey was conducted to identify the most prominent benefits, barriers, and strategies to promote the usage of bamboo as a construction material in Sri Lanka. Taherdoost (2022) acknowledged that a questionnaire survey assists the researcher in collecting relevant data on the research topic by providing structured, systematic, and quantifiable insights from participants. The questionnaire was distributed to 30 industry professionals, which represents the minimum sample size typically considered adequate for survey-based research (Bujang et al., 2024). Participants were selected using the snowball sampling method, and the survey achieved a 100% response rate.

Table 1: Expert selection criteria and profiles

Expert Code	Designation	Experience	Construction-related B.Sc.
		Industry Exposure ≥ 5 years	
R1	Deputy General Manager	✓	✓
R2	Senior Architect	✓	✓
R3	Senior Engineer	✓	✓
R4	Chief Engineer	✓	✓
R5	Senior Engineer	✓	✓
R6	Quantity Surveyor	✓	✓
R7	Freelancer - Construction	✓	✓

The collected data from the expert interviews were analyzed using manual content analysis, which improves the data handling workflow through the use of specialized concepts that bridge communication between researchers (Castro et al., 2020). The Weighted Mean Rating (WMR) technique was utilised to analyse the quantitative data from the questionnaire survey. WMR is used to compute an average rating for items or variables by placing unequal weightings on responses, dependent on their importance to other factors (Taherdoost, 2022). Further, the researcher emphasized that, unlike a simple mean, which treats all responses equally, WMR accounts for the varying significance of each category or option.

4. Findings

This section discusses the key empirical findings validated through two stages of data collection, in line with the research objectives.

4.1 BENEFITS OF USING BAMBOO IN THE SRI LANKAN CONSTRUCTION INDUSTRY

Interviewees strongly corroborated its ecological sustainability, with R6 stating its use could "reduce the pressure on forests," which fits squarely into the literature's framework of reducing deforestation. The environmental benefits were a common starting point for promotion. On economic feasibility, experts indicated its "low-cost" and "availability" and

reaffirmed it as practical and low-cost. This locates bamboo in the role of not only a low-impact eco-friendly material, but also a strategic substitute for imported materials of such, as R3, R5, and R7 emphasized, would enhance local resource sovereignty while reducing costs.

Moreover, the experts widened the literature benefits by stressing that a significant socio-economic impact will also be the establishment of local jobs. This was not just theoretical but a resulting practice as R4 expressed that "*in many places in rural areas, fencing was done by bamboo*", suggestively confirming actual demand already exists while also utilizing known local skills. Moreover, its documented qualities for infrastructural uses, will suggest potential jobs for locally based cultivation, processing, and productive fabrication in use as scaffolding, ladders, and mats.

Nonetheless, the experts importantly tempered the validation of its "high strength" quality with important warnings with respect to durability and what it meant for industry readiness. Respondents R1 and R2 rebutted its use as a basic material, given "*our lack of experience in the industry" and that "professionals always tend to follow the conventional materials and systems*". They insisted "*the required properties and other parameters need to be checked before selecting bamboo*" and warned "*insect attacks and termite attacks would cause durability issues"*. Thus, while the inherent benefits were finally validated, the practical use as a main material for structure is fundamentally reliant on overcoming both industry and durability barriers relevant to primary structural material use through localized research, a bypassed solution put forward by all but respondents.

Subsequent to the expert interviews, the benefits were then quantitatively evaluated in order to examine the perceived importance of these benefits from a broader cohort of people through a survey. The survey results had a weighted mean rating and provided a clear ranking for all the benefits. The survey results clearly highlight ecological sustainability as the most important of the three benefits, given that it received the highest weighted mean score. This outcome was driven in large part by the number of people who rated ecological sustainability as "Extremely Important," indicating that bamboo's environmental credentials as a means to reduce deforestation and decrease carbon emissions are its most compelling and universally appealing attributes. Following closely was cost-effectiveness, which also received a very high score and confirmed the expert's view of bamboo serving as a free or nearly free and abundant substitute to imported products. The benefit of creating a local job market received a positive score, but was in comparison to the other benefits received a lower rank in the weighted mean score. This suggests that while the socio-economic value of job creation is valued as an important secondary benefit, it is not an important motivational factor to adopt when the environmental and economic imperatives are compared. Therefore, the survey both confirmed and accurately ranked the interview findings, which indicate that strategic marketing of bamboo should identify ecological sustainability as its primary strength, with cost-savings as a close second.

4.2 BARRIERS TO USE BAMBOO IN THE SRI LANKAN CONSTRUCTION INDUSTRY

Through the expert interviews, the barriers to mainstream bamboo utilization in the Sri Lankan building industry were examined, and there was a lot of consensus that substantiated a number of key barriers indicated in the literature and provided important contextual information. However, the most frequently noted barrier, consistent with the knowledge gap, was the lack of technical knowledge and experience of stakeholders in the industry. As R1 and R2 emphasized, this is a key roadblock, even indicating that "*There is a lack of experience in the industry for using bamboo*" and "*Professionals always tend to follow the conventional materials and systems.*" In addition to the technical knowledge gap was the issue of efficiency in the market regarding accessibility. While the bamboo is plentiful, the lack of a standardized supply chain for treated and graded bamboo is a fundamental problem.

The issue of negative perceptions of durability, intimately linked to the previous issue, is still very relevant and is harming market confidence substantially. R4 specifically stated that "*Insect attacks and termite attacks would cause durability issues,"* depicting a perspective that persists as a major inhibitor to influence purchasing and competition against traditional materials. Respondents stated that unless they have performance data and standards, with or without research, their clients and developers will opt for steel and concrete which they already accepted as safer with better durability for permanence. Experts also uniformly identified another key enabler that is missing, and that is the lack of government support. This aspect of concern was cited as not just a barrier, but the missing enabler needed to overcome barriers. The experts argued that as a part of the ecosystem, government and responding support were critical. Many participants specified that although, "*new researches shall be established in Sri Lanka*", to test properties and establish standards, this call for action implies that overcoming the technical and knowledge gaps relates to regulatory and financial support from governmental sources in support of research funding, code development and incentivizing use to show that lack of government support is a key barrier limiting the growth of the industry.

The qualitative findings from the expert interviews were then quantitatively verified through a survey, which identified a weighted mean to rank the perceived importance of the barriers, which were validated. The survey results show a clear hierarchy of barriers, with the lack of government support emphasized by expert respondents that the lack of policies and research funding, and defined standards is viewed, qualitatively, as the most significant barrier. Next, the survey rated market competition with traditional products as the second most significant barrier at 33%. This affirms the market

situation that bamboo must address and is to a certain degree related to the expert responses on cost viewed against conventional products that will necessarily be sourced at the lowest cost possible, imports like steel and concrete. The experts were vocal about the knowledge gap for professionals, but the survey rated this as a lesser, though also important barrier at 18% suggesting there is awareness around the skills gap, but the professionals may see it as a solvable issue if there was a bigger barrier around a Public Policy initiative.

4.3 STRATEGIES FOR PROMOTING BAMBOO USAGE IN SRI LANKAN CONSTRUCTION INDUSTRY

The expert interviews provided clarity around a strategic framework for bamboo promotion in the Sri Lankan construction sector, and importantly, elucidated and improved the strategies presented in the literature. The most important and reiterated recommendation was material recognition via standardization. This recommendation was the cornerstone of a way to begin to overcome technical barriers and move toward professional acceptance of bamboo. As R3 and R6 highlighted, the current lack of acceptance is due to uncertainty: "*The required properties and other parameters need to be checked before selecting bamboo as a basic material*," which validates the necessity for standard design standards and testing methods as the required first steps to wider use. In terms of standardisation, all experts agreed that there needs to be a concerted effort to conduct research, specifically emphasising that localised solutions are needed for durability concerns. R1, with his concerns that "*Insect attacks and termite attacks would cause durability issues*", was not seen as a final rejection, but as an issue to solve that would ultimately contribute to the overall strategy of research into preservation and treatment methods. It is also a research obligation for governments; therefore, there was very strongly validated the strategy to bring in related policies on bamboo use. The experts, particularly R2, R4, and R7, arrived at a common decision that "d*ue to the rate of technological advancements, new research shall be developed within Sri Lanka which can assess the possibility of using bamboo as a primary building material,*" linking government-supported research with potential policy development.

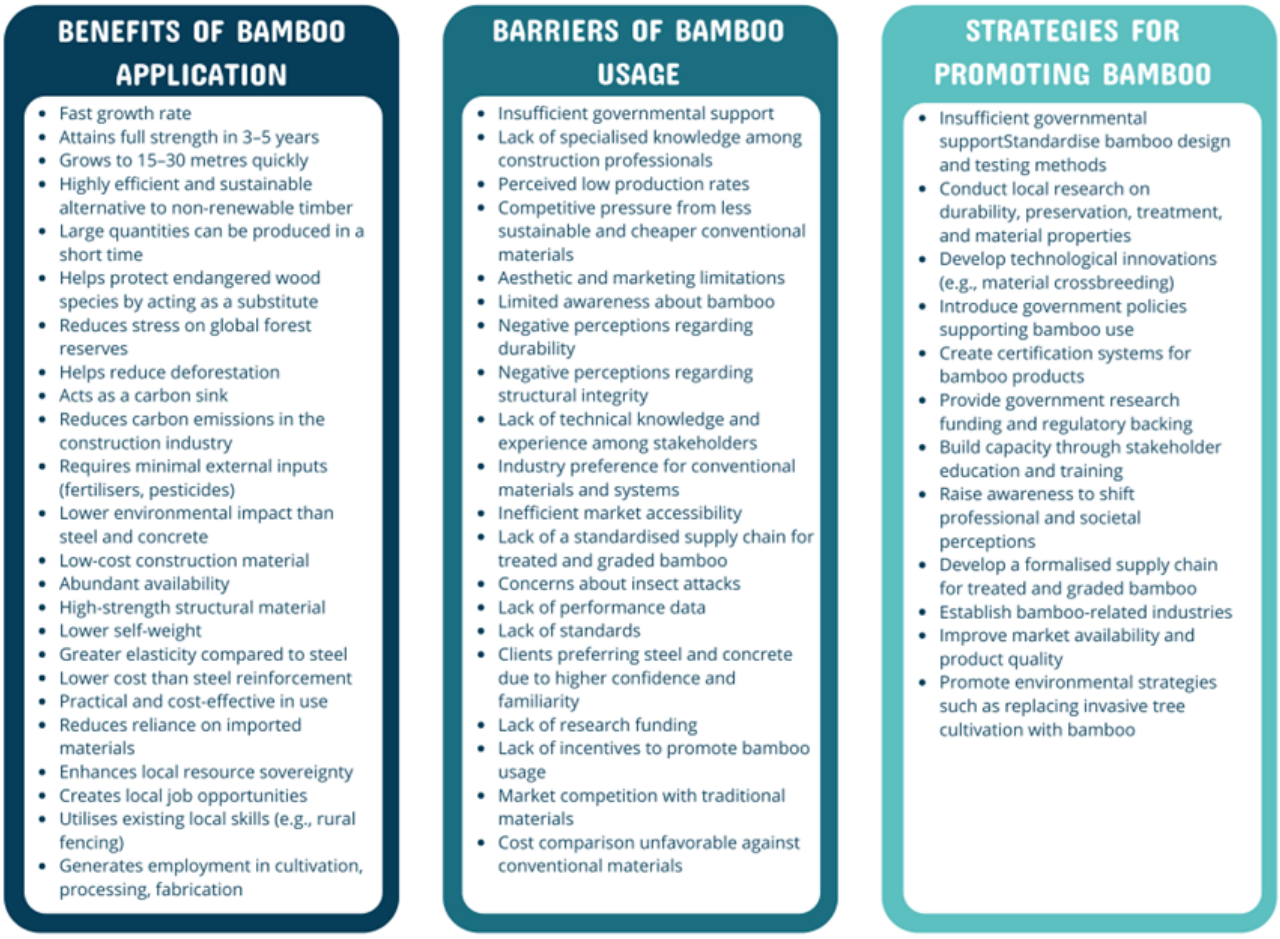

Figure1: Research Findings

In addition to technical and policy recommendations, the experts stressed the importance of awareness and capacity building to harness the potential of bamboo. The strategy to educate the industry on the usage of bamboo was deemed essential to shift mindsets, particularly to address the gap in knowledge mentioned, in which R1 and R2 noted that "*professionals always tend to follow conventional materials and systems.*" Education is the strategy for overcoming this inertia. Further, the experts indicated a proactive environmental strategy to replace the invasive tree cultivation with bamboo to promote environmental objectives, but also to enhance market availability through supply chain development, and to seek to develop bamboo-related industries. This easy, holistic view of the cultivation to application, to deployment of bamboo

highlights the necessary conditions to build a human resources capacity, cultivate local knowledge, and foster a self-sufficient ecosystem of bamboo construction in Sri Lanka.

The results of the survey, evaluated using a weighted mean rating, provided clear rankings of the strategies endorsed by experts for the dissemination of bamboo in Sri Lanka. The results indicate that an introduction of policies is by far deemed the most critical strategy, garnering a substantive 46% of the total weighted mean rating. These results strongly suggest that there is an apparent belief that governmental action, in the form of policies regulating the use of bamboo for the green buildings concept, is the necessary leverage point to successfully push forward, and encourage, each of the subsequent actions. The creation of bamboo-related industries was the second most important strategy at 30%, which corresponds to the strong opinion that developing a formalized and industrialized supply chain for bamboo is the first and necessary action in ensuring that the market provides an available supply of bamboo, improved quality, and its economic value. It is possible to provide society with education and training about utilising bamboo next at 17%, which is indicative of the view that education and changing the perception of society in regard to the use of bamboo is the obvious supplementary action, although any perception change or awareness raising need to be built on the former bamboo industry and policies introduced; which provide the foundation for its entry into society. The proposal of new cultivation of bamboo as a substitute for invading trees appeared to be the lowest priority at 7%, which was perceived to have ecological benefits but was genuinely viewed as an inferior proposal with little economic or social relevance. This suggests that while it is seen as a desirable goal in the long-term, it is considered a secondary consideration to the immediate need for policy intervention and industrial intervention to stimulate the market.

5. Discussion

The environmental benefits of bamboo highlighted in the literature (Barbeau et al., 2022; Bhalla et al., 2023; Gholizadeh et al., 2023) were vigorously confirmed by experts. The empirical evidence suggests that bamboo serves as an alternative to mitigate pressure on forest ecosystems and confirms that bamboo is a sustainable alternative to traditional materials. Consistent with existing studies, all experts noted that bamboo can contribute to cost savings (Chaowana et al., 2021) and can substitute for imported materials further leading to reduced costs; however, they pointed out a crucial barrier: the lack of technical knowledge and consistency. As noted by interviewees, professionals can be hesitant to use bamboo because they are more familiar with conventional material and feel more secure. This noted familiarity gap used in tandem with the impressions of the stakeholders, demonstrates the unavoidable gulf between theoretical utility versus practical use. The literature clearly noted socio-economic benefits to bamboo use, such as job creation, but the survey results show that ecological and economic benefits are the most important criteria to stakeholders' decisions. The job creation potential was clearly seen the as the secondary benefit, where eco-sustainable and cost saving type aspects would need to be the driver to shift adoption of bamboo.

Research suggests that the barriers identified in literature to adopting bamboo as an alternative construction material are economic, technical, regulatory, and socio-cultural (Nikyema & Blouin, 2020; Unegbu et al., 2024), which align closely with findings from Sri Lankan experts. The interviews illuminated the lack of education and resistance of the industry, with experts highlighting how established professionals prefer to use conventional materials. Furthermore, negative perceptions of durability, including concerns about insect attacks, contribute to the lack of acceptance of bamboo as a construction material and relate to the negative perceptions found in a recent systematic review of studies conducted globally to address challenges and opportunities for bamboo collectively (Abera, 2024). Importantly, experts also stressed that insufficient support from the government was the most salient barrier and that a lack of action from policymakers inhibits action. This relates to previously reported literature of the lack of institutional support (Nikyema & Blouin, 2020) as a significant barrier for the adoption of bamboo. Findings from the surveys reflected the insights from the experts, where lack of support from the government marked the highest proportion, and market competition from conventional materials was second. Experts viewed the knowledge gap as a lesser barrier, which represents a secondary issue that can be addressed through strengthening policy frameworks that support the advancement of bamboo as an alternative material. Therefore, addressing regulations and market barriers is essential to overcoming the technical and perception barriers. Despite these barriers, there is a high potential to use bamboo as a construction material in Sri Lanka, specifically for both structural and non-structural applications such as fencing, scaffolding, and ladders, which are already evidenced in current practice.

Expert interviews and survey results confirm and prioritize strategies identified in the literature to promote bamboo products in construction. All experts emphasized standardization and local research as important first steps to overcome technical barriers and facilitate professional acceptance and highlighted the cases of polys and material professions in their domains. This finding directly supports literature calls for verified design standards and testing methods (Speciale et al., 2025). In addition, experts made explicit links between the need for government-supported research on durability and treatment and policy reform, reaffirming the literature perception of policy as a major arbiter (Mengesha, 2025).

On the survey, respondents ranked introducing policies and developing bamboo industries as the highest priorities, which shows that structural support and market development are perceived as necessary components. Education was ranked lower than context-oriented initiatives but was still considered the next priority, which is consistent with the literature indicating other stakeholders' capacity building (Unegbu, 2025). Finally, cultivating invasive species was assigned

the lowest priority, with respondents indicating that ecological strategies are a value but remain a concern in priority to immediate policy and industry initiatives. This result acknowledges that even if literature recommends full-spectrum initiatives, the prospect for successful uptake depends upon a focused way of engaging with actions in sequential order, starting with policy and industrial efforts.

6. Conclusion

This research provides evidence that bamboo has significant promise as a sustainable, affordable, and socially responsible building material in Sri Lanka. The research confirms its potential environmental benefits and advantages in decreasing reliance on imported materials, while generating local economic opportunities. The research identifies that the most fundamental barriers to its adoption are the absence of enabling government policy, competition with traditional materials, and the lack of technical knowledge requires a structured, phased effort to address the barriers identified. Notwithstanding these challenges, bamboo demonstrates substantial potential within the Sri Lankan construction sector, offering suitability for a wide range of structural and non-structural uses. Accordingly, leveraging the potential of bamboo will require a phased implementation strategy. The first step should include establishing policies by government entities that not only provide the mechanism for standardizing bamboo into codes and standards, but also funding for local research into the durability, preservation, and treatment of bamboo, as well as the economy into green building codes. After the policy aspect is in place and technical capacity is developed, the education policies will have to reinforce and create technical capacity in architects, engineers, and builders to change people's perceptions of using bamboo in building construction. If Sri Lanka is truly intending to mainstream bamboo construction as an alternative method of construction, this sequential system should engage institutional support before engaging an industry that is larger than the current buildings in Sri Lanka, ensuring the government leads the private sector, and facilitating a sustainable, resilient, and economically viable sector. Consequently, the emphasis of this study on the Sri Lankan context was a primary limitation of the research, as its findings were confined to the Sri Lankan context, limiting its broader application to different geographic or regulatory environments.

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