

**Preliminary Study on the Market Potential of Engineered Wood
Products (EWPs) in Bhutan's Construction Sector**



Large Industry Promotion Division

Department of Industry

Ministry of Industry, Commerce and Employment

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Executive Summary

The construction sector in Bhutan is at a strategic inflection point, with modern Engineered Wood Products (EWPs) emerging as a high-potential alternative to traditional concrete and steel. This study evaluates the market feasibility of EWPs, such as glue-laminated timber (glulam), cross-laminated timber (CLT), and structural panels, within the country's construction context. While Bhutan has historically relied on sawn timber, EWPs offer enhanced structural integrity, precise dimensions, and superior resistance to warping and pests. As the country aligns its infrastructure goals with environmental sustainability, these products present a strategic opportunity to utilise Bhutan's extensive forest cover while reducing the carbon footprint associated with imported heavy construction materials.

Market dynamics indicate a significant window of opportunity driven by robust sector growth and high-level policy support. In 2024 alone, the construction industry contributed over 11% to the national GDP, and the 13th Five-Year Plan has earmarked Nu. 12.5 billion for public infrastructure. Furthermore, flagship economic initiatives, notably the Gelephu Mindfulness City (GMC), create a natural demand for sustainable, wood-based structural systems. Despite this potential, the domestic industry remains in its infancy; survey data reveal that while 79.6% of contractors see a viable market for EWPs, only a small fraction have practical experience with structural applications, with most current usage limited to non-structural elements like doors and flooring.

The transition to an EWP-centric construction model faces several critical bottlenecks that must be addressed. High initial costs and a lack of domestic production capacity have led to a heavy reliance on imports, which reached BTN 767.8 million in recent years. Additionally, the absence of specific building code approvals for EWPs and a shortage of technical expertise among the workforce create a "confidence gap" that deters large-scale adoption. Many wood-based industries in Bhutan still focus on traditional sawmilling and furniture, lacking the specialised machinery and technical "know-how" required to manufacture high-value structural components like CLT or Glulam.

To overcome these barriers, the study proposes coordinated, phased strategic recommendations. This begins with market creation through public sector mandates, where government-funded projects are mandated and encouraged to use EWPs, and extends to providing financial incentives for local industries to upgrade their technology. Simultaneously, the relevant ministries must fast-track the integration of EWP specifications into national building codes. By adopting a phased approach, starting with mass-market items like doors and windows before scaling up to full structural systems, Bhutan can build a resilient, sustainable, and self-reliant construction ecosystem that leverages its natural wealth for long-term economic diversification.

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CHAPTER 1: Introduction

1.1. Background

Wood is one of the essential construction materials, along with concrete and steel. While timber is used extensively in the framing, decking, and finishing of buildings, modern engineered wood enables the construction of larger, stronger, and more sustainable structures. Engineered wood products (EWPs) differ from standard sawn timber as they are manufactured by binding wood strands, particles, fibres, boards or veneers together under controlled conditions, resulting in composite materials with enhanced strength, uniformity, precise dimensions and resistance to warping, moisture, and pests compared to natural solid wood¹.

EWPs are mainly made of glue-laminated timber (glulam/GLT), cross-laminated timber (CLT), laminated veneer lumber (LVL/LSL), wood I-beams, structural plywood, fibreboard, and particleboard (*detailed in the table below*). Apart from their traditional usage in furniture and flooring, EWPs can also substitute for sawn timber in their intended structural applications. Its use can range from flooring to structural beams and panels, and it is considered an environmentally friendly building resource compared to steel and cement.

The advantages of using engineered wood products in building are their strengthened mechanical properties, such as higher dimensional stability, improved strength-to-weight ratio, and greater resistance to warping, shrinking or cracking². Furthermore, engineered wood products utilise waste timber, strands and fibres that are reconstituted into usable structural components. Another strength is that they can be manufactured into desirable lengths and widths, which are more versatile than conventional sawn timber. It is also a cost-effective option with a smaller carbon footprint.

Furthermore, wood stands out as a more sustainable alternative to traditional materials like concrete and masonry. Mass Engineered Timber (MET) products function as effective carbon sinks; by sequestering atmospheric carbon dioxide (CO₂) during growth and locking it within the building's structure, they offer a significantly lower, often negative, embodied carbon footprint. Beyond its climate benefits, MET serves as a natural thermal regulator. Due to its low thermal conductivity and high cellular density, seasoned and treated timber provides superior insulation, helping to maintain stable indoor temperatures and reduce energy consumption in both heating and cooling cycles. However, while wood is sustainable, it only works if the forestry is sustainably managed.

Therefore, EWPs are a sustainable alternative to the existing construction materials, whose potential should be explored.

The types of engineered wood products for structural applications in construction are³:

¹ Engineered Wood Meaning, Types, Quality, Price, and Everyday Uses. Interior Company”






² What is Engineered Lumber? Should You Use It in Your Remodel?



³ Engineered Wood Products as a Sustainable Construction Material: A Review: Types of Engineered Wood and Their Uses. Current Applications of Engineered Wood:

Types of engineered wood products and their applications

1	<p>Glue-laminated timber (glulam)</p> <ul style="list-style-type: none">- Made by gluing layers of solid timber together with grains aligned in the same direction.- It overcomes the size and defect limitations of natural wood and is used for beams, columns, and curved structural elements.	
2	<p>Cross-laminated timber (CLT)</p> <ul style="list-style-type: none">- Large panels made by stacking timber layers perpendicular to each other.- This cross-layering gives high strength and stability, making CLT suitable for walls, floors, and multi-storey buildings.	
3	<p>Laminated veneer lumber (LVL)</p> <ul style="list-style-type: none">- Produced from thin wood veneers glued together in the same direction.- It is strong, uniform, and commonly used for beams, headers, and load-bearing applications.	
4	<p>Laminated strand lumber (LSL)</p> <ul style="list-style-type: none">- Made from long wood strands bonded together.- It uses smaller or lower-quality trees and is used for structural components like studs, joists, and headers.	
5	<p>Parallel strand lumber (PSL)</p> <ul style="list-style-type: none">- Composed of long wood strands aligned parallel and glued together.- It is very strong and used for heavy structural elements like beams, columns, and posts.	

Types of engineered wood products and their applications

6	<p>Structural plywood</p> <ul style="list-style-type: none">- Made from thin veneer layers glued in alternating grain directions.- It provides strength and stability and is widely used for flooring, roofing, wall sheathing, and formwork.	
7	<p>Oriented strand board (OSB)</p> <ul style="list-style-type: none">- Formed by compressing wood strands with adhesives in specific orientations.- It is cost-effective and commonly used for wall, floor, and roof sheathing.	
8	<p>Wood I-beam</p> <ul style="list-style-type: none">- Engineered beam with a solid top and bottom (flanges) and a thin middle section (web).- It is lightweight, strong, and used in floors, roofs, and wall framing.	
9	<p>I-Joists</p> <ul style="list-style-type: none">- An I-shaped beam with lumber flanges and a web, strong, lightweight, and resistant to warping, is used for floors and roofs.- It is widely used in floor systems, roof framing, and wall studs.	
10	<p>Medium-Density Fiberboard (MDF)</p> <ul style="list-style-type: none">- Wood fibres and resin create a smooth, uniform panel for cabinets, furniture, and moulding.- Commonly used for cabinets, furniture, interior panelling, shelving, and decorative mouldings.	

<i>Types of engineered wood products and their applications</i>		
11	<p>Engineered Hardwood Flooring</p> <ul style="list-style-type: none"> - A real hardwood veneer over a plywood or fiberboard core, offering stability. - Primarily used for interior flooring applications. 	
12	<p>Particleboard (Chipboard)</p> <ul style="list-style-type: none"> - Wood particles/chips mixed with resin; often used in budget furniture and as a core material. 	

1.2. Introduction

There is an increasing policy shift towards promoting the engineered wood industry in Bhutan. The *21st Century Economic Roadmap* identifies the engineered wood industry as one of the focus areas in forest-based manufacturing. The products are aimed at harnessing the demand for sustainable construction materials in the country's domestic projects, notably the Gelephu Mindfulness City (GMC) development. Similarly, the *Industrial Development Roadmap 2025* emphasises the promotion of value-added wood products, especially engineered wood, as one of the key interventions to enhance the wood-based industry.

The country's abundant forest resource, which currently stands at 69.71% (equal to 2.68 million hectares) of the total surface area, provides a strong foundation for the sustainable development and expansion of a domestic engineered wood-based industry. Studies estimate that up to 12.05 million cubic feet of timber can be sustainably harvested annually. However, in 2024, Bhutan only harvested 3.5 million cubic feet of timber, indicating a significant gap between the available resource and its utilisation. However, the Natural Resource Development Corporation Limited (NRDCL) has plans to increase timber extraction to over 5 million cubic feet annually as the company has invested Nu. 900 million in modern extraction machinery in 2024⁴.

Bhutan also has a rich wood industry base, as the *Industry Census Report 2024* found that forest-based industries constitute 46.0% of the total number of production and manufacturing industries in the country. As of 2024, there were 624 operational wood-based industries in the country, with major sectors being furniture units (57.21%), sawmills (13.62%), woodcraft (11.38%) and logging (10.10%)⁵. However, industries specialising in engineered wood products, such as integrated wood-based industry, joinery, prefabricated wood products,

⁴ NRDCL Annual Report 2024

⁵ Industry Transformation Map for Wood Based Industries 2025, Department of Industry, MoICE

structural wood production, particle board and plywood production, together constituted less than 7.69% of the total operational wood-based industries. A vast majority of the wood-based industries are cottage and small-scale, constituting more than 96% of the total industries, with medium and large-scale wood industries accounting for only 2.1% and 1.6%, respectively. Likewise, the industry is characterised by low technology adoption, high waste rate and relatively low value addition to products.

In summary, while Bhutan has an abundance of forest resources with favourable policies for the promotion of high-value-added wood-based industries and the adoption of engineered wood products, the industry base is characterised by small conventional sawmills and furniture units with minimal advancement.

1.3. Rationale for the Study

The rationale for conducting this study is as follows:

- a) **Current Material Dependence:** Bhutan's construction sector remains heavily reliant on traditional materials like concrete and steel, which often have high carbon footprints and are largely imported.
- b) **Resource Underutilization:** Despite Bhutan's abundant forest resources, high-quality timber is often underutilised or exported as low-value-added raw material rather than being processed into high-value structural components like EWPs.
- c) **Eco-Friendly and Sustainable:** EWPs not only have a lower carbon footprint than concrete and cement but are also sustainable.
- d) **Policy Interest:** Policy recommendations to promote EWPs are mentioned in the *21st Century Economic Roadmap* and *Industrial Development Roadmap 2025*.
- e) **Knowledge Gap:** There is a lack of localised data and studies on the economic viability and feasibility of adopting EWPs in Bhutan's construction sector.
- f) **Cost Optimisation:** While initial production costs may be high, establishing a domestic EWP market creates economies of scale.
- g) **Import Substitution:** Increased domestic production of EWPs could also reduce dependence on imported construction materials and labour, thereby contributing to lower foreign currency outflows.
- h) **Preservation and Modernisation of Traditional Architecture:** Wood has historically been an integral component of Bhutanese architecture. Adopting EWPs provides a modern and sustainable means of preserving traditional architectural elements while meeting contemporary construction requirements.

1.4. Objectives of the Study

The primary aim of this report is to assess the potential for integrating engineered wood products into Bhutan's construction industry. The specific objectives are:

- a) Market Assessment:** To evaluate the current demand and future market potential for various EWPs within the domestic construction sector.
- b) Identify Constraints:** To identify the technical, regulatory, and supply-chain barriers that currently hinder the adoption of EWPs in Bhutan.
- c) Policy Recommendations:** To propose a strategic framework for industrial support and regulatory development to foster a domestic EWP market.

CHAPTER 2: Methodology

2.1. Study Design

This study employs a mixed-methods approach, combining quantitative market data with qualitative stakeholder insights. This ensures a comprehensive understanding of both the economic numbers and the underlying social and regulatory sentiment.

2.2. Secondary Data Collection

- a) **Statistics:** Analysis of trading data and the construction industry's economic contribution to determine current material consumption patterns.
- b) **Desk Research:** Review of existing policy documents and annual reports.

2.3. Primary Data Collection

- **Stakeholder Surveys:** Distribution of structured questionnaires to the contractors and wood-based industries in Bhutan to gauge their awareness and readiness for EWPs.

2.4. Data Analysis Framework

- a) **Quantitative Analysis:** Analysis of numerical data of engineered wood product import and export to identify trend patterns.
- b) **Qualitative Analysis:** Analysis and interpretation of the findings from the non-numerical survey information compiled from the contractors and wood-based industries.
- c) **SWOT Analysis:** Following the findings from the above analyses, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis will be conducted to evaluate the feasibility of promoting and establishing domestic EWP manufacturers in Bhutan.

2.5. Scope and Limitations

- a) **Scope:** The study focuses primarily on structural EWPs and their application in urban and semi-urban construction centres in Bhutan.
- b) **Limitations:** Limitations include the potential lack of historical domestic price data for advanced wood products and the reliance on respondent perceptions for market demand forecasts.

CHAPTER 3: Review and Assessment of Market Opportunity

3.1. Construction Sector Growth

The construction sector in Bhutan has demonstrated a strong recovery and expansion trajectory over the years, reinforcing its role as a key driver of economic growth. In 2024, the sector recorded a growth rate of 8.25%, a significant turnaround from a contraction of 7.19 percent in 2023, and contributed 0.82 percentage points to GDP growth, compared to a negative contribution in the previous year. The sector accounted for 11.28% of GDP, reflecting a substantial increase from 7.68% in 2023, and its gross value added rose markedly from Nu. 19,109.31 million to Nu. 31,587.71 million. The structure of the sector is dominated by private and public corporations (64.64% of GVA), followed by government construction (21.34%) and hydropower projects (14.02%), indicating broad-based construction activity across both public and private domains⁶. Moreover, the construction sector employed 5.7% of the total workforce in 2025, which is the fifth-highest economic activity contributing to the total employment⁷.

This strong growth trajectory, coupled with increasing contributions from both government-led and private construction, highlights a rapidly expanding demand for construction materials in Bhutan. As the sector continues to scale, there is a growing need for efficient, durable, and sustainable building materials to support large-scale and standardised construction. In this context, engineered wood products (EWP) present a viable alternative to conventional materials, offering advantages such as prefabrication, improved structural performance, and resource efficiency. When aligned with the rising construction demand and government investment, the expanding construction sector provides a favourable market environment for the adoption and growth of engineered wood products in Bhutan.

3.2. Public Sector Investment in Construction

The indicative budget outlay of Nu. 12.5 billion allocated for the construction of office buildings, hospitals, institutes, and residential quarters under Bhutan's 13th Five-Year Plan (FYP) highlights the significant scale of upcoming public sector construction activities⁸. This level of investment reflects a substantial and sustained demand for construction materials, presenting a strong opportunity for the integration of EWPs into mainstream building practices.

Given that government projects constitute a major share of construction demand in Bhutan, such planned expenditure can act as a catalyst for market creation, providing the volume and consistency required for EWP adoption. Furthermore, the nature of these projects, which are often standardised and large-scale, aligns well with the advantages of engineered wood, such as prefabrication, efficiency, and structural performance. When considered alongside the survey findings (detailed below), which indicate both a high willingness among contractors to adopt EWP and a strong interest among the wood industries to produce them, the 13th FYP

⁶ National Accounts Statistics 2025, National Statistics Bureau

⁷ Labour Force Survey Report 2025, National Statistics Bureau

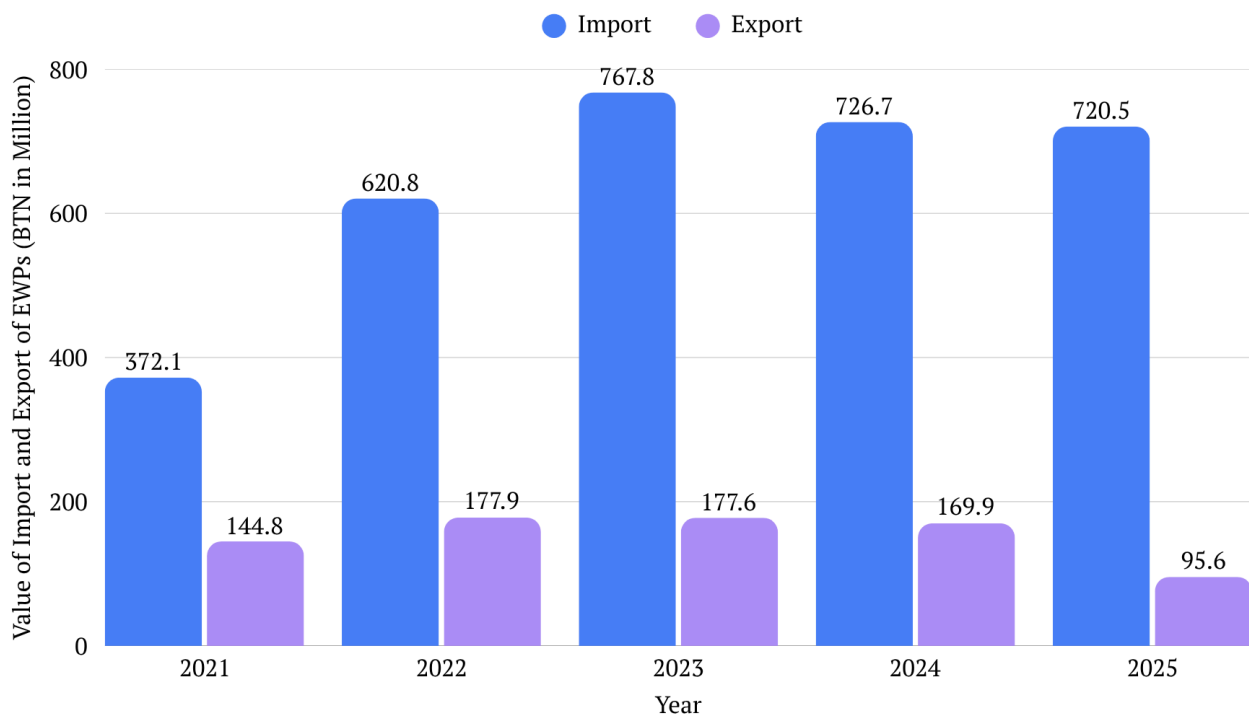
⁸ 13th Five Year Plan Projects and Activities 2024-2029, Royal Government of Bhutan

investment reinforces the practical feasibility and market potential for developing an engineered wood sector in Bhutan.

3.3. Import Vs Export of Engineered Wood Products

The trading data of EWPs over the past five years (2021-2025) indicate a consistently higher level of imports compared to exports, showing a persistent trade deficit throughout the period. The following figure illustrates the trend in the import and export values of EWPs, measured in BTN million.

Figure 3.a: Value of Import and export of EWPs from 2021-2025⁹



Imports demonstrate a generally increasing trend, rising significantly from BTN 372.1 million in 2021 to a peak of BTN 767.8 million in 2023. Although imports slightly declined thereafter to BTN 726.7 million in 2024 and further to BTN 720.5 million in 2025, they remained substantially higher than initial levels, reflecting sustained domestic demand for EWP-related products.

In contrast, exports remained relatively low and stagnant over the same period. Export values increased modestly from BTN 144.8 million in 2021 to around BTN 177.9 million in 2022 but plateaued thereafter, with only minor fluctuations before declining sharply to BTN 95.6 million in 2025. This downward trend in the most recent year suggests weakening export performance or limited competitiveness in external markets.

The widening gap between imports and exports over time highlights Bhutan's continued reliance on imported EWPs and the underdevelopment of its domestic production capacity.

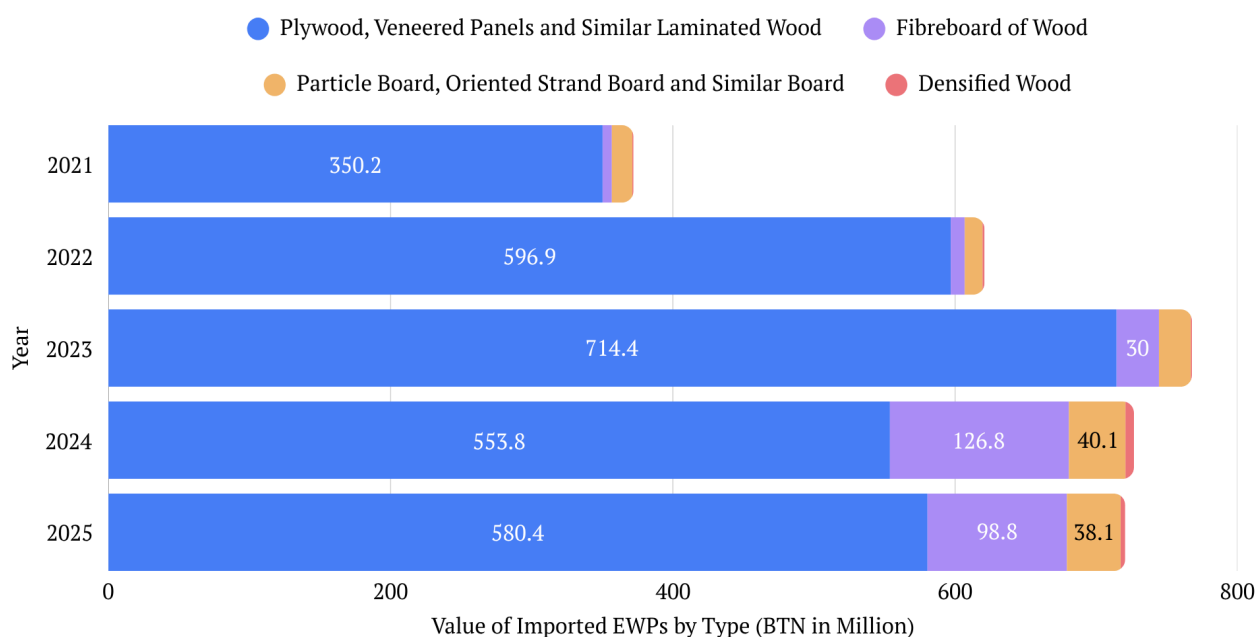
⁹ Bhutan Trade Statistics 2021-2025, Ministry of Finance

This trend showcases the opportunity to strengthen local manufacturing capabilities, reduce import dependency, and enhance export potential as part of developing a competitive engineered wood industry.

3.3.1. Import Composition of EWPs

The composition of Bhutan’s imports of EWPs by product type over the period of 2021 to 2025 indicates that imports are heavily concentrated in a few key product categories (namely plywood, veneer panels and similar laminated boards), with notable shifts in composition over time.

Figure 3.b: Import composition of EWPs by product type



Plywood, veneered panels, and similar laminated wood consistently account for the largest share of imports throughout the period. Import values for this category increased sharply from BTN 350.2 million in 2021 to a peak of BTN 714.4 million in 2023, before declining to BTN 553.8 million in 2024 and slightly increasing again to BTN 580.4 million in 2025. Despite the recent moderation, this category remains the dominant contributor to total EWP imports, highlighting strong and sustained demand for these products in Bhutan’s construction sector.

In contrast, the fibreboard of wood shows a significant and rapid increase, particularly in the later years. Imports rose modestly from BTN 6.5 million in 2021 to BTN 30.0 million in 2023, followed by a sharp surge to BTN 126.8 million in 2024, before slightly declining to BTN 98.8 million in 2025. This trend suggests a growing demand for fibreboard products, possibly driven by their increasing use in interior applications, furniture, and panelling.

Imports of particleboard, oriented strand board (OSB), and similar boards have shown a steady upward trend over the period. Starting at BTN 14.6 million in 2021, imports increased consistently to reach BTN 40.1 million in 2024, before a slight decline to BTN 38.1 million in

2025. This indicates gradual but stable growth in demand for these products within the construction and wood-processing sectors.

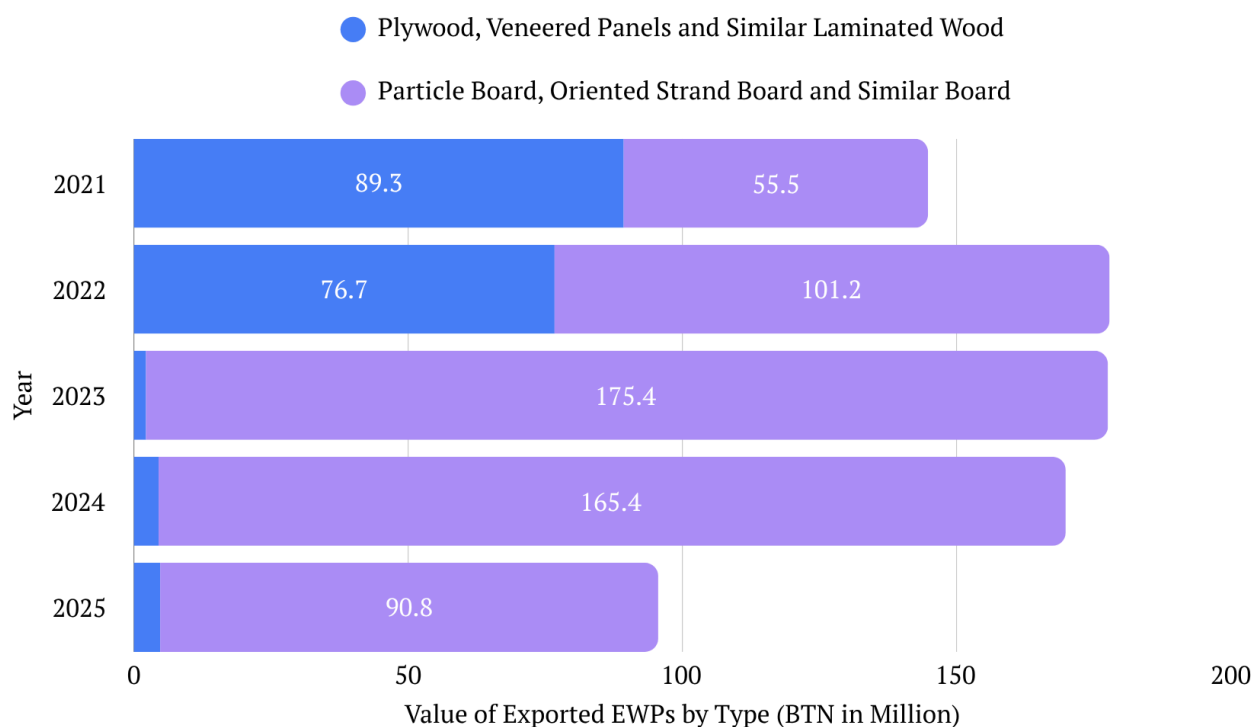
Densified wood represents the smallest share of imports across all years, with relatively low and fluctuating values. Imports increased marginally from BTN 0.8 million in 2021 to BTN 6.0 million in 2024, before declining to BTN 3.2 million in 2025. The limited scale of imports suggests that this product category remains niche or underutilised in Bhutan.

Overall, the import composition reflects a strong dependence on plywood and laminated wood products, alongside emerging growth in fibreboard and particleboard segments. These trends indicate both the current structure of demand and potential areas for domestic production expansion, particularly in high-growth segments such as fibreboard and panel-based products.

3.3.2. Export Composition of EWPs

The export composition of Bhutan’s EWPs has shifted markedly in the types of products being exported from 2021 to 2025, as illustrated in the following figure.

Figure 3.c: Export composition of EWPs by type



Plywood, veneered panels, and similar laminated wood initially accounted for the majority of exports in 2021, with BTN 89.3 million. However, this category experienced a sharp decline over the period, dropping to just BTN 4.8 million by 2025.

Particleboard, oriented strand board, and similar boards, in contrast, displayed strong growth over the same period. Exports increased from BTN 55.5 million in 2021 to a peak of BTN 175.4 million in 2023, before slightly declining to BTN 90.8 million in 2025.

This trend indicates a major shift in Bhutan's EWP export profile from traditional plywood and laminated products toward particleboard and oriented strand board. The decline in plywood exports after 2021 may reflect changes in domestic production capacity, global market demand, or strategic focus on particleboard, which became the dominant export by volume from 2022 onward.

In summary, the data suggest that Bhutan's EWP export sector is increasingly specialising in particleboard products, which now form the bulk of exports, while plywood exports have become a minor component.

CHAPTER 4: Findings of the Contractor's Survey

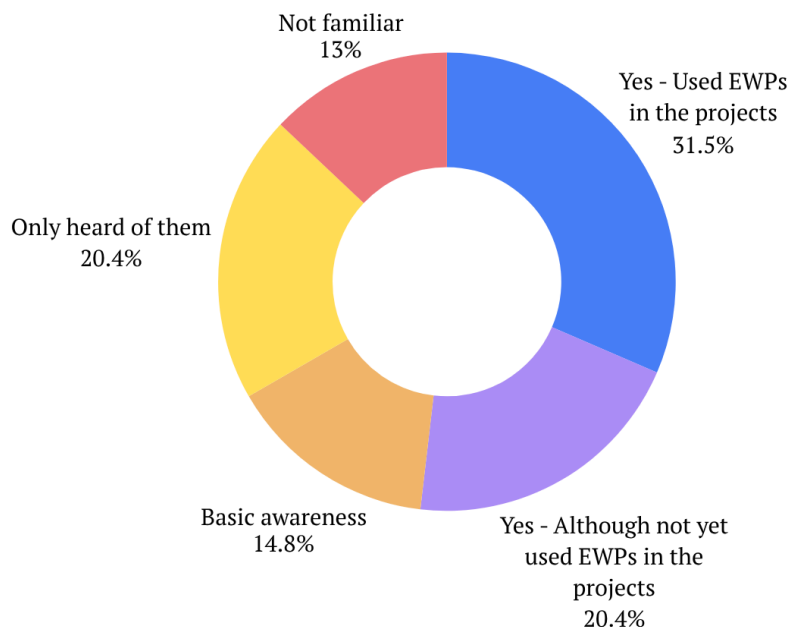
4.1. Overview of the Respondents

The study collected responses from 54 licensed contractors through a survey questionnaire sent via email. The respondents represent a mix of contractors engaged in various types of construction projects, with the majority in infrastructure and housing development.

4.2. Awareness of EWPs

The findings indicate a moderate level of awareness among the respondents, with 51.9% having full awareness of EWPs, 14.8% having basic awareness, 20.4% having only heard of it, and 13% being unfamiliar with it. In terms of usage, 31.5% of the respondents had used EWPs in their construction projects, indicating a certain level of practical application.

Figure 4.a: Awareness of Engineered Wood Products (EWPs) among the contractors



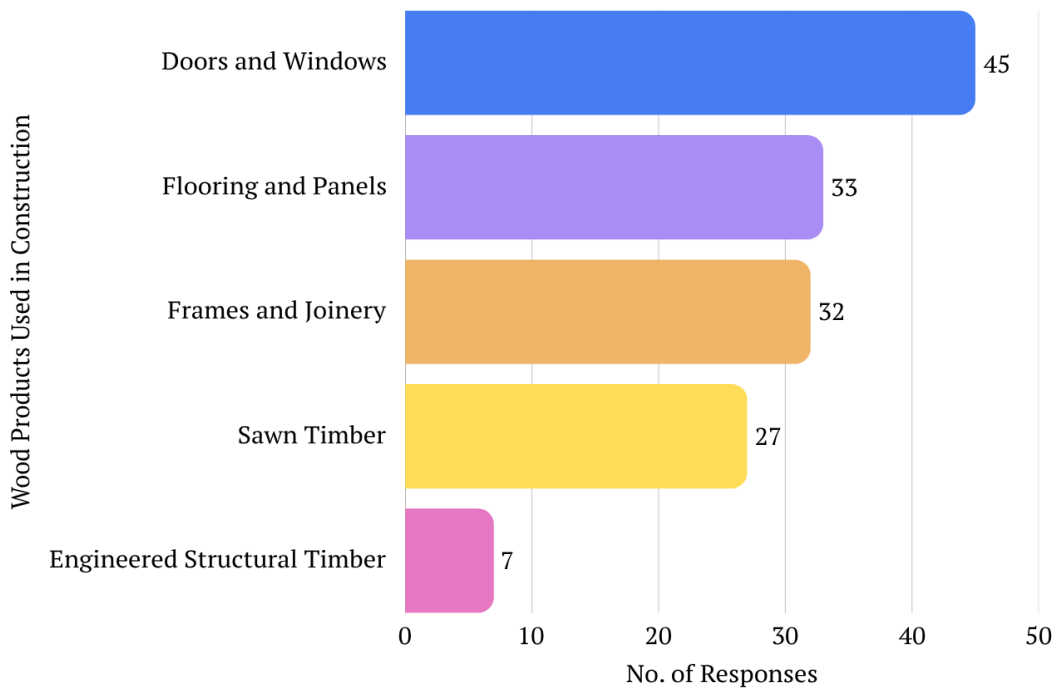
4.3. Usage of Structural Materials

The most used structural materials among the respondents are concrete, steel and sawn timber, where 60-80% of the respondents chose them as the most used material. On the other hand, EWPs emerged as a rarely used material, with 61% of the responses indicating it was rarely used.

4.4. Usage of Wood Products

The survey results indicate that wood products are widely used across various construction applications by the respondents. It is important to note that this was a multiple-response question, allowing respondents to select more than one type of wood product, which explains why the total number of responses exceeds the total number of participants.

Figure 4.b: Types of wood products currently used in construction



Among the different categories, doors and windows were the most commonly used wood products, with 45 responses, highlighting their dominant role in construction projects.

This was followed by flooring and panels (33 responses) and frames and joinery (32 responses), indicating substantial use of wood in both structural and finishing elements.

Additionally, sawn timber (unengineered) recorded 27 responses, suggesting that traditional wood materials remain widely utilised in the industry.

In contrast, the use of engineered structural timber was significantly lower, with only 7 responses, reflecting its limited adoption in current construction practices.

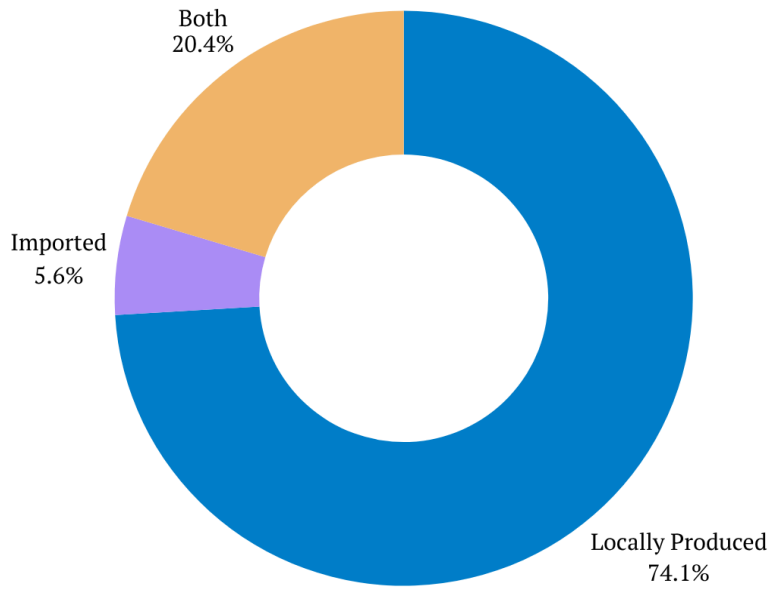
4.5. Source of Wood Products

The findings indicate that the majority of respondents rely on locally produced wood products, with 40 responses, highlighting the strong availability and preference for domestic resources.

A smaller number of respondents (11) reported using both local and imported sources, suggesting some level of supplementation from external markets.

In contrast, only 3 respondents depend solely on imported wood products.

Figure 4.c: Source of wood products

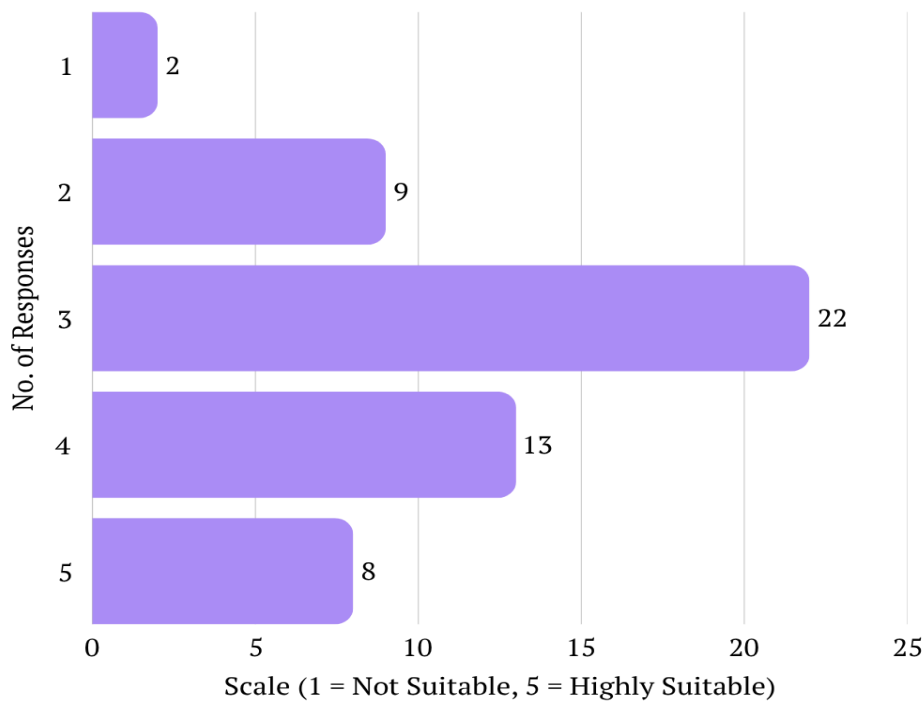


This shows that Bhutan’s construction sector is largely dependent on local wood supply, with limited reliance on imports.

4.6. Perception of Suitability of EWPs for Construction

Respondents were asked to rate the suitability of engineered wood products on a scale of 1 to 5, where 1 indicates “not suitable” and 5 indicates “highly suitable.” The majority of responses rated EWP as moderately to highly suitable, concentrated between 3 (neutral) and 4 (suitable) ratings.

Figure 4.d: Perception of the suitability of EWP for construction



Specifically, 22 respondents (40.7%) rated EWP as 3, indicating a neutral to moderately suitable perception.

This was followed by 13 respondents (24.1%) who rated it 4, and 8 respondents (14.8%) who rated it 5, reflecting a generally positive outlook.

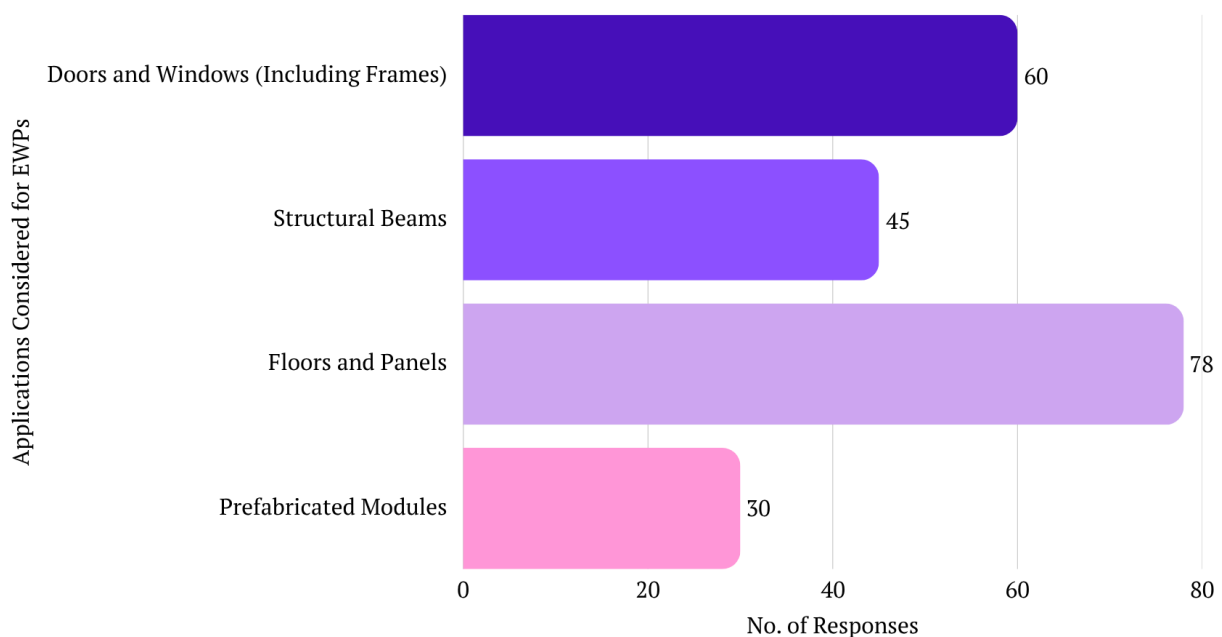
On the lower end of the scale, 9 respondents (16.7%) rated EWP as 2, while only 2 respondents (3.7%) considered it not suitable (1).

In general, the findings suggest that while there is a positive perception towards the suitability of engineered wood products, a significant proportion of respondents remain neutral, indicating scope for increased awareness and confidence-building within the industry.

4.7. Applications Considered for EWPs

Regarding the applications of EWPs, the responses indicate that EWPs are considered suitable for a range of construction applications such as doors and window frames, structural beams, floors, panels and prefabrication modules. As this was a multiple-response question, respondents were able to select more than one option.

Figure 4.e: Applications considered for EWPs



The most commonly identified application was doors and windows (including frames), with 41 responses, suggesting strong acceptance of EWPs in non-structural and finishing elements. This was followed by floors and panels (33 responses), indicating growing confidence in their use for surface and panel applications.

In terms of more advanced uses, prefabricated modules received 25 responses, reflecting interest in modern construction methods such as modular building. Meanwhile, structural

beams recorded 20 responses, showing comparatively lower but notable consideration for load-bearing applications.

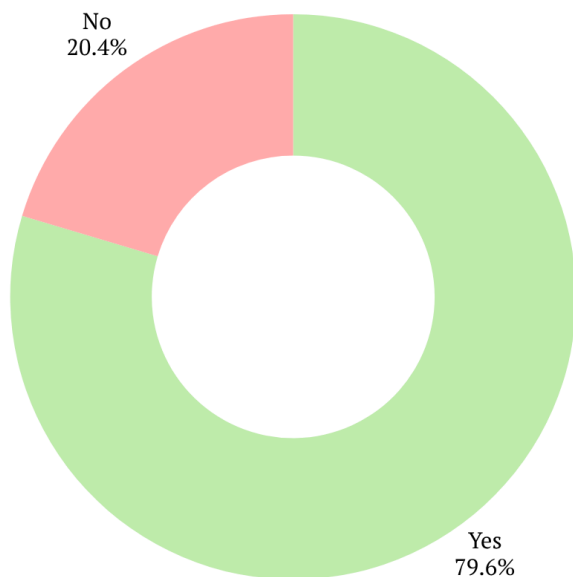
The results suggest that while EWPs are primarily favoured for non-structural and semi-structural applications, there is emerging interest in their use for structural and prefabricated construction systems.

4.8. Market Potential and Demand Outlook in Construction

4.8.1. Market Potential Perception

The survey results indicate a strong positive perception regarding the market potential of EWPs in Bhutan’s construction sector. A significant majority of respondents, 43 (79.6%), believe that there is a viable market for EWP, while only 11 respondents (20.4%) indicated otherwise. The findings reflect a favourable market sentiment, indicating strong potential for the expansion of EWP within the construction industry.

Figure 4.f: Perception of Market Potential of EWP in Construction



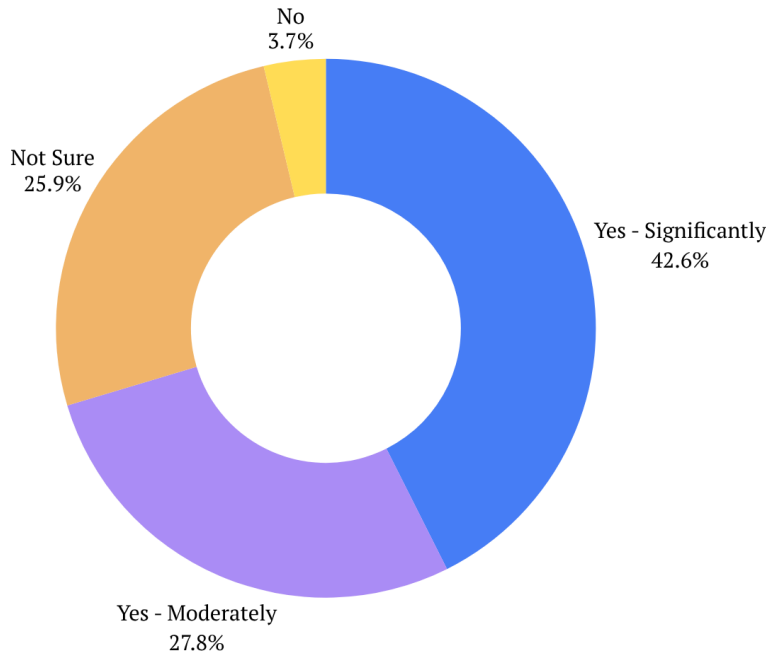
4.8.2. Future Demand Outlook

In terms of future demand, the responses indicate a generally positive outlook for EWPs in Bhutan’s construction sector.

A majority of respondents expect demand to increase, with 23 respondents (42.6%) anticipating a significant increase and 15 respondents (27.8%) expecting a moderate increase.

Meanwhile, 14 respondents (25.9%) indicated that they are not sure, reflecting some uncertainty within the industry. Only a very small proportion, 2 respondents (3.7%), believe that demand will not increase.

Figure 4.g: Expectation of Increase in Demand for EWP in Construction



Thus, the findings suggest a strong expectation of growing demand for EWPs, although there is a minor presence of uncertainty, highlighting the need for greater awareness, market development, and confidence-building measures within the sector.

4.8.3. Analysis of the Reasoning Provided for the Demand Outlook

The qualitative responses provided by respondents reveal several key themes explaining why the demand for EWPs is expected to increase in Bhutan’s construction sector. The analysis shows that the expected increase in demand for EWPs is driven by a combination of performance advantages (quality, durability, strength), economic factors (cost and availability), and broader trends such as sustainability and modernisation of construction practices.

These reasons can be grouped into the following major categories:

a) Improved Quality and Durability

A significant number of respondents highlighted the superior quality and durability of engineered wood compared to traditional timber. Issues such as warping, decay, and moisture damage in unseasoned natural wood were commonly mentioned, with EWP seen as a solution to these challenges. This indicates that contractors value performance, reliability and long-term material stability, which are critical in Bhutan’s varying climatic conditions.

b) Better Finishing and Aesthetic Appeal

Many respondents emphasised the visual appeal and finishing quality of engineered wood. Comments related to good appearance, smooth finish, and suitability for modern designs suggest that EWPs are perceived as enhancing the overall look of buildings. This is particularly relevant for sectors such as tourism (hotels, resorts, and homestays), where aesthetics play a key role.

c) Cost Efficiency and Local Availability

Some respondents pointed out that demand would increase if EWPs were locally produced and available at reasonable prices. There is also a perception that domestic production could reduce reliance on imports and improve accessibility. This highlights that cost competitiveness and supply chain development are crucial factors influencing adoption.

d) Sustainability and Resource Efficiency

Several responses referenced environmental benefits, such as reduced reliance on traditional timber, better utilisation of wood resources, and alignment with sustainable construction practices. This suggests growing awareness of eco-friendly materials and Bhutan's broader sustainability goals.

e) Structural Performance and Efficiency

Respondents also noted the strength, reliability, and ease of use of EWPs. Benefits such as better structural performance, ease of handling and installation, and time-saving through prefabrication were identified as key drivers. This reflects the potential of EWPs to support modern, efficient construction methods, including prefabrication and multi-storey buildings.

f) Adaptation to Local Conditions

Some responses highlighted that natural timber deteriorates quickly in certain regions (e.g., humid southern areas), making EWPs a more suitable alternative due to their resistance to environmental factors. This indicates that climate resilience is an important factor in material selection.

g) Growing Construction Demand and Modernisation

Several respondents linked increasing demand to future development activities, urbanisation, and the need for improved construction standards. EWPs are seen as part of a transition towards more advanced and standardised construction practices.

h) Cultural and Traditional Relevance

A few respondents noted that wood already plays a significant role in Bhutanese traditional architecture, and engineered wood could enhance this by offering greater durability while maintaining cultural identity.

i) Remaining Uncertainty and Knowledge Gaps

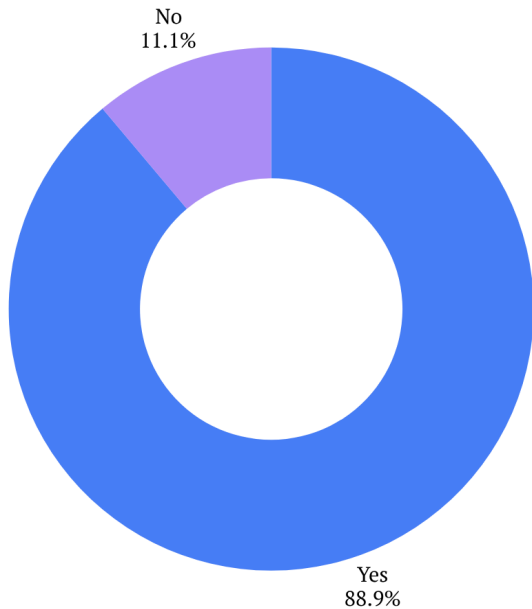
It is also important to note that some respondents expressed uncertainty or a lack of knowledge, indicating that awareness of EWPs is still developing within the industry.

Moreover, the responses also highlight that price, awareness, and local availability remain critical conditions for this demand to materialise. Addressing these factors will be essential to fully realise the growth potential of EWPs in Bhutan's construction sector.

4.8.4. Consideration of Using EWPs in Construction

The survey results show a strong willingness among respondents to consider the use of EWPs in construction projects. A significant majority, 48 respondents (88.9%), indicated that they would consider using EWP, while only 6 respondents (11.1%) stated that they would not.

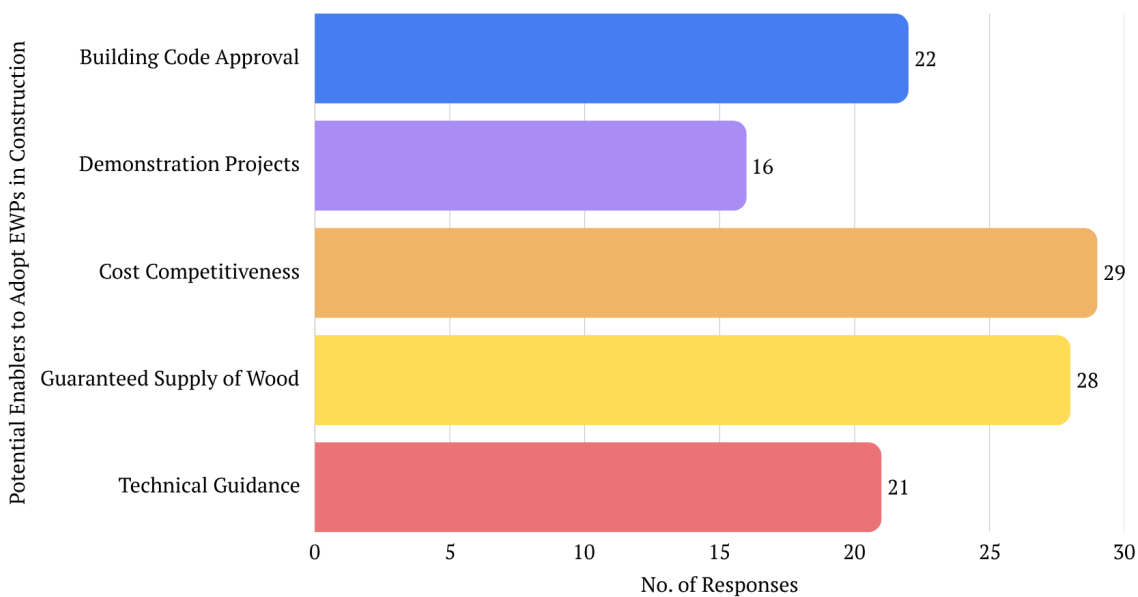
Figure 4.h: Consideration of Using EWP in Construction



4.9. Potential Enablers to Adopt EWPs in Construction

The survey results highlight several key factors that would enable the adoption of EWPs in Bhutan’s construction sector. As this was a multiple-response question, respondents were able to select more than one option.

Figure 4.i: Potential enablers to adopt EWP in construction



Among the identified enablers, cost competitiveness (29 responses) and guaranteed supply of wood (28 responses) were the most significant, indicating that economic feasibility and reliable availability are the primary concerns influencing adoption decisions.

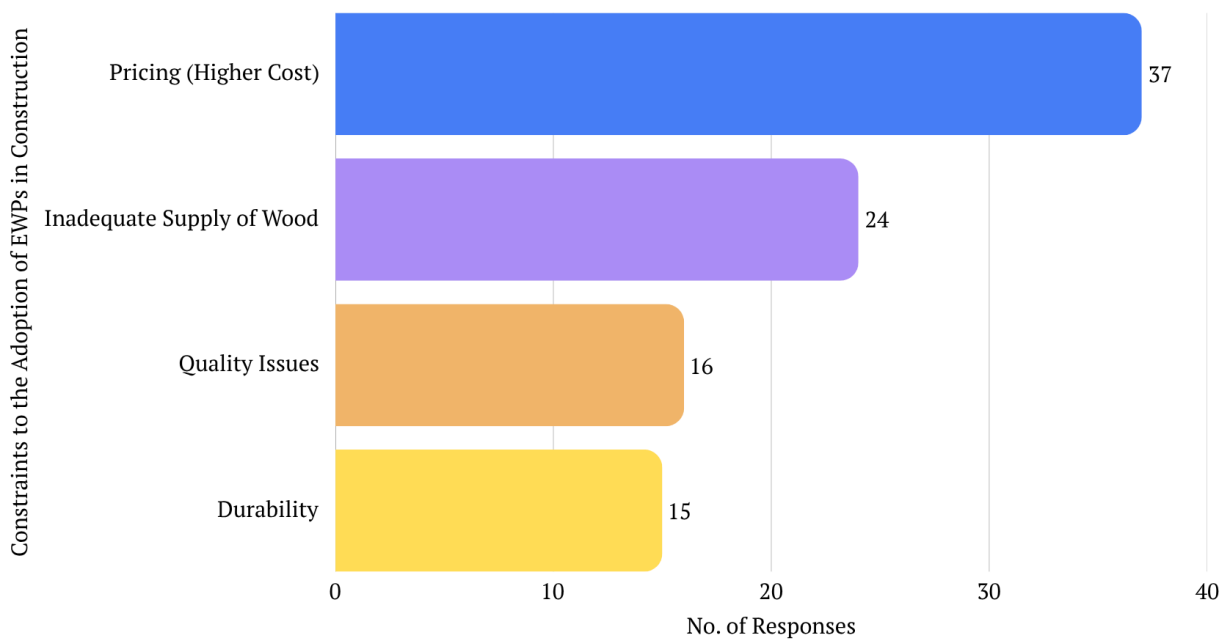
This was followed by building code approval (22 responses) and technical guidance (21 responses), suggesting that regulatory support and access to technical knowledge are also important in building confidence among contractors. Additionally, demonstration projects (16 responses) were identified as a useful enabler, highlighting the need for practical examples and proven applications to showcase the performance of engineered wood products.

Overall, the findings suggest that adoption of EWP depends on a combination of cost, supply reliability, regulatory framework, and knowledge dissemination, with economic and supply-related factors being the most critical.

4.10. Constraints to the Adoption of EWPs in Construction

The survey results identify several key constraints limiting the use of EWPs in Bhutan's construction sector. As this was a multiple-response question, respondents were able to select more than one constraint.

Figure 4.j: Constraints to the adoption of EWPs in construction



The most significant barrier identified was pricing (higher cost), with 37 responses, indicating that cost remains the primary concern affecting adoption. This suggests that many contractors perceive engineered wood products as less competitive compared to traditional materials.

This is followed by an inadequate supply of wood (24 responses), highlighting issues related to availability and supply chain limitations within the domestic market. Additionally, quality issues (16 responses) and durability concerns (15 responses) were also noted, reflecting some uncertainty or lack of confidence in the performance of EWPs.

The findings suggest that the adoption of EWP is constrained mainly by economic factors and supply limitations, along with perceived performance concerns, all of which need to be addressed to facilitate wider acceptance in the construction industry.

4.11. Thematic Analysis of Open-Ended Responses

The additional open-ended comments provided by respondents offer further insights into the perceptions, concerns, and expectations regarding EWPs in Bhutan's construction sector. The meaning of feedback can be grouped into the following key themes:

a) Need for Improved Availability and Affordability

A recurring theme in the responses is the need for better availability of engineered wood products within the country at reasonable prices. Respondents emphasised that local access to these materials would reduce reliance on imports, support the domestic economy and encourage wider adoption in construction. This highlights that market accessibility and cost-effectiveness are critical enablers for growth.

b) Supply Chain and Material Quality Issues

Some respondents pointed out challenges related to the lack of seasoned and treated wood in Bhutan's construction industry. Engineered wood products were viewed as a potential solution to the poor quality of traditional timber and issues such as durability and performance, reinforcing the perception of EWPs as a higher-quality alternative to conventional wood.

c) Limited Awareness and Industry Familiarity

Several comments indicated that engineered wood is still a relatively new concept in Bhutan, with many contractors lacking sufficient knowledge or exposure. Statements such as "few contractors might know about the product" and "the topic is new" reflect this gap, suggesting a strong need for awareness programs, training, and industry education.

d) Sustainability and Environmental Considerations

A few respondents raised questions about the sustainability of engineered wood, while others acknowledged its eco-friendly aspects, such as the use of wood waste and fast-growing species. This indicates a growing but still uncertain understanding of environmental benefits, highlighting an area for further awareness-building.

e) Competition from Alternative Materials

Some responses noted that traditional wood is increasingly being replaced by materials such as PVC, WPC, or HPL boards. This suggests that EWPs will not only compete with conventional timber but also with other modern substitute materials. This emphasises the need for EWP to demonstrate clear advantages in cost, durability, and performance.

f) Policy and Market Structure Concerns

One response mentioned concerns regarding market interference and institutional roles, which may affect the supply and competitiveness of wood products. This points to the importance of a transparent and supportive regulatory environment for market development.

g) Positive Outlook and Future Potential

Despite challenges, several respondents expressed optimism, noting that EWP is a good concept for long-term development with the potential to support local industries and economic growth. A few responses also noted that it is the right time to introduce such products in Bhutan. This reflects a generally positive attitude towards future adoption, even among those with limited current knowledge.

h) Overall Interpretation

The open-ended responses reinforce the broader survey findings, indicating that while EWPs are not yet widely understood or adopted, there is clear recognition of their potential benefits in terms of quality, sustainability, and economic value.

However, key challenges remain, particularly in awareness, affordability, availability, and market structure. Addressing these issues through policy support, capacity building, and supply chain development will be essential to unlocking the full potential of EWPs in Bhutan's construction sector.

CHAPTER 5: Findings of the Wood-Based Industries' Survey

5.1. Overview of the Respondents

The study collected responses from 32 licensed wood-based industries through a survey questionnaire sent via email, comprising wood-based industries engaged in activities such as furniture manufacturing, sawmilling, joinery, veneer production, plywood/plyboard manufacturing, and integrated wood processing. Many respondents indicated involvement in multiple activities, suggesting that the industries often operate across different stages of the wood value chain.

In terms of experience, a large proportion of industries fall within the “less than 5 years” category, indicating a growing and relatively young industry. This is complemented by a moderate number of industries with 5–10 years of operation and a smaller group of more established industries with over 10–20 years or more than 20 years of experience. This distribution suggests a sector that is expanding but still in a developmental stage, with limited long-standing industrial players.

5.2. Structure of the Wood Industry

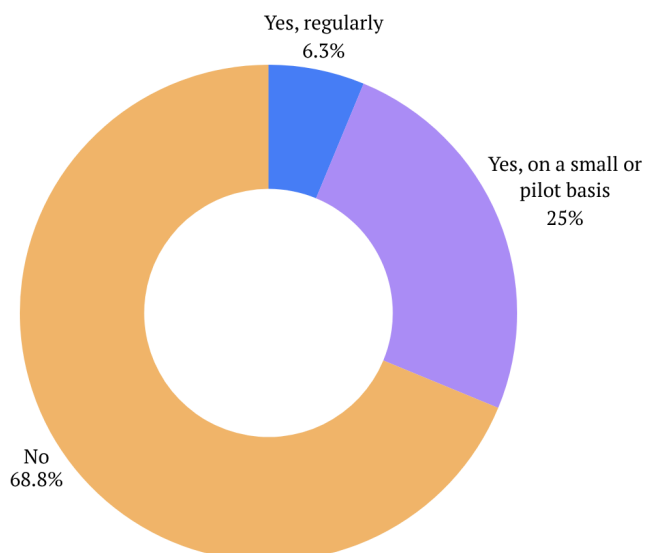
The findings show that furniture manufacturing is the most dominant activity, followed by sawmilling and joinery operations. The presence of veneer, plywood, and integrated wood-based industries indicates that some level of value-added processing already exists within the country.

5.3. Industry Experience and Interest in EWPs

5.3.1. Experience in EWPS

The survey results indicate that experience in producing engineered or semi-engineered wood products among respondents is relatively limited.

Figure 5.a: Industry experience in EWPs



Only 2 respondents (6.3%) reported that they regularly produce such products, while 8 respondents (25.0%) indicated that they have engaged in production on a small or pilot basis.

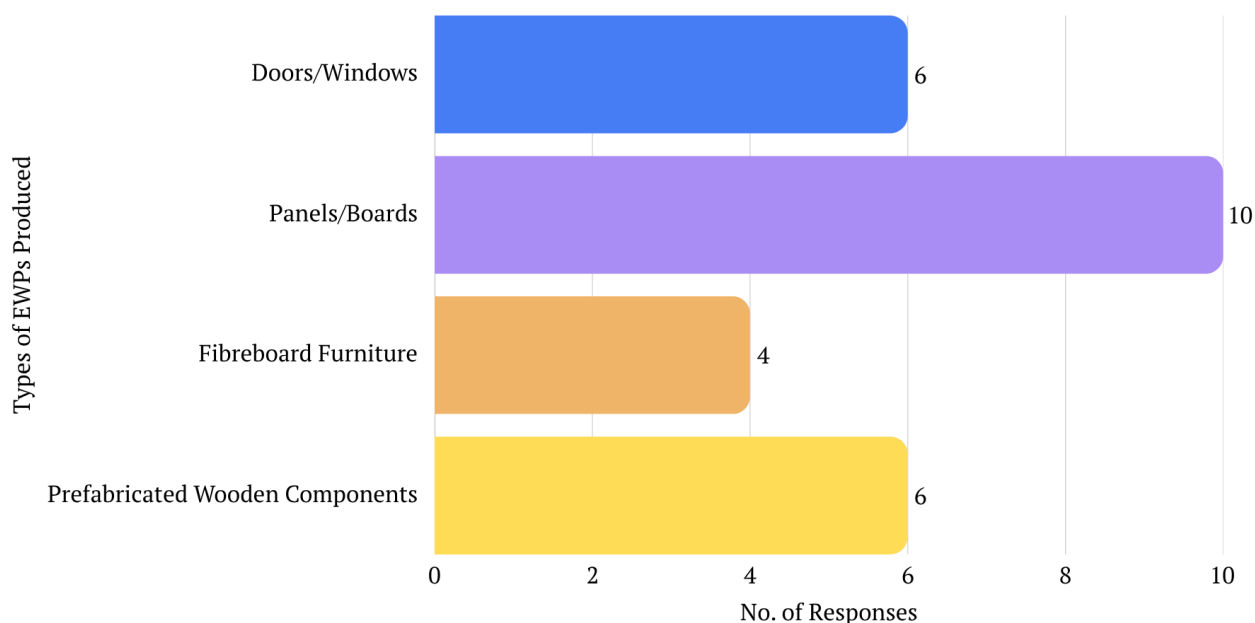
In contrast, the majority of respondents, 22 (68.8%), stated that they have no experience in producing EWPs.

The findings suggest that while there is some initial exposure to EWP production, the industry is still at an early stage of development, with most industries yet to adopt or scale up production of engineered wood products.

5.3.2. Types of Wood Products Produced

The responses from the industries that have previously produced engineered or semi-engineered wood products indicate a range of applications, with a stronger focus on non-structural and semi-processed products. As this was a multiple-response question, respondents were able to select more than one product type.

Figure 5.b: Types of wood products produced



The most commonly produced category is panels and boards, with 10 responses, suggesting that this is the most accessible and widely manufactured form of EWP within the industry. This is followed by doors and windows (6 responses) and prefabricated wooden components (6 responses), indicating moderate engagement in value-added construction-related products.

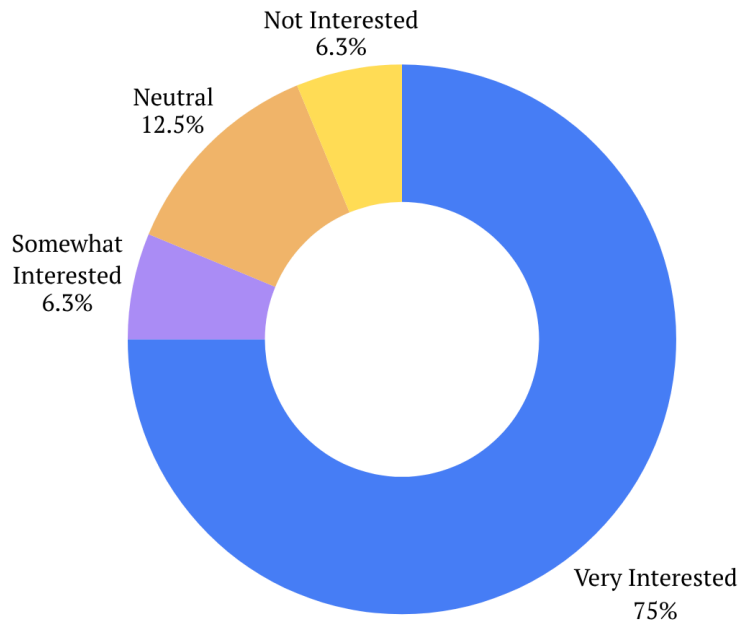
A smaller number of respondents, 4, reported producing fibreboard furniture, reflecting limited but existing diversification into composite-based furniture products.

Overall, the findings suggest that current EWP production in Bhutan is concentrated in simpler, non-structural products, with relatively limited involvement in more advanced structural engineered wood applications.

5.3.3. Interest in Manufacturing EWPS

The survey results indicate a strong interest in manufacturing EWPs among wood-based industries in Bhutan.

Figure 5.c: Interest in manufacturing EWPs



A significant majority of respondents, 24 (75.0%), expressed that they are very interested in manufacturing EWPs.

This is complemented by 2 respondents (6.3%) who are somewhat interested, further reinforcing the overall positive inclination.

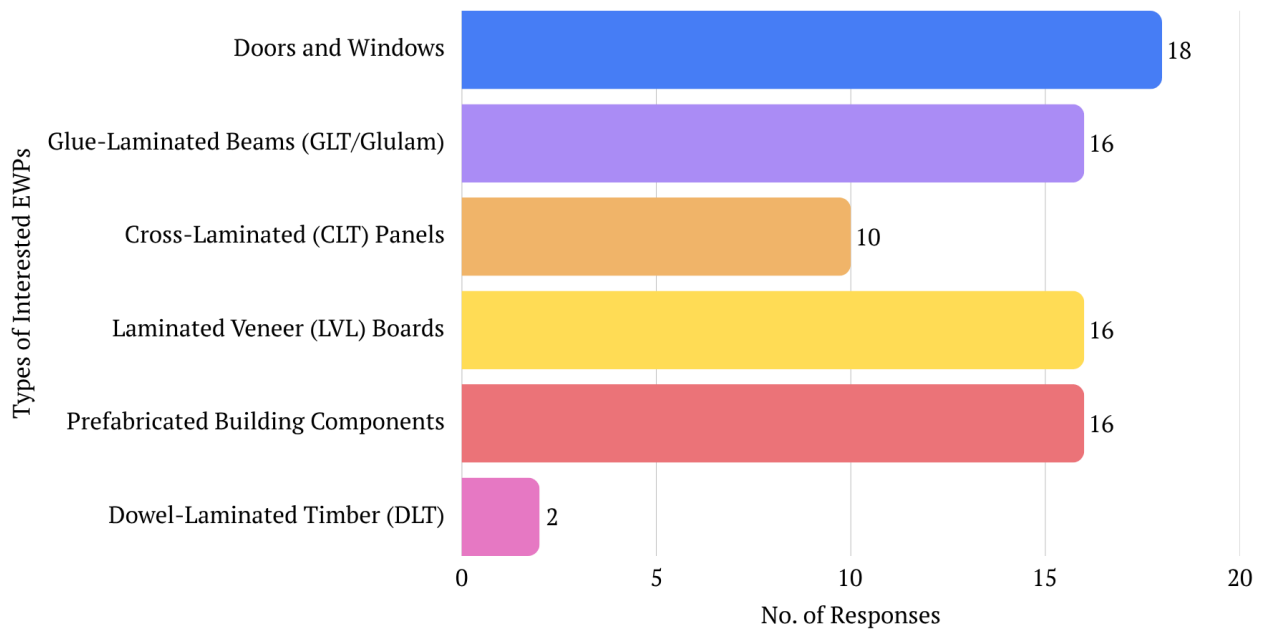
On the other hand, a smaller proportion of respondents, 4 (12.5%), reported being neutral, while only 2 respondents (6.3%) indicated that they are not interested in manufacturing EWPs.

Therefore, findings highlight a high level of enthusiasm and willingness within the industry to engage in EWP production, suggesting strong potential for sectoral growth, provided that enabling factors such as technology, investment, and market access are addressed.

5.3.4. Types of EWPs Interested In

The survey results indicate a broad interest among respondents in manufacturing different types of EWPs. As this was a multiple-response question, respondents were able to select more than one option.

Figure 5.d: Types of EWPs interested in



The most preferred product category is doors and windows, with 18 responses, reflecting strong interest in non-structural and value-added applications.

This is followed by glue-laminated beams (glulam), laminated veneer lumber (LVL) boards, and prefabricated building components, each receiving 16 responses, indicating substantial interest in both structural and semi-structural applications.

Cross-laminated timber (CLT) panels received 10 responses, suggesting moderate interest in more advanced mass timber products.

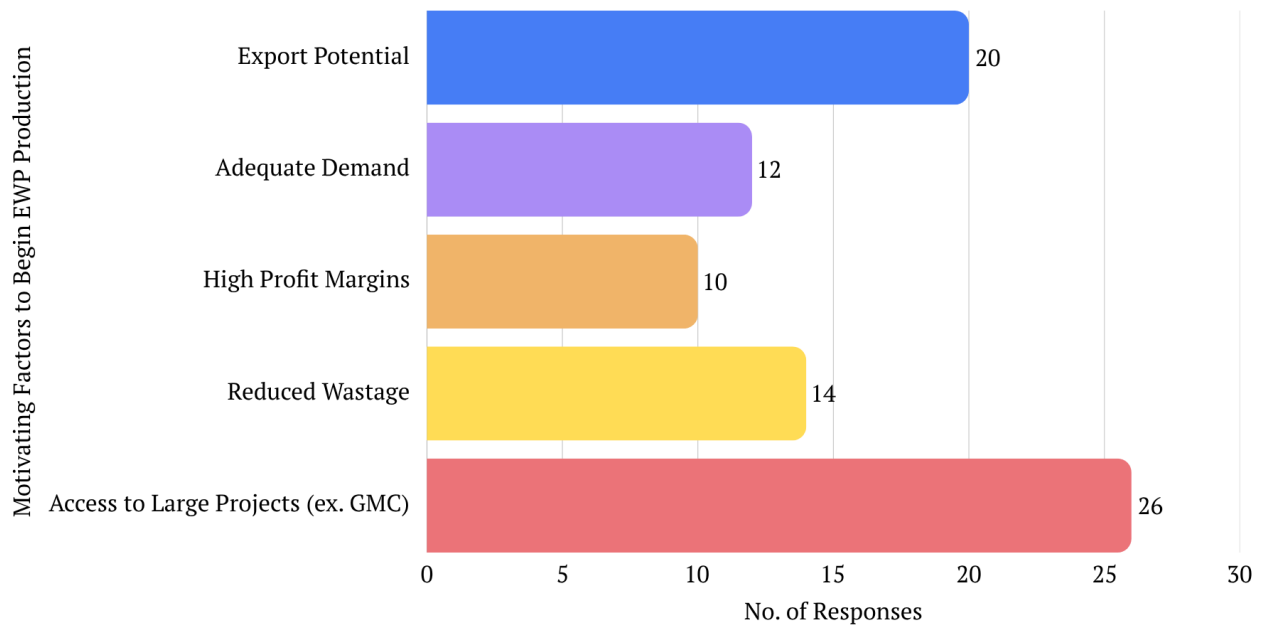
In contrast, dowel-laminated timber (DLT) recorded only 2 responses, indicating limited awareness or demand for this product type.

In conclusion, the findings suggest that while there is strong interest in conventional and moderately advanced engineered wood products, interest in more specialised or less familiar technologies remains relatively low, highlighting the need for awareness and technical capacity building.

5.4. Motivating Factors for Interest in EWPs

The survey results highlight several key factors motivating respondents' interest in manufacturing EWPs. As this was a multiple-response question, respondents were able to select more than one factor.

Figure 5.e: Motivating Factors for Interest in EWPs



The most significant motivation identified was access to large projects (e.g., GMC), with 26 responses, indicating that respondents see EWP as a means to participate in larger-scale and more complex construction opportunities.

This is followed by export potential (20 responses), suggesting that many firms view EWP as an opportunity to expand beyond the domestic market.

Other important factors include reduced wastage (14 responses), reflecting interest in more efficient utilisation of wood resources, and adequate demand (12 responses), indicating confidence in the market potential of these products.

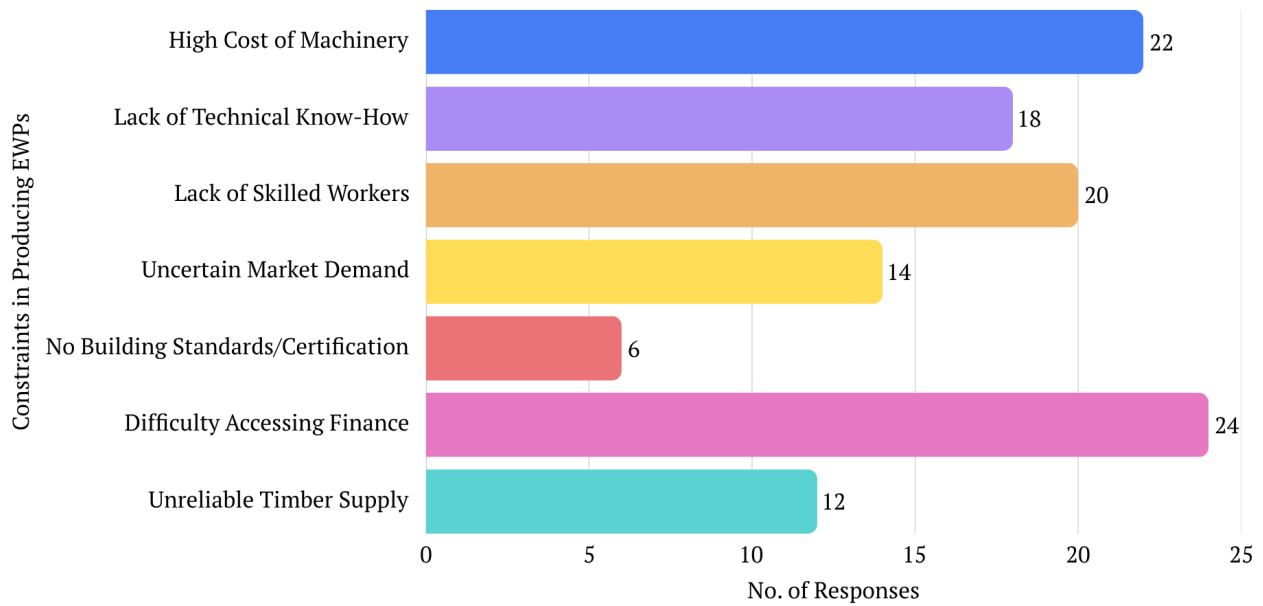
Additionally, high profit margins (10 responses) were identified as a motivating factor, highlighting the commercial attractiveness of EWP production.

The findings suggest that interest in EWP manufacturing is driven by a combination of market opportunities, economic benefits, and resource efficiency, with a strong emphasis on accessing larger projects and expanding market reach.

5.5. Constraints in Producing EWPs

The survey results identify several key constraints faced by wood-based industries in producing EWPs. As this was a multiple-response question, respondents were able to select more than one constraint.

Figure 5.f: Constraints in Producing EWPs



The most significant barrier is difficulty accessing finance, with 24 responses, indicating that limited access to capital is a major challenge for firms looking to invest in EWP production.

This is closely followed by the high cost of machinery (22 responses) and lack of skilled workers (20 responses), highlighting constraints related to high initial investment and workforce capability.

Additionally, lack of technical know-how (18 responses) was identified as a major issue, suggesting that many firms lack the specialised knowledge required for EWP manufacturing.

Uncertain market demand (14 responses) and unreliable timber supply (12 responses) also pose challenges, reflecting concerns about market stability and raw material availability.

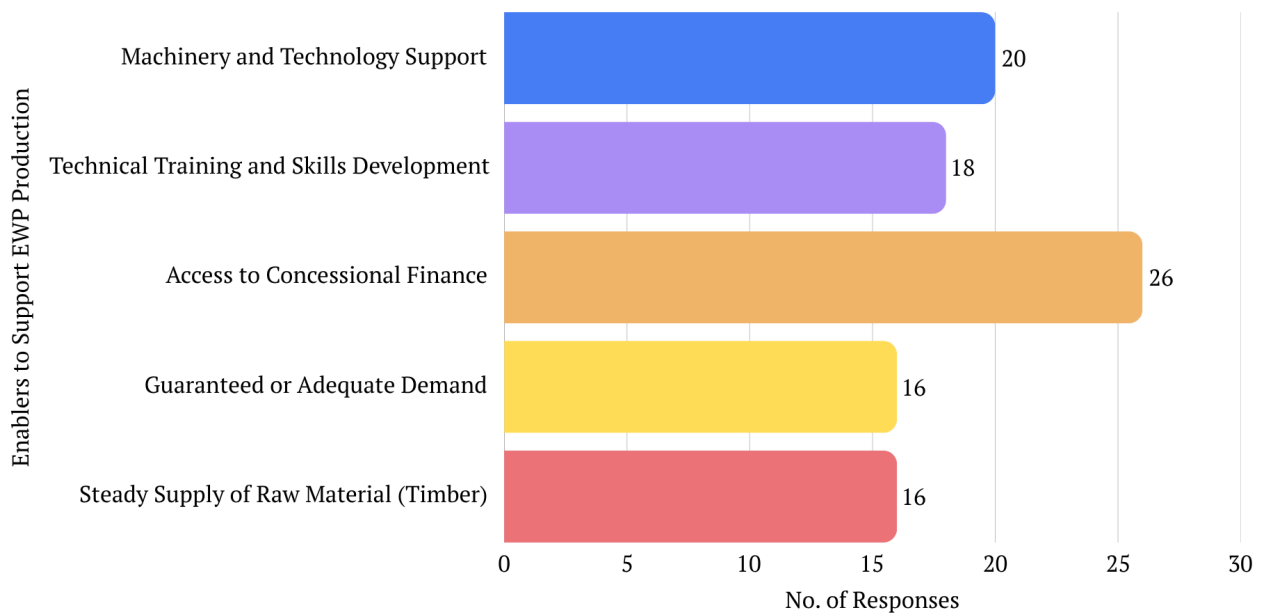
Finally, a smaller number of respondents (6 responses) pointed to the absence of building standards and certification, indicating that regulatory frameworks are still underdeveloped.

As a result, the findings suggest that the production of EWP in Bhutan is constrained by a combination of financial, technical, and institutional challenges, with access to finance, machinery costs, and skill gaps being the most critical barriers.

5.6. Enablers to Support Production of EWPs

The survey results highlight several key forms of support required by wood-based industries to enable the production of EWPs. As this was a multiple-response question, respondents were able to select more than one option.

Figure 5.g: Enablers to Support Production of EWPs



The most significant enabler identified is access to concessional finance, with 26 responses, indicating that affordable financing is critical for firms to invest in machinery, technology, and production capacity.

This is followed by machinery and technology support (20 responses) and technical training and skills development (18 responses), reflecting the need for both modern equipment and skilled human resources to undertake EWP manufacturing.

Additionally, guaranteed or adequate demand (16 responses) and a steady supply of raw materials (16 responses) were also highlighted as important factors. These responses suggest that firms require market assurance and a reliable timber supply to reduce risks associated with production.

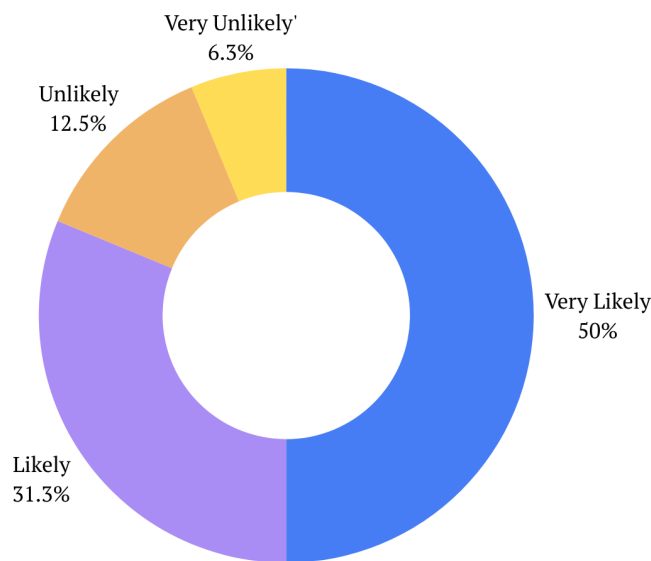
In general, the findings indicate that enabling EWP production in Bhutan requires a combination of financial support, technological upgrading, capacity building, and supply chain stability, with access to affordable finance emerging as the most critical factor.

5.7. Likelihood to Upgrade Operations to Produce Higher-Value Wood Products

The survey results indicate a generally strong inclination among respondents to upgrade their operations towards producing higher-value wood products. A majority of respondents expressed a positive outlook, with 16 respondents (50%) indicating they are very likely to upgrade and 10 respondents stating they are likely to do so.

In contrast, a smaller number of respondents expressed hesitation, with 4 respondents (12.5%) indicating they are unlikely and 2 respondents (6.3%) stating they are very unlikely to upgrade their operations.

Figure 5.h: Likelihood to Upgrade Operations to Produce Higher-Value Wood Products



The findings suggest that most wood-based industries in Bhutan are open to moving up the value chain, reflecting a readiness to transition towards more advanced and value-added production, such as engineered wood products, provided that enabling conditions are met.

5.8. Thematic Analysis of Open-Ended Responses

The open-ended responses from wood-based industries provide valuable insights into the challenges, expectations, and opportunities associated with the development of EWPs in Bhutan. Several key themes emerge from the analysis as follows:

a) Strong Need for Government Support

A dominant theme across responses is the need for active government intervention. Respondents emphasised support in areas such as access to raw materials, low-interest or concessional financing (e.g., loans) and guaranteed markets through government projects. Many respondents indicated that public sector projects (e.g., large construction initiatives) could play a crucial role in creating stable demand and encouraging investment. This highlights that the development of the EWP sector is seen as highly dependent on policy support and institutional backing.

b) Financial and Investment Constraints

Several responses pointed to high capital requirements as a major barrier, particularly for advanced machinery and equipment and initial setup costs. There is also concern about limited demand, making such investments risky. Firms expressed hesitation to invest without market assurance. This suggests that financial risk and uncertainty are key limiting factors in scaling up EWP production.

c) Competition from Neighbouring Markets

Respondents highlighted the challenge of competing with countries like India, where labour costs are lower, raw materials are cheaper, and production is more established, indicating that Bhutanese industries may face cost competitiveness issues, making it difficult to compete regionally without support or differentiation.

d) Skill and Technical Capacity Gaps

A lack of skilled workers and technical expertise was identified as a major challenge. Respondents noted the need for training, skill development and technical knowledge in engineered wood manufacturing. This reinforces the importance of capacity building and workforce development in enabling industry growth.

e) Market Uncertainty and Need for Assured Demand

Several respondents expressed willingness to invest in EWP production only if there is a guaranteed market, particularly through government-backed projects and large-scale developments (e.g., infrastructure or urban projects). This reflects a risk-averse approach, where firms require demand certainty before committing resources.

f) Emerging Industry Initiatives and Interest

Some responses indicate that initial steps are already being taken, such as the approval of veneer-related projects with potential expansion into EWP and exploring international collaborations and machinery suppliers. Additionally, there is a strong individual interest among some respondents to engage in EWP production, particularly in products like glulam, CLT, and LVL. This suggests that while the sector is still nascent, there are early movers and potential pioneers.

g) Importance of Strategic Implementation

One response emphasised that while there are many business opportunities in the wood sector, successful execution is critical, and not all industries may be capable of handling the complexity of EWP manufacturing. This points to the need for careful selection of capable firms and strategic planning to avoid failure and ensure sustainable development.

h) Overall Interpretation

The qualitative responses reveal that Bhutan's wood industry sees strong potential in engineered wood products, but this potential is accompanied by significant challenges. The sector is characterised by a high interest but cautious investment behaviour, dependence on government support and policy direction, constraints in finance, skills, and competitiveness and emerging but still limited industrial readiness. Overall, the development of the EWP sector in Bhutan will require a coordinated approach, combining government support, private sector capability, and market development, to transform interest into actual industrial growth.

CHAPTER 6: SWOT Analysis from Secondary Review and Survey Results

Based on the secondary review and survey results assessment, the SWOT analysis of the market potential of EWPs in the construction sector is as follows:

6.1. Strengths

- Abundant forest resources, with significant underutilised timber harvesting capacity, provide a strong raw material base for engineered wood production.
- Established wood-based industry presence, which provides a foundation for scaling up value-added production.
- Strong willingness among contractors to adopt EWPs and high interest among industries to produce them.
- Alignment with Bhutan's sustainability goals, including efficient resource use and a lower carbon footprint compared to steel and cement.
- Positive perception of EWP performance in terms of durability, quality, and aesthetics.

6.2. Weaknesses

- Limited technical capacity and experience in manufacturing engineered wood products, with most firms lacking skills, technology, and expertise.
- The high investment cost of producing engineered wood products compared to traditional materials affects cost competitiveness and adoption.
- Inadequate and inconsistent supply chain, including limited domestic production and unreliable access to raw materials.
- Lack of building codes, standards, and certification systems for EWPs creates uncertainty in usage.
- Limited awareness and familiarity among stakeholders lead to cautious adoption.

6.3. Opportunities

- Rapid growth of the construction sector, increasing demand for efficient and sustainable building materials.
- Large-scale public investments under the 13th Five-Year Plan and projects such as Gelephu Mindfulness City are creating potential market demand.
- Opportunity to move towards higher value-added wood processing and industrial upgrading.
- Export potential in South Asian markets with rising demand for sustainable construction materials.
- Growing adoption of prefabrication and modern construction methods, where EWPs have strong advantages.
- Increasing focus on green building materials is aligned with environmental sustainability goals.
- Reducing the cost of construction and enhancing the quality of construction.
- Reducing wood waste and optimal utilisation of timber.

6.4. Threats

- Strong competition from conventional materials such as concrete and steel, as well as substitutes like PVC and WPC.
- Regional competition from countries like India, with lower production costs and more advanced industries.
- Uncertain market demand may discourage private investment.
- Market perception risks, including concerns about the durability, quality, or sustainability of EWPs.
- Risks related to sustainable timber supply and resource management if not properly managed.
- Policy and regulatory uncertainty may delay adoption and industry development.

CHAPTER 7: Recommendations

The recommendations presented in this section are derived from a comprehensive analysis of both primary and secondary data. The study incorporated findings from survey responses, a review of relevant reports, and a SWOT analysis to assess internal and external factors. Based on these insights, the following recommendations are proposed to address the key issues identified and to support informed decision-making:

7.1. Market Creation through Public Sector Intervention

The study findings reveal a strong willingness among contractors to adopt EWPs, with nearly 89% indicating openness, alongside a similarly high level of interest among wood-based industries to engage in production. However, this demand remains largely latent due to uncertainty in market conditions, which is further reinforced by the SWOT analysis identifying market and investment risks as a key threat. To address this gap, the government should play a catalytic role in market creation by integrating EWPs into public construction projects, particularly under the 13th Five-Year Plan and large-scale initiatives such as the Gelephu Mindfulness City (GMC). Such intervention would directly leverage the opportunity presented by the expanding construction sector while mitigating the threat of uncertain demand. By creating a stable and predictable market, public sector participation can reduce investment risks for industries and accelerate the transition from willingness to actual adoption.

7.2. Strengthening Regulatory and Standards Framework

The absence of building standards, certification systems, and technical guidelines for EWPs has been identified as both a constraint in the findings and a structural weakness in the SWOT analysis. This lack of regulatory clarity contributes to uncertainty among contractors, particularly regarding the use of EWPs in structural applications. Establishing and integrating EWP-specific standards into national building codes is therefore essential to legitimise their use, ensure safety and quality and enhance the demand. This will also help address market perception risks related to durability and performance, which are highlighted as threats. A well-defined regulatory framework will not only build confidence among stakeholders but also facilitate wider and more consistent adoption across the construction sector.

7.3. Facilitating Access to Finance and Investment Support

The study findings emphasise that access to finance and high capital investment requirements are among the most critical barriers to EWP production. To overcome this constraint, the provision of concessional financing, targeted credit schemes, and fiscal incentives will be necessary to support firms in acquiring machinery and upgrading production capabilities. Given the strong interest among industries to move towards higher value-added production, financial support mechanisms can play a crucial role in converting this interest into tangible industrial capacity. Aligning such support with clear development priorities will ensure that investments contribute to sustainable sector growth.

7.4. Enhancing Cost Competitiveness and Supply Chain Efficiency

The findings identify high pricing and inadequate supply as the most significant constraints to EWP adoption, while highlighting cost competitiveness and supply chain limitations as key weaknesses. At the same time, Bhutan's abundant forest resources represent a major strength that remains underutilised. Addressing these issues requires improving efficiency across the timber value chain, including harvesting, processing, and distribution systems. Expanding domestic production capacity will be critical to reducing dependence on imports and achieving economies of scale. In the long term, strengthening supply chain reliability and optimising resource utilisation will help reduce production costs and improve the affordability of EWPs, enabling them to compete more effectively with conventional materials such as concrete and steel, which are identified as major competitive threats.

7.5. Capacity Building and Technical Development

A significant gap identified in the study is the limited technical capacity within the domestic industry, with most firms lacking experience in EWP manufacturing and contractors requiring technical guidance for adoption. The study highlights skill shortages and limited technical expertise as core weaknesses. To address this, targeted capacity-building initiatives should be implemented, including technical training, workforce development, and partnerships with international institutions or firms. Demonstration projects and pilot initiatives will also be essential in translating theoretical awareness into practical understanding.

7.6. Adopting a Phased and Strategic Industry Development Approach

The findings indicate that EWPs are currently more accepted in non-structural and semi-structural applications such as doors, windows, and panels, while adoption in structural applications remains limited. This reflects both a current market reality and a strategic entry point, highlighting opportunities in gradual industry upgrading and modernisation. A phased approach is therefore recommended, where initial efforts focus on scaling production and adoption in these lower-risk segments before expanding into more advanced applications such as glulam and cross-laminated timber. This strategy will allow industries to build technical capability, reduce risk, and progressively move up the value chain.

7.7. Promoting Awareness and Industry Engagement

The study highlights moderate awareness levels and a significant degree of neutrality among contractors regarding the suitability of EWPs, indicating limited familiarity and confidence. To address this, structured awareness campaigns, stakeholder engagement programs, and industry workshops should be undertaken to improve understanding of EWPs. Emphasis should be placed on communicating their advantages in terms of durability, sustainability, and long-term cost efficiency, which were identified in the findings as key drivers of demand. Strengthening awareness will be critical in transforming positive perception into actual adoption.

CHAPTER 8: Implementing the Findings: A Practical Framework for the Department of Industry

This chapter translates the study's recommendations into concrete actions for the Department of Industry (DoI) under the Ministry of Industry, Commerce and Employment (MoICE). As the lead agency for industrial development, the DoI is best positioned to drive EWP adoption and domestic production through the six functional areas outlined below.

8.1. Establishing an EWP Industry Development Programme

The DoI should formally designate EWPs as a priority sub-sector under the Large Industry Promotion Division by establishing a dedicated EWP Industry Development Programme with a clear mandate, a focal point, and a multi-year work plan aligned with the 13th Five-Year Plan cycle. The programme would coordinate all subsequent interventions across policy, finance, skills, and market development.

The programme should maintain a registry of EWP manufacturers, track key indicators (number of licensed producers, domestic production volumes, and reduction in EWP imports), and record progress to support evidence-based decision-making.

8.2. Driving Market Creation through Inter-Agency Coordination

With nearly 89% of contractors willing to adopt EWPs but the market remaining latent, government-led demand creation is essential. The DoI should initiate formal dialogue with the Ministry of Infrastructure and Transport and Dzongkhag administrations to incorporate EWP specifications into public infrastructure projects under the 13th Five-Year Plan.

A practical starting point is to pilot EWP use in two to three government projects, such as schools, community halls, or staff quarters, to generate performance data and build contractor confidence.

8.3. Facilitating Industrial Upgrading and Investment Support

With 75% of wood-based industries interested in EWP manufacturing but hindered by high machinery costs and limited financing, the DoI should open dialogue with financial institutions to initiate concessional funding. The DoI should also identify “anchor industries” with the capacity to scale into EWP manufacturing, supporting them through access to foreign technical partners, machinery procurement assistance, and preferential consideration in government tenders. A phased approach is recommended: starting with panels, doors, and windows before advancing to structural products such as glulam and CLT.

8.4. Advocating for Regulatory Reform and Standards Development

The absence of EWP-specific building codes and certification systems is a key barrier to adoption. While regulatory authority rests with MoIT and the Bhutan Standards Bureau (BSB), the DoI should formally recommend the integration of EWP structural specifications

into the National Building Code, drawing on the evidence base in this study. In parallel, the DoI can work with BSB to develop a product certification and quality marking scheme for domestic EWPs.

8.5. Building Technical Capacity and Industry Knowledge

Skill shortages and limited technical know-how were consistently cited as constraints across both surveys. The DoI should partner with TVET institutions and the College of Science and Technology (CST), Royal University of Bhutan, to introduce EWP manufacturing modules into engineering and construction management curricula.

In the near term, the DoI can organise technical workshops and study tours to countries with established EWP industries, such as India, Austria, or Japan, and seek hands-on training support from development partners including JICA, GIZ, and the Asian Development Bank. Demonstration projects, installing EWP components in visible public spaces, can complement these efforts and build practical confidence among contractors.

8.6. Promoting Awareness and Stakeholder Engagement

Given the moderate awareness and prevalent neutrality found in the contractor survey, the DoI can organise EWP industry forums bringing together producers, contractors, policymakers, financiers, and international experts to accelerate knowledge transfer, facilitate business connections, and raise the sector's profile – a type of event that is currently absent from Bhutan's wood sector landscape.

Conclusion

This study aimed to assess the market potential of engineered wood products (EWPs) in Bhutan's construction sector, and the findings indicate that there is a strong and emerging opportunity for their development. The analysis demonstrates that while the current level of adoption remains limited, there is a clear foundation for growth driven by positive market perception, increasing construction demand, and strong interest from both contractors and wood-based industries. The expanding construction sector, supported by public investment and large-scale projects, provides a conducive environment for the introduction and scaling of EWPs as an alternative to conventional building materials.

At the same time, the study highlights that the sector is still at an early stage of development, with several structural challenges that must be addressed. Key constraints include high costs, limited domestic production capacity, inadequate supply chains, lack of technical expertise, and the absence of clear regulatory frameworks. These challenges are further compounded by market uncertainties and competition from established materials, which together have slowed the transition from potential to actual adoption.

Despite these limitations, the overall outlook for EWPs in Bhutan remains highly promising. The country's abundant forest resources, combined with the opportunity to move towards higher-value-added wood processing, position EWPs as a strategic pathway for both industrial development and sustainable construction. Furthermore, their alignment with environmental sustainability goals and modern construction practices enhances their long-term relevance within Bhutan's development agenda.

The study, therefore, concludes that the successful development of the engineered wood sector will depend on a coordinated and phased approach that integrates market creation, industrial support, capacity building, and regulatory development. With the right policy support and strategic interventions, EWPs have the potential to play a significant role in transforming Bhutan's construction sector while contributing to economic diversification and sustainable resource utilisation.