International Conference on Business Economics, Social Sciences & Humanities

BAMBOO AS A MATERIAL IN FURNITURE

Indri Kristanty Rahmadani
Universitas Komputer Indonesia, Bandung, West Java, Indonesia

Tiara Isfiaty
Universitas Komputer Indonesia, Bandung, West Java, Indonesia

Rini Maulina
Universitas Komputer Indonesia, Bandung, West Java, Indonesia

Email: indri.75324005@mahasiswa.unikom.ac.id tiara.isfiaty@email.unikom.ac.id
rini.maulina@email.unikom.ac.id

ABSTRACT

Bamboo is a natural material that is environmentally friendly, lightweight, and has good strength, making it a potential alternative in the furniture industry. The trend of using sustainable materials is increasing along with awareness of environmental issues. Bamboo, as a fast-growing material, is an alternative to replace wood in furniture production. However, challenges such as moisture resistance, pest infestation, and structural durability are still major obstacles. This research aims to identify the potential and challenges of utilizing bamboo in furniture design through a literature-based descriptive qualitative approach. The study reviewed previous research on the mechanical properties, aesthetics and sustainability of bamboo in furniture design. Data was obtained from scientific journals, books, and industry reports related to the utilization of bamboo in furniture. The results showed that bamboo has the potential for high durability if processed with proper preservation techniques, such as drying to a moisture content below 15% and lamination. In addition, its flexibility and natural texture allow for the exploration of more innovative furniture designs. With innovation in processing techniques and appropriate marketing strategies, bamboo has the potential to become a key material in the modern furniture industry and support the sustainability of the manufacturing industry.

Keywords: Bamboo, furniture material, sustainability, furniture design, material processing

INTRODUCTION

The furniture industry continues to grow along with the increasing awareness of the importance of sustainability. Concerns about the adverse effects of waste have led to the proposed design of a craft center with a focus on utilizing plastic waste as the main material. The choice of plastic waste as the sole material in this craft center is based on the high amount of plastic waste found and its non-biodegradable nature. To overcome this problem, there are three approaches that can be applied, namely reducing the use of plastic, reusing plastic items before disposal, and recycling plastic waste into new products (Isfiaty, 2017). In the context of sustainability and cultural acculturation, efforts to reduce the use of plastic, reuse plastic items before disposal, and recycle plastic reflect adaptation to environmental challenges without eliminating existing cultural identities. This principle is also reflected in the furniture industry in Indonesia, where materials such as wood and bamboo have long been part of the local heritage

(Fitriana & Isfiaty, 2024). Teak wood, for example, has been used for generations in traditional furniture making, while bamboo is being introduced as a more sustainable alternative (Seftianingsih, 2017). Thus, innovation in the use of bamboo not only supports environmental sustainability but also maintains local cultural values in furniture design (Mubarat et al., 2024; Putra et al., 2021).

Acculturation itself is a concept related to the social process that arises from a group of cultured people who face, interact, with several elements of another culture (foreign culture), Interaction continues to occur until the stage of acceptance of foreign cultural elements begins to be adjusted to its own culture, without the need to eliminate the original culture (Fitriana & Isfiaty, 2024). In the furniture industry in Indonesia, this principle is reflected in the use of wood materials as part of the local identity. Teak wood, for example, has long been used in traditional furniture design due to its strength, durability and high aesthetic value (Fitriana & Isfiaty, 2024). In line with the principle of sustainable design, the use of local wood not only strengthens the cultural character of the design, but also reduces the carbon footprint due to long-distance transportation of materials (Seftianingsih, 2017). In addition, bamboo is being introduced as a more environmentally friendly alternative due to its rapid renewability and durability after proper preservation (Mubarat et al., 2024; Putra et al., 2021).

Thus, the integration between local materials and sustainability principles can strengthen furniture design innovations that retain local wisdom while supporting environmentally friendly practices, such as teak wood which is a characteristic in furniture making in various regions. Thus, the integration between environmentally friendly practices and cultural preservation can be done through material and design innovations that retain local wisdom. One material that is increasingly being discussed is bamboo. Bamboo has great potential as an alternative to wood, bamboo is a material that is increasingly being discussed as an alternative to wood due to its fast-growing, easily renewable, and environmentally friendly nature. Unlike hardwoods that take decades to mature, bamboo can be harvested within 3-5 years, making it a more efficient and sustainable resource (Sulastiningsih et al., 2005). In addition, bamboo has good durability after a proper curing process, making it suitable for use in building construction and furniture (Arsad, 2015). However, there is still a perception that bamboo is a lower-class material and less popular than wood (Fathurrahman & Dharmawan, 2018).

Another challenge faced by the bamboo-based furniture industry is the limited processing infrastructure and lack of product standardization, which causes production costs to be higher than softwood (Seftianingsih, 2017). However, bamboo has great flexibility that allows for the exploration of innovative designs in a variety of craft and furniture products (Putra et al., 2021). With the right processing and marketing strategies, bamboo has the potential to become a major alternative in the modern furniture industry while reducing dependence on conventional wood and maintaining the balance of forest ecosystems (Mubarat et al., 2024; Putra et al., 2021). In addition to ecological aspects and production challenges, market trends show an increasing interest in bamboo furniture. Amidst the growing global demand for eco-friendly products, bamboo is gaining attention as a potential material. Many furniture manufacturers, both locally and internationally, are beginning to explore bamboo as a sustainable alternative material (Suriyani, 2017). In sustainable furniture design and production, material selection not only considers functional and aesthetic aspects, but also cultural values and their impact on the environment (Wasista et al., 2024).

Just as Sikka ikat woven fabrics are full of philosophical and social meanings, furniture materials can also reflect identity and sustainability. Sikka ikat weaving not only functions as a work of art, but also has deep meanings that reflect the social status, religious beliefs, and cultural and economic aspects of the local community (Epo & Maulina, 2024). Similarly, utilizing bamboo as a furniture material not only offers an ecological solution, but also supports the empowerment of local artisans as well as preserving cultural heritage in a more sustainable interior design. With innovation in design and proper promotion, bamboo furniture has a great opportunity to compete in the global market and become part of the sustainable furniture industry solution. The limitation of wood material for the fulfillment of construction materials and furniture raw materials will lead to thoughts of developing technology in an effort to provide alternative materials to replace wood, one of the materials used as a substitute for wood material is bamboo. Bamboo can be used as a substitute for wood furniture construction (Li & He, 2019).

Therefore, this research aims to analyze the potential of bamboo as a key material in the furniture industry by reviewing various literature studies related to its durability, design flexibility, and ecological impact. This study uses a literature-based research method by reviewing various sources such as scientific journals, books, and industry reports related to the processing and application of bamboo in modern furniture design. By understanding the characteristics and challenges of bamboo as a raw material, it is hoped that this study can provide greater insight into its utilization in supporting a sustainable furniture industry.

LITERATURE REVIEW

Research Related to the Utilization of Bamboo as Furniture Material

Bamboo has long been used as a key material in a variety of products, including furniture, construction and household appliances. In recent decades, research on bamboo has been growing, along with the increasing awareness of the importance of environmentally friendly and sustainable materials. Bamboo is known for its fast growth, high mechanical durability and flexibility in design, making it a potential alternative to conventional wood in the furniture industry (Liese & Köhl, 2015). In addition, innovations in bamboo processing techniques, such as lamination and preservation, have improved the quality and competitiveness of this material in the global market (Sulastiningsih et al., 2005).

Research related to the utilization of bamboo in the furniture industry shows that various aspects have been studied, ranging from physical and mechanical characteristics, processing techniques, to marketing strategies for bamboo-based products. To understand more about the development of research in this area, **Table 1** provides a summary of some relevant studies, highlighting key findings, methodologies, and trends over time :

Table 1 Related Research as Furniture Material

Researchers	Research Theme	Research Results
Hidayat (2012)	The potential of bamboo in various industries, including furniture	Identified that 50 out of 125 bamboo species in Indonesia have high potential for crafts and industry. Bamboo is valued as an alternative to wood due to its fast growth and multifunctionality.
Susilo (2015)	Mechanical and aesthetic properties of bamboo in furniture	It was found that bamboo has good compressive and tensile strength, light weight, flexibility, and high aesthetics. However, the main challenge is resistance to pests and moisture fluctuations.
Prasetyo (2020)	Mechanical advantages and sustainability of bamboo	Highlighting bamboo's mechanical advantage of being lightweight yet strong, as well as its sustainability due to rapid growth (3-5 years).
Sulastiningsih et al. (2005)	Bamboo processing techniques for furniture	Identify techniques such as lamination, hot bending, and weaving as the main processing methods.
Miftahul Jannah et al. (2019)	Bamboo utilization in Kading Village	Found that people use bamboo mainly for household needs, but lack information on processing high-value products.
Praswati et. Al (2016)	Marketing strategy for bamboo craft products	Concluded that the quality of raw materials is important for product durability, such as the use of anti-mite and anti-mold coatings.
ITTO PD 600/100 Rev.1 (2011)	Capacity building for an efficient and sustainable bamboo industry	Emphasized the low export value of Indonesian bamboo products due to weak upstream-downstream industrial capacity and lack of data on the physical and mechanical properties of various bamboo species.

ITENAS (2002)	Exploring the aesthetic potential of bamboo through an exploratory approach (assignment in the 3-dimensional basic visual materials (3-dimensional nirmana) of the ITENAS Product Design Department)	Students were able to prove that bamboo is a material that can still be explored more deeply, and can offer novelty that other materials cannot. With this proof, the use of wood will be significantly reduced, so that deforestation can be gradually reduced.
Annisa, B.P. & Permanasari, M.D. (2021)	Exploration of Fine Bamboo Twists in the Design of Decorative Lamps	Fine bamboo strips have the potential of flexible and transparent material characteristics but have not been optimally utilized. The aim of this design project is to maximize the potential of transparency and flexibility of fine bamboo strips into decorative lighting product designs.
Jamaludin et. Al (2022)	Bamboo-based Design Development and Innovation in the Village	The properties and characteristics of bamboo allow bamboo weaving products to be sustainable given the fast-growing bamboo trees, which are readily available as the main material.

Unique Characteristics of Bamboo Compared to Other Materials

Bamboo has long been recognized as a versatile material that is utilized in a variety of products, ranging from furniture to kitchenware. Recent developments in bamboo processing technology have allowed this material to be used as an alternative to wood, such as in laminated bamboo products applied to parquet and furniture (Anas, 2017). Each type of plant has unique characteristics that distinguish it from others, so the material derived from the plant has distinctive properties. As a fibrous material, bamboo has specific characteristics that include:

a. A structural characteristic that determines the strength and flexibility of a material through its internal arrangement.
b. Dimensional characteristics shaped by age and growth patterns create variations in size between species.
c. The physical and chemical characteristics, which are influenced by the content of constituents, provide distinctive physical properties.
d. Aesthetic characteristics that give the material a unique visual appearance and visually distinguish it.

These four characteristics interact with each other and determine the potential and application of a plant material.

The Advantages of Bamboo in the Furniture Industry

Bamboo is one of the natural resources with great potential in the furniture industry. There are an estimated 600-700 species of bamboo in the world, with 125 species found in Indonesia. Of these, around 50 species have high potential to be developed as raw materials for crafts and industry (Hidayat, 2012). The main advantages of bamboo include:

- **Mechanical Strength:** Bamboo is lightweight but has a high resistance to load, so it can be an alternative to hardwood (Prasetyo, 2020).
- **Sustainability:** Bamboo grows fast in 3-5 years, much faster than conventional wood which takes decades to mature (Sulastiningsih et al., 2005).

- **Ease of Processing:** Bamboo can be processed into various forms of furniture with techniques such as lamination, hot bending, and weaving (Hidayat, 2019).
- **Aesthetics:** Bamboo's distinctive fibers provide a unique aesthetic value in modern and traditional interior design (Prasetyo, 2020).

Despite its many advantages, the utilization of bamboo in furniture still faces several challenges such as pest and fungus resistance, dimensional stability, and the need for processing expertise. With proper management, bamboo can be an eco-friendly and sustainable material solution for the furniture industry in the future.

Based on the literature review, this research aims to analyze the advantages of bamboo as a furniture material through a literature-based qualitative approach. The study explores the characteristics of bamboo, its benefits over other materials, and its role in supporting the sustainability of the furniture industry. As such, this research is expected to provide insights for designers, manufacturers and consumers in optimizing the utilization of bamboo and raising awareness of the importance of eco-friendly material innovation. Previous studies have discussed various aspects of bamboo utilization in the furniture industry, ranging from the potential of bamboo species, its mechanical and aesthetic properties, processing techniques, to marketing strategies. Below are the key points of these studies:

- Bamboo's Potential: Several studies identify the great potential of bamboo as an alternative to wood in the furniture industry. In Indonesia, many bamboo species have high potential for crafts and industry due to their rapid growth and multifunctionality.
- Mechanical and Aesthetic Properties of Bamboo: Bamboo has good compressive and tensile strength, is lightweight, flexible, and has high aesthetic value. However, the disadvantage of bamboo is that it is susceptible to pests and moisture changes.
- Bamboo Utilization in the Community: Bamboo utilization by the community is still limited to household needs and has not been processed into high-value products.
- Bamboo Industry Development: The export value of Indonesian bamboo products is still low due to weak industrial capacity and lack of data on the physical and mechanical properties of various bamboo species. Other research emphasizes the need to develop the capacity of an efficient and sustainable bamboo industry.

Bamboo is one of the natural resources that has great potential to be developed in various industries, including the furniture industry. There are an estimated 600 to 700 species of bamboo in the world, with 125 species found in Indonesia. Of these, around 50 bamboo species have high potential to be developed as raw materials for crafts and industry (Hidayat, 2012). The main advantage of bamboo is its fast growth and multifunctional nature, making it an alternative to conventional wood which takes longer to harvest. Indonesia is the third largest producer of bamboo in the world after China and Thailand (Hidayat, 2012).

Bamboo has been widely used in the furniture industry due to its lightweight, flexible nature and high aesthetic value. In addition, bamboo also has a unique fiber structure, which provides good resistance to compressive and tensile loads (Susilo, 2015). Some of the main advantages of bamboo in the furniture industry include:

- Mechanical Strength: Bamboo has a fairly high resistance to load, so it can be an alternative to hardwood (Prasetyo, 2020).
- Sustainability: Bamboo can grow quickly within 3-5 years, much faster than conventional wood which takes decades to mature (Sulastiningsih et al., 2005).
- Ease of Processing: Bamboo can be processed into various forms of furniture with different techniques, such as lamination, heat bending, and weaving (Hidayat, 2019).
- Aesthetics: Bamboo's distinctive fibers provide a unique aesthetic value in modern and traditional interior design (Prasetyo, 2020).

While bamboo has many advantages, there are some challenges in utilizing it as a furniture material. One of the

main challenges is its resistance to pests and mold. Bamboo is susceptible to pests such as termites and powder beetles due to the starch content found in the bamboo flesh (Noor, 2009). Other challenges include:

- Resistance to Pests and Fungi: Without proper preservation, bamboo is susceptible to destructive organisms such as blue stain and insects (Susilo, 2015).
- Dimensional Stability: Bamboo tends to shrink and change shape due to fluctuations in air humidity, which can affect the quality of the furniture produced (Hidayat, 2019).

Bamboo is a natural material that has great potential in the furniture industry. Its advantages include mechanical strength, sustainability, ease of processing, and high aesthetic value. However, several challenges such as pest resistance, dimensional stability, and the need for processing expertise need to be addressed to optimize the utilization of bamboo in the furniture industry. With proper management, bamboo can be an eco-friendly and sustainable material solution for the furniture industry in the future. Furniture, or furnishings, are an important element in human life indoors. According to Yordanus (2013), furniture is a term used for household furniture that functions as a place to store goods, a place to sit, a place to sleep, and a place to do something in the form of a table or a place to put things on its surface. In general, furniture functions as a facility that supports various human activities in the room, from waking up, doing activities, to resting again. The selection and arrangement of the right furniture not only supports function and comfort, but also contributes to the aesthetics and efficiency of space in a room. As stated by Yordanus (2013), furniture can be made of various materials such as wood, bamboo, metal, or plastic. As an artistic product, furniture usually made of selected woods with beautiful colors and textures that are done with fine finishes.

Based on this, it is necessary to dig deeper into the potential advantages of bamboo in furniture materials as a broad utilization to increase public awareness to preserve forests by innovating using bamboo as a furniture industry to spur sustainability. Therefore, this study was conducted to analyze the advantages of bamboo as a furniture material through a literature-based qualitative approach. This study will explore the characteristics of bamboo, its benefits over other materials, and its role in supporting the sustainability of the furniture industry. Thus, this research is expected to provide insights for designers, manufacturers, and consumers in optimizing the utilization of bamboo.

METHODOLOGY

This research uses a descriptive, literature-based qualitative approach to analyze the use of bamboo as a material in furniture design. This method was chosen to deeply explore the meanings, perceptions, and interpretations related to the use of bamboo in the furniture industry, especially in the context of sustainable and innovative design. The qualitative approach allowed the research to identify patterns, themes, and concepts that developed in the utilization of bamboo as a furniture material. Various literature sources, including scientific journals, books, research reports and articles relevant to this topic, were analyzed. Furthermore, this research also explores the transformation of bamboo furniture design, looking at how aspects of aesthetics, symbolism and material innovation create added value in interior design. In addition, this research will examine how bamboo's characteristics, such as flexibility, strength and sustainability, are interpreted in the context of modern furniture design. With this method, the research is expected to provide new insights for designers, academics, and furniture industry players in optimizing the use of bamboo as a material that is not only functional, but also has strong aesthetic and philosophical values.

RESULT & DISCUSSION

RESULT

Bamboo has the potential to be a superior furniture material compared to wood. This is due to several factors, including the higher level of flexibility of bamboo, the longer size of bamboo, and a much faster harvesting period

compared to wood (Hidayat, 2012). These advantages make bamboo more efficient to use as a material in furniture making. In addition, bamboo is also a renewable natural resource, as it can regrow quickly after being harvested. According to Sukirno and Purwanto (2014), innovation is a new finding that can be in the form of an idea, method, or form that is different from what has existed before. In this context, the use of bamboo as a furniture material is a form of innovation, where bamboo, which may not have been considered much until now, becomes a more environmentally friendly and efficient alternative to wood, which has several limitations, such as longer harvesting time and more intensive processing, both of which play a significant role in bamboo production. Bamboo, as a sustainable material, requires careful cultivation and management to ensure its quality and durability. The Keputih Bamboo Forest in Surabaya **(Figure 1)** serves as an example of how bamboo is grown and maintained before undergoing further processing for various applications.

Figure 1 Keputih Bamboo Forest, Surabaya
(Source: Google.com, 2025)

Furniture products made from bamboo are expected to have more value than wood, both in terms of art and price. This is due to the characteristics of bamboo which has a very interesting shape and the uniqueness of each type of bamboo, such as different fibers, shapes, sizes and colors. In addition, bamboo also has aesthetic value that can increase the attractiveness of furniture products. According to Muhammad (2019), the factors of capital, labor and raw materials simultaneously affect the income of the furniture industry. In this case, bamboo as a raw material provides an opportunity to create more valuable products, because of the diversity of bamboo which allows the creation of more varied and unique furniture designs. These advantages of bamboo make it an attractive option in the furniture industry, which is not only beneficial in terms of beauty, but also provides better economic opportunities for the furniture industry.

Bamboo has a very important role in the life of rural communities, especially in the interior field. As revealed by Rekno (2018), bamboo has excellent properties to be utilized, including its strong, resilient, straight, hard, flat, easy to split, easy to shape, and light, making it easier to transport and work with. These advantages make bamboo an ideal material for a variety of needs, both in building construction and furniture making. In addition, bamboo is also relatively cheaper than other building materials, thus providing better economic value, especially for rural communities. Bamboo in round form can be used for a wide variety of building constructions, while in split form, it can be made into cubicles, walls or floors, fences, crafts, and many other products. The diverse forms and functions of bamboo make it a versatile plant that is highly valuable to rural communities, including in the manufacture of furniture that has high aesthetic value.

This research focuses on the utilization of bamboo as a material in furniture design, highlighting its technical characteristics, advantages and innovative potential in the furniture industry. Below are some of the key findings based on the literature review:

Table 2 Bamboo Types and Descriptions

Type of Bamboo	Scientific Name	Structural Characteristics	Physical Characteristics	Aesthetic Characteristics	Description

 ***Figure 2*** Bamboo Petung (Source: Google.com, 2025)	*Dendrocalamus Asper*	Very strong, pressure and impact resistant (Nuroji et. Al., 2021).	Thick, heavy (Nuroji et. Al., 2021).	Crude fiber, natural (Nuroji et. Al., 2021).	Petung bamboo is bamboo with large and thick stems, very strong and durable. Suitable for use for heavy furniture. Able to withstand pressure and impact (Nuroji et. Al., 2021). Petung bamboo culms can reach a length of 10 meters to 14 meters, internode length ranges from 40 cm to 60 cm, with a diameter of 6cm to 15 cm, wall thickness of 10 mm to 15mm (Morisco, 1999).
 ***Figure 3*** Bamboo Gutter (Source: Google.com, 2025)	*Gigantochloa Apus*	Flexible, easy to mold (Novriyanti & Nurrohman, 2004).	Mild (Novriyanti & Nurrohman, 2004).	Fine fiber, bright color (Novriyanti & Nurrohman, 2004).	Chamfered bamboo is bamboo with slender and long culms, flexible and malleable. It is suitable for aesthetic design, but is lighter and vulnerable to hard impacts (Novriyanti & Nurrohman, 2004).

 ***Figure 4*** Tamiang Bamboo (Source: Google.com, 2025)	*Thyrsostachys olivery*	Small, impact resistant (Ritonga et. Al., 2020).	Easy to mold (Ritonga et. Al., 2020).	Unique pattern (Ritonga et. al., 2020).	Tamiang bamboo is a bamboo with small and flexible stems, easily molded into intricate and decorative designs. It has good resistance to impact (Ritonga et. Al., 2020).
 ***Figure 5*** Black Bamboo (Source: Google.com, 2025)	*Bambusa Textilis*	Strong, moisture and pest resistant (Widnyana, 2012).	Medium weight (Widnyana, 2012).	Dark colors, elegant (Widnyana, 2012).	Black Bamboo is a dark-stemmed bamboo that is strong and resistant to moisture and pests. Ideal for furniture with a luxurious and elegant impression (Widnyana, 2012).

This description table contains information on the scientific name and a brief description of each type of bamboo used in the furniture industry.

Based on the table above, petung bamboo is the strongest type in terms of strength and function, making it suitable for construction and heavy furniture. Black bamboo has good resistance to moisture and pests, making it an ideal choice for luxury furniture. Chamfered bamboo is lighter and more flexible, suitable for aesthetic and decorative designs. Meanwhile, tamiang bamboo has great flexibility, so it is often used in interior decoration products and accessories. The choice of bamboo type depends on the requirements of its use, whether for structural strength, aesthetics or design flexibility. This information forms the basis for further analysis of bamboo utilization in the furniture industry. **Table 3** provides a detailed characterization of each bamboo type, including its structural integrity, processing requirements, and potential applications, serving as a fundamental reference for material selection and product development.

Table 3 Comparative Analysis between Bamboo Material Types

Type of Bamboo	Usage	Strength and durability	Flexibility and aesthetics	analysis
Bamboo Petung	• Table • Chair	• Extremely strong,	Not very flexible for complex	Suitable for outdoor furniture

	• Heavy Furniture Rack (Nugraha, 2014)  **Figure 6** One of the furniture with Petung Bamboo Material, namely Chairs and Tables (Source: Google.com, 2025)	resistant to pressure and impact. • Resistant to moisture and pests (Nugraha, 2014)	designs, suitable for large and stable furniture (Nugraha, 2014).	and large constructions (Nugraha, 2014).
Gutter Bamboo	• Chair • Coffee Table • Interior Decoration (Nugraha, 2014).  **Figure 7** Furniture that uses Bamboo Gutter Material (Source: Google.com, 2025)	• Durable enough, albeit lighter • Moisture resistant, but more vulnerable to hard impacts (Nugraha, 2014).	Flexible and malleable for aesthetic design, but not suitable for heavy furniture (Nugraha, 2014).	Ideal for decoration and light furniture (Nugraha, 2014).
Bamboo Tamiang	• Chair • Cabinets • Household furniture (Nugraha, 2014).  **Figure 8** One of the furniture with Petung Bamboo Material, namely Chairs and Tables (Source: Google.com, 2025)	• Has good resistance to impact, • but are more susceptible to moisture if not treated (Nugraha, 2014).	Very flexible, suitable for intricate and decorative designs (Nugraha, 2014).	Good for furniture with complex and elastic designs (Nugraha, 2014).
Black Bamboo	• Chair • Table	• Very strong, resistant to	Elegant and luxurious	Suitable for furniture that

	• Household accessories (Nugraha, 2014).  Figure 9 One of the Furniture with Petung Bamboo Material, namely Chairs and Tables (Source: Google.com, 2025)	moisture and pest attack. • More impact resistant than other bamboos (Nugraha, 2014).	impression, suitable for designs that require visual appeal (Nugraha, 2014).	requires a luxurious and elegant impression (Nugraha, 2014).

Comparative Analysis of Bamboo Materials in Furniture

Based on a literature review, bamboo has several advantages over wood in furniture manufacturing, including:

Table 1, shows that various previous studies have identified the advantages of bamboo in the furniture industry, both in terms of mechanical properties, aesthetics, and a more positive environmental impact than hardwoods. Bamboo has a high growth rate and can be harvested in a shorter time compared to conventional timber trees. Several studies have also highlighted that while bamboo has good strength, its weakness lies in its resistance to moisture and pest infestation, which requires special treatment before it can be optimally used as a furniture material. In addition, research also reveals that the bamboo industry in Indonesia still has limitations in terms of production capacity, processing techniques, as well as marketing strategies, leading to the low competitiveness of bamboo products in the global market. .

Table 2, then, provides information on the various types of bamboo commonly used in the furniture industry, along with the structural, physical and aesthetic characteristics of each type. **Petung Bamboo (*Dendrocalamus asper*)** has high strength and good resistance to pressure and impact, making it very suitable for heavy furniture making and large constructions. **Black Bamboo (*Bambusa textilis*)** offers better resistance to moisture and pest attacks, making it an ideal choice for luxury and premium furniture. Meanwhile, **Bamboo Talang (*Gigantochloa apus*)** and **Bamboo Tamiang (*Thyrsostachys olivery*)** are more flexible and lightweight, making them more suitable for furniture designs that require flexibility, such as interior decoration and woven products. By understanding the characteristics of each type of bamboo, furniture designers and manufacturers can choose the material that best suits the design needs and functionality of their products, and in

Table 3, compares different types of bamboo based on their use in the furniture industry, their strength and durability, as well as their flexibility and aesthetics. Petung bamboo is the strongest type, making it suitable for making tables, chairs and shelves with a solid structure. However, due to its lack of flexibility, this type of bamboo is less ideal for designs that require more complex shapes. Talang bamboo is lighter and malleable, making it a good choice for decorative furniture, but less resistant to hard impacts. Tamiang Bamboo has great flexibility and is often used for intricate designs that require elastic materials, although its weakness lies in its resistance to moisture. Black Bamboo, on the other hand, offers a combination of strength, resistance to pests and moisture, and luxurious aesthetics, making it suitable for furniture that emphasizes high aesthetic value.

DISCUSSION

The potential of bamboo as a building material is still very large to be developed. However, like any other building material, bamboo also has its advantages and disadvantages. Therefore, we are faced with the challenge of innovating in developing structural patterns and processing of bamboo, so that it can become a more and more

widely utilized alternative building material in the future. In addition, we also need to find solutions to overcome the weaknesses of bamboo so that it can become a higher quality building material (Yuuwono, 2016)

Comparative Analysis of Bamboo Materials in Furniture

Based on a literature review, bamboo has several advantages over wood in furniture manufacturing, including:

- **Production efficiency**: Faster harvesting period compared to hardwoods.
- **Sustainability**: Resources that can be renewed quickly.
- **Aesthetic uniqueness**: Has a variety of distinctive shapes, colors, and textures.
- **Flexibility in design**: Easy to mold and use in various design concepts.

However, there are some limitations to the utilization of bamboo, such as:

- **Resistance to moisture and pests** that require special treatment.
- **Mechanical properties vary** depending on the type of bamboo used.
- **Limited processing technology** that still requires further innovation in order to compete with conventional wood materials

The analysis shows that the utilization of bamboo in furniture design has great potential as a more environmentally friendly alternative to wood. The advantages of bamboo in terms of flexibility, durability and aesthetics allow the creation of innovative and varied furniture designs. In addition, the lightweight and malleable characteristics of bamboo provide convenience in the production and transportation process.

Based on the objective of this research, which is to examine the advantages of bamboo as a furniture material, it can be concluded that:

- **The research objectives have been achieved** by demonstrating that bamboo has various advantages over wood in the furniture industry.
- **The main obstacles encountered** were the need for special treatments to improve bamboo's resistance to moisture and pests, as well as the limitations of processing technologies that still require further innovation.

This study has several limitations, including:

1. **Limited to a literature study** without any direct testing of the mechanical characteristics of bamboo in furniture making.
2. **Focus on material advantages** without further exploring the distribution and marketing challenges of bamboo-based furniture products.
3. **There is a lack of empirical data** on the market response to bamboo furniture compared to conventional wood furniture.

The implications of this research for academics and practitioners are:

- **For academics**, this research can serve as a basis for further studies on bamboo processing innovations in furniture design.
- **For the furniture industry**, the results of this study can serve as a reference in developing bamboo-based furniture products that are more competitive in the market.
- **For policy makers**, this research shows that bamboo has great potential as a sustainable material that needs to be supported by appropriate resource management and industry development policies.

Bamboo has great potential, but when compared to wood, it has weaknesses in terms of physical, mechanical and chemical properties, leading to its suboptimal use. Therefore, more information on bamboo is needed to obtain high-quality bamboo plants (Setiawaty, E, 2006). Bamboo processing varies depending on its utilization, especially in furniture making. Therefore, it is important to know how to improve the quality and added value of bamboo in the development of small and medium industries. Bamboo has been widely used by the community, ranging from simple technology to industrial-scale use with an export orientation. In general, people utilize bamboo for household needs with simple technology, while industries focus more on export orientation.

CONCLUSION AND RECOMMENDATION

CONCLUSION

Based on the analysis results presented in **Table 1**, **Table 2**, and **Table 3**, it can be concluded that bamboo has great potential as a key material in the furniture industry. The main advantages of bamboo lie in its mechanical strength, its flexibility in design, and its sustainability as a rapidly renewable natural resource. However, there are several challenges in its utilization that need further attention so that bamboo can become a more competitive alternative to conventional wood materials.

Overall, bamboo has great potential to replace wood in the furniture industry, mainly due to its abundant availability, rapid growth, and environmentally friendly nature. However, there are several challenges that need to be addressed, including the need for innovation in bamboo processing techniques to make it more resistant to moisture and pests, as well as the development of more effective marketing strategies to increase the competitiveness of bamboo products in domestic and international markets. In addition, further research is needed to optimize the characteristics of bamboo in various furniture applications, including the exploration of more innovative lamination, preservation and finishing techniques. With development efforts in processing, protection and marketing, bamboo can become one of the main materials supporting the sustainable furniture industry in the future. Wider utilization of bamboo will not only provide economic benefits to the creative industry and local artisans, but can also contribute to environmental conservation efforts by reducing dependence on conventional wood from natural forests.

RECOMMENDATION

Based on the findings of this study, increasing the use of bamboo in the furniture industry requires a strategic approach. One of the key aspects is the development of bamboo processing technology. Bamboo has great potential as a sustainable alternative to wood, but its durability remains a challenge. To address this issue, it is essential to develop more effective preservation techniques that enhance bamboo's resistance to moisture, pests, and decay. Methods such as chemical treatments, heat processing, and natural preservation techniques should be further explored. Additionally, the application of lamination and composite technology can improve bamboo's mechanical strength, making it more suitable for structural applications in furniture design. By enhancing these processing techniques, bamboo can become a more reliable and long-lasting material in the modern furniture industry.

Education and training for craftsmen also play a crucial role in maximizing the potential of bamboo. Many traditional craftsmen are skilled in working with bamboo, but there is still a need to improve their knowledge and techniques to meet contemporary design and quality standards. Training programs should focus on innovative bamboo processing methods, efficient construction techniques, and sustainable design principles. Furthermore, equipping craftsmen with the necessary business and marketing skills can help them compete in a market that is still largely dominated by conventional wood-based furniture. By investing in education and skill development, the furniture industry can ensure that bamboo-based products gain wider acceptance and higher economic value.

ACKNOWLEDGEMENT

We would like to express my sincere gratitude to Universitas Komputer Indonesia for the moral support provided during this research. I also extend my appreciation to the individuals and institutions that contributed valuable insights and discussions, enriching the findings of this study.

REFERENCES

Arsad, E. (2015). Bamboo processing technology and benefits. *Journal of Forest Products Industry Research*, 7(1), 45-52. https://media.neliti.com/media/publications/453047-none-8e15bb62.pdf

Epo, A. L., and Maulina, R. (2024). ANALYSIS OF THE SHAPE AND MOTIVE ARTS OF DALA MAWARANI WOODWORK, SIKKA DISTRICT, FLORES, EAST CENTRAL NUSA.*Process of International Conference on Business, Economics, Social Sciences, and Humanities*, *7*, 1046-1055.https://doi.org/10.34010/icobest.v7i.618

Fathurrahman, U. F., & Dharmawan, C. (2018). Exploration of bamboo in furniture by Harry Mawardi. *Waca Cipta Ruang: A Scientific Journal of Interior Design*, 4(2), 313-317. https://ojs.unikom.ac.id/index.php/wacaciptaruang/article/view/313

Fitriana, T. R., & Isfiaty, T. (2024). CULTURAL ACCULTURATION IN THE INTERIOR OF CHENG HO PANDAAN MOSQUE IN EAST JAVA. *International Conference on Business, Economics, Social Sciences, and Humanities*, *7*, 147-156. https://doi.org/10.34010/3n6k5w09

Hidayat, A. (2019). The role of bamboo in modern interior design and its sustainability. *Indonesian Interior Design Journal*, 8(2), 45-56

Isfiaty, T. (2017). Implementation of Recycled Plastic Materials on Environmental Aesthetics. *Waca Cipta Ruang*, *3*(2), 244-249. https://ojs.

ITENAS Product Design Department. (2002). *Exploration of bamboo potential through assignment of basic 3-dimensional visual materials (3-dimensional nirmana)*. National Institute of Technology Bandung. Retrieved from https://lib.itenas.ac.id/kti/?p=5331

Jahrani, M. (2019). The influence of capital, labor, and raw materials on the income of the wood furniture industry in Banjarmasin City (Case Study of Alalak Tengah Village, North Banjarmasin District). *JIEP: Journal of Economics and Development*, 1(1)

Jamaludin, et al. (n.d.). Bamboo-based Design Development and Innovation in the Village. Rekarupa Journal. Retrieved from https://ejurnal.itenas.ac.id/index.php/rekakarya/article/download/6414/2964

Jannah, M., Baharuddin, B., & Taskirawati, I. (2019). Potential and utilization of bamboo plants on community land in kading village, barru district. *Perennial*, *15*(2), 87-92.

Li, H., & He, X. (2019). Research on bamboo furniture design based on D4S (Design for Sustainability). *IOP Conference Series: Earth and Environmental Science*, 310, 022082. https://iopscience.iop.org/article/10.1088/1755-1315/310/2/022082

Liese, W., & Köhl, M. (Eds.). (2015). *Bamboo: The plant and its uses*. Springer. https://doi.

Mohamad, S., & Hidayat. (2012, October 23). Bamboo as an environmentally friendly product to improve sustainable people's economy. Speech of the Minister of Industry at the opening of the National Bamboo Development Forum, Jakarta.

Morisco. (1999). *Bamboo engineering*. Nafiri Publisher.

Mubarat, H., Viatra, A. W., Pambudi, D. R., & Ansyah, A. (2024). Bamboo craft training to improve skills and income of Gajah Mati Village community, Babat Supat Sub-district, Musi Regency. *Journal of Abdimas Galuh*, 6(1), 676-685. https://ejournal.unigal.ac.id/index.php/abdimasgaluh/article/view/676

Novriyanti, E., & Nurrohman, E. (2004). Simple preservation of talang bamboo. *Journal of Forest Products Research*, *22*(4), 223-230.

Nuroji, Sukamta, & Iyowau, N. (2021). Experimental Study of Flexural Behavior of Layered Bamboo Board with Petung Bamboo Type. *Cycle: Journal of Civil Engineering*, *7*(1), 19-30. https://doi.

Poerwanto, S., & Zakaria, L. (2014). *Business Communication: Conceptual and Cultural Perspectives*. Yogyakarta: Student Library.

Prasetyo, R. (2020). Structural characteristics of bamboo as a sustainable furniture material. *Journal of Materials Engineering*, 12(1), 78-89

Praswati, A. N., Syamsudin, S., Isa, M., & Prijanto, T. (2016). Product Catalog Marketing Strategy (Case Study of Sukodono Sragen Bamboo Craftsmen). *Benefit: Journal of Management and Business (This Journal Has Migrated)*, *1*(2), 149-155.

Putra, I. G. A. P., Putra, N. T. S., Gunawarman, A. A. G. R., & Putra, I. B. G. P. (2021). The potential of bamboo as an alternative material for furniture. *Scientific Journal of Architecture*, *Warmadewa University*, 55-60. https://ejournal.warmadewa.ac.id/index.php/jia/article/view/55

Putri, A. B., & Dian, P. M. (2021). EXPLORATION OF FINE BAMBOO SLICES IN DECORATIVE LAMP DESIGN. *FAD*

Ritonga, M. A., Navia, Z. I., Arico, Z., & Damayanto, I. P. G. P. (2020). Bamboo species diversity in the Leuser Ecosystem Area, Tenggulun District, Aceh Tamiang District, Aceh. *Germplasm Bulletin*, *26*(2), 109-122.

Setiawaty, E., & Masyamah. (2006). Analysis of bamboo utilization in industry and crafts in terms of physical and mechanical properties and future prospects. *Warta Balai Industri Banjarbaru*, 21(1), June 2006. Balai Riset dan Standardisasi Industri, Banjarbaru

Seftianingsih, D. K. (2017). Introduction to Various Types of Furniture with Material Combinations and Their Construction. *Kemadha Journal*, *7*(1). https://jurnal.usahidsolo.ac.id/index.php/kmd/article/view/473/390

Sulandjari, R. (2018). Marketing communication strategy on entrepreneurial interest in local products (bamboo handicrafts) in KWD Pulutan Village, Sidorejo Sub-district, Salatiga City. *Egalitarian Journal*, 2(03).

Sulastiningsih, I. M., Nurwati, & Santoso, A. (2005). Effect of wood layers on bamboo lamina properties. *Journal of Forest Products Research*, 23(1), 15-22.

Suriani, E. (2017). Bamboo as an alternative to ecological materials: potential and challenges. *EMARA: Indonesian Journal of Architecture*, *3*(1), 33-42. https://doi.

Susilo, E. (2015). Utilization of bamboo as an alternative raw material in the furniture industry in Indonesia. *Journal of Interior Design*, 7(2), 55-70.

Syahrany Noor, G. (2009). Bamboo core plywood. *Regional Research and Development Agency (Balitbangda) of South Kalimantan Province*, 1(1). Banjarmasin

Wasista, P. U., Giri, K. R. P., Artadi, I. M. P., Kerdiati, N. L. K. R., Trisna, N. M. S. W., Darmastuti, P. A., ... & Putra, P. S. U. (2024). *Interior Design: Theory and Development*. SIDYANUSA

Widnyana, K. (2012). Bamboo with its various benefits. *Bumi Lestari Journal of Environment*, *8*(1), 1-10.

Yordanus. (2013). Wood furniture design and construction. University of Education Indonesia. https://repository.upi.edu/8766/2/s_psr_0809503_chapter1.pdf

Yulianto, B. (2018). Bamboo as the main material in sustainable furniture industry. *Journal of Wood Engineering*, 10(3), 99-115.

Yuuwono, A. B. (2016). Potential development of bamboo as an environmentally friendly building material. *Journal of Civil Engineering and Architecture*, 18(22). https://doi.org/10.36728/jtsa.v18i22.362

ABOUT THE AUTHORS

Indri Kristanty Rahmadani, email: indri.75324005@mahasiswa.unikom.ac.id

Indri Kristanty Rahmadani is a master's student at the UNIKOM Postgraduate Faculty. She is currently conducting

research for her thesis with the theme of interior design. The last education that has been taken is Bachelor of Interior Design. Pursuing a master's study to continue her career as a lecturer.

Tiara Isfiaty, email: tiara.isfiaty@email.unikom.ac.id

Tiara Isfiaty is a lecturer at Universitas Komputer Indonesia. She teaches in the Master of Design study program (postgraduate) and serves as the head of the Interior Design study program (undergraduate) and teaches several courses in the program. She completed her education at the Bandung Institute of Technology.

Rini Maulina, email: rini.maulina@email.unikom.ac.id

Rini Maulina is an Associate Professor and head of the Visual Communication Design Study Program at UNIKOM. She actively conducts research activities in the fields of art, design, and culture, as well as actively creating artworks. She earned her degree from Bandung Institute of Technology, Bandung, West Java, Indonesia.