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APPLICATION OF BAMBOO PRODUCTS FOR GREEN INTERIOR

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ABSTRACT

Purpose: Bamboo is not widely accepted in Ghanaian society, as most people frown at its products and do not know the abundant eco-friendly aesthetic products obtained from it. The research aims to investigate the comprehensive application of bamboo products in green interior design, focusing on sustainability.

Design/Methodology/Approach: This study employed a cross-sectional research design to investigate the sustainability and marketability of bamboo and bio-based products in the interior design sector. A convenient sampling technique was used to collect data using a structured questionnaire developed specifically for this study to gather information on the demographic profile of artisans, the quality and use of bamboo products, levels of patronage, and competition with imported goods.

Findings: Innovative strategies, including eco-design, product life extension, and sustainable materials utilisation, have been identified as important factors in defining the contributions that bamboo products can make to broadening the sources of materials needed in the interior.

Research Limitation: Research confined to specific climate zones. Limited long-term performance data for bamboo products in interior applications.

Practical Implication: Advocacy for the patronage of more bamboo products leads to carbon sequestration, a means of achieving net zero (of carbon emissions) by 2050, the worldwide dream. This will result in low carbon emissions and reduced global warming and its antecedence.

Social Implication: Exposure of bamboo products to consumers enhances the marketability of the products, leading to more job creation, financial enhancement, and improved livelihood. Policymakers will, therefore, have to devise a strategy to ensure the continual supply of raw materials that will not endanger the ecosystem. Establishing bamboo plantations will result in re-afforestation, and marketing the harvested bamboo will eliminate rural poverty. This will lead to the achievement of the SDG 1.

Originality/ Value: This study aims to enhance the patronage of our Indigenous bio-based handicraft products from bamboo by architects and interior designers to curtail our carbon footprints through enhanced carbon sequestration.

***Keywords**: Bamboo. eco-design. eco-friendly. green. interior space*

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INTRODUCTION

The global shift towards sustainability and eco-friendliness has increased interest in bio-based materials, notably interior design, architecture, and handicrafts (Azam et al., 2023). Among the most promising of these materials is bamboo, a versatile, sustainable, and eco-friendly alternative to conventional materials such as wood and plastic. Bamboo's growing appeal is mainly due to its regenerative nature, rapid growth rate, and minimal environmental impact during cultivation (Amjad, 2024). This article explores the role of bamboo in promoting sustainability within the interior design industry, particularly in Ghana. The study seeks to highlight the potential of bamboo to not only replace traditional materials but also contribute to environmental preservation and the sustainable development of the handicraft industry.

Bamboo is a unique and valuable resource that belongs to the perennial grass family Poaceae, and the subfamily Bambusoideae (INBAR Working Paper, 2020) and exhibits tree-like characteristics, making it an ideal material for various applications, including furniture, flooring, and decorative items. There are over 1,250 species of bamboo, which thrive in diverse climatic conditions and can grow in a wide range of soil types (Lobovikov et al., 2009).

There are seven (7) indigenous bamboo species in Ghana (Forestry Commission, 2016), with *Bambusa vulgaris* forming about 90%-95%, of the population (Ebanyenle & Oteng-Amoako, 2007). Tekpetey, in 2011, estimated the bamboo coverage in the country to be about 300,000 ha. Bamboo's rapid growth—maturing in 3 to 5 years compared to the decades required for hardwood trees—makes it a renewable and inexhaustible resource when appropriately managed (Peprah et al., 2014).

The regenerating tendency of bamboo after harvesting makes it an inexhaustible material. (Lobovikov et al., 2009), Peprah et al, (2014). Bamboo is also known to be the fastest-growing plant, as it has been recorded to have species that grow up to 91cm per day (Guinness World Records, 2024). Globally, the bamboo trade generates approximately $4.5 billion annually, with around 2.5 billion people utilising bamboo products daily and over a billion people residing in bamboo homes (INBAR, 2023).

Despite its numerous advantages, bamboo remains underutilised in many parts of the world, including Ghana. The general population in Ghana is often reluctant to embrace bamboo products, mainly due to limited awareness of its benefits and aesthetic potential in modern design. This reluctance parallels similar challenges faced in other regions, such as Fiji, where the Bamboo Awareness Foundation (BAF) conducted workshops to promote bamboo's use in 1998 (SPRIG, 1999). In Ghana, however, bamboo continues to be overshadowed by the dominance of traditional hardwoods, which are rapidly depleting due to unsustainable logging practices. This study, therefore, aims to shed light on the potential of bamboo products to enhance interior spaces while

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simultaneously promoting environmental sustainability and preserving the nation's natural resources.

Plate 1: Culms of bamboo : (a) Fresh ones, over and above ; (b) Drying ones directly above

The primary goal of this study is to explore the potential of bamboo products in the Ghanaian interior design industry, with a particular focus on their sustainability, marketability, and capacity to replace traditional materials. To this end, the study seeks to answer several key objectives, including determining the workforce's level of skills, establishing the quality of products and areas (living room, parlour, garden, kitchen) of usage, and identifying the consumer's perception of bamboo products.

This study is significant because it addresses a gap in the literature regarding the use of bamboo in interior design in Ghana. While bamboo has been extensively studied in other parts of the world,

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there is limited research on its potential in West Africa. Focusing on the Ghanaian market, this study provides valuable insights into how bamboo can contribute to regional sustainability while offering practical recommendations for increasing its use in interior design.

Moreover, this study's findings have broader implications for the global interior design industry. As the world grapples with the effects of climate change and resource depletion, there is an urgent need to adopt sustainable and functional materials. Bamboo offers a viable solution to these challenges with its myriad environmental benefits. This study aims to promote greater adoption of bamboo products in Ghana and beyond by showcasing its potential in interior design.

The interior design industry is at a critical juncture where sustainability and eco-friendliness are becoming essential considerations. Bamboo, as a bio-based, renewable resource, offers a promising alternative to traditional materials that are depleting at an alarming rate (Skoczinski et al., 2023; Xie et al., 2023; Han et al., 2023; Lou et al., 2023)

LITERATURE REVIEW

The Case for Bamboo in Interior Design

If not adequately addressed, the climate change crisis can reverse development gains already made in human settlement and development. Continuous use and overreliance on timber forest products lead to ever-increasing greenhouse gas (GHG) emissions (Wang & Azam, 2024). They are steadily eroding the natural resources needed to maintain enhanced carbon sequestration. Without a secure natural environment, sustainable human development can be a mirage.

Bamboo is a potential material for a greener future, considering the dwindling timber volumes in our existing forests. Although bamboo is a non-timber forest product (NTFP), it is a fast-growing and early-maturing species that can be used to reduce the impact of climate change in many countries (Solomon et al., 2020). Climate change is one of humanity's most significant threats in the 21st Century.

According to the Intergovernmental Panel on Climate Change (IPCC), global warming is very glaring, with evidence from increases in average air and ocean temperatures, melting of snow and ice and sea level rise (IPCC, 2007). If global emissions are not intentionally reduced or utilised, the scientific evidence points to increasing risks of severe, irreversible impacts (Ayer et al., 2023; Stern, 2006). Bamboo has been used for centuries for various purposes, including material for low-cost housing and furniture production (Opoku et al., 2015).

Strength data must be generated for bamboo as an engineering material in structural applications (Akinlabi et al., 2017). With the renewed interest in bamboo for structural applications, some commonly used bamboo in different countries have been evaluated for strength. The strength and

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durability of wood-based composite products are a function of the mechanical properties of the component materials. Analysis of the mechanical properties entails investigating the material's behaviour when subjected to loads.

Material reactions under loads are the stress and strain generated within the materials, and they usually result in deformation (Sun & Li, 2018; Hearn, 1997). Sufficient knowledge of bamboo's mechanical behaviour enables a safe design for the material's service life. Bamboo, like timber, exhibits excellent variability and complexity due to various growing conditions such as moisture, soil, and competition.

Bamboo is an orthotropic material with particular mechanical properties in the three directions: longitudinal, radial, and tangential. Studies have been carried out to investigate the variation in these three directions, between the internodes and nodes, and the variation in different locations in the culm (Molari & García, 2021; Mohmod et al., 1993; Sattar, 1991). Different authors have used different test procedures, so comparing results seems complicated. (Tekpetey, 2011). The most important physical property is the mass of the material per unit volume (which is the density), usually expressed in kg/m^3.

For most bamboo, the density is about 700-800 kg/m3, which varies with the site's quality of growing, the species and the position in the culm (Janssen, 2000). The greater the density, the heavier the bamboo (as observed in wood), because more molecules are present in a unit volume. This results in properties that are desirable in most situations. This relation between mass per volume and strength gives a positive correlation.

Prolonged carbon sequestration is provided through bamboo products ranging from construction materials to pulp (Yuen et al., 2017; Liese, 2009). There are debates about the ability of harvested products to contribute to carbon reserves. The longevity and durability of bamboo products may greatly determine their carbon storage performance. Bamboo products have been classified based on their longevity of service.

There are short-term products such as fuel, papers or other agricultural usages; medium-term products such as bamboo baskets and panels; and long-term products such as furniture, laminated products and permanent bamboo houses or flooring. It is important to reduce by-products and waste in bamboo processing and to produce durable bamboo products. Technological innovations and product development have increased the number of durable bamboo products. Prolonged carbon storage is possible whenever the culms are processed into products with long life cycles, such as construction materials, panel products and furniture. (Tekpetey, 2011).

According to him, bamboo is excellent and must be developed for the sustainable development of Ghana as the timber resources dwindle at a very alarming rate. Once bamboo has been developed to any extent, the need to promote the patronage of the products by all and sundry is inevitable;

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hence, the need to showcase the enviable, patronisable artisans' products utilisable in the present-day interiors. Interior design is increasingly moving towards using aesthetically pleasing and environmentally responsible materials. Bamboo meets both of these criteria, offering designers a material that is flexible, durable, and capable of being crafted into a variety of products that can compete with and even surpass those made from traditional materials like wood (Singnar et al., 2017). Bamboo can create furniture, wall panels, flooring, and decorative items, contributing to a more sustainable interior environment.

The advantage of bamboo to sequester carbon needs not be overemphasised in the fight against climate change. Studies have shown that bamboo can absorb significantly more carbon dioxide than traditional hardwoods, emphasising its role in environmental preservation (Singnar et al., 2017).

Moreover, bamboo's regenerative properties—where it regrows after being harvested without replanting—make it a sustainable alternative to deforestation-prone hardwoods. Bamboo's role in eco-design, product life-extension, and the cycling and cascading use of bio-based materials is becoming increasingly relevant in the face of climate change.

The world is witnessing unprecedented temperature increases, particularly in temperate regions, highlighting the urgent need for materials to reduce environmental impact while offering long-term sustainability. With its rapid growth cycle and environmental benefits, bamboo is poised to play a crucial role in this transition. It offers a functional solution and an opportunity to preserve traditional craftsmanship and support local economies, particularly in Ghana, where artisanal skills are vital to community livelihoods.

The State of Bamboo Utilisation in Ghana

In Ghana, product diversity and acceptance of bamboo are relatively low and need to be vigorously investigated and developed for the sustainable livelihood of Ghanaians (Akua-Sakyiwah, 2020; Tekpetey, 2011).

The Bamboo and Rattan Development Programme (BARADEP) in Ghana has identified a wide range of stakeholders in different sectors of the economy that will help develop bamboo in Ghana for poverty alleviation and enhanced livelihood. Stakeholders include bamboo-endowed communities, chiefs and opinion leaders, the Ministry of Lands and Natural Resources (MLNR), some Non-Governmental Organizations (NGOs) such as Friends of River and Water Bodies, Bamboo and Rattan Artisans, Bamboo Culms Harvesters and Retailers and all those whose livelihood depend on bamboo.

The BARADEP Secretariat has put in place a lot of pragmatic measures to ensure the sustainable utilisation of Ghana's bamboo and rattan resources. These strategies include: · Nationwide education and sensitisation on bamboo and rattan's socio-economic and environmental importance

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for the populace to appreciate the need to protect the resources to enhance their livelihood and address pertinent environmental issues. ·

The Secretariat has developed a proposal on Interim Measures for regulating the indiscriminate exploitation of bamboo in Ghana, which is yet to be approved by the relevant authority. · The Secretariat also encourages and technically assists individuals/organisations in the bamboo plantations to help augment the current natural stock.

BARADEP also conducts training on the harvesting and managing natural bamboo stands in the bamboo endowed communities. This is aimed at building the technical capacity of such communities to manage and sustainably harvest their bamboo resources to ensure constant and efficient regeneration of young shoots and to promote healthy clusters of stands.

Despite the availability of raw materials, the bamboo handicraft industry remains underdeveloped. Artisans who work with bamboo often face market acceptance and competition challenges from imported products (Acquah et al., 2024). Consumers, particularly in urban areas, tend to favour imported furniture and decorative items, often perceiving bamboo products as inferior or unsuitable for modern interiors. This perception, however, is gradually changing as more awareness is raised about the environmental and economic benefits of using locally sourced, sustainable materials.

Bamboo stands a greater chance of contributing to the realisation of the Global Goals for Sustainable Development (SDGs), especially SDG1 (poverty relief), SDG6 (clean water and sanitation) and SDG 13(climate action). Thus, Ghana can achieve these SDGs through bamboo resources, and the Bamboo and Rattan Development Programme (BARADEP) Secretariat is mandated to oversee all its activities. In collaboration with international organisations such as the International Bamboo and Rattan Organisation (INBAR), the Ghanaian government has promoted bamboo to address deforestation and provide sustainable livelihoods for rural communities.

Bamboo is also a key material in the country's efforts to meet its climate commitments under the Paris Agreement, as it offers a renewable alternative to conventional building materials. However, for bamboo to become widely accepted in the Ghanaian interior design market, concerted efforts are needed to educate consumers and artisans about its potential.

METHODS

Research Design

This study employed a cross-sectional research design to investigate the sustainability and marketability of bamboo and bio-based products in the interior design sector. The design was

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chosen because it can capture data at a single point in time, allowing for the analysis of current trends and perceptions regarding bamboo products among artisans and their consumers.

Sample and Sampling Technique

A convenient sample of 32 artisans from the Greater Accra Region of Ghana was selected for the study. Convenience sampling was used due to the accessibility and availability of the artisans within the region, providing a representative snapshot of the workforce involved in bamboo and bio-based crafts.

Data Collection Instrument

Data were collected using a structured questionnaire developed specifically for this study to gather information on the demographic profile of artisans, the quality and use of bamboo products, levels of patronage, and competition with imported goods. The questionnaire was divided into four sections:

- Section A: Collected personal data such as gender, age, academic qualifications, profession, and years of experience.
- Section B: Focused on the types and sources of bio-based materials used in handicrafts, product quality and areas of usage.
- Section C: Assessed artisans' knowledge regarding materials used and the market demand for bio-based products.
- Section D: Evaluated attitudes towards the sustainable supply of bio-based materials.

Sections C and D were scored using a five-point Likert scale, with response options ranging from "Strongly Disagree as 1" to "Strongly Agree as 5."

Data Collection Procedure

Data were collected from March to May 2024 by administering the questionnaire in person to artisans within their workshops. Before administering the questionnaire, the respondents were informed about the study's purpose and assured of their responses' confidentiality. The researchers from Accra Technical University facilitated the process to ensure accurate completion of the questionnaires.

Data Analysis

The collected data were analysed using descriptive and inferential statistical tools. Descriptive statistics, such as frequencies, percentages, and means, were used to summarise the demographic information and questionnaire responses.

For hypothesis testing, the following inferential statistics were used:

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• Chi-square tests were conducted to examine relationships between categorical variables, such as demographic factors and the sustainability of the artisans' skills.

• Independent t-tests compared product quality and marketability perceptions between locally manufactured and imported products.

• Regression analysis was employed to assess the influence of consumer perceptions on the marketability of bamboo products.

All statistical analyses were performed using SPSS software, and results were considered significant at a 95% confidence level ($p < 0.05$).

RESULTS AND DISCUSSION

Demographic Information of Respondents

Table 1: Frequency Distribution of Demographic Profile of Respondents (Artisans).

Status	Frequency	Percentage
Gender		
Male	30	94.0
Female	2	6.0
Age group		
Below 20 years	1	3.1
20 - 30 years	3	9.4
31 – 40 years	7	21.9
Above40 years	21	65.6
Education		
SSSCE / WASSCE	3	9.4
OTHERS	29	90.6
Professional Level		
Apprentice (Learners)	2	6.3
Artisans	28	87.5
Others	2	6.3
Experience at Work		
Below 5 years	2	6.3
5 – 10 years	5	15.6
11 – 20 years	5	15.6
Above 20 years	20	62.5

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Table 1 covers the demographic profile of the respondents who participated in this study. The sample had only 6% females and 94% males. Also, as many as 65.6% of the respondents fell in the above-40 age group, with just 3.1% falling below the 20-year group. As many as 90.6% of the artisans had some basic education or none, with just 9.4% having secondary school education. About 87.5% of the respondents were master craftsmen, and 6.3% were learners or associates selling accessories to the trade. Mastery is portrayed as 62.5% of the respondents having more than 20 years' experience, and 15.6% each had 5-10 years or 10 – 20 years of experience in the business; only 6.3% were under 5 years.

The Quality Level of the Products Churned Out

Hypothesis one focuses on the quality of bamboo products, questioning whether they suit interior design applications. Specifically, the hypothesis tests the null proposition that bamboo handicrafts are of inferior quality. Tables 4 and 5 provide data related to this hypothesis by comparing the perceived quality of products made from bamboo and non-bamboo materials.

Table 2: Group Statistics

	Material the artisan use	N	Mean	Std. Deviation	Std. Error Mean
The interior space of the respondent	Bamboo	22	4.8636	0.35125	0.07489
	Non-bamboo	10	4.9	0.31623	0.1
Bio-based materials that sustain the the respondent environment	Bamboo	22	4.6818	0.47673	0.10164
	Non-bamboo	10	4.9	0.31623	0.1

Table 2 presents the group statistics for artisans using bamboo and non-bamboo materials in terms of their impact on the interior space of respondents and the environment. For interior space, artisans using bamboo products reported a mean score of 4.86 (with a standard deviation of 0.35), while non-bamboo users reported a mean of 4.9 (with a standard deviation of 0.32). The slight difference in mean values suggests that both bamboo and non-bamboo products are rated highly in terms of their suitability for interior space, with no significant difference.

Regarding the sustainability of bio-based materials, bamboo users had a mean score of 4.68, and non-bamboo users scored 4.9. While bamboo products still rank highly, non-bamboo materials

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received a slightly higher mean score regarding sustainability. This suggests that while bamboo products are considered sustainable, non-bamboo alternatives may be viewed more favourably regarding their environmental impact.

Table 3: Independent Samples T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	p-value	Mean Difference
The interior space of the respondent	Equal variances assumed	0.327	0.572	-0.28	30	0.782	-0.0364
	Equal variances not assumed			-0.291	19.321	0.774	-0.0364
Bio-based materials that sustain the respondent environment	Equal variances assumed	11.013	0.002	-1.316	30	0.198	-0.2182
	Equal variances not assumed			-1.53	25.525	0.138	-0.2182

In the "interior space" variable, the p-value is 0.782, indicating no statistically significant difference between bamboo and non-bamboo products regarding their impact on interior design, as shown in Table 3. This supports the argument that bamboo products are just as suitable for interior applications as non-bamboo materials.

Similarly, the p-value for "bio-based materials that sustain the environment" is 0.198, indicating no statistically significant difference in environmental sustainability between bamboo and non-bamboo products. Although non-bamboo products have a slightly higher mean, the data suggests that bamboo products are still viewed as environmentally sustainable.

The Sustainability of the Raw Material Base That Guarantees Future Security of the Profession

Hypothesis Two evaluates the effect of customer demographics on the sales of bamboo products, focusing on whether different types of buyers (foreigners, beginners in life, rich people, and

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government entities) influence the perception that bamboo products sell faster. The null hypothesis suggests that customer perceptions regarding their patronage of bamboo products must be changed, while the alternative hypothesis proposes that no such change is necessary.

Table 4: Effect of type of buyers on sale of Bamboo products

Variables	B	Std. Error	Beta	*t-stat*	P-Value
(Constant)	2.881	0.454		6.351	0
Leading buyers - Foreigners	0.3	0.138	0.37	2.181	0.037
(Constant)	3.117	0.569		5.475	0
Leasing buyers-Beginner of life	0.226	0.182	0.221	1.244	0.223
(Constant)	2.711	0.75		3.616	0.001
Leasing buyers-rich people	0.283	0.191	0.261	1.478	0.15
(Constant)	1.695	0.857		1.979	0.057
Leasing buyers-Government	0.46	0.185	0.414	2.494	0.018

Table 4 presents the results of a bivariate linear regression analysis. The dependent variable is the perception that "bamboo products sell faster." The independent variables are the types of buyers, including foreigners, beginners in life, rich people, and government buyers. The regression analysis reveals how each type of buyer impacts the sales of bamboo products.

Foreign Buyers: The coefficient (B = 0.3, p-value = 0.037) indicates that foreign buyers have a positive and statistically significant effect on the perception that bamboo products sell faster. This suggests that foreign buyers are an important factor in driving the sales of bamboo products, as their patronage significantly contributes to the perception of higher sales.

Beginners in Life: The effect of beginner buyers is positive but not statistically significant (B = 0.226, p-value = 0.223). This suggests beginner buyers have a moderate but non-significant

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influence on bamboo product sales. Their impact on boosting sales is not as strong as that of foreign buyers.

Rich People: Similarly, the coefficient for wealthy buyers (B = 0.283, p-value = 0.150) is positive but not statistically significant. Although there is a positive relationship between rich buyers and bamboo product sales, the influence is not significant enough to draw firm conclusions.

Government Buyers: Government buyers have a positive and statistically significant effect (B = 0.46, p-value = 0.018) on the perception that bamboo products sell faster. This indicates that government purchases play a crucial role in driving the sales of bamboo products, making them a key entity for promoting the use of bamboo in the handicraft industry.

The findings from Table 4 support rejecting the null hypothesis under Hypothesis Four, as foreign and government buyers significantly positively influence bamboo product sales. This suggests there is no need to drastically change customer perceptions, particularly among these key buyer groups, as they already contribute to the faster sales of bamboo products. The results align with the article's theme, *"Accelerating Our Lives In The Interior To Sustainability And Eco-Friendly Levels – Maximizing The Use Of Bamboo Products,*" by highlighting the importance of targeting foreign and government buyers to enhance the marketability and patronage of bamboo products, further promoting sustainability and eco-friendly interior design solutions.

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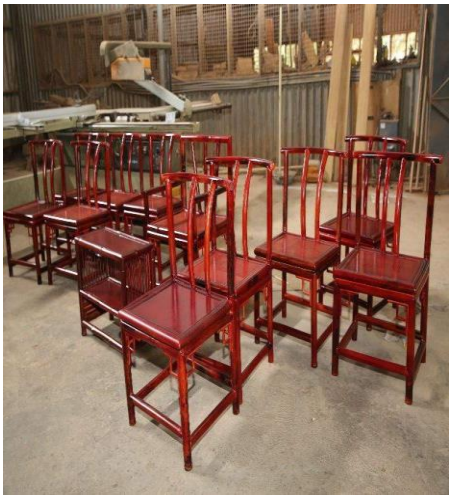
Pictures Showing Some Well-Finished Bamboo Products for The Interior Spaces





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Plates i – vii: Finished furniture products: Culled from the BRU Practical Training at WITC, at Ejisu, Ashanti Region.

DISCUSSION

The findings of this study offer significant insights into the role of bamboo products in promoting sustainability within the interior design industry in Ghana. The results underscore the potential of bamboo as a viable alternative to conventional materials, addressing both environmental concerns and market demands for eco-friendly options. The discussion is framed around the key hypotheses and findings, illustrating the interplay between artisan demographics, product quality, market acceptance, and consumer perceptions.

Artisan Demographics and Sustainability

The study's first hypothesis explored the relationship between artisans' current demographic profile and the handicraft industry's sustainability. The data revealed an ageing workforce, with a significant percentage of artisans being above 41 years of age. This trend raises concerns about the sustainability of bamboo craftsmanship in Ghana, as the older generation of artisans may retire without sufficient skills transfer to younger individuals. This issue aligns with findings from other studies, which highlight the need for practical training and mentorship programs to ensure the longevity of traditional crafts (Kumar et al., 2022).

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Additionally, the low representation of women in the artisan sector indicates an opportunity for increased inclusivity and empowerment. Encouraging female participation in bamboo craftsmanship could enhance the diversity of skills and lead to innovative designs that appeal to broader markets. As Anjum et al. (2023) highlighted, promoting gender inclusivity in artisanal sectors can drive economic growth and improve community resilience.

Quality of Bamboo Products

The second hypothesis assessed the perceived quality of bamboo products compared to non-bamboo alternatives. The findings demonstrated no statistically significant difference between bamboo and non-bamboo products regarding suitability for interior design applications. Both categories received high ratings, suggesting that bamboo is a competitive material in interior design. This is consistent with other research indicating that bamboo products can match or exceed the quality of traditional materials, given the right manufacturing practices (Singnar et al., 2017).

Despite these positive perceptions, there remains a lingering stigma around bamboo as an inferior material in Ghana. This perception could be addressed through targeted marketing strategies that highlight the unique qualities of bamboo, such as its sustainability, durability, and aesthetic appeal. Furthermore, as consumers increasingly prioritise eco-friendly products, the demand for bamboo in interior design will likely grow, provided its benefits are effectively communicated (Peprah et al., 2014).

Market Patronage and Competition

The study's third hypothesis focused on the market patronage of bamboo products. The results revealed that bamboo products are not the most widely patronised, with many artisans perceiving cane products as faster-selling alternatives. This finding underscores the importance of understanding consumer preferences and market trends. Previous studies indicate that imported products often dominate local markets due to their perceived modernity and higher quality (Kumar et al., 2022).

Strategies that emphasise bamboo products' unique attributes, such as sustainability and cultural significance, are crucial to enhancing their competitiveness. Local artisans can benefit from collaborating with designers to create innovative bamboo products that resonate with contemporary consumers. Moreover, increasing awareness of the environmental impact of traditional materials may shift consumer preferences toward more sustainable options like bamboo.

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Consumer Perceptions and Acceptance

The fourth hypothesis examined consumer perceptions of bamboo products and their influence on marketability. The findings indicate that while there is a growing recognition of bamboo's environmental benefits, misconceptions about its quality and durability persist. This underscores the need for educational campaigns to inform consumers about bamboo's advantages and dispel myths about its use. As Anjum et al. (2023) noted, engaging consumers through storytelling and authentic narratives about bamboo's sustainability can foster a deeper connection and appreciation for the material.

Additionally, the study identified key buyer demographics, such as foreign and government entities, that positively influence the perception of bamboo product sales. The local bamboo industry can gain a foothold in broader markets by leveraging these relationships and promoting bamboo in governmental and institutional procurement policies. This approach aligns with the recommendations of INBAR (2023), which advocates for integrating bamboo products into public sector initiatives to promote sustainability and support local economies.

CONCLUSION

In summary, this study highlights the potential of bamboo products to contribute to a more sustainable and eco-friendly interior design landscape in Ghana. While the artisan workforce faces challenges related to demographics and market acceptance, there are significant opportunities to enhance the visibility and competitiveness of bamboo as a sustainable material. By addressing consumer perceptions, promoting inclusive practices, and developing targeted marketing strategies, stakeholders can foster greater acceptance of bamboo products in the interior design industry. The findings of this study pave the way for further research into innovative uses of bamboo and strategies to bolster its market presence, ensuring that it becomes a cornerstone of sustainable design practices in Ghana and beyond.

Recommendations

Based on this study's findings, several key recommendations are proposed to enhance the utilisation of bamboo products in the interior design industry in Ghana. These recommendations aim to address the challenges identified regarding artisan demographics, product quality, market acceptance, and consumer perceptions, ultimately promoting sustainability and eco-friendliness in design practices.

Capacity Building and Skills Development

To ensure the sustainability of the bamboo handicraft industry, it is essential to invest in capacity building and skills development for artisans, particularly the younger generation. Training

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programs should focus on innovative bamboo processing, design, and production techniques. Collaborations between educational institutions, government agencies, and industry stakeholders can create mentorship opportunities, allowing experienced artisans to pass on their knowledge and skills to apprentices. This approach will help cultivate a new workforce to meet the growing demand for bamboo products.

Promote Gender Inclusivity

Encouraging female participation in the bamboo artisan sector fosters diversity and enhances creativity. Organisations and NGOs should implement initiatives to empower women in bamboo craftsmanship through targeted training and funding opportunities. The industry can benefit from a broader range of perspectives and innovative designs that appeal to diverse consumer bases by supporting women artisans. Gender-inclusive practices will strengthen the artisan community and contribute to broader socio-economic development.

Marketing and Awareness Campaigns

Comprehensive marketing and awareness campaigns highlighting bamboo's sustainability, durability, and aesthetic appeal are vital to combat misconceptions regarding bamboo products. These campaigns should educate consumers about bamboo's environmental benefits, emphasising its role in reducing deforestation and carbon emissions. Storytelling and community engagement can effectively promote bamboo's cultural significance and potential as a modern material for interior design. Collaboration with local influencers, designers, and media outlets can amplify these messages and foster a positive image of bamboo products.

Collaboration with Design Professionals

Local artisans should collaborate with interior designers and architects to create contemporary bamboo products that meet modern design standards. Such partnerships can facilitate the development of innovative bamboo applications that resonate with current market trends. By showcasing the versatility of bamboo in various design contexts—such as residential, commercial, and institutional spaces—these collaborations can enhance the visibility and acceptance of bamboo products in the market.

Government Support and Policy Implementation

The Ghanaian government should play a pivotal role in promoting bamboo as a sustainable resource. This can be achieved by implementing supportive policies that incentivise the use of bamboo in public procurement, construction, and interior design projects. Financial support for local artisans, such as grants or low-interest loans, can help establish and grow bamboo-based businesses. Furthermore, incorporating bamboo into national sustainability initiatives will highlight its importance in achieving environmental goals.

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Research and Development

Continued research into bamboo species, cultivation practices, and innovative uses is necessary to enhance the competitiveness of bamboo products. Academic institutions and research organisations should be encouraged to conduct studies that explore the potential of bamboo in various applications, including furniture design, construction, and sustainable materials development. This research can provide valuable insights into optimising bamboo processing techniques and improving product quality, strengthening its market position.

Consumer Engagement and Feedback

Engaging consumers in developing and promoting bamboo products is essential for increasing acceptance and marketability. Artisans and manufacturers should actively seek consumer feedback to understand preferences, trends, and areas for improvement. Organising workshops, exhibitions, and community events can provide platforms for consumers to interact with artisans, learn about bamboo products, and share their experiences. This engagement will foster a sense of community and loyalty towards local bamboo craftsmanship.

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