Original Research Article
Consumer's Preference for Various Types of Wood for Household Application

ABSTRACT

Aims: The primary goal of this study was to delve into the determinants influencing the choice of various wood types, including solid timber, plywood, particle board, and medium-density board. By examining these factors, the research aimed to shed light on the preferences individuals have for these materials, thus contributing valuable insights to the field of wood selection and its broader applications..
Study design: Exploratory research design
Place and Duration of Study: The present study was conducted in the year 2023 during June and July
Methodology: The data were collected from 120 consumers in Coimbatore city using snowball sampling and Convenience sampling will be used to select the respondents for the present study with the help of a well-structured interview schedule used to scale the factors. To analyze the data using factor analysis to identify the main factors that influence consumers' preference for wood such as availability, price, durability, appearance, ecofriendly and personal preference.
Results: Factors analysis provides that material excellence factors which comprise four factors versatile and modifiable, eco-friendly, aesthetic appeal, and uniqueness of material with a variance of 63.770 per cent were the most influenced factors for preference for wood.
Conclusion: In conclusion, this study employed factor analysis to discern the key determinants shaping consumers' wood preference. The analysis revealed that material excellence, encompassing factors related to versatility, eco-friendliness, aesthetic appeal, and material uniqueness, accounted for a significant variance of 63.770 percent in influencing wood preference. These findings emphasize the paramount importance of considering factors beyond traditional attributes like availability, price, and durability, and highlight the significance of holistic material qualities in shaping individuals' choices in wood selection.

Keywords: wood and wood products, engineered wood, consumer preference, household application.

1. INTRODUCTION

Wood is regarded as a renewable resource. However, natural forest-based wood industries in many nations have been characterized by rapid rises in production, followed by a peak and a subsequent decrease. A review was done to see if there was any evidence of a global trend in the removal of wood from natural forests. This was accomplished using publicly available information on the production of wood worldwide from a variety of sources, including plantations, planted forests, and trees that are not part of forests. Around 1989, the world's supply of wood from natural forests reached a peak, and it has been declining ever since. The difference between the entire demand for roundwood and the natural forest supply has been filled by an increasing supply of cultivated trees (Warmen, 2014).

Nowadays, natural wood is used less frequently than in the past to make household appliances, furniture, and decorative items. Binggeli (2007) asserts. Wood byproducts are useful to humans for producing furniture, designing interior spaces, and for decorative purposes. There are numerous categories of these byproducts. For instance, wood veneers are very thin slices of wood that are applied to the surface of furniture, decorative items, and wall paneling, whereas lumber is solid wood used for construction and framing. An uneven number of layers of wood products are sandwiched together to form plywood. Plywood, particleboard, MDF, hardboards, and oriented strand board (OSB) are examples of wood composite panels (composition boards). They offer broader flat surfaces and are constructed of layers of wood particles and glue.

Wood materials that people use in their houses as furniture, decorative objects, and various domestic appliances have benefits and detriments. According to Turkcu (2010), lightness is the leading positive feature of wood. Wood materials that can be easily jointed can be interconnected, attached, and pieced with nails, screws, etc. It is a heat-insulating material. It

can be easily processed. Also, it is a material that does not transmit electricity (non-conducting) when dry, while its conductivity increases when wet. It is a material with high bearing capacity. Water permeability is one of the undesired features of wood. If not protected, it absorbs water, whereas upon drying it shrinks, and it may crack when dry. Another negative feature of wood is that it tends to decay and rot. Woodworms, insects, fungi, and bacteria may cause wood decay. Lack of fire resistance is its most negative characteristic.

Over the 150 species of timber which are produced in India, a list of major plantation timbers is available with Anon. (2020a). The commonly harvested species from natural forests in India include, among others: Teak (Tectona grandis), both from natural and planted forests; Sal (Shorea robusta); and Khair (Acacia catechu). Commonly planted species include, among others, fast-growing (and short-rotation) species: Teak (Tectona grandis) most widely planted timber species and most of it is harvested from planted forests; Eucalypts (Eucalyptus spp.); Poplar (Populus spp.); Acacia (Acacia spp.); and Subabul (Leucaena leucocephala).

The products of primary mechanical processing of wood—are Roundwood products (e.g., poles and pilings), sawn wood (primarily lumber), veneer, plywood and laminated wood, particleboard, fibreboard, and pulp and paper. It also discusses treatments (drying and preservation) that have been devised to improve the performance of wood in use and the chemical products that are derived or extracted from wood. Some products of primary manufacturers, such as poles and posts, are used directly, but many constitute intermediate materials that by further processing are turned into secondary products such as furniture, building structures and components, containers, and musical instruments.

Table 1. Production and Trade – Export & Import

	Production Quantity (x 1000 m3)	**Import Quantity (x 1000 m3)**	**Export Quantity (x 1000 m3)**
Ind. Roundwood	48154	4923	5.6
Sawnwood	23975	1715.14	4.78
Veneer	291.03	390.14	53.21
Plywood	10060	174.67	151.47
ITTO (2022)			

Existing data lacks details on end-user wood product consumption due to variations. Measuring per capita consumption is crucial for sustainability, production, and carbon analysis. This innovative study uses industry surveys, database creation, and household verification. Findings identify two main wood product categories: construction and furniture. Consumption varies based on factors like roof type, doors, windows, and furniture quantity. In Bogor, consumption averaged 0.1 m3 per capita, influenced by usage time and family size. This study pioneers a fresh approach to quantifying household wood consumption and illuminates usage trends. **(**Abdulah *et al*. 2020). This study examines factors influencing consumers' preference for manufacturer brands of wooden furniture in Bangladesh. Qualitative exploratory research was followed by conclusive descriptive research. A survey with 114 participants from urban areas in Bangladesh rated thirteen dimensions on a 7-point Likert scale regarding furniture buying decisions. Factor and regression analyses were performed. Findings highlight the significant influence of certain attributes on consumers' brand preference for wooden furniture, providing insights for manufacturers to attract more customers in Bangladesh (Ahmed, N. 2015). Discovered seven elements that will help in influencing customer buying behaviour such as identifying end-users, identifying the influence of other factors, frequency of use and buying, identifying influencers, seasonal and cyclical fluctuations, usage, and the relationship between product and person (Dani 2006**).** This study explores the impact of using wood in indoor spaces and its potential health benefits in urban environments. It examines different degrees of wood use, finding that wood significantly affects visual psychological responses. Spaces with medium wood use attract more visual attention and evoke perceptions of naturalness, warmth, relaxation, and desirability. The study emphasizes considering both wood coverage and surface variations for designing healthy indoor environments. **(**Li *et al*. 2021). This research examines the growing use of wood in construction as an eco-friendly alternative. Key findings highlight the importance of construction workmanship, time, system choice, cost-efficiency, material composition, and floor plan design in housing sustainability from users' perspectives. The study offers insights into innovative approaches for sustainable housing and a more efficient construction industry. **(**Svajlenka, J., & Kozlovska, M. 2021).

1.1 Theoretical Framework

Factor analysis is a statistical technique that focused on the relationships between variables without categorizing them as 'dependent' or 'independent'. In this study, factor analysis served two main purposes: firstly, to condense the data while preserving its essential information, and secondly, to merge highly correlated variables into a single factor. As a result, the initial dataset was condensed into a smaller number of factors that were mostly independent or had minimal correlations among them. The technique helped to identify the underlying dimensions that grouped variables into factors.

Factor analysis Model

$$Xi= A_{ij}F_1+ A_i2F_2 + Ai_3F_3+ \text{----------} + A_{im}F_m + V_iU_i$$

Where,

X_i = i th standardized variable
A_{ij}= standardized multiple regression coefficient of the variable on common factor j
F= common factor
V_1= standardized multiple regression coefficient of the variable on unique factor i
U_i= Unique factor for variable i
m = number of common factors

The unique factors are uncorrelated with each other and with common factors. The common factors themselves can be a linear combination of the observed variables.

$$Fi= W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3+ \text{----------} + W_{ik}X_k$$

Where,

F_i = estimate of ith factor
W_i = weight or factor score coefficient
K = several variables.

It is possible to select weights or factor score coefficients so that the first factor explained the largest portion of the total variance. Then a second set of weights can be selected so that the second factor accounted for most of the residual variance subject to being uncorrelated with the first factor.

2. METHODOLOGY

The study was conducted in Coimbatore city of Tamilnadu and data was collected from with 120 consumers. The sampling method used was snowball sampling. The data were collected through a well-structured questionnaire and the information was collected from the consumers and industries. Factor analysis technique was used for analyzing and interpreting data. Factor analysis was used to find the major factor that influenced the consumer preference for various types of wood for household applications.

3. RESULTS AND DISCUSSION

3.1 Factors Influencing Consumer Preferences

3.1.1 Result of KMO & Bartlett's Test

From this table, it has been found that the approx. Chi-Squire value is 938.549 with 78 degrees of freedom which is significant at 0.05 level. Besides, a high value (between 0.5 and 1.0) of the KMO measure of sampling adequacy indicates that the factor analysis is appropriate. Here, as the value of the KMO statistic (Table 2) is .604, the factor analysis has been considered an approximate technique for analyzing the data. It could be concluded that the results of KMO & Bartlett's test proved the sampling adequacy of the data to run the factor analysis.

Table 2 KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.604
Bartlett's Test of	Approx. Chi-Square	938.549

Sphericity	df	78
	Sig.	0.000

3.1.2 Total variance

In Table 4, the eigenvalues for a factor indicate the total variance attributed to that factor. The total variance accounted for by all thirteen variables is 13, which is equal to the number of variables. Factor 1 accounts for a variance of 3.136, which is 24.125 per cent of the total variance. Likewise, the next 4 factors account for 15.731 per cent, 13.998 per cent, 9.916 per cent, and 8.351 per cent of the total variance respectively. Here, the first five (05) factors combined account for 72.121 per cent of the total variance. The 'Extraction Sums of Square Loadings' shows the variances associated with the factors that are retained. These are the same as under 'Initial Eigenvalues'.

Table 3 Total Variance Explained

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.136	24.125	24.125	3.136	24.125	24.125
2	2.045	15.731	39.856	2.045	15.731	39.856
3	1.820	13.998	53.854	1.820	13.998	53.854
4	1.289	9.916	63.770	1.289	9.916	63.770
5	1.086	8.351	72.121	1.086	8.351	72.121
6	0.950	7.311	79.432			
7	0.616	4.736	84.168			
8	0.591	4.543	88.711			
9	0.500	3.844	92.555			
10	0.402	3.091	95.646			
11	0.321	2.470	98.116			
12	0.227	1.747	99.864			
13	0.018	0.136	100.000			
Extraction Method: Principal Component Analysis.						

3.1.3 Scree plot

The number of factors has been determined based on several considerations: (i) eigenvalues (only five factors with eigenvalues greater than 1.0 are retained [Table 4]); (ii) screen plot (the plot [Fig 1] has broken at 5 factors between the steep slope of factors, with large eigenvalues and gradual trailing off (scree) associated with the rest of the factors); (iii) a percentage of variance the factors extracted should account for least 60 per cent of the variance and here, the first five (05) factors account for 72.121 per cent of the total variance [Table2].

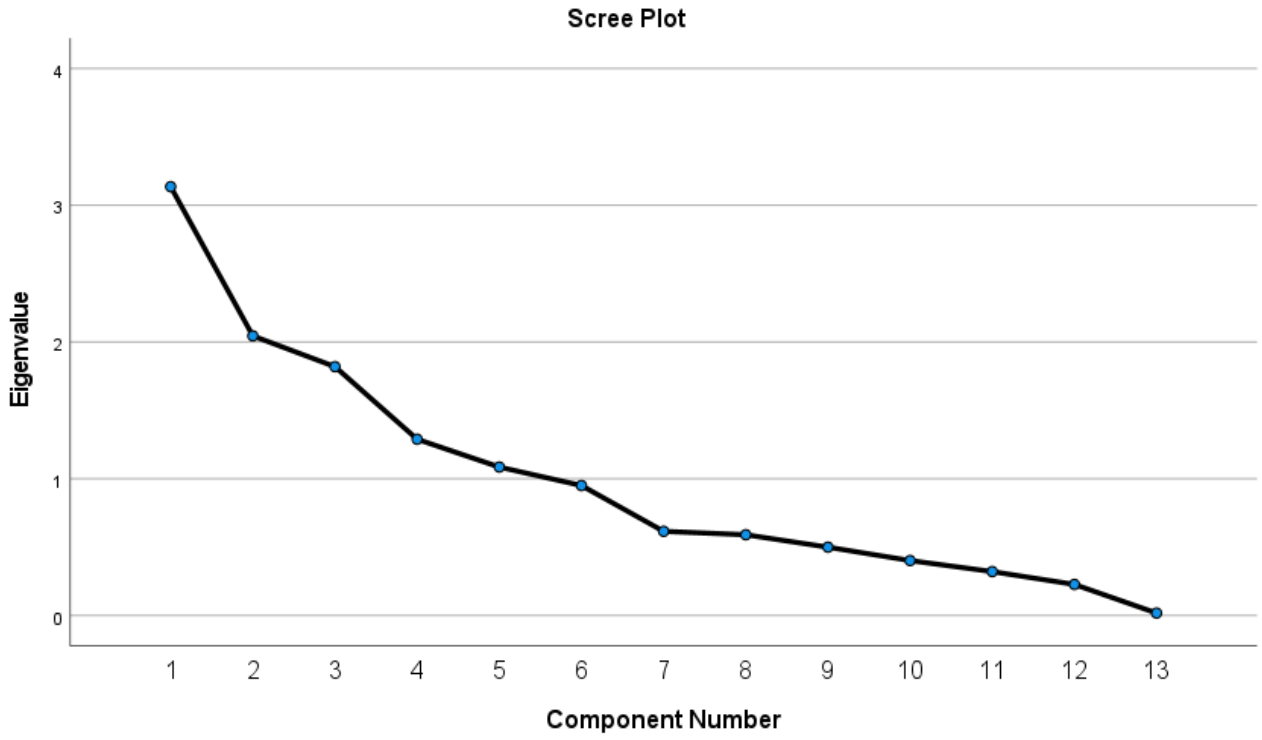

Fig 1 Scree plot

3.1.4 Rotated Component Matrix

Table 4 Rotated Component Matrix

Rotated Component Matrixa					
	Component				
	1	2	3	4	5
Versatile and modifiable	**0.930**				
Ecofriendly	**0.926**				
Aesthetic appeal	**0.782**		-0.239		0.123
Uniqueness of material	**0.671**	0.391			0.241

Thermal and sound insulation		**0.818**			-0.165
Building comfort		**0.787**			
Fire resistance		**0.673**	-0.307	-0.139	0.210
Weather resistance	-0.116		**0.898**		
Ease of handling			**0.857**	-0.106	
Health and Safety	-0.155		-0.197	**0.855**	
Durability to withstand damage	0.368	-0.147		**0.775**	
Reasonable price	0.174	-0.126		-0.114	**0.808**
Easy maintenance and cleaning	-0.134	0.149	0.283	0.160	**0.561**
Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					

3.1.5 Component and Factors

It could be inferred from Table 5 that four component was named Material Excellence Factors which comprise four factors Versatile and modifiable, Ecofriendly, Aesthetic appeal, Uniqueness of material List with a variance of 63.770 per cent, and the second component named Building Performance Enhancements which includes three factors such, Thermal and sound insulation, Building comfort, Fire resistance with a variance of 20.398 per cent. The third component was named Practical Performance Features which includes two factors Weather resistance, Ease of handling with a variance of 8.387 per cent. The fourth component was named Protection and Longevity Aspects which includes two factors Health and Safety, factor Durability to withstand damage, with a variance of 5.562 per cent. The fifth component was named Economic Viability and Maintenance which includes two factors Reasonable price and Easy maintenance and cleaning with a variance of 1.883 per cent.
It could be evident from the factor analysis that Material Excellence Factors with a variance of 63.770 per cent were the most influenced factors in the preference for various types of wood in the household application. The factors namely versatile and modifiable, eco-friendly, aesthetic appeal, and uniqueness of material were loaded under component 1 and the same referred to as material excellence factors.

Table 5 Component and Factors

Component	**Variance %**	**Factors**
Material Excellence Factors	63.770	Versatile and modifiable Ecofriendly Aesthetic appeal Uniqueness of material
Building Performance Enhancements	20.398	Thermal and sound insulation Building comfort Fire resistance
Practical Performance Features	8.387	Weather resistance Ease of handling

Protection and Longevity Aspects	5.561	Health and Safety Durability to withstand damage
Economic Viability and Maintenance	1.883	Reasonable price Easy maintenance and cleaning

4. CONCLUSION

The comprehensive analysis of both consumer profiles and factor analysis provides valuable insights for the coconut milk industry. By understanding consumer demographics and preferences, businesses can tailor their marketing strategies to effectively target specific segments. Furthermore, uncovering the key factors influencing retailer preferences aids in making informed stocking decisions and enhancing brand positioning. This collective understanding has the potential to drive growth, improve customer satisfaction, and foster a more efficient and consumer-oriented Coconut Milk market.

5. FUTURE SCOPE

The future scope of the study on consumers' preferences for different types of wood in household applications can encompass a variety of dimensions. Research could deliver into the cross-cultural variations in preferences, investigating the interplay between regional aesthetics and wood choices. Evaluating the environmental consciousness of consumers and their inclination towards sustainable wood options would provide insights into evolving market trends. Additionally, an exploration of the psychological and emotional associations people have with specific wood types can uncover deeper drivers of preference. The study could also assess the impact of marketing strategies on shaping consumer perceptions. Overall, an expansive scope considering cultural, environmental, psychological, and marketing factors will yield a comprehensive understanding of how and why consumers choose certain wood types for their homes.

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