

## CONSUMER PREFERENCES FOR JOINERY PRODUCTS AND FURNITURE IN SLOVAKIA AND POLAND

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### ABSTRACT

This paper compares end user preferences for the selected wood products in Slovakia and Poland. The preferences of consumers for the selected wood properties in comparison with substitute materials were assessed for the area of joinery products and furniture used in households. The survey was carried out using a questionnaire survey. The research identified competitive properties of wood and compared preferences of consumers for wood in both countries. Additionally, multi-criteria analysis was used to identify significant differences in preferences between the Slovak and Polish respondent samples. For both product groups and in both countries wood is preferred to non-wood materials principally because of its ecological properties, environmental appropriateness, renewability and naturalness as well as traditions and health and safety properties. There were several properties identified which are differently considered by consumers in making their decisions for a particular product. Such properties are mainly of technical nature such as e.g. fire resistance, health and safety properties, durability, firmness etc.

**Keywords:** consumer behaviour, preferences, wooden furniture, joinery products, non-wood material.

### INTRODUCTION

The Slovak economy disposes of limited volume of its own natural and energy resources so that many sectors depend on their imports. On the other hand, the country disposes of renewable raw material – wood, which resources cannot be exhausted once the sustainable forest management principles are kept (ŠUPÍN 2011). Besides the non-production forest functions and a wide scale of services for society, the importance of forests is also in the raw wood material production. At the present time, wood is important material for industry processing, as well as for energy sector worldwide. The history proves that wood is important material for the development of society. New technologies in industries utilise low quality wood and recycled materials in processing (PAROBEK 2010). The way of roundwood from the forest to final consumer is quite long and many times it has to pass different levels of processing and different types of markets while it is used for the desired purposes. Wood and wood products can be widely utilised at the different types of market, from large commodity markets (construction industry) to niche markets (musical instrument production). Wood passes through different levels, which are represented by the forest, primary forest industry, secondary forest industry, relating sectors using wood for their production and finally reaches the final consumers.

Wood and wood products demand is derived demand in terms of the way how it is created and it depends on the final wood products demand (e.g. beech round timber demand is derived from the beech furniture demand). If the final products demand is increasing the demand for the production inputs (intermediate products) is increasing too. At the same time with the wood products demand there is a demand for the competitive products. In relation to wood the competitive products take a position of substitutes. The main feature of the substitutive materials is that they can satisfy the same needs and the buyers (purchaser) and consumers have the possibility to choose among them according to their individual preferences. Preferences are typical for consumer markets. They influence what consumers would buy and relate to the material used for product production, its quality, appearance, functionality etc. Significant advantages of wood are its ecological characteristics and the ability of being sustainable renewable (PALUŠ 2010). Consumer preferences and behaviour play important role in budgeting furniture sales (POTKÁNY 2009).

Competitive advantages of wood can be found in its properties. However, these properties are specific to any particular use of wood or wood products. One may prefer wooden furniture to plastic one because of nature of the material as well as ecological and aesthetic properties. On the other hand, wood as building material will be used because of its durability and other mechanical and physical properties. Taking into account the different properties of wood (stability, durability, aesthetic properties, ecologic properties, renewable resource, etc.) there are different possibilities for wood utilisation and a different number of competitive (substitutive) products and materials existing on each of the markets. A real technical compatibility and possibility to meet the same needs and expectations of consumers are the basic precondition for products substitution. One of the main conditions of substitution is the technical compatibility of the materials and price level of substitutes (PALUŠ 2002). Optimally, substitution process in each market sector should to be evaluated individually. Such an approach would allow to identify the factors and trends within each market sector and to recognise whether the wood products are the “winners” or “losers” in the competitive fight.

CSIKSZENTMIHALYI *et al.* (1995) found that when Americans were asked about objects felt to be significant in their lives, 36% of the respondents mentioned furniture, and furniture was also the most frequently mentioned item. Consequently, it is important to know the end-users' preferences when decisions are made in furniture purchasing situations. VON HIPPEL (1998) stated that most new innovations come from costumers. Therefore, it is important to know the customers' needs and desires in order to develop customer-oriented products. Since wood is the single most important raw material in the furniture industry, it is important for the industry to know the customers' conceptions of wood as a furniture material and to better understand what the success factors for wood furniture are. BURROWS and SANNESS (1999) analysed competitive environment for wood products and factors influencing substitution. All wood products are subject to substitution. Wood substitution is strongest for framing materials, windows and doors, mouldings and casework, cladding furniture, pallets and packaging. Packaging materials, windows, doors, terraces and garden furniture represents products that are especially sensitive to substitution by plastics. Consumer preferences are permanently changing because of product innovations and changing life style of consumers. Price, marketing effort and investments into research and development are the key substitution factor. The ecological aspect is important in case when two products have the same price but they are produced from different materials.

PAKARINEN (1999) studied consumer perceptions about the use of wood in furniture and also determined whether wood is perceived to have some superior attributes compared

to other furniture materials. The data were collected from shoppers at a major furniture retail chain in Finland. The four most often mentioned attributes were reliable, environmentally friendly, good-looking and valued. The perception by customers of wood as a furniture-making material is dominated by consumers concern about safety and the environment. These two elements, along with a consumer perception that wood is good-looking and is trendy, provide a combination of attributes that is difficult for substitutes to achieve. RAMETSTEINER *et al.* (2007) analysed attitudes of European consumers towards wood and wood products. Preferred are general properties such as naturalness of wood or its feature to be environmentally friendly material. When using wood in interiors, consumers appreciate the fact that wood creates comfortable and pleasant atmosphere and good feeling in the room. Other preferred properties are design and quality. GOLD and RUBIK (2008) examined attitudes of German consumers towards wood as building material in general and towards wooden buildings. Wood as a building material is preferred due to its properties such as comfort, aesthetic and ecological features. Though these soft criteria represent important factors for choosing wood, they are not sufficient to generate intensive demand for wood used in construction.

The objective of this paper is to determine attitudes of end users towards different ways of wood utilisation in Slovakia and Poland. This determination is based on the evaluation of consumers' preferences for the selected wood properties in comparison with substitute materials for the selected area of wood use. Additionally, significant differences in preferences between the Slovak and Polish respondents are examined.

## METHODOLOGY

A prior to the questionnaire survey it was necessary to determine main end uses of wood and characteristic properties of wood products within each of these groups. The two main groups were identified:

- Windows, doors, flooring, wall facing (joinery products)
- Furniture

Based on an extensive literature review covering a broad scope of scientific, expert and popular literature it was able to determine a number of properties for each area of wood use. Such properties represented physical, hygienic, utility, aesthetic, ecological, environmental, quality and other properties of wood and its substitutes specifically for each product category. The identified properties are important from the point of end users decision making when choosing between the wood products and their competitive products from non-wood materials. In addition, the basic demographic data of respondents were proposed to be collected: gender, age, completed education and net income per month.

The questionnaire was distributed in Slovakia and Poland, covering 625 and 114 respondents, respectively. The random sample was represented by end-users. Non-probability sampling was used. The introductory part of the questionnaire contained instructions for respondents. The questionnaire body included 5 tables, each for the respective area of wood use (product category). Each table contained selected properties of wood and non-wood products. The last part consisted of demographic data. We used closed, semi-closed and open questions. Semi-closed questioned were used to allow respondents to identify their own product properties.

Data collected in the survey were coded and table arranged. A frequency analysis was used to evaluate the collected data.

Cross tabulation was used to find out relations between the individual answers within one posed question and mutually between the questions. Contingency tables display the multivariate frequency distribution of the variables. In order to examine relations between the variables, the Pearson's chi-squared test was used at level of significance  $p < 0.05$ . Pearson's chi-squared test of independence assesses whether paired observations on two variables, expressed in a contingency table, are independent of each other. We verified the assumption that there are significant differences in preferences for wooden and non-wood materials in Slovakia and Poland. In particular, a null hypothesis ( $H_0$ ) that there is no relation between the answers was tested (the null hypothesis is that the occurrence of two outcomes is statistically independent). The value of the test-statistic  $\chi^2$  is

$$\chi^2 = \sum_{i=1}^R \sum_{j=1}^C \frac{(n_{ij} - E_{ij})^2}{E_{ij}} \quad (1)$$

where:  $R$  – number of rows

$C$  – number of columns

$n$  – number of cells in the table

$E_{ij}$  – expected (theoretical) frequency

Fitting the model of independence reduces the number of degrees of freedom by  $p = r + c - 1$ , where  $r$  stands for number of rows and  $c$  for columns. The number of degrees of freedom is equal to the number of cells  $rc$ , minus the reduction in degrees of freedom,  $p$ , which reduces to  $(r - 1)(c - 1)$ . A chi-squared probability of less than or equal to 0.05 is interpreted as justification for rejecting the null hypothesis that the row variable is independent of the column variable.

Further on, the Cramer's contingency coefficient, Pearson contingency coefficient and Phi coefficient were used to examine the strength of an association between two variables. Only those contingency tables were considered where the following assumptions were met: all expected counts  $E_{ij}$  are  $> 1$  and, at the same time, more than 80% of  $E_{ij}$  are  $> 5$  (LUHA 2007).

Cramer's is a measure of association between two nominal variables, giving a value between 0 and +1. It can reach 1 only when the two variables are equal to each other.

$$V = \sqrt{\frac{\chi^2 / n}{\min(R, C) - 1}} \quad (2)$$

Cramer's  $V$  is the intercorrelation of two discrete variables and may be used with variables having two or more levels. In the case of a  $2 \times 2$  contingency table Cramer's  $V$  is equal to the Phi coefficient.

The Pearson's contingency coefficient is one method to provide an easier to interpret measure of strength of association. Specifically, it is:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}} \quad (3)$$

This statistic basically scales the chi-square statistic to a value between 0 (no association) and 1 (maximum association). If the sample size increases, the value of Pearson's contingency coefficient does not change as long as values in the table change the same relative to each other.

## RESULTS AND DISCUSSION

In Slovakia, men represented 41.8% of respondents. As for the age structure, over 48% of respondents was between 26-60 years of age. Over 72% concluded secondary and 22% university education. More than 44% earns 350-700 EUR per month and over 38% up to 350 EUR per month.

The Polish sample of respondents was represented by 60% of men. Over 56% of respondents were at the age of 26-60 years. More than 57% concluded secondary and more than 37% university education. More than 27% earns up to 350 EUR, 42% between 350-700 EUR and 30% over 700 EUR per month.

The relative frequencies are shown in table 1. Answers not relevant to the particular product group are marked by n/a. The missing percentage indicates that the question was not answered by respondents.

**Table 1 Relative frequencies.**

Material properties	Windows, doors, flooring, wall facing				Furniture			
	SK		PL		SK		PL	
	Wooden	Other non-wood materials	Wooden	Other non-wood materials	Wooden	Other non-wood materials	Wooden	Other non-wood materials
	%							
Versatility of product use	n/a	n/a	n/a	n/a	65,9	32,2	80,7	19,3
Material contributes to the creation of enjoyable atmosphere in a room	88,2	8,6	98,2	1,7	94,9	4,2	99,1	0,9
Heat insulation properties	65,4	34,4	68,4	31,6	n/a	n/a	n/a	n/a
Natural defects of material	53,4	43,0	63,2	36,8	61,9	33,9	71,0	29,0
Aesthetic properties	79,0	20,5	77,2	22,8	80,5	18,2	98,2	1,8
Sound insulation properties	36,8	59,4	80,7	19,3	n/a	n/a	n/a	n/a
Ecological use of material	95,0	3,5	87,7	12,3	88,2	9,0	88,6	11,4
Fire resistance	17,1	73,6	48,2	50,0	17,0	74,4	31,6	68,4
Durability, endurance, resistance (firmness) of material	27,5	69,0	53,5	45,6	36,6	60,5	57,9	42,1
Easy renovation	62,4	34,4	71,0	29,0	72,0	26,0	75,4	23,7
Health and safety properties of material	89,4	7,8	94,7	1,8	89,4	8,3	100,0	0
Environmental appropriateness of material	96,2	2,2	100,0	0	95,8	2,7	100,0	0
Renewability of material	93,0	5,3	98,2	1,7	93,8	4,5	100,0	0
Naturalness of material	95,2	2,7	99,1	0,9	91,7	6,4	100,0	0
Material is unique	79,8	14,4	85,1	14,9	81,4	13,6	97,4	2,6
Tradition in material use	87,0	6,2	92,1	7,9	93,1	2,7	100,0	0
Resistance against pets	3,4	95,0	0,9	99,1	3,8	94,9	0	100,0

In general, respondents in both countries prefer wooden windows, doors, flooring and wall facing to the competitive non-wood products. The most preferred properties of wood in comparison to other non-wood materials are the ecological use of wood, its environmental appropriateness, renewability and naturalness of wood. Ecological use is connected to the ability of wood to be recycled, repeatedly used, etc. Environmental appropriateness of wood relates to low environmental loads and disposals, lower emission of pollutants etc. Renewability of wood material is linked to its ability to be renewed without significant endeavour of people. Wooden joinery products gain other significant

preferences also for their traditions, naturalness of the material and the fact that wood contributes to the creation of enjoyable atmosphere and comfort. Health and safety properties of wood as a material are also important features considered by the end users. On the other hand, non-wood windows, floors, doors are preferred because of their resistance to fire and pets as well as their durability, endurance, and firmness of the material. Similarly, over 73% of Slovak respondent would prefer wooden products because of their fire resistance, while in Poland it is only 50%.

Taking into consideration differences between the Slovak and Polish respondents, it can be said that the prevailing number of properties is similarly preferred for wooden windows, doors, flooring and wall facing in both countries. However, properties such as sound insulation properties relating to noise elimination and acoustic properties, fire resistance and durability of material are perceived differently in Slovakia and Poland. Only 36.8% of the Slovak respondents would prefer wooden windows because of its insulation properties, while in Poland more than 80% of the observed sample would prefer wooden windows and doors to other non-wood products in order to eliminate noise. The last significant differences can be found in considering durability, endurance and firmness of wood used for windows and doors manufacturing as 27.5% of the Slovak respondents and 53.5% of the Polish respondents would prefer wood because of their mechanical and physical properties.

Similarly, most of the properties of wood are preferred in furniture products to other materials used for furniture manufacturing. End users prefer wooden furniture mainly for its health and safety properties, environmental appropriateness, renewability and naturalness of wood. Wooden furniture contributes to the creation of enjoyable atmosphere and comfort in homes. Traditional use of wood in furniture making is also considered to be a significant feature. According to the respondents, fire resistance and resistance against pets are properties in favour of substitution materials.

Contingency tables enabled to examine statistically significant differences between answers of respondents from Slovakia and Poland for each product group. The significant differences are shown in table 2.

**Table 2 Statistically significant differences in answers between the Slovak and Polish respondents.**

Product group	Property	Pearson chi-square			Pearson contingency	Cramer's V
		chi-square	df	p		
Windows, doors, flooring, wall facing	Fire resistance	57.16604	3	0.00000	0.2679583	0.2781294
	Health and safety properties of material	10.99375	3	0.01176	0.1210721	0.1219694
	Durability, endurance, resistance (firmness) of material	31.11393	3	0.00000	0.2010018	0.2051895
Furniture	Versatility of product use	10.56315	2	0.00509	0.1187114	0.1195569
	Fire resistance	21.04197	3	0.00010	0.1663889	0.1687412
	Durability, endurance, resistance (firmness) of material	19.84144	3	0.00018	0.1617004	0.1638568
	Material is unique	18.31078	3	0.00038	0.1554950	0.1574096

There are three characteristics where significant differences in material preferences can be identified between the examined countries – fire resistance, health and safety properties and durability, endurance and resistance properties of wood and non-wood material used for joinery products manufacturing. There is a significant difference in

preferences regarding the fire resistance of material used. Almost 74% of Slovak respondents would not prefer wooden joinery products because of their weak fire resistance while, on the other hand, almost 50% of Polish respondents consider wooden joinery products to be fire resistant. Even if 95% respondents in Poland and 90% in Slovakia would prefer wooden windows, doors and other joinery products for their health and safety properties, significant differences occurred in preferring these properties for non-wood products. Health and safety features of non-wood materials for windows manufacturing are preferred by nearly 8% and only 1.7% of Slovak and Polish respondents, respectively. Greater variations can be also identified when durability of material is taken into account. Up to 69% of Slovak respondents would prefer non-wood products for their features regarding durability, however, almost 54% of Polish respondents think that wooden joinery products are made of durable and resistant material.

As for furniture, there were four significant differences identified in preferences for wooden and non- wood furniture in Slovakia and Poland. In particular, the answers differed in properties such as versatility of product use, fire resistance, and durability, endurance and resistance (firmness) of material and uniqueness of material. Versatility of wood and its utilisation for furniture production is more preferred by Polish respondents (over 80%). On the other hand, one third of Slovak respondents would prefer furniture from non-wood material once versatility of wood is considered. Almost 6% of respondents in Slovakia do not consider fire resistance to be relevant property for furniture and only 17% of them would also prefer furniture produced from wood (compared to one third of Polish respondents). Durability, endurance and resistance are properties for which more than 60% of respondents sample in Slovakia would prefer non-wood furniture, while in Poland almost 58% of respondents link this property to wooden furniture. Similar associations were observed in preferences for joinery products. The uniqueness of wood is considered as a preferable feature of wooden furniture by 82% of Slovak sample compared to over 97% of Polish respondents.

Another group of results is represented by identified significant differences between the answers of respondents from both countries where, however, the basic precondition that all expected counts  $E_{ij}$  are  $> 1$  and, at the same time, more than 80% of  $E_{ij}$  are  $> 5$  was not met. Considering this unfulfilled assumption, the statistically significant differences for both product groups are shown in table 3.

**Table 3 Statistically significant differences in answers between the Slovak and Polish respondents (assumption about the expected values of counts not met).**

Product group	Property	Pearson chi-square			Pearson contingency	Cramer's V
		chi-square	df	p		
Windows, doors, flooring, wall facing	Sound insulation properties	76.12229	3	0.00000	0.3055938	0.3209473
Furniture	Aesthetic properties	21.80884	3	0.00007	0.1693084	0.1717885

Differences in two additional properties appeared to be significant – sound insulation properties for windows, doors, flooring and wall facing and aesthetic properties of furniture.

The null hypothesis that there is no relation between the answers was totally rejected in 7 above mentioned cases and so that for other cases the hypothesis  $H_1$  was accepted that there were significant relations between the answers of respondents at level of significance  $p < 0.05$ , while the condition about the expected values of counts had to be met.

As stated by Anderson et al. (2005), in order to understand consumers and to fulfil their needs and requirements companies shall consider consumer behaviour theory and apply marketing conception. Therefore, it is necessary to use marketing research methods. There has been an increasing trend observed in the use of more sophisticated methods in collecting data on consumers. In order to evaluate the position of products (or materials) in the marketplace, it is necessary to understand how customers perceive the product (or materials) in relation to substitutes. The consumers' perceptions do not always correspond to how manufacturers feel about their own products, even if it is a matter of perceiving a factor that determines success in the marketplace. Perceptions result in beliefs about products (or materials), which combine to create attitudes that ultimately direct consumer buying behaviour (SINCLAIR 1992).

Taking into account differences in both countries, preferences for wooden furniture are similar to those in joinery products. Generally, higher percentage of Polish respondents would prefer wooden furniture to other materials when these two properties are considered. Results of the above analysis show that in some cases that are significant differences in preferences of consumers for wooden and non-wood material in furniture and joinery products. There were several properties identified which are differently considered by consumers in making their decisions for a particular product. Such properties are mainly of technical nature such as e.g. fire resistance, health and safety properties, durability, firmness etc.

The results are of importance for companies and their managements as they point out the differences which influence the final consumers' decision making process in relation to the country of origin. They show possible differences in buying decision making caused by cultural conditions or by factors such as the consumers' level of information on products advantages or disadvantages associated to their properties. The survey results can be used by companies for formulation and development of promotion campaigns as they reveal the space of consumers' "information gaps" or their confidence because the opinions on material properties are created on the basis of traditional view and they do not take into account new knowledge and results of innovation changes in the respective area. The results can also facilitate the entrance of companies to foreign markets as knowledge of cultural environment in a given country is one of the crucial factors of internationalisation. Information on consumers should not be limited to those relating the income as such "soft" factors are determining the final decision for buying or not buying the product, respectively. At the academic level, the results bring new knowledge about perception of wood products properties. Consumers' views can be considered as a barometer of how the new knowledge is transferred to general awareness of society as they show the gaps or, literary, the myths about the respective materials and products use.

## **CONCLUSION**

The properties of wood and wood products are important for end users to make decision when purchasing such products. The objective of this paper was to determine attitudes of end users towards different ways of wood utilisation in Slovakia and Poland based on the evaluation of consumers' preferences for the selected wood properties in comparison with substitute materials for joinery products and furniture. For both product groups and in both countries wood is preferred to non-wood materials principally because of its ecological properties, environmental appropriateness, renewability and naturalness as well as traditions and health and safety properties. By the use of multi-criteria statistical



analyses we identified significant differences in preferences for wood and non-wood joinery products and furniture in Slovakia and Poland.

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