



SUSTAINABLE PACKAGING INDICATORS FOR HOUSEHOLD CHEMICALS

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Abstract

Sustainable business requires changes in the management of logistics activities. One of these activities is packaging, which has recently attracted the attention of many stakeholders in the supply chain. This paper focuses on consumer recognition of sustainable packaging for products of the chemical industry. Based on a combination of qualitative and quantitative research among Czech consumers (focus group, questionnaire survey), indicators of sustainable packaging are identified and their level of importance in consumer assessment of product sustainability is quantified. The results of the research showed that the important indicators of sustainable packaging include returnability of packaging, recyclability of packaging, refillability of packaging, use of recycled packaging materials and eco-label. While green customers pay more attention to most of the indicators compared to mainstream customers, the order of their perceived importance does not differ in principle. Both customer groups consider returnability and recyclability of packaging to be the most important indicators. The findings develop the existing knowledge on consumer perceptions of packaging and provide business managers with the necessary basis for developing appropriate sustainable packaging strategies.

Keywords: sustainable packaging, sustainable packaging indicator, household chemicals, chemical industry

1. INTRODUCTION

Sustainability significantly influences the direction of human society and has also become one of the major trends influencing the shape of corporate strategies in the last decade [1]. A significant contributor to the negative impact of corporate activities on the environment and society is the generation of packaging waste that is not further processed and ends up in landfills. For this reason, current packaging strategies focus specifically on packaging redesign to increase its sustainability [2], which has a positive impact on business performance [3].

These strategies typically focus on the use of renewable materials and reducing the volume of materials used in product packaging [4]. Packaging policies also incorporate circular economy principles, in particular, the introduction of recyclable, returnable and reusable packaging [2], however, changing the structure of packaging can contribute to greater sustainability [5]. Appropriately designed packaging can make more efficient use of space during transport and storage or facilitate product handling. This can reduce fuel wastage during transport and reduce energy use and emissions [6].

The success of the introduction of sustainable packaging in consumer markets depends primarily on the willingness of consumers to purchase products in such packaging. While consumer behaviour is dependent on many factors such as consumers' personal values, attitudes towards environmental issues, knowledge, emotions, and a range of other internal and external influences [7], if a consumer chooses to purchase products in sustainable packaging, the sustainability of the packaging must be clearly identifiable to them. Therefore, it is important to investigate how consumers recognise sustainable packaging and apply these insights to the design and marketing communication of sustainable packaging.



However, the current knowledge in this research area is largely limited, as previous research has generally relied on qualitative studies (i.e. the results are difficult to generalise), examined only selected indicators (i.e. did not compare different types of indicators according to their perceived importance from the consumers' perspective) and focused on sustainable packaging in general (i.e. ignored possible specificities of packaging recognition for different types of goods). This paper aims to identify, through a combination of qualitative and quantitative research, important indicators by which consumers recognise sustainable packaging when purchasing household chemicals.

2. SUSTAINABLE PACKAGING INDICATORS

The appearance of packaging helps consumers to assess its sustainability. Sustainable packaging should therefore evoke in consumers the feeling that the packaging is environmentally friendly [5]. Herbes et al. [8] identified four main groups of indicators by which consumers can recognise sustainable packaging: structural indicators, visual indicators, information on environmental impact, and sensory indicators.

Herbes et al. [8] consider the type of packaging material to be the main structural indicator. Moreover, reusability and recyclability of packaging are among the most frequently desired characteristics of sustainable packaging [9,10]. Therefore, green consumers prefer returnable or refillable packaging made of a single material type, especially glass or paper [11]. Conversely, the size and shape of the packaging are not decisive when assessing the sustainability of the packaging [8]. Similarly, a study by Boesen et al. [1] suggests that consumers do not sufficiently perceive the link between waste and packaging size. Although square-shaped packages are easier to store and take up less space during transport, this aspect is not important to consumers [12]. However, an inappropriately chosen shape and size of the packaging can make consumers feel that the package is not sufficiently filled with product [13].

Another area of indicators by which consumers can assess the sustainability of packaging is the visual and information aspect of the packaging. According to a study by Herbes et al. [8], approximately 80 % of consumers assess the sustainability of packaging based on its labelling.

Eco-labels provide consumers with information about the environmental performance of the product and packaging, which should make it easier for them to choose sustainable products [14]. However, the current way of eco-labelling products in consumer markets is burdened by the fact that manufacturers use a large number of eco-labels. Each one is based on different evaluation criteria and often conveys diametrically opposed information, which can be confusing for consumers [15]. According to Navas et al. [16], the impact of eco-labels on consumers is therefore minimal. However, consumer attitudes towards a product manufacturer or brand can also influence purchasing decisions to a large extent [17]. If consumers are familiar with the brand and trust it, they are more likely to trust the sustainability claims on the packaging [18,19].

Packaging colour is one of the most salient features of packaging that drives purchasing decisions for organic products [20] as it attracts attention and can also signal naturalness and sustainability [11]. Consumers perceive sustainable packaging as less appealing as it tends to be plain and not as colourful [10]. Earth-coloured packaging (e.g. brown, cream, or green) is a common indicator of sustainable products. Transparent packaging or packaging in colours that are associated with the naturalness of the product are also considered more sustainable options [11]. Similarly, the use of natural motifs on packaging can increase the perceived sustainability of the packaging [8].

According to Otto et al. [11], consumers evaluate packaging primarily through their feelings. They most often associate sustainability with the recyclability or reusability of packaging and their knowledge of other aspects of sustainable packaging is limited. As a result, consumers' behaviour may be much less sustainable than they assume [4].



3. RESEARCH METHODS AND HYPOTHESES

To meet the research objectives, a mixed methods approach was used that combines qualitative and quantitative research methods in a single research study. The qualitative research first revealed potential indicators of sustainable packaging from the perspective of green consumers. Follow-up quantitative research allowed us to measure the perceived importance of these indicators in the whole population of Czech consumers in order to reveal the most important indicators of sustainable packaging when purchasing household chemicals.

The qualitative research was carried out using the focus group discussion method, which included 6 Czech consumers of different genders and ages. However, all participants shared an inclination towards a sustainable lifestyle and a preference for purchasing goods in sustainable packaging. An audio-visual recording was made of the discussion, which was transcribed into written form and subjected to content analysis. The synthesis of the results of the content analysis and the literature search made it possible to identify 18 indicators of sustainable packaging, the relevance of which was investigated in a follow-up stage of the research. At the same time, two research hypotheses were defined:

H₁: Recyclability and reusability of packaging are among the main indicators of sustainable packaging for household chemicals from a consumer perspective.

H₂: Green consumers show a better ability to recognise sustainable packaging compared to conventional consumers.

The quantitative research was carried out in the form of a sample questionnaire survey among 400 Czech consumers aged 18+ years in the period January-February 2023. The sample of respondents was drawn by quota sampling with gender and age quotas according to the Czech Statistical Office [21]. The sample was consisted of: 49.0% of male and 51.0% of female; 23.2% aged 18–34, 36.8% aged 35–54, and 40.0% aged 55+; 17.3% primary educated, 42.8% secondary educated, and 41.0% tertiary educated. Based on the chi-square test, the research sample can be considered representative in terms of gender ($\chi^2 = 0.002$; $p = 0.968$) and age of respondents ($\chi^2 = 0.001$; $p = 0.999$), however, it is dominated by consumers with higher education ($\chi^2 = 150.248$; $p < 0.001$).

Data were collected using a face-to-face interview method involving a structured questionnaire. In the first part of the questionnaire, respondents assessed the extent to which they were able to identify sustainable packaging when purchasing household chemicals according to 18 pre-specified indicators. A four-point assessment scale (where 1 = no; 2 = rather no; 3 = rather yes; 4 = yes) was used for measurement. The survey also identified respondents' basic demographic characteristics (gender, age, education) and attitudes towards sustainable lifestyles (willingness to adapt to sustainability trends, interest in sustainability-related information, frequency of purchasing sustainable products and household waste sorting) on a five-point frequency scale (where 1 = never; 2 = sometimes; 3 = often; 4 = very often; 5 = always). Based on attitudes towards sustainable lifestyles, the sample of respondents was divided into two segments (67.5% of conventional consumers, 32.5% of green consumers). The segmentation of the sample was done using a two-step cluster analysis method according to Řehák and Brom [22].

The research hypothesis H_1 was tested through the Friedman test at a 5% significance level [22], which allows us to rank the indicators in order of average significance and identify the group of the most significant indicators of sustainable packaging. The research hypothesis H_2 was tested using a chi-square test at a 5% level of significance, which allows to compare the frequencies of responses between two groups of respondents [22]. For the purpose of hypothesis testing, the 'recognition rate' (%) was identified as the frequency of positive responses (rather yes; definitely yes) to the question of whether respondents are able to recognise that the goods they buy are packaged sustainably according to a given indicator.



4. RESEARCH RESULTS AND DISCUSSION

The focus group discussion confirmed the significance of most of the indicators described in the literature. However, participants in the discussion emphasised structural indicators (especially recyclability and reusability of packaging) more than visual indicators (e.g. eco-labels and packaging colour). At the same time, the theoretical list of indicators has been extended to include indicators in more detailed way not previously studied in the literature (see **Table 1**).

Table 1 Sustainable packaging indicators and their relevance for consumers [authors]

Indicator	Frequency of responses ^a (%)				Mean rank ^b	Recognition rate ^d (%)		Chi-squared test	
	No	Rather no	Rather yes	Yes		Conventional consumers	Green consumers	χ^2	<i>p</i>
Returnability of packaging	2.3	12.5	48.3	37.0	12.76 ^c	85.2	85.4	0.003	0.96
Recyclability of packaging	1.0	12.8	53.3	33.0	12.66 ^c	83.7	91.5	4.542	<0.05
Refillability of packaging	2.3	17.3	49.8	30.8	12.17 ^c	78.9	83.8	1.374	0.24
Use of recycled materials	2.5	21.0	53.0	23.5	11.30 ^c	73.0	83.8	5.781	<0.05
Sustainability (eco-) certification label	3.0	21.0	51.5	24.5	11.29 ^c	72.2	83.8	6.500	<0.05
Type of packaging material	2.0	24.0	59.0	15.0	10.53	68.9	84.6	11.280	<0.05
Packaging filling ratio	6.8	28.5	42.0	22.8	10.45	61.1	72.3	4.820	<0.05
Number of material types used	5.0	27.8	51.3	16.0	9.97	62.6	76.9	8.182	<0.05
Volume of packaging material used	6.8	29.5	46.5	17.3	9.84	58.5	74.6	9.839	<0.05
Other sustainable claims on packaging	4.8	32.3	51.3	11.8	9.59	61.5	66.2	0.822	0.37
Product brand or manufacturer name	12.5	29.3	44.8	13.5	9.20	51.1	73.1	17.410	<0.05
Number of levels (layers) of packaging	9.0	35.5	40.0	15.5	9.08	51.9	63.1	4.477	<0.05
Type of sales network	13.0	37.5	43.8	5.8	8.08	46.7	55.4	2.668	0.10
Images and nature motifs	20.0	37.3	35.3	7.5	7.49	41.1	46.2	0.912	0.34
Product placement	15.0	44.3	33.8	7.0	7.44	37.0	48.5	4.744	<0.05
Packaging colour	21.5	43.5	27.8	7.3	6.75	34.1	36.9	0.313	0.58
Minimalist graphic design	21.3	44.5	30.3	4.0	6.47	32.6	37.7	1.013	0.31
Shape of packaging	28.3	45.5	20.8	5.5	5.93	22.2	34.6	6.962	<0.05

- Frequency of responses to the question of whether respondents are able to recognise, according to the given indicator, that the goods purchased are packaged in a sustainable way.
- Ranking according to the Friedman test (an indicator with higher significance has a higher mean rank value).
- According to post-hoc tests, there is no significant difference among the mean rank values.
- Frequency of positive responses (rather yes; yes) to the question of whether respondents are able to recognise, according to the given indicator, that the goods purchased are packaged in a sustainable way.



The follow-up analysis of the questionnaire survey data made it possible to compare the significance of the 18 indicators across the population of Czech consumers (18+) and between subgroups according to their inclination towards a sustainable lifestyle. **Table 1** summarises the main results of the quantitative research, including the results of a chi-square test verifying the statistical significance of differences between conventional and green consumers.

The first part of the results presented in **Table 1** shows that not all indicators of sustainable packaging play an equally significant role in the purchase of household chemicals, as confirmed by the results of the Friedman test ($\chi^2 = 1419$; $p < 0.001$). The most significant indicators include returnability of packaging, recyclability of packaging, refillability of packaging, use of recycled materials and eco-labelling. Most of these indicators are related to the recyclability and reusability of packaging, so the findings support research hypothesis H_1 (*Packaging recyclability and reusability are among the main indicators of sustainable packaging for household chemicals from a consumer perspective*). The importance of recyclability, reusability and eco-labelling are consistent with previous research [8–10]. However, the theoretical list of the most important indicators can be extended to include the use of recycled materials.

The shape of the packaging, which determines the effective filling of secondary packaging, is the least important indicator from the consumers' point of view, while the filling rate of the primary packaging is a much more important indicator for consumers. This suggests that consumers assess the sustainability of packaging only at the product life cycle's consumption stage and cannot assess the impacts of packaging design at earlier stages of the life cycle. Previous research [8,12] has come to a similar conclusion. The research results also confirmed a higher tendency to judge packaging by its eco-label (through product certification by independent parties) compared to other labels and environmental claims made by the manufacturer on the packaging. This is probably due to the higher credibility of eco-labels provided by independent organisations, as some previous research [18,19] has also pointed out. In contrast, attitudes towards other visual indicators of packaging (graphic design) are inconsistent with some previous research [11,20]. In our research, these indicators are not decisive in the recognition of sustainable packaging, which may be due to the fact that consumers are not fully aware of their influence when choosing a product. However, if a consumer is attracted to a product only by the graphic design of the packaging that is not in line with the other important indicators of sustainable packaging, the purchase may not be made.

The comparison of recognition rates between conventional and green consumers in **Table 1** shows that green consumers declared a higher ability to recognise sustainable packaging for all indicators. For 11 of the 18 indicators examined, the difference found is statistically significant, supporting research hypothesis H_2 (*Green consumers show a better ability to recognise sustainable packaging compared to conventional consumers*). Fundamental difference was identified for the type of packaging material. As a result of that, the type of material will significantly influence attitudes towards packaging, especially among green consumers.

5. CONCLUSION

The research carried out allowed the identification of 18 indicators of sustainable packaging. Subsequently, their importance in the purchase of household chemicals was assessed. The list of the most important indicators in the literature (eco-labelling, recyclability and reusability of packaging) was extended to include one more important indicator (use of recycled materials). For green consumers, the type of packaging material is another important indicator. The research findings extend the existing theoretical understanding of consumer recognition of packaging sustainability and are directly applicable to the practice of manufacturing companies (especially manufacturers of household chemicals) in developing packaging strategies and designing appropriate marketing communication of sustainable packaging in consumer markets.



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