

**Consumer's behaviour on sustainable food packaging in  
North Macedonia**

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## **Abstract**

The paper investigates the North Macedonian consumer's behaviour concerning sustainable packaging through quantitative research. The study aims to determine the perception of the North Macedonian consumer regarding the role of eco-packaging in forming sustainable behaviour. To achieve it, the assessment of consumer preferences for the types of ecological packaging, including the reasons for purchasing green packaging, and the role of the information about eco-packaging in promoting sustainability, has been collected. Data was collected through an online survey implemented in the country's main cities with a total sample size of 342 respondents. Most respondents (56.73%) reported that quality is essential during buying packaged food products regarding their regional area distribution ( $P < 0.05$ ). There was a highly positive correlation between consumers considering the environmental sustainability of product packaging and how they usually buy products with eco-friendly packaging. Kruskal Wallis test showed significant ( $P < 0.05$ ) differences among the region areas considering the impact of packaging on the environment and the price of the packaged food products. There was no statistical significance between the product brand and the food product's environmental impact ( $P < 0.05$ ) during buying. The highest packaging preferences for bread (87.7 %), fruit and vegetables (58.2 %) and pasta and cereals (48.5%) include paper and, to a lesser extent, plastic. In conclusion, consumers are willing to consider the labelling indicating the impact of packaging on the environment and more product information to identify packaging sources while adopting a sustainable behaviour.

**Keywords:** food waste; food packaging; sustainable behaviour; environmental protection; consumer acceptability

## **1. Introduction**

Several official institutions suggest "green economy" as one concept of a sustainable economy considering the three-dimensionality of sustainability – economy, human well-being, and environment. The study and development of new packaging options are increasing due to consumers' needs but specially because an ecological necessity (Otto et al., 2021). Environmental and consumer organizations identify food and plastic waste as significant economic, ecological and social challenges. However, the environmental impact is even worse when food is wasted rather than consumed (Obersteiner et al., 2021). Since packaging is seen to be as one of the most significant contributors to waste generation (76%), sustainable packaging is becoming more critical for retailers and companies (Elzen, 2016). The concept of sustainability in food packaging was applied in early civilizations and is used in modern civilizations in food preservation until the next season's harvest. The emergence of the actual term "sustainability" is based on a 1987 United Nations report (Brundtland Report) defining sustainable development as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Boz et al., 2020). Organizations, corporations, NGOs, and policymakers have formalised the modern sustainability definition and adapted it to various fields, and there are more than 300 definitions for the term "sustainability" (Geissdoerfer et al., 2017). Many producers are integrating their sustainability concepts into their product packaging; however, sustainable packaging has never been conceptualized very clearly (Nordin and Selke, 2010).

Eco-packaging must benefit the consumer since it is safe and healthy for the individual and the community throughout its life cycle. It should also be market-efficient and cost-effective; obtained, produced, transported, and recycled via renewable energy sources. It should utilize best practices and clean production technologies and increase the use of renewable materials (Orzan et al., 2018). Many investigations explored the consumer

preference for food packaging in general, but only few investigated the consumer knowledge and perceptions about sustainability towards food and food packaging materials: glass, metal, paper, and plastic. In this regard, knowledge and perception of Swedish consumers of environmental aspects of food packaging were investigated by Lindh, Olsson, and Williams (2016). They concluded that material-related characteristics were dominant regarding the ecological concerns of packaging. Other study evaluated the attitude of French consumers and showed mainly positive attitudes toward biodegradable and recycled plastics (Orset et al., 2017). Lately, government and nongovernment concerns in N. Macedonia have promoted the mass use of eco-packaging and set up specific eco-labelling regulations to prevent environmental damage (Official Gazette of N Macedonia, 215, 2021). The primary objectives were to reduce the negative impact of packaging and packaging waste on the environment and human health to the lowest possible level, and to improve environmental protection standards by economic operators during the life cycle of packaging, and especially during the treatment, reuse, processing and disposal of packaging waste. To our knowledge, in N. Macedonia, there has been no study on consumer preferences on sustainable behaviour, environmental protection and food waste so far. Therefore, this study aims to gain more consumers' perceptions of packaging in different regions. How important to consumers is sustainability, and which packaging is most important while evaluating the products is also evaluated.

## **2. Materials and Methods**

The quantitative research aimed to determine the familiarity of the North Macedonian consumer regarding the role of sustainable packaging in forming sustainable behaviour. Through its significant objectives, the study identifies consumer preferences for organic

packaging, knows the reasons for buying/not buying the environmental packaging and the role of information for the consumer, and helps determine the significant factors influencing the North Macedonian consumer's perception of ecological packaging and their sustainable behaviour.

### *2.1. Study design and participants*

The quantitative research was conducted on a sample of 365 respondents and yielded 342 valid questionnaires. The sample structure was designed in three main objectives concerning description, waste management and the overall knowledge (Table 4). Although it is exploratory online research, following the analysis and interpretation of information collected from respondents, the results are valuable if they are corroborated by other studies conducted on the same subject.

### *2.2. Instruments and variables*

The study was conducted from early January to May 2022 through the online survey method as a tool based on a questionnaire developed according to the purpose of the research.

It consisted of a total of 20 questions; three of them were sociodemographic classifications (age, gender, and region), two dichotomous closed questions (Q1 and Q17), and other mixed questions (Q3, Q5 and Q20) who's tried to identify other reasons than those mentioned in the variants, an open question and closed questions (Q2, Q4, Q6 -16, Q18-19).

### *2.3. Procedure and. statistical analysis*

To analyze and interpret the results obtained in these questions, but also to produce bivariate correlations and analyses that lead to essential data for the researched subject, a systematic model has been created that highlights how the analyzed variables lead to the fulfilment of the

objectives and purpose of the research. For each value (demographic, use, information), first was analysed descriptive statistics, i.e., means and proportions. Kruskal-Wallis test or Student's t-test (for non-normal or normal continuous distributed data, respectively), and Chi-squared tests (for categorical data) were used to evaluate differences in means or proportions by these variables. Multinomial and ordinal regression models were used to explore variables associated with the change in being informed (informed versus non-informed, as reference) to sustainable food packaging. Odds ratios (ORs) and corresponding 95% Confidence Intervals (CIs) were estimated in univariate regression models. The threshold for statistical significance in two-sided tests was set at a p-value = 0.05. Data were analyzed with SPSS (version 16.0).

### **3. Results and discussion**

#### *3.1. Sociodemographic and regional characteristics of the study sample.*

Three hundred forty-two individuals from N. Macedonia (76,4 % females and 23,6 % males) participated in the survey and completed the questionnaire (see in Supplement). Most participants were 20–35 years old (45,5%), and the higher percentage of the sample was from Skopje, Tetovo and Ohrid districts.

#### *3.2. Factors related to consumers' decision to purchase*

About 51% of the participants supplied food products every day (51.2%), and the supermarkets were the place of purchase (90%). No statistical difference between gender levels was found for participants that considered the products' environmental sustainability/packaging impact (Fig. 1 a). However, a statistically significant interaction between regions that consider the environmental sustainability/packaging impact of the products and in terms of buying products that have eco-friendly/sustainable packaging (Fig. 1 b, c) (p-value = 0.022 and 0.011) was observed, respectively.

The analysis of the data shows that N. Macedonian consumers prefer cardboard (paper) for bread and baking products (87.7%), fruits - vegetables (58.2%) and rice, pasta and cereals (48.5), respectively (Fig. 2a). Glass as packaging material was generally most preferable, especially for spices, oils and sauces (42.1%) and milk and drinking milk products (34.8). The results support an inconvenience for environmental protection because cardboard and paper are the easiest to recycle and produce the most negligible impact on the environment, and glass is reusable packaging. The results lead to the conclusion that, although there is a concern for protecting the environment, sustainable behaviour cannot be considered since around 41% of respondents prefer plastics as packaging for meat and fish, especially as there is no other packaging material. There were significant differences (Kruskal Wallis,  $P < 0.05$ ) between the regional distribution regarding the packaging material of the dairy drinking products, meat, fish and spices, oils and sauces. Similar findings were conducted by Orzan et al. (2018) in the study about consumers' behaviour concerning sustainable packaging. The main reasons behind the purchase of packaged food products resulting from data analysis are the quality, price, comfort, environmental impact, availability, brand and package size (Fig. 2b). Considering the Kruskal-Wallis test, there were highly significant  $P=0.000$  differences between the region distribution regarding the quality reason for purchasing food packaged products (Fig. 3a). Also, there were significant differences in the region over environmental impact, price, availability and convenience as reasons for buying the packaged food products (Fig. 3c,d,e,g). Therefore, no significant differences ( $P > 0.05$ ) were between regions and factors such as brand and package size (Fig. 3 b,f). Regarding the main reasons behind purchasing packaged food products, there was a significantly high positive correlation between environmental impact and availability (Table 2). Based on the data analysis, it can be concluded that there is a medium awareness of the effects of packaging on the environment, which is also supported by the respondents' answers on the benefits of buying packaged products. Some investigations indicate that

consumers are willing to pay a 10% price surcharge for fair trade labelled products), but high prices are one of the main barriers to purchasing sustainable products (Zander and Hamm, 2010; Grunert, 2011). It shows behaviour and attitude gaps, meaning consumers are willing to pay more for sustainable products but eventually do not. It is reported that the environmental benefit of avoiding food waste through packaging is significantly higher than the environmental costs of packaging production and packaging optimization. Amongst the investigated packaging types, bio-based and glass are the most environmentally sustainable, and plastic is generally perceived as the least favourable. Laminated cartons receive a mixed perception but can be ecologically preferable solutions, even though they may be difficult to recycle (Pilz et al., 2014; Boesen et al., 2019).

### *3.3. Waste management options and perceptions of consumers*

Only a reasonably low percentage considers the waste management methods such as compost, recycling and reuse (Fig. 4). According Kruskal Wallis test, significant differences between regions in terms of waste management such as reuse ( $P=0.024$ ) and recycling ( $P=0.00$ ); therefore, no significant in terms of compost ( $P=0.299$ ) and none using any waste management ( $P=0.068$ ). Concerning recycling the packaging, a higher percentage of the respondents (40 %) consider it complex, and a significantly higher percentage, 38.3%, consider that they require a recycle bin for recycling (Fig. 5). The results conclude that, although concerned about difficulties with packaging recycling, respondents are aware of this as an essential impediment to adopting sustainable consumer behaviour. The N. Macedonian consumer included in this study is aware of the impact of packaging on the environment and a large amount of waste generated, so the main reasons mentioned for which they would be willing to contribute and considers themselves responsible for protecting it. A statistically significant interaction between buying eco-friendly packaged products with the frequency of

buying and place of purchasing (Fig. 6 a, b) ( $P$ -value = 0.019 and 0.000) was observed, respectively. Also, a significant interaction between region and frequency of buying with consideration of eco-friendly packaged products was observed (Fig. 6 c, d) ( $P$  = 0.004 and 0.003). Regional differences ( $P$ = 0.003) regarding the amount of waste resulting from the packaging were also very variable (Fig. 6f).

In Table 3, we chose to conduct a regression analysis that grouped the likelihood of the problem of the amount of waste resulting from packaging in one variable as dependent and seven other variables as predictors to see if there were a strong link between them. Using the SPSS program, we obtained the following results: Model Fitting with Chi-square value is statistically significant, as Sig = 0.000, whereas the test of parallel lines was insignificant, corresponding to a 95% probability of guaranteeing results. The analysis suggested that the seriousness of the problem of the amount of waste resulting from packaging is predicted positively with how informed are about the sustainable concept ( $P$ =0.009), consideration of the environmental sustainability ( $P$ =0.032) and if the food products were labelled indicating the impact of packaging on the environment ( $P$ =0.000).

#### *3.4. Consumer knowledge of the use of sustainable food packaging*

Nominal regression analysis (Table 3) was chosen to conduct a regression analysis that grouped the likelihood of consideration of the food products if they were labelled with a dot indicating the impact of packaging on the environment as dependent and ten other variables as predictors to see if there were a strong link between them. In both case analyses, we started from hypothesis H1: a correlation between the eight analyzed variables and assuming the null hypothesis—H0—that there is a link between the variables analyzed. We obtained statistically significant, as Sig = 0.000 of the Model Fitting with Chi-square value guaranteeing the probability of results. The analysis suggested that higher consideration of the problem of the

amount of waste resulting from packaging ( $P=0.022$ ) can predict the definitively the consideration of the food products labelled for the environmental impact. Analyzing the statements of the respondents, it is very promising that the highest percentage is that they strongly disagree that environmental protections are only the duty of the companies and public administration.

Sustainable packaging is justified since a higher percentage strongly agreed (16.4%) with the price paid for friendly packaging. The statement is that they did not have enough information about ecological packaging (Fig. 7a). As the recommendation and suggestions asked from the respondents significantly highest percentage belongs to the statement that more information on the product and packaging is needed for more consideration of sustainable food packaged products (Fig. 7b).

#### **4. Conclusion**

Although there was a concern for protecting the environment, we cannot talk about sustainable behaviour cannot be considered since around 41% of respondents prefer plastics as packaging for meat and fish, especially as there is no other packaging material. Significant differences between the regional distribution regarding the packaging material of the dairy drinking products, meat, fish and spices, oils and sauces. Developing efficient processes and products with reduced energy and resource consumption should characterise the modern industrial economy. Since packaging production represents one of the most consistent causes of material-related environmental impacts, innovative tools should be designed to improve the environment and economic performance. Additional research is required from industries, consumers, and governments to ensure a more sustainable society with a minimum impact on the environment and future generations.

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## Figure Captions

**Figure 1-** a. Consumer consideration of the environmental sustainability over gender  
b. Consumer consideration of the environmental sustainability over the region (1- Skopje, 2- Kumanovo, 3- Tetovo, 4 -Gostivar, 5 -Struga, 6- Ohrid, 7- Debar, 8- Kicevo, 9- Other)  
c. Frequency of buying eco-friendly over the region (1-Skopje,2- Kumanovo, 3- Tetovo, 4 - Gostivar, 5 -Struga, 6- Ohrid, 7- Debar, 8- Kicevo, 9- Other)

**Figure 2.** Survey results of consumers preferred food packaging (Number of replies: 342)

**Figure 3.** Importance of the factors during buying of packaged food (Number of replies: 342)

**Figure 4.** Importance of buying over the region (*a. Quality, b. brand, c. environmental, impact d. price, e. availability, f. package size, g. convenience*)

**Figure 5.** Frequency of waste management methods

**Figure 6.** Recycling of food packaging after use (*a. Ease to recycle, b. Difficulties for recycling*)

**Figure 7.** a. Frequency of buying products that have eco-friendly packaging over how often are bought  
b. Frequency of buying products that have eco-friendly packaging over the place of buying  
c. Consideration on the eco-friendly label when shopping over the region (1- Skopje,2- Kumanovo, 3- Tetovo, 4 - Gostivar, 5 -Struga, 6- Ohrid, 7- Debar, 8- Kicevo, 9- Other)  
d. Consideration on the eco-friendly label when shopping over how often is bought  
e. Consideration of the eco-friendly label when shopping over the place of buying  
f. Consideration of the problem of waste from packaging over the region (1-Skopje,2- Kumanovo, 3- Tetovo, 4 - Gostivar, 5 -Struga, 6- Ohrid, 7- Debar, 8- Kicevo, 9- Other)  
g. Consideration of the problem of waste from packaging over how often is bought  
h. Consideration of the problem of waste from packaging over the place of buying

**Figure 8.** Survey results of consumers about statements for a sustainable environment.

**Figure 9.** Consumer suggestion's on helping on buying eco-friendlier food packages.

