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Article

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THE IMPACT OF THE "GREEN TRANSITION" IN THE FIELD OF FOOD PACKAGING ON THE BEHAVIOR OF ROMANIAN CONSUMERS

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Abstract

Sustainability has become one of the constant concerns of active participants in the food chain: producers, traders, consumers, and regulators. The paper aims to identify consumers' perceptions of the use of sustainable food packaging, in an exploratory survey of a sample of 280 respondents, knowing the importance of recycling to create a healthy and sustainable environment. The relevance of the research derives from the need to know the behavior of consumers in a certain geographical area, with regard to the aspects related to the recycling and sustainability of packaging. This is a component of green marketing that involves the management of activities related to the reconsideration of products and production processes, as well as the use of eco-sustainable packaging. The validation of the research hypotheses was done with methods of non-parametric analysis of the interdependencies between the identified variables, the results obtained highlighting the need to study this issue on a representative sample, using a more complex questionnaire. 81% of the study respondents identified as the main benefit for the use of sustainable packaging the possibility of living in a less polluted environment, an essential component of the development of ecological and sustainable food systems, being identified in the ability of producers and traders to communicate the placement on the market of sustainable packaging for marketed products.

Keywords: sustainable packaging, green marketing, consumer behavior, eco-innovation, eco-labeling, European Green Pact, non-parametric analysis.

JEL Classification: C25, D12, M31, M37, M38, O33, Q53.

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Introduction

The European Green Deal, published by the European Commission at the end of 2019, provides - as its name suggests - a consensual framework for all actors in the European value chain to contribute to the sustainable (“green”) transition to the circular economy and to mitigate the effects of climate change - one of the biggest challenges of the present days (European Commission, 2019a). The main food chain companies – producers and traders – have embarked on processes to transform the way they run their businesses to assimilate European goals of environmental protection and sustainable development, with increased transparency in consumer relations (Bobe et al., 2020). In recent years, many of these companies have made public commitments detailing the steps they take to meet these goals (Jurconi and Ilie, 2019). A new generation of entrepreneurs has also emerged, entrepreneurs who have a real interest in sustainability (Negrutiu, Vasiliu and Enache, 2020).

Increasing consumer awareness of environmental issues, along with attention to health and a balanced diet, are global trends that have been exacerbated in the COVID-19 pandemic (Di Renzo et al., 2020; Mastercard, 2021). At the national level, these two global trends are confirmed by an Ernst & Young study of 393 respondents, which shows, among other things, that “personal and family health are the main elements that currently concern more than 64% of Romanian consumers” (Ion and Cârstoiu, 2021). In this context, it is necessary to explore innovation trends in the field of “green” and “healthy” materials for food packaging – consequences of the materialisation of the sustainability commitments of some key players in the European food chain.

The results of a study conducted almost a decade ago on the “attitude of Romanians toward eco-labeling” (Dinu, Schileru and Atanase, 2012), showed, at the time, that 55% of the respondents were “fully aware” of the “most significant effects” of packaging on the environment. Factors such as “ecological education, nature orientation, and respondents’ willingness to pay a higher price for organic products”, as shown by Ahmad et al. (2012), are prerequisites for a significant improvement in the level of “ecological awareness”. In the same study, the authors demonstrated that “individual cultural level or religious beliefs do not influence ecological awareness”, but that “the ecological awareness of consumers has a significant positive influence on the declared ecological behavior”. One of the conclusions of the research conducted a decade ago on the perception of consumers in Romania on the use of eco-packaging (Dinu, Schileru and Atanase, 2012) shows that the need for consumer information is high, there is “a lack of environmental education”. The results of research conducted by Petcu, Miron and David-Sobolevski (2012) concluded that “the imposition by rules and coercion of ecological behavior would lead to the formation of ecological attitudes that would strengthen ecological behavior”. Other studies consider the multi-directional public communication campaigns of the main actors involved in the food chain to play a key role in the ecological education of consumers - producers, traders, regulators, consumer organizations, educational institutions and the media (Jurconi, Pamfilie and Lupu, 2021).

Structured into three main sections, this paper aims to identify aspects of the impact of organic marketing on consumer orientation toward the use of sustainable food packaging. The first part of the paper captures the most important results of studies in the field, emphasizing the use of technological advantage and recyclable materials in the field of food packaging, the innovation being the engine of the “Green Transition”. The research methodology regarding the behavior of the Romanian consumer of packaged food sustainably in the context of the European Green Pact is found in the second part of the study,

the last part including the analysis of results, validation of hypotheses, formulation of conclusions in the context of research limits, and future research directions.

The results presented in this paper are the authors' concern to explore the issue of sustainable packaging use from a consumer perspective, providing support for more accurate and comprehensive future statistical research to underpin public policies in this area.

1. Innovation - the engine of the “Green Transition” in the field of food packaging

The technological advancement of the last two decades has made it possible to use sustainable materials made of paper, cardboard, vegetable fiber, glass, and steel for food packaging. Also, under certain conditions, certain recycled polymers, in particular polyethylene terephthalate (rPET), may meet the necessary food quality and safety requirements, as set out in EU Regulation 1935/2004 on food contact materials (Alvarado Chacon, Brouwer and Thoden van Velzen, 2020) – but these plastics do not fully meet the needs of the Romanian consumer of packaged food products (Ilie and Jurconi, 2019). 60% of the approximately 400 million tons of plastic produced annually worldwide go to food packaging (Groh et al., 2019). In order to reduce the effects of plastic on the environment and to stimulate the circularity of the Member States' economies, the European Commission has adopted Directive 904/2019 (European Commission, 2019b), which sets a roadmap with clear objectives for all participants in the single use non-biodegradable packaging chain. This high-impact enactment creates the consensual framework under which the packaging industry, national and European regulatory bodies, traders, consumers, and their organizations can contribute to the gradual replacement of plastic packaging with more durable and environmentally friendly packaging (Prata et al., 2019).

Food plastic packaging waste is mainly responsible for pollution of the marine and terrestrial natural environment, (ii) accumulation in the groundwater of micro - particles resulting from the slow and aerobic mechanical decomposition of plastic and migration of toxic substances contained in plastic packaging to the packaged foods (Muncke et al., 2020). Plastic food packaging contains certain chemical compounds that have been unintentionally added by manufacturers (NIAS) due to the nature of the technological process and the impurities of the basic and auxiliary raw materials; the problem is that certain NIAS can cause serious disruption of the human endocrine system (De Wilde et al., 2013).

Sustainable food packaging combines the natural properties of plant fiber substrates with those of inert compounds in terms of chemical interaction with packaged food, resulting in biodegradable composite materials, often reusable, with mechanical and thermal properties comparable to food plastics, but without its ecological and sanogenic disadvantages (Alizadeh-Sani, Mohammadian and McClements, 2020; Asensio, Montañés and Nerín, 2020; Bhardwaj et al., 2020; Ahankari et al., 2021). Zimmermann et al. (2020) have shown that, although sustainable packaging also contains unintentionally added chemicals, the risk of their migration into packaged food (and hence into the human body) is significantly lower than in the case of plastic packaging.

Glass is a reusable, recyclable and durable material, easy to sanitize and chemically inert, used as a transport packaging for many categories of food, thus securing longer shelf life. These glass packaging systems and their sealing element do not pose food safety or consumer

safety issues, except for their low resistance to mechanical shock, have a shelf life of 3.5 times longer than plastic ones, and can be easily recycled many times by selective collection, being practically the best choice among sustainable packaging materials for food (Gallego-Schmid, Mendoza and Azapagic, 2018; Demirel and Erol Taygun, 2020).

In the last two decades, there has been a Japanese-inspired socio-cultural trend for the packaging of “ready-to-eat” food and food prepared in the so-called “bento” boxes, whose lids increase the use value of the respective packaging, as they can also be used as portable plates for cutting or portioning food (Nishimoto et al., 2015). However, some of the plastic caps for bento boxes contain bisphenol-A (BPA), a substance with a devastating effect on the human endocrine system, known for its role in both male and female infertility and the development of associated tumors, which explains the growing interest of food packers in bamboo screw caps and lids, all this reflecting in the state of health, at both personal and public level, and can lead to a decrease in quality of life (Konieczna, Rutkowska and Rachoń, 2015; Țițan et al., 2020).

Food grade stainless steel does not rust, has a high thermal resistance, is reusable and recyclable, chemically inert, but lighter than glass and has an increased resistance to mechanical shocks (Nishimoto et al., 2015).

The COVID-19 pandemic has led, among other things, to a readjustment of the sustainability goals of some food companies regarding the recycling targets of plastic in the packaging placed on the market (Lehmann et al., 2021). In the early days of the pandemic, there was even an increase in the consumption of single-use plastic packaging used by traders to package fruit and vegetables, amid allegations of transmission of the virus through contact with surfaces. If the global market for sustainable packaging was \$ 211 billion by 2020, it is projected to reach \$ 327 billion in 2026 amid growing global awareness of the need to protect the environment and health (Mordor Intelligence, 2021).

2. Study of the Romanian consumer’s behavior of sustainable food packaging in the context of the European Green Deal

2.1. Research methodology

In order to assess the importance of awareness and implementation of eco-innovation results, as well as the extent to which it influences respondents’ concerns about the environmental impact of packaging, data from an exploratory sample of 280 respondents from the Bucharest-Ilfov region, between September and December 2021 through an online questionnaire. As it was difficult to conduct research on a representative random sample, the authors of this empirical exploratory study considered the inclusion of people in the sample according to the criterion of relevance (people who possess the essential characteristics of the research population – consumers of packaged food). The questionnaire used in the research includes 24 questions aimed at knowing consumer behavior in the context of the European Green Pact, the first 7 of which outline the socio-demographic profile of respondents.

The study of the behavior of the Romanian consumers, in the context of the Green Pact, represents the purpose of the research, the objectives subordinated to it aiming at:

- identifying the degree of knowledge about the concept of “3Rs”;

- determination of the perception regarding the use of ecological packaging;
- highlighting the concern for waste sorting in order to reduce environmental pollution;
- establishing the link between the age of the respondents and the concern for environmental protection;
- identifying the influence of the level of education on the consumer's orientation toward a green economy.

The interdependencies between the statistical variables (Annex 1) identified by the items of the questionnaire used in the study were analyzed using nonparametric correlation methods, as well as the ordinal regression model, using the statistical data analysis facilities provided by IBM SPSS (ver. 26). The use of statistical methods specific to ordinal variables aims to avoid distorted estimation of effect size, increased error rates, and other problems that may distort research results (Liddell and Kruschke, 2018; Bürkner and Vuorre, 2019), observed in the case of statistical models that I falsely assume they are metrics. The association analysis between the variables, performed by means of Goodman and Kruskal's tests, allowed the identification of the intensity of the dependencies between the variables, its level of statistical significance, and the specification of the ordinal regression model. The regression model used has the ordinal dependent variable In9, the degree of concern of the respondents regarding the impact of packaging on the environment, and as independent variables In10, the practice of sorting household waste and In12, the degree of knowledge of the concept of "3R" ("Reduce - Reuse - Recycle").

The methods of analysis described above were used to verify the research hypotheses established on the basis of the stated objectives:

- *Hypothesis 1* Knowledge of the concept of "3R" as a result of awareness of the impact of household waste on the environment;
- *Hypothesis 2* Improving the quality of life from the perspective of reducing pollution depends on the degree of concern of consumers for the use of environmentally friendly packaging;
- *Hypothesis 3* Familiarizing respondents with the concepts related to the green economy, as well as the practice of sorting household waste, influences the extent to which they are concerned about the impact of packaging on the environment;
- *Hypothesis 4* Age is a factor influencing respondents' concern for environmental protection;
- *Hypothesis 5* The level of education influences the respondents' concern for environmental protection.

2.2. Results and discussions

In order to achieve the research objectives related to the study of consumer behavior from the perspective of knowledge and perception on the use of sustainable packaging, the links between the statistical variables identified in the questionnaire questions were analyzed with

the aim of validating the hypotheses.

2.2.1. Analysis of consumer behavior in relation to the concern about the impact of packaging on the environment using the ordinal regression model

For the validation of the first research hypotheses (# 1, # 2 and # 3) we used the regression analysis with ordinal variables, the Logit model, which has as endogenous variable in In9, and as exogenous variables In10 and In12, it is observed that most of the respondents are concerned about the impact of packaging on the environment and, at the same time, a large part of them know the concept of the "3R" and practice the sorting of household waste (Table no. 1).

Table no. 1. Proportion of cases falling at each level of the dependent variable (In9)

		Marginal Percentage
The degree the respondent is concerned about the impact of packaging on the environment (In9)	I have no interest on the matter	0.7%
	I am little worried	2.9%
	I am somehow interested	24.6%
	I care a lot	52.5%
	I am extremely concerned	19.3%
Occurrence of the household waste sorting (In10)	Never	8.6%
	Sometimes	30.0%
	Always	61.4%
The degree to which the respondent is familiar with the concept of "3R" (In12)	I have never heard about it	12.9%
	I have some knowledge about this concept	62.1%
	I know the concept very well	25.0%

The significant value of the Chi-Square test (66.119, *Sig.* = 0.0000) obtained in the case of the model with predictors leads to the rejection of the null hypothesis and shows that it is adequate for the proposed analysis. Pearson's Chi-square (24,036, *Sig.* = 0.680) statistics were used to test the validity of the model and its suitability for the analyzed data (Goodness-of-Fit tests), as well as Chi-square statistics based on analysis of variance. (24,501, *Sig.* = 0.655). For both tests applied, it is demonstrated that the model is valid and according to the data included in the analysis (*Sig.* > 0.05).

Unlike the classical model of multifactorial regression, in which the coefficient of determination (R^2) indicates the proportion in which the predictors influence the variation of the endogenous variable, in the case of ordinal regression, three statistics are calculated summarizing the proportion of variation of the result: Cox and Snell (0.210), Nagelkerke (0.234) and McFaddencare (0.104). The interpretation of pseudo R-square values should be done with caution, especially since in the literature there is no reference to how they should be interpreted (Lomax and Hahs-Vaughn, 2012; Smith and McKenna, 2013; Osborne, 2015; Pituch and Stevens, 2016; Crowson, 2019). The values obtained, such as *Nagelkerke*, suggest that the proposed factor variables (Item10 and Item12) explain in a proportion <25% the variance in the extent to which they are concerned about the impact of packaging on the environment. Certainly, the result obtained is not surprising because there are other factors that can influence the choice of respondents.

Analyzing the regression coefficients and significance tests for each of the independent variables included in the model (Table no. 2), it is observed that the estimates obtained are

negative, which means that for each unit increase of an independent variable, a decrease is estimated, to some extent, the probability of obtaining a higher level for the dependent variable (Crowson, 2019).

Table no. 2. Estimation of the parameters of the regression model

Parameter Estimates								
		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[In9 = 1]	-7.083	0.787	81.093	1	0.000	-8.625	-5.542
	[In9 = 2]	-5.370	0.456	138.644	1	0.000	-6.263	-4.476
	[In9 = 3]	-2.709	0.306	78.489	1	0.000	-3.308	-2.109
	[In9 = 4]	0.124	0.246	0.255	1	0.614	-0.358	0.606
Location	[In10=1]	-2.160	0.446	23.446	1	0.000	-3.035	-1.286
	[In10=2]	-1.153	0.272	17.983	1	0.000	-1.686	-.620
	[In10=3]	0a	.	.	0	.	.	.
	[In12=1]	-2.105	0.421	25.025	1	0.000	-2.930	-1.280
	[In12=2]	-1.280	0.291	19.366	1	0.000	-1.850	-.710
	[In12=3]	0a	.	.	0	.	.	.

Notes: Link function: Logit.

a. This parameter is set to zero because it is redundant.

2.2.2. The demographic profile of the consumer from the perspective of the orientation towards a green economy

The study was conducted on 280 respondents over 18 years of age, of which 120 were male (42.9%) and 160 were female (57.1%). Approximately 82% of the people included in the analysis come from urban areas, more than 85% of them are between 31 and 65 years old, and 37.1% declared an income higher than 7,500 lei.

Respondents' concern about the impact of packaging on the environment is reflected in their response, with more than 80% of the respondents interested in protecting the environment.

One of the key demographic factors in this study is *the age of the respondents*, the analysis of the correlation between this factor (In1) and the extent to which the respondents are interested in the *impact of packaging on the environment* – In9 (Figure no. 1), through the Goodman and Kruskal's test, showing a direct association, of moderate intensity $\gamma = 0.382$, statistically significant (*Approximate Sig.* = 0.000).

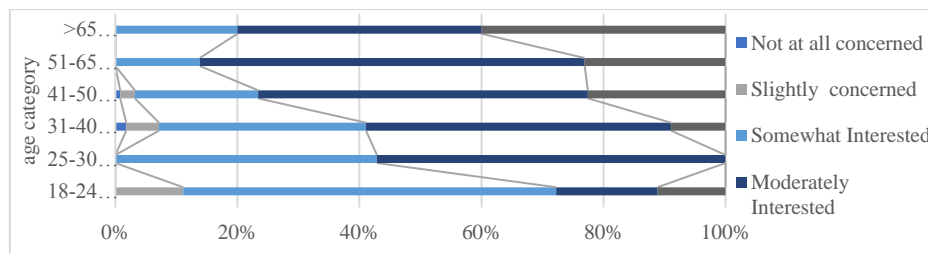


Figure no. 1. The association between age group and respondents' concern about the impact of packaging on the environment

There is the same type of link between the age of the respondents and the extent to which they practice sorting the resulting household waste (Table no. 1): direct, low-intensity and statistically significant ($\gamma = 0.268$, *Approximate Sig.* = 0.002).

In the case of the analysis of the association between the age and the knowledge of the respondents about the concept of the "3R" (Table no. 2), the null hypothesis of the independence between the variables is rejected (*Approximate Sig.* = 0.00), the coefficient γ having the value of 0.393, which means the fact that if we know the values of one of the variables, the errors of prediction of the values of the second variable are reduced by 39% (Rotariu et al., 2006; Coman, 2011).

The analysis of the dependencies between *the age of the respondents* (In1) and the variables that *quantify the extent to which they are concerned about the impact of packaging on the environment* (In9), their *familiarity with the concept of "3R"* (In12), and the application of these practices (In10) statistically direct and significant associations, but of moderate-low intensity. Thus, the #4 Hypothesis of the research is verified, the respondents' concern about protecting the quality of the environment being reflected in the frequency with which they practice the sorting of household waste in households (Figure no. 1).

The analysis of the dependencies between the respondents' studies and the involvement in environmental protection by mastering the concepts of green economy, as well as their application in practice, reflects the recent concerns of those involved in awareness of the need to develop a sustainable society.

If the influence of *the level of education* (In6) of the respondents regarding *the knowledge of the concept of the "3R"* (In12) is a direct one, of low intensity ($\gamma = 0.237$), but statistically significant (*Approximate Sig.* = 0.002), regarding the connection with the *degree of concern of the impact of packaging on the environment* (In9), there is no statistically significant dependence ($\gamma = 0.124$, *Approximate Sig.* = 0.125). Therefore, the analysis of the association between the educational level and the implementation of the concepts related to the green economy requires an in-depth approach from the perspective of the respondents' age, as awareness actions on the importance of environmental protection are primarily carried out among young people. This observation is also supported by the absence of an association between the *educational level* (In6) and the *sorting of household waste* by the respondents (In10).

The results of the analysis show that the level of education is not a significant factor influencing the concern of the respondents about environmental protection, a result that refutes #Hypothesis 5. As a future research approach, the authors propose to identify variables to be used in structuring the sample (e.g., *age*) and to focus research on the influence of the level of education on environmental protection among respondents aged up to 40 years. In this study, the number of respondents in this category does not meet the conditions that lead to results that can be validated from a statistical perspective.

Also, the analysis of identifying an association between *professional status* (In5) and the respondents' concern about the *impact of packaging on the environment* (In9), respectively, on *waste sorting* (In10) showed that there is no statistically significant correlation.

Regardless of the professional status, age, or level of education of the respondents, their concern about the impact of packaging on the environment (In9) is reflected in the behavior of households, by practicing household waste sorting (In10). Following the association analysis performed between these items, an association coefficient was obtained that shows

a direct correlation, of medium intensity and statistically significant ($\gamma = 0.521$, *Approximate Sig.* = 0.000). A similar result ($\gamma = 0.502$, *Approximate Sig.* = 0.000) was obtained in the case of the association between Item In9 and Item In12, result that confirms the research #Hypothesis 1.

A component of the development of environmentally friendly and sustainable food systems is the use of sustainable packaging for marketed products. One of the objectives of this study is the perception of consumers regarding the use of sustainable packaging and the way they are presented / highlighted.

With regard to *respondents' option to a certain concept of "sustainable food packaging"* (In14), most respondents (71.8%) identified as "sustainable packaging" that packaging that is made of biodegradable raw materials or that can be reused later for other purposes (Figure no. 2).

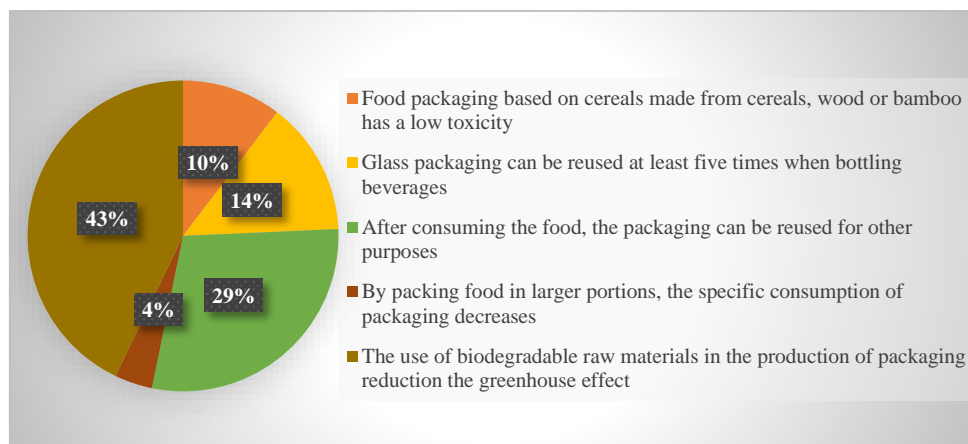


Figure no. 2. The structure of the respondents according to the option on the concept of "sustainable food packaging"

Regarding the *presentation of sustainably packaged products* (In15), approximately 70% of the respondents opted to place the food thus packaged on a separate shelf/section or to make sustainable packaging in the same color as the "parent – bin". Regarding the *way of marking, labeling* (In16), the majority of respondents opted for the application of a distinctive and easily recognizable graphic sign of sustainability, occupying at least a quarter of the label area (204 respondents, 73.2%).

The *main benefit identified* by respondents as a result of the use of sustainable food packaging (In 19) is the concern to live in a less polluted environment (81%). At the same time, the majority of respondents (86.5%) indicated that environmental protection and more efficient management of the planet's resources for the benefit of future generations were the main benefits of sustainable packaging compared to "classic" food packaging (In20), thus confirming research #Hypothesis 2.

As a *disadvantage of using sustainable packaging*, compared to "classic" food packaging (In21), respondents identified their higher cost (58%). This view is also argued by the distribution of respondents according to their willingness to pay extra for a sustainable packaged product: less than 1 lei 23.2%, between 1 and 2 lei 41.8%, between 3 and 5 lei

11.8% and only 6% of them are willing to pay in addition an amount higher than 5 lei. The fact that approximately 80% of the participants in this study are willing to pay extra for the products packaged in that way, highlighting the fact that, *in the purchasing decision, the possibility to live in a less polluted environment is the main benefit of sustainable food packaging*, in contrast to the conclusions of Ahmad et al. (2012), which stated that *"the willingness of consumers to pay higher prices for organic products is not correlated with ecological awareness"*.

The analysis of the answers to the question regarding the importance of the criteria proposed by the authors regarding the decision to buy a food product with sustainable packaging (In17) confirms the respondents' concern for the development of ecological and sustainable food systems, in order to protect the environment and increase quality of life (Table no. 3).

Table no. 3. Ranking the criteria used in the decision to purchase a sustainable packaged product according to the importance given by the respondents

Criteria in the decision to purchase a sustainable packaged product	The share of respondents who considered the criterion to be important and very important (%)
The concern for my health and that of my family	62
The price of the product on the shelf / discount offered by the merchant	51
The ratio between the volume of the package and the weight of the packaged food	39
Manufacturer's identity / product brand	31
The possibility to use the packaging for other purposes	21

An important criterion in the decision to buy a sustainable packaged product is the price of the product on the shelf / discount offered by the trader (Table no. 3), which shows that, in the opinion of the respondents, producers and traders must be involved in facilitating the transition to the use of sustainable packaging in various ways.

One of the green marketing strategies (Andronie et al., 2018; Affde, 2021) is the respondents' choice of the most appropriate way in which a food producer can inform consumers about sustainability. packaging (In23). Thus, the contribution of producers to the development of sustainable food systems can be achieved by highlighting the sustainability of packaging by marking or labeling the product without influencing, by other means, the consumer's purchasing decision. In this way, a double effect is obtained; on the one hand, the consumer awareness, and, on the other hand, the impact on the environment is minimal. Certainly, the buyer awareness process is also supported by the respondents' appreciation for the introduction of a chapter with notions about sustainability in the "Environmental Education" textbooks (In22), thus confirming # Hypothesis 3. Practically, at a difference of almost a decade from the study conducted by Dinu, Schileru and Atanase (2012), the level of declared awareness of the *"most significant effects"* of packaging on the environment has increased to more than 80%. Respondents also considered it appropriate to partner with public research institutes to develop laboratories for the design and testing of new types of sustainable food packaging materials.

The study is based on qualitative research that investigates the views of decision makers in the distribution area on the location strategy of new stores. The research results confirm the existence of differences between the criteria used by the location models and the practice of

distribution companies on the Romanian market, a result also supported by Cazabat et al. (2017) that confirms the existence of differences between the criteria used by the location models and the practice of large distribution companies on the Romanian market.

Regarding the involvement of government institutions in the development of organic and sustainable food systems, the majority of the respondents (62%) considered the state as the main actor (exclusively responsible or jointly and severally liable) for creating a legislative framework and implementing policies and strategies compatible with circular economy standards (In24). A similar opinion is supported by Cristina IOM et al. (2021), which considers that at national level, regional and local governments have an important role to play in promoting coherent sustainability in economic, social and environmental activities, and that development policies must consider and monitor the determinants of sustainable development.

The conclusions obtained from the analysis of the results of the regression model reflect the change in consumer behavior in relation to the concern about the impact of packaging on the environment. Thus, being involved in the process of environmental protection, as they become better acquainted with the concept of “3R” and apply the sorting of household waste, respondents’ concern about the impact of packaging on the environment diminishes.

Conclusions

The main objective of the article is to study the behavior of Romanian consumers in the context of the Green Pact, in relation to the degree of knowledge of the aspects related to packaging recycling and sustainability. Thus, the applied exploratory research aimed to obtain the necessary information to be able to assess and understand the importance of awareness and implementation of eco-innovation results, as well as understanding the motivation and attitude of respondents about the impact of packaging on the environment. Given the non-random sampling used in exploratory research, the main limitation of the study is the impossibility of generalizing the results obtained. This study, carried out on a relevant sample from the perspective of the studied topic, has a preliminary character and lays the foundations of a complex future research on a representative sample.

The analyzed data show that the age and knowledge related to recycling and the sustainability of packaging influence the respondents’ concern about the impact of packaging on the environment, with a direct association between them. The results of the analysis suggest a greater concern of people under the age of 40 for environmental protection through the use of sustainable packaging. In this regard, one of the future research directions is to validate this conclusion on the basis of a representative sample for this category of respondents.

The study participants’ concern about the impact of packaging on the environment is reflected in the practice of sorting household waste and in having adequate knowledge of the concept of “3Rs”, regardless of their professional status, age, or level of education. The last research hypothesis is thus refuted by the results of the analysis, the level of education not significantly influencing the respondents’ concern regarding the protection of the environment.

From the perspective of understanding the issues related to packaging sustainability, most of the respondents (71.8%) identified as “sustainable packaging” those packaging that are made of biodegradable raw materials or can be reused later for other purposes, identifying the

higher cost as the main disadvantage of their use.

Among the positive aspects identified after the analysis of the answers offered by the respondents are: the possibility to live in a less polluted environment, the concern for the development of ecological and sustainable food systems, and the increase of the quality of life. At the same time, the participants of the study appreciate that by introducing a chapter with notions about sustainability in the "Ecological Education" textbooks will improve consumer behavior in recognizing the need for environmental protection through the use of sustainable packaging.

The contribution of producers to the development of sustainable food systems can be achieved by highlighting the sustainability of the packaging, using graphics of the same color as the "parent bin" or applying a distinctive and easily recognizable graphic sign of sustainability, without influencing, by other means, the decision to consumer purchase. Traders can contribute to the marketing of packaged products in a sustainable way by placing packaged food on a separate shelf/section.

The role of government institutions in the development of environmentally friendly and sustainable food systems is considered essential by more than 60% of respondents, by creating a legislative framework and implementing policies and strategies compatible with the standards of the circular economy.

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Annex 1. Variables included in the analysis

Code	Variable name
In1	Age group
In2	Gender
In3	Group of monthly income
In4	Field of work
In5	Professional status
In6	Level of education
In7	Area of living
In8	Source of packaged food
In9	Degree of respondents' concern about the impact of packaging on the environment
In10	Occurrence household waste sorting
In11	Knowledge of the color codes for the selective packaging waste collection bins
In12	Knowledge of the concept of "3R" ("Reduce - Reuse – Recycle")
In13	Occurrence of reading the food label
In14	Option for the a certain concept of "sustainable food packaging"
In15	Option for a certain merchandising method for sustainably packaged food
In16	Option for a certain marking / labeling method for sustainably packaged food
In17	Decision criteria for purchasing a packaged food
In18	Readyness to pay an extra cost for a sustainable packaged product
In19	The main benefit of buying a sustainable packaged food product
In20	The main advantage of sustainable packaging compared to "classic" food packaging
In21	The main disadvantage of sustainable packaging compared to "classic" food packaging
In22	Degree of respondents' concern on advocating sustainability
In23	Ways to inform consumers about food packaging sustainability
In24	The role of the state in the field of sustainable food packaging